Primo-shield, Inc.
Oneida County
Utica, New York

Site Management Plan
NYSDEC Site No. 633027

NYSDEC State Superfund Standby Contract
(Work Assignment No. D009806-34)

Prepared for

New York State Department of Environmental Conservation
Division of Environmental Remediation
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May 2025

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May 2025

CERTIFICATION STATEMENT

I, Donald Conan, certify that I am currently a New York State registered Professional Engineer (P.E.) and that this Site Management Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and Green Remediation (DER-31).

05/01/2025

Donald Conan, P.E. Date



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LIST OF ACRONYMS AND ABBREVIATIONS

µg/L	Microgram(s) per liter
bgs	Below ground surface
COC	Contaminant of concern
Department	New York State Department of Environmental Conservation
DER	Division of Environmental Remediation
EA	EA Engineering and Geology, P.C.
EC	Engineering control
EPA	U.S. Environmental Protection Agency
FDR	Field data record
FEMA	Federal Emergency Management Administration
ft	Foot (feet)
FS	Feasibility Study
GWTS	Groundwater treatment system
HASP	Health and Safety Plan
IC	Institutional control
Inc.	Incorporated
LTM	Long-term monitoring
MACTEC	MACTEC Engineering and Consulting, P.C.
mg/L	Milligram(s) per liter
No.	Number
NYCRR	New York Codes, Rules, and Regulations
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
O&M	Operation and Maintenance
P.E.	Professional Engineer
POTW	Publicly-Owned Treatment Works
PRR	Periodic Review Report
PVC	Polyvinyl chloride
QAPP	Quality Assurance Project Plan
RAO	Remedial Action Objective
RI	Remedial Investigation

ROD	Record of Decision
RSO	Remedial System Optimization
SCG	Standards, Criteria, and Guidance Value
SCO	Soil Cleanup Objective
Site	Primo-shield, Inc. Site
SMP	Site Management Plan
VOC	Volatile organic compound

ES. EXECUTIVE SUMMARY

The following provides a summary of the controls implemented for the Primo-shield, Incorporated (Inc.) Site, as well as the inspections, monitoring, maintenance, and reporting activities required by this Site Management Plan (SMP).

Site Identification: New York State Department of Environmental Conservation
Site No. 633027
Primo-shield, Inc. Site
1212 Street Vincent Street
Utica, New York 13501

Institutional Controls	
Sitewide	1. The property may be used for: • "Industrial Use" as defined in New York State Department of Environmental Conservation (NYSDEC) Regulations Title 6of the New York Codes, Rules, and Regulations (NYCRR) Part 375 – 1.8(g)(2)(iii) and (iv).
	2. Institutional controls (ICs) for the Site are: • Access to the Site for maintaining the groundwater collection system must be allowed. • Groundwater extraction for anything other than monitoring is prohibited. • Animal production for human consumption is prohibited. • Vegetable gardens are prohibited on-Site unless planted in gardens where soil achieves the residential use soil cleanup objectives. • Site use is limited to industrial uses only. The Site may not be used for a less restrictive use without additional remediation and amendment of the SMP by the NYSDEC. Should any development of the Site be considered, soil and soil vapor sampling would be necessary to evaluate current conditions relative to soil standards, criteria, and guidance values. • Excavation on the property is prohibited without written permission from the NYSDEC. • Compliance by the Grantor and the Grantor's successors and assigns with this SMP. • Engineering controls (ECs) must be operated and maintained as specified in this SMP. • ECs on the Controlled Property must be inspected at a frequency and in a manner defined in the SMP. • Groundwater and other environmental or public health monitoring must be performed as defined in this SMP. • Data and information pertinent to SMP for the Controlled Property must be reported at the frequency and in a manner defined in this SMP. • On-site environmental monitoring devices, including but not limited to groundwater monitoring wells, must be protected and replaced as necessary to ensure the devices function in the manner specified in this SMP. • Future activities on the Site that will disturb remaining contaminated material are prohibited unless they are conducted in accordance with the SMP. • NYSDEC retains the right to access the Site in order to evaluate the continued maintenance of controls.
	3. ECs must be inspected at a frequency and in a manner defined in the SMP.
Engineering Controls	
Sitewide	1. Groundwater Collection System

Site Management Activities	Frequency
Monitoring	
1. Monitoring well groundwater sampling and analysis from seven monitoring wells	Every 15 months
Maintenance	
1. Mowing	Annually
2. Fence repair	As needed
3. Building structures	As needed
4. Groundwater collection trenches	As needed
5. Monitoring wells	As needed
Inspections	
1. Fencing, gates, and Site access	Semi-Annually
2. Monitoring well integrity and water levels from 7 wells	Semi Annually
3. Groundwater treatment system building and piping	Semi-Annually
Reporting	
1. Inspection Report	Semi-Annually
2. Long-term Monitoring Technical Memo	Following groundwater sampling events
3. PRR	Every 5 years

Further descriptions of the above requirements are provided in detail in the latter sections of this SMP.

1. INTRODUCTION

1.1 GENERAL

This Site Management Plan (SMP) is a required element of the remedial program for the Primo-shield, Incorporated (Inc.) Site (Site) located in Utica, New York. **Figure 1-1** presents the site location. The Site is currently in the New York State (NYS) Inactive Hazardous Waste Disposal Site Remedial Program, Site Number (No.) 633027, which is administered by New York State Department of Environmental Conservation (NYSDEC or Department).

The City of Utica entered into an Order on Consent in December 1989 with the NYSDEC to remediate the Site. **Figure 1-2** provides the site location and boundaries. **Appendix A** contains the site survey map.

After completion of the remedial work, some contamination was left at this Site, which is hereafter referred to as "remaining contamination." Institutional controls (ICs) and engineering controls (ECs) have been incorporated into the site remedy to control exposure to remaining contamination to ensure protection of public health and the environment. Decision Documents can be found in **Appendix B**.

This SMP was prepared to manage remaining contamination at the Site. This plan has been approved by NYSDEC, and compliance with this plan and with ECs and ICs at the Site is required. This SMP may only be revised with the approval of the NYSDEC.

It is important to note that:

- This SMP details the site-specific implementation procedures that are required by the Environmental Easement. Failure to properly implement the SMP is a violation of the Environmental Easement, which is grounds for revocation of the Certificate of Completion (COC); and

- Failure to comply with this SMP is also a violation of Environmental Conservation Law, 6 NYCRR Part 375; and thereby, subject to applicable penalties (NYS 2006).

All reports associated with the Site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in NYS. A list of contacts for persons involved with the Site is provided in **Table 1-1** and **Appendix C** of this SMP.

This SMP was prepared by EA Engineering and Geology, P.C. (EA), on behalf of the NYSDEC, in accordance with the requirements of the NYSDEC Division of Environmental Remediation (DER)-10 Technical Guidance for Site Investigation and Remediation, dated May 2010, and the guidelines provided by the NYSDEC. This SMP addresses the means for implementing the ICs and/or ECs that are required for the Site.

1.2 REVISIONS AND ALTERATIONS

Revisions and alterations to this plan will be proposed in writing to the NYSDEC's Project Manager. The NYSDEC can also make changes to the SMP or request revisions from the remedial party. Revisions will be necessary upon, but not limited to, the following occurring: a change in media monitoring requirements, upgrades to or shutdown of a remedial system, post-remedial removal of contaminated sediment or soil, or other significant change to the site conditions. All approved alterations must conform with Article 145 Section 7209 of the Education Law regarding the application of professional seals and alterations. For example, any changes to as-built drawing must be stamped by a NYS Professional Engineer (P.E.). The NYSDEC Project Manager will provide a notice of any approved changes to the SMP and append these notices to the SMP that is retained in its files.

1.3 NOTIFICATIONS

Notifications will be submitted by the property owner to the NYSDEC, as needed, in accordance with NYSDEC's DER-10 for the following reasons:

- 60-day advance notice of any proposed changes in site use that are required under the terms of the Order on Consent, 6 NYCRR Part 375 and/or Environmental Conservation Law.

- 7-day advance notice of any field activity associated with the remedial program.

- 15-day advance notice of any proposed ground-intrusive activity pursuant to the Excavation Work Plan. If the ground-intrusive activity qualifies as a change of use as defined in 6 NYCRR Part 375, the above mentioned 60-day advance notice is also required.

- Notice within 48 hours of any damage or defect to the foundation, structures or EC that reduces or has the potential to reduce the effectiveness of an EC, and likewise, any action to be taken to mitigate the damage or defect.

- Notice within 48 hours of any non-routine maintenance activities.

- Verbal notice by noon of the following day of any emergency, such as a fire, flood, or earthquake that reduces or has the potential to reduce the effectiveness of ECs in place at the Site, with written confirmation within 7 days that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.

- Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action submitted to the NYSDEC within 45 days describing and documenting actions taken to restore the effectiveness of the ECs.

Any change in the ownership of the Site or the responsibility for implementing this SMP will include the following notifications:

- At least 60 days prior to the change, the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective purchaser/remedial party has been provided with a copy of the Order on Consent, and all approved work plans and reports, including this SMP.

- Within 15 days after the transfer of all or part of the site, the new owner's name, contact representative, and contact information will be confirmed in writing to the NYSDEC.

Table 1-1 includes contact information for the above notifications. The information in this table will be updated as necessary to provide accurate contact information. A full listing of site-related contact information is provided in **Appendix C**.

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2. SUMMARY OF PREVIOUS INVESTIGATIONS AND REMEDIAL ACTIONS

2.1 SITE LOCATION AND DESCRIPTION

The Site consists of two properties totaling approximately 0.82 acres and situated between Conkling Avenue and St. Vincent Street in Utica, New York (**Figure 1-2**). The parcels are located at 1223 Conkling Avenue (Tax Map Parcel No. 318.083-2-41) and 1212 St. Vincent Street (Tax Map Parcel No. 318.083-2-33) (**Appendix D**). The two parcels total approximately 0.82 acres and are enclosed by a chain-link fence. Additional contiguous site property encompassing 1.58 acres was historically investigated and deemed not to need remediation; and therefore, is not subject to this SMP.

The owner of the fenced site parcels at the time of issuance of this SMP is the City of Utica.

2.2 PHYSICAL SETTING

2.2.1 Land Use

The Site is currently a vacant, grass-covered, open area which is mowed by the city of Utica. Site features include fenced lawn and a small concrete block building used for the treatment system. The site entrance is from St. Vincent Street. Current zoning for the Site is primarily commercial land with a small piece of residential property within the fenced area.

The Site is located in a mixed commercial/residential area of Utica in Oneida County. The properties adjoining the Site, and in the neighborhood surrounding the Site, are primarily residential, with some commercial properties. The St. Agnes Roman Catholic cemetery is located immediately southeast of the Site. The Mohawk River is located downgradient, approximately 1- to 1.5-miles to the north of the Site.

2.2.2 Geology

The geology in the vicinity of the Site is characterized by a sequence of fill and glacial till deposits overlying Ordovician age shale and limestone bedrock. A geologic cross section is not available for this Site.

The fill thickness as based on borings advanced during previous investigations can be up to ten ft thick in some areas but is generally thinner and variable across the Site. The glacial till deposits are a dense material composed of a fine-grained matrix of clay, silt, and fine sand with variable amounts of course-grained material including medium to coarse sand and gravel. The till becomes very dense at approximately 25 feet (ft) below ground surface (bgs).

The Geologic Map of New York (Davis 1970) indicates bedrock at the Site is the Utica Shale, which is described as a gray to dark gray to black calcareous organic rich shale with some interbedded limestone layers containing less organic material. Bedrock is estimated to be 34 to 39 ft bgs based on the refusal depth for borings advanced at the Site and depths of casing for bedrock wells installed at the Site during previous investigations (including hollow stem auger boring P-102 and bedrock wells P-106D and P-107D; well construction logs are provided in **Appendix E**.

Logs of the bedrock borings completed during previous investigations were not available to confirm the bedrock materials encountered on-site.

2.2.3 Hydrogeology

The Site is located in a groundwater recharge zone to the general watershed of the Mohawk River. Neither overburden groundwater nor the shallow bedrock groundwater in the vicinity of the Site is used as a water supply. Residences and businesses in the area are supplied with municipal water.

Historical groundwater elevation data are provided in Table 2-1. Groundwater at the Site has been encountered in the overburden wells from 1 to 5 ft bgs and in the bedrock wells from 24 to 26 ft bgs, indicating strong downward gradients from overburden to bedrock. However, shallow surficial overburden strata (generally less than 20 ft in total thickness) are underlain by approximately 35 ft or more of dense silt/clay rich glacial till, which limits the vertical migration of groundwater at the Site. Horizontal groundwater gradients are interpreted to flow to the northeast in both the overburden and bedrock. A groundwater contour map is shown in Figure 2-1. Historical groundwater elevation data is provided in **Table 2-1**. Groundwater monitoring well construction logs are provided in **Appendix E**.

2.3 INVESTIGATION AND REMEDIAL HISTORY

Primo-shield was a metal electroplating facility that operated from the early 1970s until it was abandoned in August 1985. The property consisted of office and factory buildings, a small laboratory, and a storage trailer. An adjacent gravel parking lot not owned by Primo-shield was included in the original Site. When the facility was abandoned in 1985, a number of drums and open vats (some of which contained acids, cyanide solutions and spent plating solutions) were left scattered over the entire property. The City of Utica subsequently assumed ownership of the property due to non-payment of taxes.

The following narrative provides a remedial history timeline and a brief summary of the available project records to document key investigative and remedial milestones for the Site. Investigation and remedial reports for the Site are listed below. Full titles for each of the reports referenced below are provided in Section 8 – References.

- Remedial Investigation (RI) (O'Brien & Gere Engineers Inc. and Harza Northeast Inc. 1994)
- Feasibility Study (FS) (O'Brien & Gere Engineers Inc. and Harza Northeast Inc. 1995)
- ROD (NYSDEC 1995)
- Post Remediation Report (NYSDEC 1999a)
- Soil Vapor Intrusion Evaluation Determination (New York State Department of Health [NYSDOH] 2009)

2.3.1 Site Investigation History

Following an initial site reconnaissance and sampling effort by NYSDEC in December 1985, laboratory sample results obtained indicated a very high risk to the public from the Site. On 12 March 1986, the NYSDEC formally petitioned the U.S. Environmental Protection Agency (EPA) Region II Office to perform an Emergency Response and Removal Action at the Site, including but not limited to, the cleanup and removal of the surficial and containerized hazardous wastes and the installation of a fence and gate system to resecure the Site. In 1986 and 1987, EPA removed all containerized wastes and disposed of the wastes at approved disposal locations. All structures on the property were demolished and removed. In November 1987, EPA emergency response and cleanup actions at the Site were completed and jurisdiction for further remedial action at the Site was returned to NYSDEC.

In December of 1989, NYSDEC negotiated a Title 3 Consent Order and a State Assistance contract with the City for an RI/FS. The RI was conducted from September/October 1992 through October 1993 to define the nature and extent of contamination resulting from previous activities at the Site (O'Brien & Gere Engineers Inc. and Harza Northeast Inc. 1994). The following activities were conducted as part of or in support of the RI:

- Performed a baseline survey and established a sampling grid.
- Performed a soil vapor survey and geophysical survey, installed groundwater monitoring wells, and completed subsurface soil and groundwater sampling.
- Completed surface soil sampling and analysis.
- Performed sediment sampling (manholes, catch basins, and building sumps); performed residential basement sampling (sump water and sediment).
- Sampled building structural materials.
- Performed a Human Health Risk Assessment.
- Completed a Fish and Wildlife Impact Analysis.

Sample results from the RI were compared to Standards, Criteria, and Guidance Values (SCGs) revealing that certain areas and media at the Site required remediation based on the potential for public health and environmental exposure routes.

Site-related contaminants of concern (COCs) identified in environmental media included metals and volatile organic compounds (VOCs). COCs in surface soil included metals (cadmium, chromium, nickel and cyanide), with concentrations exceeding the site clean-up criteria generally limited to the top 12 inches. COCs in groundwater included 1,1,1-trichloroethane, 1,1-dichloroethane, and chromium. At the time of the RI, the shallow groundwater plume at the Site was estimated at ½ acre in size with a 6-ft saturated thickness beginning at 4 ft bgs. Both the surficial soil contamination and the shallow groundwater contamination extended a short distance

to the north from the Site onto the adjoining property. Water and sediment samples collected from the sumps in the basement of the adjacent residence indicated elevated concentrations of both VOCs and inorganic compounds.

2.3.2 Site Remediation History

Two Interim Remedial Measures[1] were implemented at the Site prior to completion of the RI/FS as follows:

- On 15 June 1993, an interim structural brace (tubular metal scaffolding system) was installed in the center of the main production building to transfer loading from an unbraced vertical column which appeared to be close to failure.

- On 19 April 1994. a site surficial cleanup was conducted at the Site. Scrap metal and scrap lumber were collected and stockpiled for later recycling and/or disposal. Brush was cleared and stockpiled, and miscellaneous debris was collected and stockpiled for later off-site disposal.

The ROD was signed on 22 March 1995 and called for the following (NYSDEC 1995):

- Excavation and disposal of hazardous and non-hazardous soils

- Building demolition

- Groundwater collection trench installation

- Operation, maintenance, and monitoring of a groundwater collection system, the purpose of which was to intercept, collect, and discharge contaminated groundwater.

The Site was assigned by NYSDEC as a State Superfund project in November of 1996 because the City of Utica had inadequate funds to complete the remediation. Since entering the State Superfund program, the NYSDEC has completed the remediation, including building demolition and soil removal in 1998, and assumed responsibility for Operations and Maintenance (O&M) of the treatment system that was installed in 1998. The following actions were completed at the Site between March and December 1998 (NYSDEC 1999a):

- Removal of hazardous materials from inside the former production and laboratory buildings and placement into 20 cubic yard roll-off containers for off-site disposal prior to performing demolition work.

- Demolition of the former production, laboratory and office buildings, which were disposed off-site at the Seneca Meadows Landfill as asbestos-containing waste.

[1] Interim Remedial Measures are conducted at sites when sources of contamination or exposure pathways can be effectively addressed before completion of the RI/FS.

- Excavation of non-hazardous soils and off-site disposal at Seneca Meadows Landfill.

- Excavation of hazardous soils and off-site disposal at Chemical Waste Management in Model City, New York.

- Pumping liquids from two underground storage tanks into a vacuum truck, cleaning both, and transporting the liquids and the tanks for proper disposal off-site.

- Constructing three cut-off trenches, a central collection manhole and installation of a submersible pump to intercept and collect the plume of contaminated groundwater.

The originally installed groundwater treatment system was designed to intercept and collect the plume of contaminated groundwater and treat the water by carbon filtration, with effluent discharged to the Oneida County Sewer System Publicly Owned Treatment Works (POTW). The pump and treat system worked effectively, the groundwater contaminant levels dropped to below discharge criteria, and the system was modified in 2001 to bypass the carbon treatment prior to discharge to the POTW. The groundwater treatment system was considered no longer necessary for containment of site contaminants of concern and was shutdown 20 July 2020.

Site management consists of the following:

- Semi-annual site inspections
- Long-term monitoring (LTM) consisting of groundwater monitoring every 15 months

Existing wells are monitored to evaluate COC concentrations (i.e., cadmium, chromium, lead, nickel, cyanide, and VOCs) in groundwater. Eleven groundwater monitoring wells installed at and near the Site during the RI in the mid-1990s were initially included in the LTM program; however, evaluation of the monitoring well network in 2015 determined that four wells were not needed and were decommissioned in October 2016 (MACTEC Engineering and Consulting, P.C. [MACTEC] 2016). Groundwater analytical results are compared to the site cleanup goals (NYS Class GA Standards, 6 NYCRR Parts 700–705).

2.4 REMEDIAL ACTION OBJECTIVES

The Remedial Action Objectives (RAOs) for the Site as listed in the ROD dated March 1995 are as follows:

- Reduce, control, or eliminate the contamination present within soil on-site.

- Eliminate the threat to surface water by eliminating future contaminated surface water run-off from the contaminated soil on-site, and potential future discharge from site sewer lines to the Oneida County Sewer System.

- Eliminate the potential for direct human contact with the contaminated soil on-site.

- Mitigate the impacts of contaminated groundwater to the environment and to nearby residents.

- Prevent to the extent possible migration of contaminants in the soil to groundwater.

- Provide for attainment of SCGs for groundwater quality at the limits of the area of concern.

- Remediate the Site and adjoining property to provide for future delisting and unrestricted use.

The ROD defined cleanup criteria for the various media at the Site (surface soil, groundwater, sump sediments/solids, and basement seepage, sump water, and groundwater) (NYSDEC 1995). The shallow soil (12 inches) cleanup goals defined in the ROD for cadmium, chromium, and lead are less stringent than the current residential and/or commercial Part 375 SCOs (**Table 2-2**). Groundwater cleanup goals are Class GA standards, as presented in **Table 2-3**.

2.5 REMAINING CONTAMINATION

Remediation has been completed for sump and basement-related contamination, leaving groundwater and soil as the remaining media of concern.

Based on a review of available historical data, the following RAOs have not been achieved:

- Provide for attainment of SCGs for groundwater quality at the limits of the area of concern.

- Remediate the Site and adjoining property to provide for future delisting and unrestricted use.

The known remaining contamination at the Site consists of contaminated groundwater, and possibly contaminated soil, above Part 375 (NYS 2006) restricted residential levels.

2.5.1 Soil

Soil contamination exceeding SCGs may remain at the Site. Based on available documentation, post-remediation sampling was not conducted to confirm concentrations of Site contaminants left in on-site soil. The Post Remediation Report (NYSDEC 1999) documents pre-remediation sample results, which were used to determine the extent of the soil removal during the soil excavation in 1998. Approximately 152 Tons of hazardous soil was removed from the site and 2,118 CY of nonhazardous soil was removed from the Site. Sample results indicated some soil with concentrations of COCs exceeding the current SCOs for restricted residential use may not have been removed during remedial activities conducted in 1998.

2.5.2 Groundwater

Groundwater sample results from the LTM sampling events show VOCs and metals are present at concentrations exceeding class GA standards. Sampling locations are shown on **Figure 1-2**. Results above class GA standards are presented on **Figure 2-2**. **Table 2-3** presents the September 2022 groundwater results. Historical groundwater results for site COCs can be found in **Table 2-4**. The following are the contaminants that were detected at concentrations exceeding class GA standards in 2022:

- Trichloroethene, which exceeded the Class GA standard of 5 micrograms per liter (µg/L) at P-107S (12 µg/L)

- Iron, which exceeded the Class GA standard of 0.3 milligrams per liter (mg/L) at GW-01 (1.8 mg/L), P-106D (0.62 mg/L), P-107D (3.2 mg/L), and P-107S (2.1 mg/L)

- Manganese, which exceeded the Class GA standard of 0.3 mg/L at GW-01 (0.46 mg/L) and P-105 (0.42 mg/L)

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3. INSTITUTIONAL AND ENGINEERING CONTROL PLAN

3.1 GENERAL

Since remaining contamination exists at the Site, ICs and ECs are required to protect human health and the environment. This IC/EC Plan describes the procedures for the implementation and management of all IC/ECs at the Site. The IC/EC Plan is one component of the SMP and is subject to revision by the NYSDEC Project Manager.

This plan provides:

- A description of all IC/ECs on the Site.
- The basic implementation and intended role of each IC/EC.
- A description of the key components of the ICs.
- A description of features that should be evaluated during each required inspection and periodic review.
- A description of plans and procedures to be followed for implementation of IC/ECs, such as the implementation of the Excavation Work Plan (**Appendix F**) for the proper handling of remaining contamination that may be disturbed during maintenance or redevelopment work on the Site.
- Any other provisions necessary to identify or establish methods for implementing the IC/ECs required by the site remedy, as determined by the NYSDEC Project Manager.
- A description of the reporting requirements for these controls.

3.2 INSTITUTIONAL CONTROLS

A series of ICs are required to: (1) implement, maintain, and monitor EC systems (groundwater collection system); (2) prevent future exposure to remaining contamination; and (3) limit the use and development of the Site to commercial uses only. Adherence to these ICs on the Site will be implemented under this SMP. ICs may not be discontinued without an amendment to or extinguishment of the SMP. These ICs are:

- Access to the Site for maintaining the groundwater collection system must be allowed.
- Groundwater extraction for anything other than plume control and monitoring is prohibited.
- Animal production for human consumption is prohibited.

- Vegetable gardens are prohibited on-Site unless planted in gardens where soil achieves the residential use SCOs.

- Site use is limited to commercial use only. The Site may not be used for a less restrictive use without additional remediation and amendment of the SMP by the NYSDEC. Should development of the Site be considered, soil and soil vapor sampling would be necessary to evaluate current conditions relative to soil SCGs.

- Excavation on the property is prohibited without written permission from the NYSDEC.

- Compliance with this SMP by the Grantor, the Grantor's successors and assigns is required.

- ECs must be operated and maintained as specified in this SMP.

- ECs on the Site must be inspected at a frequency and in a manner defined in the SMP.

- Groundwater and other environmental monitoring must be performed as defined in this SMP.

- Data and information pertinent to site management for the Site must be reported at the frequency and in a manner defined in this SMP.

- On-site environmental monitoring devices, including but not limited to groundwater monitoring wells, must be protected and replaced as necessary to ensure the devices function in the manner specified in this SMP.

- Future activities on the Site that will disturb remaining contaminated material are prohibited unless they are conducted in accordance with the SMP.

- NYSDEC retains the right to access the Site in order to evaluate the continued maintenance of controls.

3.3 ENGINEERING CONTROLS

EC systems at the Site include the groundwater collection system (formerly the groundwater treatment system (GWTS), Site access controls, and groundwater monitoring wells. These systems are described in more detail below. **Figure 1-2** shows the location of the ECs for the Site.

3.3.1 Engineering Control Systems

A GWTS was installed at the Site in 1998 to remediate groundwater contamination to the Division of Water Technical and Operational Guidance Series (1.1.1 Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations) (NYSDEC 1998). The system previously collected groundwater via gravity feed to an on-site sump. Once the water reached the high-water float, the pump was activated, and water was discharged to the POTW. Procedures for the inspection and maintenance of the collection system are provided in the O&M Plan included in

Section 5 of this SMP. Inspection forms for the groundwater collection system are located in **Appendix G**. As-built drawings, signed and sealed by a P.E., are included in **Appendix H** – O&M Manual. The system was discontinued from use at request of NYSDEC and was shut down on 2 July 2020 by MATEC. The building and ground water treatment system are still currently intact.

Unauthorized access to the Site is restricted by 6-ft chain-link fence with locked gates. Procedures for the inspection and maintenance of the fencing are provided in Section 4 of this SMP.

3.3.2 Criteria for Completion of Remediation/Termination of Remedial Systems

Generally, the remedial processes will be considered completed when monitoring indicates that the remedy has achieved the RAOs identified by the decision document. The framework for determining when remedial processes are complete is provided in Section 6.4 of NYSDEC DER-10 (NYSDEC 2010). Unless waived by the NYSDEC, confirmation samples of applicable environmental media are required before terminating any remedial actions at the site. Confirmation samples require Category B deliverables and a Data Usability Summary Report.

Groundwater monitoring activities will continue on a 15-month schedule, as determined by the NYSDEC, until residual groundwater concentrations are found to: (1) reach levels that are consistently below the site SCGs as appropriate; (2) have become asymptotic to a low level over an extended period of time as accepted by the NYSDEC; or (3) the NYSDEC has determined that the groundwater collection system has reached the limit of its effectiveness. This assessment will be based in part on post-remediation contaminant levels in groundwater collected from monitoring wells located throughout the Site. Systems will remain in place and operational until permission to discontinue their use is granted in writing by the NYSDEC.

As discussed below, the NYSDEC may approve termination of a groundwater monitoring program. When a remedial party receives this approval, the remedial party will decommission all site-related monitoring, injection and recovery wells as per the NYSDEC CP-43 policy.

The remedial party will also conduct any needed site restoration activities, such as asphalt patching and decommissioning treatment system equipment. In addition, the remedial party will conduct any necessary restoration of vegetation coverage, trees and wetlands, and will comply with NYSDEC and United States Army Corps of Engineers regulations and guidance. Also, the remedial party will ensure that no ongoing erosion is occurring on the site.

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4. MONITORING AND SAMPLING PLAN

4.1 GENERAL

This Monitoring and Sampling Plan describes the measures for evaluating the overall performance and effectiveness of the remedy. This Monitoring and Sampling Plan may only be revised with the approval of the NYSDEC Project Manager. Details regarding the sampling procedures, data quality usability objectives, analytical methods, etc. for all samples collected as part of site management for the Site are included in the approved Quality Assurance Project Plan (QAPP)..

This Monitoring and Sampling Plan describes the methods to be used for:

- Sampling and analysis of groundwater and collection system effluent
- Assessing compliance with applicable NYSDEC SCGs, particularly groundwater standards
- Evaluating site information periodically to confirm that the remedy continues to be effective in protecting public health and the environment

To adequately address these issues, this Monitoring and Sampling Plan provides information on:

- Sampling locations, protocol, and frequency
- Information on all designated monitoring systems
- Analytical sampling program requirements
- Inspection and maintenance requirements for monitoring wells
- Monitoring well decommissioning procedures
- Semi-annual inspection and periodic certification

Reporting requirements are provided in Section 7 of this SMP.

4.2 SITEWIDE INSPECTION

Site-wide inspections will be performed monthly or at a minimum of once per year. These periodic inspections must be conducted when the ground surface is visible (i.e. no snow cover). Site-wide inspections will be performed by a qualified environmental professional as defined in 6 NYCRR Part 375, a PE who is licensed and registered in NYS, or a qualified person who directly reports to a PE who is licensed and registered in NYS (depending on the need to evaluate engineering controls). Modification to the frequency or duration of the inspections will require approval from the NYSDEC project manager. Site-wide inspections will also be performed after all severe weather conditions that may affect ECs or monitoring devices. During these inspections, an

inspection form will be completed (**Appendix G**). The form will compile sufficient information to assess the following:

- Compliance with all ICs, including site usage
- An evaluation of the condition and continued effectiveness of ECs
- General site conditions at the time of the inspection
- Whether stormwater management systems, such as basins and outfalls, are working as designed
- The site management activities being conducted including, where appropriate, confirmation sampling and a health and safety inspection
- Confirm that site records are up to date
- Site security – fencing, gates, and site access (semi-annual)
- Performance of the collection system (semi-annual)
- Monitoring wells (15-month interval during LTM sampling events)

Inspections of all remedial components installed at the site will be conducted. A comprehensive site-wide inspection will be conducted and documented according to the SMP schedule, regardless of the frequency of the Periodic Review Report. Inspections will be conducted using the treatment system Inspection Form included in **Appendix G**. Inspection elements and objectives are listed below. Reporting requirements are outlined in Section 7. The inspections will determine and document the following:

- Whether ECs continue to perform as designed
- If these controls continue to be protective of human health and the environment
- Compliance with requirements of this SMP
- Achievement of remedial performance criteria
- If site records are complete and up to date

Visual observation and maintenance of the perimeter fence will be completed semi-annually to evaluate and document the conditions including:

- Breaches in the fence
- Condition of the gates and locks

- Vegetation growing on or near the fence that could cause damage (vegetation that can be removed with hand tools will be cut back during inspections)

Observation and maintenance of the groundwater collection system will be completed semi-annually to evaluate and document the system conditions including:

- General Building Condition:

  — Check the pump operating condition (auto/off/hand/alarm) to determine if the pump is operating, cycling or malfunctioning.

  — Check the system piping for leaks or breaks and repair if possible. Repairs requiring significant time or expense will be noted on the inspection check list and included in the semi-annual report.

  — Check building heater (during cold weather) for operating condition.

  — Check building vents for blockage.

  — Check building fire extinguisher charge.

Inspections will also be performed in the event of an emergency. If an emergency, such as a natural disaster or an unforeseen failure of any of the ECs occurs that reduces or has the potential to reduce the effectiveness of ECs in place at the Site, verbal notice to the NYSDEC Project Manager must be given by noon of the following day. In addition, an inspection of the site will be conducted within 5 days of the event to verify the effectiveness of the IC/ECs implemented at the site by a qualified environmental professional, as defined in 6 NYCCR Part 375. Written confirmation must be provided to the NYSDEC Project Manager within 7 days of the event that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public. The remedial party will submit follow-up status reports to the NYSDEC within 45 days of the event on actions taken to respond to any emergency event requiring ongoing responsive action, describing and documenting actions taken to restore the effectiveness of the ECs.

4.3 POST-REMEDIATION MEDIA MONITORING AND SAMPLING

Groundwater samples will be collected to evaluate the effectiveness of the remedy. Sampling locations, required analytical parameters, and schedule are provided in **Table 4-1** – Post Remediation Sampling Requirements and Schedule. Modification to the frequency or sampling requirements will require approval from the NYSDEC Project Manager.

Detailed sample collection and analytical procedures and protocols are provided in the approved QAPP. General field activities, including health and safety and waste management, are described in Section 4.5.

4.3.1 Soil and Sediment Sampling

Soil sampling and sediment sampling are not currently conducted at the Site.

4.3.2 Groundwater Sampling

The network of monitoring wells has been installed to monitor upgradient, on-site, and downgradient groundwater conditions at the Site. Groundwater monitoring will be conducted at a network of sixon-site (P-103, P-105, P-106S, P-106D, P-107S, P-107D) and one off-site wells (GW-01). Monitoring well network is illustrated in **Figure 2-1**. The well network has been designed based on the sample rationale provided in **Table 4-1**. Well construction details are presented in **Table 2-1**. Well construction logs are provided in **Appendix E**.

Groundwater monitoring will be performed every 15 months to monitor the contaminant concentrations in the vicinity of the Site, monitor long-term trends in concentrations of Site-related contaminants in groundwater, and evaluate the effectiveness of the remedial actions. Modification to the frequency or sampling requirements will require approval from the NYSDEC Project Manager.

The performance of the remedy will be assessed using the following measures:

- Groundwater quality
- Changes in contaminant plume configuration
- Potential for migration off-site

All sampling activities will be recorded in a field book and associated sampling log as provided in **Appendix G** – Site Management Forms. Other observations (e.g., groundwater monitoring well integrity) will be noted on the sampling log. The sampling log will serve as the inspection form for the monitoring network.

The sampling frequency may only be modified with the approval of the NYSDEC project manager. This SMP will be modified to reflect changes in sampling plans approved by the NYSDEC project manager.

Deliverables for the groundwater monitoring program are specified in Section 7 – Reporting Requirements.

Groundwater Elevation Survey

A synoptic round of groundwater elevation measurements will be collected every 15 months during the groundwater sampling event to evaluate trends in groundwater levels. Groundwater elevations will be measured using an electronic water level meter to the surveyed top of riser and referenced to mean sea level. Groundwater levels will be measured to the nearest 0.01 ft and recorded in the field book and/or field data records (FDRs). FDRs are presented in **Appendix G**. Results will be used to evaluate groundwater flow direction.

Monitoring Well Inventory and Repair

A monitoring well inspection will be completed to document the condition and physical details of the monitoring wells. Data will be recorded on monitoring well inspection forms provided in **Appendix G**. Damages or deficiencies noted during the well inventory and recommendations for repairs will be included in the Annual Reports and the Periodic Review Report (PRR).

If biofouling or silt accumulation occurs in the on-site and/or off-site monitoring wells, the wells will be physically agitated/surged and redeveloped. Additionally, monitoring wells will be properly decommissioned and replaced if an event renders the wells unusable.

Repairs and/or replacement of wells in the monitoring well network will be performed based on assessments of structural integrity and overall performance.

The NYSDEC project manager will be notified prior to any repair or decommissioning of any monitoring well for the purpose of replacement, and the repair or decommissioning and replacement process will be documented in the subsequent PRR. Well decommissioning without replacement will be done only with the prior approval of the NYSDEC project manager. Well abandonment will be performed in accordance with NYSDEC's guidance entitled "CP-43: Groundwater Monitoring Well Decommissioning Procedures." Monitoring wells that are decommissioned because they have been rendered unusable will be replaced in kind in the nearest available location, unless otherwise approved by the NYSDEC project manager.

Groundwater Sampling

Groundwater samples will be collected from each well using low-flow sampling procedures for analysis of VOCs and target analyte list metals as presented in **Table 4-1**. During each groundwater sampling event, samples will be analyzed by an approved Environmental Laboratory Accreditation Program-certified laboratory in accordance with NYSDEC Analytical Services Protocol. Additional details regarding monitoring and sampling protocols are provided in the approved QAPP.

If biofouling or silt accumulation occurs in the monitoring wells, they will be physically agitated/surged and redeveloped. Additionally, monitoring wells will be properly decommissioned and replaced if the wells become unusable.

Groundwater monitoring wells that are no longer functioning will be decommissioned or replaced on an as-needed basis. The NYSDEC will be notified prior to repair or decommissioning of groundwater monitoring wells for the purpose of replacement, and the repair or decommissioning and replacement process will be documented in the subsequent PRR. Well decommissioning without replacement will be conducted only with the prior approval of the NYSDEC. Well abandonment will be performed in accordance with the NYSDEC's Groundwater Monitoring Well Decommissioning Procedures. Groundwater monitoring wells that are decommissioned because they have been rendered unusable will be reinstalled in the nearest available location, unless otherwise approved by the NYSDEC.

4.4 GENERAL FIELD ACTIVITIES

General field activities supporting data collection include health and safety, decontamination, and investigation-derived waste disposal. Prior to implementing an LTM field event, a field team orientation meeting will be held with involved personnel to familiarize field workers with site history, health and safety requirements, equipment calibration procedures, and other investigation methods and procedures.

4.4.1 Health and Safety

The Site-Specific Health and Safety Plan (HASP) is provided as **Appendix I** to this document. SMP fieldwork will be conducted in Level D personal protection. Specific investigation activities and required level of personal protection are set forth in the Site-Specific HASP. Criteria for upgrading or downgrading the specified level of protection are also provided in the Site-Specific HASP. Should site conditions pose a threat to those present on-site, and/or should site conditions warrant an upgrade from Level D, as defined by the Site-Specific HASP, work will stop, and the situation will be re-evaluated by the NYSDEC and the subcontractor performing the work.

4.4.2 Decontamination and Investigation Derived Wastes

Sampling methods and equipment for the LTM have been chosen to minimize decontamination requirements, mitigating potential for cross-contamination. Disposable sampling equipment will be used as much as practical to minimize decontamination time and water disposal. Non-disposable sampling equipment will be decontaminated before and after the collection of each subsequent sample.

Non-disposable sampling equipment will be decontaminated by washing the sample collection equipment with potable water and Liquinox, rinsing with potable water, rinsing with deionized water, and then allowing the equipment to air dry. Decontamination fluids will be released on-site to the ground surface in the area of decontamination, so as to allow the liquids to infiltrate into the soil and not run off-site.

Used protective clothing will be double-bagged in polyethylene trash bags and sealed with twist ties. The bags will be disposed of as municipal solid waste.

Purge water from groundwater sampling will be released on-site to the ground surface in the area of the well, so as to allow the liquids to infiltrate into the soil and not run off-site.

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5. OPERATION AND MAINTENANCE PLAN

5.1 GENERAL

This O&M Plan provides a brief description of the measures necessary to operate, monitor and maintain the mechanical components of the remedy selected for the site. This O&M Plan:

- Includes the procedures necessary to allow individuals unfamiliar with the Site to operate and maintain the groundwater collection system
- Will be updated periodically to reflect changes in site conditions or the manner in which the groundwater collection system is operated and maintained.

Further detail regarding the O&M of the groundwater collection system is provided in **Appendix H** – O&M Manual. A copy of this O&M Manual, along with the complete SMP, is to be maintained at the Site. This O&M Plan is not to be used as a standalone document, but as a component document of this SMP.

Ongoing treatment at the Site consists of a groundwater collection system. The remedial objective of the system is to intercept and collect contaminated groundwater upgradient of the nearest receptors. The system was discontinued from use at request of NYSDEC and was shut down on 2 July 2020 by MATEC. The building and ground water treatment system are still currently intact.

5.2 OPERATION AND MAINTENANCE OF GROUNDWATER TREATMENT SYSTEM

The groundwater collection system collects groundwater in three trenches (**Figure 1-2**). Trench 1 is approximately 100 ft long on the eastern boundary of the Site along St. Vincent Street. Trench 2 is approximately 140 ft long located outside the site fence along the northeastern boundary and between the Site and the neighboring house. Trench 3 is located inside the site fence and is approximately 200 ft long running in a north/northeast direction. Water from these trenches flows via gravity into a 12 ft deep manhole-covered concrete vault located on the northeast corner of the treatment building. From the vault, groundwater is pumped using a 1½-horsepower sump pump to the treatment building. The sump pump operates automatically through the use of a three-float system (low, mid, and high) and a programmable logic controller (**Figure 5-1**). The low- and mid-floats operate the sump pump on/off; the high-float shuts the sump pump off in case it was not shut off at the mid-float, and sounds a high-level alarm.

Upon entering the treatment building, water flows through 1½-inch polyvinyl chloride (PVC) pipe before discharging to the POTW. As originally designed, the water would have passed through two basket strainers with 0.4 micron stainless steel mesh screen prior to passing through carbon filters before discharge to the POTW. Both the basket strainers and carbon filters have been removed. The filters have been bypassed with a flexible hose. This hose joins back to the PVC piping before the flow meter/totalizer. From here, water exits the building and discharges directly to the POTW. A second discharge point is available for discharging water to a temporary storage tank. This pipe is capped on the outside of the building.

The system includes the following major components:

- Submersible groundwater pump/vault
- Flow meter
- Building
- Utilities connections
- Control systems

For detailed O&M procedures for the treatment system components, including cut sheets for the treatment system components as well as the original as-built drawings provided in **Appendix H**. A revised process flow diagram of the system is presented on **Figure 5-1**, and the programmable logic controller wiring diagram is provided in **Appendix J**.

5.2.1 ROUTINE SYSTEM OPERATION AND MAINTENANCE

Groundwater collection system operation is automatic and controlled by the Programmable Logic Controller (**Appendix J**). The groundwater collection system is composed of:

- Gravity-fed groundwater collection trenches
- PVC piping
- Groundwater collection system building
- Vault
- Three floats (low-, mid-, and high-level)
- Sump pump
- Pressure gauge
- Flow meter/totalizer

Maintenance of these components may include the following, as needed:

- Flow Meter/Totalizer (maintenance as necessary):

  — Switch the pump off.
  — Take apart the flow meter and clean with Liquinox and water.
  — Place clean parts back into meter housing and secure cover.
  — Switch pump to auto.

- Vault/Pump:

  — Sump pump can be pulled and cleaned if necessary.

Table 5-1 presents the groundwater collection system components.

5.2.2 System Monitoring Devices and Alarms

The groundwater treatment system has a warning device to indicate that the system is not operating properly. In the event that warning device is activated, applicable maintenance and

repairs will be conducted, as specified in the Operation and Maintenance Plan, and the groundwater treatment system will be restarted. Operational problems will be noted in the Periodic Review Report to be prepared for that reporting period.

5.2.3 Fire Safety

The remedial party will conduct an annual facility walk with the local fire chief and/or fire suppression team. The site walk will allow for the addition of the facility to any local preplanning efforts. The NYSDEC project manager will be provided with the local fire chief's/fire suppression team's recommendations as soon as they become available. Following review, the NYSDEC project manager may direct the remedial party to implement the recommendations and/or revise the SMP.

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6. PERIODIC ASSESSMENTS/EVALUATIONS

6.1 CLIMATE CHANGE VULNERABILITY ASSESSMENT

Increases in both the severity and frequency of storms/weather events, an increase in sea level elevations along with accompanying flooding impacts, shifting precipitation patterns and wide temperature fluctuation, resulting from global climactic change and instability, have the potential to significantly impact the performance, effectiveness and protectiveness of a given site and associated remedial systems. Vulnerability assessments provide information so that the site and associated remedial systems are prepared for the impacts of the increasing frequency and intensity of severe storms/weather events and associated flooding.

This section provides a current vulnerability assessment that evaluates the vulnerability of the site and/or engineering controls to severe storms/weather events and associated flooding. This section also identifies vulnerability assessment updates that will be conducted for the site in PRRs.

- Flood Plain— The site is not located in a mapped floodplain or flood hazard area (**Appendix K**).

- Site Drainage and Storm Water Management—Identify areas of the Site, which may flood during severe rain events due to insufficient groundwater recharge capabilities or inadequate storm water management systems.

- Erosion—The site is entirely covered in grass or other vegetation so there are no components of the site which may be susceptible to erosion during periods of severe rain events.

- High Wind—There are no components of the site which may be susceptible to damage from the wind itself or falling objects, such as trees or utility structures during periods of high wind.

- Electricity—Electrical fixtures in the groundwater treatment system building may be susceptible to power loss and/or dips/surges in voltage during sever weather events, including lightning strikes.

6.2 GREEN REMEDIATION EVALUATION

NYSDEC's DER-31 Green Remediation requires that green remediation concepts and techniques be considered during all stages of the remedial program, including site management, with the goal of improving the sustainability of the cleanup and summarizing the net environmental benefit of any implemented green technology.

This section of the SMP also provides a summary of green remediation evaluations to be completed for the site during site management activities and reported as part of the PRRs.

The remedy in place at the Site involves gravity-fed groundwater collection that is no longer in operation but is still intact so it may be turned on if needed. Maintenance activities are limited to annual mowing and repairs, as necessary.

The LTM program generates minimal waste by reusing materials such as tubing.

Methods utilized to reduce energy consumption, resource usage, waste generation, water usage, etc. will be included in the PRR.

Green remediation efforts will be reported in the PRR.

6.2.1 TIMING OF GREEN REMEDIATION EVALUATIONS

For major remedial system components, green remediation evaluations and corresponding modifications will be undertaken as part of a formal Remedial System Optimization (RSO), or at any time that the NYSDEC project manager feels appropriate, (e.g. during significant maintenance events or in conjunction with storm recovery activities).

Modifications resulting from green remediation evaluations will be routinely implemented and scheduled to occur during planned/routine operation and maintenance activities after approval from the DER project manager. Reporting of these modifications will be presented in the PRR.

6.2.2 REMEDIAL SYSTEMS

Remedial systems will be operated properly considering the current site conditions to conserve materials and resources to the greatest extent possible. Consideration will be given to operating rates and use of reagents and consumables. Spent materials will be sent for recycling, as appropriate.

6.2.3 BUILDING OPERATIONS

Structures including buildings and sheds will be operated and maintained to provide for the most efficient operation of the remedy, while minimizing energy, waste generation and water consumption.

6.2.4 FREQUENCY OF SYSTEM CHECKS, SAMPLING AND OTHER PERIODIC ACTIVITIES

Transportation to and from the Site, use of consumables in relation to visiting the Site in order to conduct system checks and/or collect samples, and shipping samples to a laboratory for analyses have direct and/or inherent energy costs. The schedule and/or means of these periodic activities have been prepared so that these tasks can be accomplished in a manner that does not impact remedy protectiveness but reduces expenditure of energy or resources.

6.2.5 METRICS AND REPORTING

As discussed in Section 7.0 and as shown in **Appendix G** – Site Management Forms, information on energy usage, solid waste generation, transportation and shipping, water usage and land use and ecosystems will be recorded to facilitate and document consistent implementation of green remediation during site management and to identify corresponding benefits. A set of metrics has been developed and will be evaluated over time to ensure that green remediation actions are achieving the desired results.

6.3 REMEDIAL SYSTEM OPTIMIZATION

An RSO study will be conducted any time that the NYSDEC Project Manager or the remedial party requests in writing that an in-depth evaluation of any future remedial systems is needed.

An RSO may be appropriate if any of the following occur:

- The remedial actions have not met or are not expected to meet RAOs in the timeframe estimated in the Decision Document.
- The management and operation of a remedial system is exceeding the estimated costs.
- A remedial system is not performing as expected or as designed.
- Previously unidentified source material may be suspected.
- A plume shift has potentially occurred.
- Site conditions change due to development, change of use, change in groundwater use, etc.
- There is an anticipated transfer of the site management to another remedial party or agency.
- A new and applicable remedial technology becomes available.

An RSO will provide a critique of a site's conceptual model, give a summary of past performance, document current cleanup practices, summarize progress made toward the site's cleanup goals, gather additional performance or media specific data and information and provide recommendations for improvements to enhance the ability of the present system to reach RAOs or to provide a basis for changing the remedial strategy.

The RSO study will focus on overall site cleanup strategy, process optimization and management with the intent of identifying impediments to cleanup and improvements to site operations to increase efficiency, cost effectiveness and remedial time frames. Green remediation technology and principals are to be considered when performing the RSO.

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7. REPORTING REQUIREMENTS

SMP reporting will consist of semi-annual inspection reports, EQuIS™ electronic data deliverables of 15-month LTM results, and an Annual Report or PRRs. Reports will be emailed and/or provided in portable document format. Each type of report is described below.

The results of the inspection and Site monitoring data will be evaluated as part of the EC/IC compliance to confirm that the:

- EC/ICs are in place, are performing properly, and remain effective
- The Monitoring Plan is being implemented
- O&M activities are being conducted properly
- Based on the above items, the Site remedy continues to be protective of public health and the environment and is performing as designed

7.1 SITE MANAGEMENT REPORTS

All site management inspection, maintenance, and monitoring events will be recorded on the appropriate site management forms provided in **Appendix G**. These forms are subject to NYSDEC revision. All site management inspection, maintenance, and monitoring events will be conducted by a Qualified Environmental Professional as defined in 6 NYCRR Part 375, a P.E. who is licensed and registered in NYS, or a Qualified Person who directly reports to a P.E. who is licensed and registered in NYS.

All applicable inspection forms and other records, including media sampling data and system maintenance reports, generated for the Site during the reporting period will be provided in electronic format to the NYSDEC in accordance with the requirements of **Table 7-1** and summarized in the Annual Report or PRR.

Annual inspection reports will be submitted for inspection of the following:

- Fencing, gates, and site access
- Monitoring wells
- Treatment building

All interim monitoring/inspections reports will include, at a minimum:

- Date of event or reporting period
- Name, company, and position of person(s) conducting monitoring/inspection activities
- Description of the activities performed

- Where appropriate, photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet)
- Type of samples collected (e.g., sub-slab vapor, indoor air, outdoor air, etc.)
- Copies of all field forms completed (e.g., well sampling logs, chain-of-custody documentation, etc.)
- Sampling results in comparison to appropriate standards/criteria
- A figure illustrating sample type and sampling locations
- Copies of all laboratory data sheets and the required laboratory data deliverables required for all points sampled (to be submitted electronically in the NYSDEC-identified format)
- Any observations, conclusions, or recommendations
- A determination as to whether contaminant conditions have changed since the last reporting event

LTM results will be reported in the Annual Report or PRR for the year in which the sampling was conducted.

Routine maintenance event reporting forms will include, at a minimum:

- Date of event
- Name, company, and position of person(s) conducting maintenance activities
- Description of maintenance activities performed
- Any modifications to the system
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet)
- Other documentation such as copies of invoices for maintenance work, receipts for replacement equipment, etc., (attached to the checklist/form)

Non-routine maintenance event reporting forms will include, at a minimum:

- Date of event
- Name, company, and position of person(s) conducting non-routine maintenance/repair activities
- Description of non-routine activities performed
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents (included either on the form or on an attached sheet)
- Other documentation such as copies of invoices for repair work, receipts for replacement equipment, etc. (attached to the checklist/form).

Data will be reported in digital format as determined by the NYSDEC. Currently, data is to be supplied electronically and submitted to the NYSDEC EQuIS™ database in accordance with the requirements found at this link: http://www.dec.ny.gov/chemical/62440.html.

7.2 ANNUAL AND PERIODIC REVIEW REPORT

An Annual Report or PRR will be submitted to the NYSDEC by January 30 of the following year. Annual reports will be prepared and submitted for years when a PRR is not prepared. A description of each report is provided below.

A letter-style annual report in final format will be submitted annually to the NYSDEC for years when a PRR is not prepared. Annual Reports will include a description of activities conducted within the calendar year related to the following:

- Annual IC/EC assessment of effectiveness
- LTM
- Semi-Annual Inspection
- Maintenance and repair activities (if conducted)
- Conclusions and Recommendations

The annual letter reports will provide a brief site history; describe the Scope of Work conducted for the year; include pertinent photographs, data (e.g., analytical results for sampling conducted in the year, inspection findings); and provide recommendation(s) for the coming year.

PRRs are scheduled to be completed every 5 years; however, the NYSDEC may request that a PRR be completed more frequently if they determine activities conducted during the year warrant a PRR. The report will be prepared in accordance with NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation.

The frequency of submittal of the report may be modified with the approval of the NYSDEC. The report will include:

- Identification, assessment, and certification of all ECs/ICs required by the remedy for the Site
- Results of the required annual site inspections, fire inspections, and severe condition inspections, if applicable
- All applicable site management forms and other records generated for the Site during the reporting period in the NYSDEC-approved electronic format, if not previously submitted
- Identification of any wastes generated during the reporting period, along with waste characterization data, manifests, and disposal documentation
- A summary of any discharge monitoring data and/or information generated during the reporting period, with comments and conclusions.
- Data summary tables and graphical representations of COCs by media (groundwater, soil vapor, etc.), which include a listing of all compounds analyzed, along with the applicable standards, with all exceedances highlighted. These tables and figures will include a presentation of past data as part of an evaluation of contaminant concentration trends, including but not limited to:
  - Trend monitoring graphs that present groundwater contaminant levels from before the start of the remedy implementation to the most current sampling data
  - Trend monitoring graphs depicting system influent analytical data on a per event and cumulative basis
  - O&M data summary tables
  - A current plume map for sites with remaining groundwater contamination
  - A groundwater elevation contour map for each gauging event
- Results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables for all samples collected during the reporting period will be submitted in digital format as determined by NYSDEC. Currently, data is supplied electronically and submitted to the NYSDEC EQuIS^{TM} database in accordance with the requirements found at this link: http://www.dec.ny.gov/chemical/62440.html.

- A site evaluation, which includes the following:
  - The compliance of the remedy with the requirements of the site-specific Remedial Action Work Plan, ROD, or Decision Document
  - The operation and the effectiveness of all treatment units, etc., including identification of any needed repairs or modifications
  - Any new conclusions or observations regarding site contamination based on inspections or data generated by the Monitoring and Sampling Plan for the media being monitored
  - Recommendations regarding any necessary changes to the remedy and/or Monitoring and Sampling Plan
  - An evaluation of trends in contaminant levels in the affected media to determine if the remedy continues to be effective in achieving remedial goals as specified by the Remedial Action Work Plan, ROD or Decision Document
  - The overall performance and effectiveness of the remedy
- A performance summary for all treatment systems at the site during the calendar year, including information such as:
  - The number of days the system operated for the reporting period
  - The average, high, and low flows per day
  - The contaminant mass removed and the cost per pound of mass removed during the certification period and during the life of the treatment system
  - A description of breakdowns and/or repairs along with an explanation for any significant downtime
  - A description of the resolution of performance problems
  - Alarm conditions
  - Trends in equipment failure
  - A summary of the performance, effluent and/or effectiveness monitoring

— Comments, conclusions, and recommendations based on data evaluation. Recommendations must address how receptors would be impacted. Recommendations can include:

- Proposals to address efficiency and costs such as: instituting remote operation, system changes to decrease maintenance costs and downtime, and system changes to decrease energy use.

- Proposals to modify or shut down a treatment system due to remediation completion, system performance or changed conditions. System shutdowns are addressed in Section 6.4 of the DER-10.

7.2.1 Certification of Institutional and Engineering Controls

Every 5 years, a Qualified Environmental Professional will prepare, and include in the PRR, the following certification as per the requirements of NYSDEC DER-10:

"*For each institutional or engineering control identified for the site, I certify that all of the following statements are true:*

- *The inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under my direction;*

- *The institutional control and/or engineering control employed at this site is unchanged from the date the control was put in place, or last approved by the Department;*

- *Nothing has occurred that would impair the ability of the control to protect the public health and environment;*

- *Nothing has occurred that would constitute a violation or failure to comply with any site management plan for this control;*

- *Access to the site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;*

- *If a financial assurance mechanism is required under the oversight document for the site, the mechanism remains valid and sufficient for the intended purpose under the document;*

- *Use of the site is compliant with the environmental notice;*

- *The engineering control systems are performing as designed and are effective;*

- *To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program and generally accepted engineering practices; and*

- *The information presented in this report is accurate and complete.*

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, [name], of [business address], am certifying as the Remedial Party for the site."

At the end of each certifying period, as determined by the NYSDEC Project Manager, the following certification will be provided to the NYSDEC Project Manager:

"For each institutional control identified for the site, I certify that all of the following statements are true:

- *The institutional control employed at this site is unchanged from the date the control was put in place, or last approved by the Department;*
- *Nothing has occurred that would impair the ability of the control to protect the public health and environment;*
- *Nothing has occurred that would constitute a violation or failure to comply with any site management plan for this control;*
- *Access to the site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;*
- *If a financial assurance mechanism is required under the oversight document for the site, the mechanism remains valid and sufficient for the intended purpose under the document;*
- *Use of the site is compliant with the environmental notice.*
- *The information presented in this report is accurate and complete.*

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, [name], of [business address], am certifying as [Owner or Owner's Designated Site Representative]: [and I have been authorized and designated by all site owners to sign this certification] for the site."

The signed certification will be included in the PRR.

The PRR will be submitted, in electronic format, to the NYSDEC Project Manager and the NYSDOH Project Manager. The PRR may also need to be submitted in hard-copy format if requested by the NYSDEC Project Manager.

7.3 CORRECTIVE MEASURES WORK PLAN

If any component of the remedy is found to have failed, or if the periodic certification cannot be provided due to the failure of an IC or EC or failure to conduct site management activities, a Corrective Measures Work Plan will be submitted to the NYSDEC Project Manager for approval. This plan will explain the failure and provide the details and schedule for performing work necessary to correct the failure. Unless an emergency condition exists, no work will be performed pursuant to the Corrective Measures Work Plan until it has been approved by the NYSDEC Project Manager.

7.4 REMEDIAL SITE OPTIMIZATION REPORT

There are currently no remedial systems in place at the Site. An RSO study will be conducted any time that the NYSDEC Project Manager or the remedial party requests in writing that an in-depth evaluation of any future remedial systems is needed.

8. REFERENCES

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New York State Department of Health (NYSDOH). 2009. Memorandum: Soil Vapor Evaluation Determination. June.

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Tables

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Table 1-1. Notifications*

Name	Contact Information	Required Notification**
Jasmine Stefanksy New York State Department of Environmental Conservation Project Manager	518-402-9575 jasmine.stefansky@dec.ny.gov	All Notifications
Jeffrey Dyber New York State Department of Environmental Conservation Project Manager's Supervisor	518-402-9621 jeffrey.dyber@dec.ny.gov	All Notifications
Kelly Lewandowski New York State Department of Environmental Conservation Site Control	518-402-9569 kelly.lewandowski@dec.ny.gov	Notifications 1 and 8
Anthony Perretta New York State Department of Health Project Manager	518-402-7860 BEEI@health.ny.gov	Notifications 4, 6, and 7
Adam Etringer EA Engineering and Geology, P.C. Project Manager	315-565-6564 aetringer@eaest.com	All Notifications

Notes:
* Notifications are subject to change and will be updated as necessary.
** Numbers in this column reference the numbered bullets in the notification list in this section.

Table 2-2. Soil Cleanup Objectives

Contaminant	ROD Clean-Up Criteria	SCO Unrestricted	SCO Residential	SCO Restricted Residential	SCO Commercial	SCO Industrial
Cadmium	10	**2.5**	**2.5**	**4.3**	**9.3**	60
Chromium	50	**30**	**36**	180	1,500	6,800
Lead	500	**63**	**400**	**400**	1,000	3,900
Nickel	30	30	140	310	310	10,000
Cyanide	1.2	27	27	27	27	10,000

Notes:
ROD = Record of Decision (NYSDEC 1995)
SCO = Soil Cleanup Objective (NYSDEC 2006)
Values are in parts per million
Bold values indicate [stricter/more stringent/lower] than ROD Clean-up Criteria

Table 2-3. Summary of Sample Results (September 2022)

		Location ID	**GW-01**	**P-103**	**P-105**	**Duplicate**	**P-106D**	**P-106S**	**P-107D**	**P-107S**
		Sample Name	**GW-01**	**P-103**	**P-105**	**Duplicate**	**P-106D**	**P-106S**	**P-107D**	**P-107S**
		Parent Sample ID				**P-105**				
		Sample Date	**9/16/2022**	**9/16/2022**	**9/16/2022**	**9/16/2022**	**9/16/2022**	**9/16/2022**	**9/16/2022**	**9/16/2022**
Analyte	**Screening Level**	**Unit**								
Total Metals (SW6010C/SW7471B)										
Aluminum	NSL	mg/L	0.89	< 0.05 U	< 0.05 U	< 0.05 U	0.32	< 0.05 U	2.6	1
Antimony	0.003	mg/L	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Arsenic	0.025	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Barium	1	mg/L	0.11	0.059	0.066	0.067	0.077	0.072	0.11	0.064
Beryllium	.003	mg/L	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U
Cadmium	.005	mg/L	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U
Calcium	NSL	mg/L	120	100	57	58	11	100	19	99
Chromium, Total	.05	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Cobalt	NSL	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Copper	.2	mg/L	0.015	0.012	0.013	0.011	0.011	0.011	0.023	0.017
Iron	.3	mg/L	1.8	0.082	0.18	0.19	0.62	< 0.05 U	3.2	2.1
Lead	.025	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Magnesium	35	mg/L	26	25	64	64	0.67	25	1.6	18
Manganese	.3	mg/L	0.46	0.015	0.42	0.4	0.012	0.028	0.062	0.16
Mercury	.0007	mg/L	< 0.0001 U	< 0.0001 U	< 0.0001 U	0.00013	< 0.0001 U	< 0.0001 U	< 0.0001 U	< 0.0001 U
Nickel	.1	mg/L	0.14	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	0.022	< 0.01 U	0.13
Potassium	NSL	mg/L	3.9	< 2 U	3.3	3.3	3.9	< 2 U	5.9	3
Selenium	.01	mg/L	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Silver	.05	mg/L	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Sodium	20	mg/L	8.9	5.5	13	13	47	7.7	65	2
Thallium	.0005	mg/L	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U
Vanadium	NSL	mg/L	0.012	0.011	< 0.01 U	0.011	< 0.01 U	< 0.01 U	< 0.01 U	0.01
Zinc	2	mg/L	0.023	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	0.031	0.02
VOCs (SW8260C)										
1,1,1-Trichloroethane (TCA)	5	µg/L	1	4.4	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	1.7
1,1,2,2-Tetrachloroethane	5	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	5	µg/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1,2-Trichloroethane	1	µg/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethane	5	µg/L	< 1 U	1.1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	1.1
1,1-Dichloroethene	5	µg/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2,3-Trichlorobenzene	5	µg/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
1,2,4-Trichlorobenzene	5	µg/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dibromo-3-Chloropropane	0.04	µg/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
1,2-Dibromoethane (Ethylene Dibromide)	NSL	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,2-Dichlorobenzene	3	µg/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichloroethane	0.6	µg/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichloropropane	1	µg/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,3-Dichlorobenzene	3	µg/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,4-Dichlorobenzene	3	µg/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,4-Dioxane (P-Dioxane)	0.35	µg/L	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
2-Hexanone	50	µg/L	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Acetone	50	µg/L	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Benzene	1	µg/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Bromochloromethane	5	µg/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Bromodichloromethane	50	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Bromoform	50	µg/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U

Table 2-3. Summary of Sample Results (September 2022)

		Location ID	GW-01	P-103	P-105	Duplicate	P-106D	P-106S	P-107D	P-107S
		Sample Name	GW-01	P-103	P-105	Duplicate	P-106D	P-106S	P-107D	P-107S
		Parent Sample ID				P-105				
		Sample Date	9/16/2022	9/16/2022	9/16/2022	9/16/2022	9/16/2022	9/16/2022	9/16/2022	9/16/2022
Analyte	**Screening Level**	**Unit**								
Bromomethane	5	µg/L	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Carbon Disulfide	60	µg/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Carbon Tetrachloride	5	µg/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Chlorobenzene	5	µg/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Chloroethane	5	µg/L	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Chloroform	7	µg/L	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Chloromethane	NSL	µg/L	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Cis -1,2-Dichloroethylene	5	µg/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Cis -1,3-Dichloropropene	0.4	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Cyclohexane	NSL	µg/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Dibromochloromethane	50	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Dichlorodifluoromethane	5	µg/L	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Ethylbenzene	5	µg/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Isopropylbenzene (Cumene)	5	µg/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Methyl Acetate	NSL	µg/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Methyl Ethyl Ketone (2-Butanone)	50	µg/L	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U	< 20 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	NSL	µg/L	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Methylcyclohexane	NSL	µg/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Methylene Chloride	5	µg/L	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Styrene	5	µg/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Tert-Butyl Methyl Ether	10	µg/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Tetrachloroethylene (PCE)	5	µg/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Toluene	5	µg/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Trans -1,2-Dichloroethene	5	µg/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Trans -1,3-Dichloropropene	0.4	µg/L	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Trichloroethylene (TCE)	5	µg/L	< 1 U	2.3	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	12
Trichlorofluoromethane	5	µg/L	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Vinyl Chloride	2	µg/L	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Xylenes, Total	5	µg/L	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U

Notes:
µg/L = Microgram(s) per liter
ID = Identification
mg/L = Milligram(s) per liter
NSL = No screening level
U = Analyte not detected
VOC = Volatile organic compound
Screening Level is New York State Department of Environmental Conservation Class GA Groundwater Standards.
Shading represents an exceedance above screening level.

Table 2-4. Historical Groundwater Concentrations of Contaminants of Concern

			Location ID	GW-01	GW-01	GW-01	GW-01	GW-01	GW-01	GW-01	GW-01	GW-01	GW-01	GW-01
			Sample Name	633027GW01	633027GW01	633027-GW01	GW-01	GW-01	GW-01	633027GW01	633027 - GW01	GW-01	GW-01	633027-GW-01
			Parent Sample ID											
			Sample Date	9/10/2015	5/4/2016	6/19/2019	6/28/2016	7/20/2016	9/13/2016	12/20/2016	3/27/2018	8/20/2021	9/16/2022	1/18/2024
Analyte	**NYSDEC AWQS[1]**	**Unit**												
VOCs (SW8260)														
1,1,1-Trichloroethane (TCA)	5	µg/L	< 0.36 UJ	1.4	< 0.21 U	0.36 J	0.49 J	0.38 J	1.4	0.5 J	1.9	1	0.88 J	
1,1-Dichloroethane	5	µg/L	< 0.2 UJ	0.63 J	< 0.2 U	< 0.28 U	< 0.28 U	< 0.28 U	0.36 J	< 0.2 U	0.79 J	< 0.14 U	0.69 J	
Trichloroethylene (TCE)	5	µg/L	< 0.22 UJ	< 0.22 U	< 0.2 U	< 0.33 U	< 0.33 U	< 0.33 U	< 0.33 U	< 0.22 U	< 0.46 U	< 0.19 U	< 0.53 U	
Total Metals (Various Methods)														
Chromium, Total	50	µg/L	NA	NA	< 0.59 U	NA	NA	NA	21	NA	8.5	< 2.5 U	3.3	
Iron	300	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	6100	1800	5220	
Lead	25	µg/L	NA	NA	< 2.1 U	NA	NA	NA	29	NA	3.7 J	< 3 U	9.2	
Manganese	300	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	390	460	759	
Dissolved Metals (Various Methods)														
Chromium, Total	50	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Iron	300	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Lead	25	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Manganese	300	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	

			Location ID	P-101D	P-101D	P-101D	P-101D	P-101D	P-101D	P-101D	P-101D
			Sample Name	633027MW101DXX	633027P101DXX	633027P101DXX	633027P101D	633027MW101DXX	633027P101DXX	633027P101DXX	633027P101D
			Parent Sample ID								
			Sample Date	12/21/2011	3/27/2013	6/25/2014	9/9/2015	12/21/2011	3/27/2013	6/25/2014	9/9/2015
Analyte	**NYSDEC AWQS[1]**	**Unit**									
VOCs (SW8260)											
1,1,1-Trichloroethane (TCA)	5	µg/L	< 1 U	< 0.36 U	< 0.36 U	< 0.36 UJ	< 1 U	< 0.36 U	< 0.36 U	< 0.36 UJ	
1,1-Dichloroethane	5	µg/L	< 1 U	< 0.2 U	< 0.2 U	< 0.2 UJ	< 1 U	< 0.2 U	< 0.2 U	< 0.2 UJ	
Trichloroethylene (TCE)	5	µg/L	< 1 U	< 0.22 U	< 0.22 U	< 0.22 UJ	< 1 U	< 0.22 U	< 0.22 U	< 0.22 UJ	
Total Metals (Various Methods)											
Chromium, Total	50	µg/L	< 10 U	< 0.816 U	2 J	< 0.4 U	< 10 U	< 0.816 U	2 J	< 0.4 U	
Iron	300	µg/L	806	NA	NA	NA	806	NA	NA	NA	
Lead	25	µg/L	< 5 U	< 0.813 U	< 2 U	< 5 U	< 5 U	< 0.813 U	< 2 U	< 5 U	
Manganese	300	µg/L	56.1	NA	NA	NA	56.1	NA	NA	NA	
Dissolved Metals (Various Methods)											
Chromium, Total	50	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	
Iron	300	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	
Lead	25	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	
Manganese	300	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	

Notes:

(1) NYSDEC Ambient Water Quality Standard Class GA (Standard/guidance values) (Technical and Operational Guidance Series 1.1.1).
µg/L = Microgram(s) per liter.
AWQS = Ambient water quality standard
J = Concentration is estimated.
NA = Not analyzed.
U = Analyte not detected.
Concentrations exceeding the screening level are shaded gray.

Table 2-4. Historical Groundwater Concentrations of Contaminants of Concern

		Location ID	P-103	P-103	P-103	P-103	P-103	P-103	P-103	P-103	P-103	P-103
		Sample Name	633027MW103XX	633027P103XX	633027P103XX	633027P103XX	633027P103	633027 - P103	633027-P103	P-103	P-103	633027-P-103
		Parent Sample ID										
		Sample Date	12/20/2011	3/27/2013	6/24/2014	9/9/2015	12/19/2016	3/27/2018	6/18/2019	8/20/2021	9/16/2022	1/18/2024
Analyte	**NYSDEC AWQS[1]**	**Unit**										
VOCs (SW8260)												
1,1,1-Trichloroethane (TCA)	5	µg/L	16.3	4.6 J	5.9	6.9 J	2.8	2.1	4.6	1.3	4.4	4.3
1,1-Dichloroethane	5	µg/L	< 1 U	1.3 J	1.8	1.8 J	< 0.28 U	< 0.2 U	0.59 J	< 0.38 U	1.1	< 0.57 U
Trichloroethylene (TCE)	5	µg/L	2	0.94 J	1.1	1.6 J	1.2	0.84 J	2.1	0.98 J	2.3	2
Total Metals (Various Methods)												
Chromium, Total	50	µg/L	< 10 U	< 0.816 U	< 0.9 U	< 0.4 U	1.3 J	< 1.4 U	< 0.59 U	< 1.0 U	< 2.5 U	< 2 U
Iron	300	µg/L	< 100 U	NA	NA	NA	NA	NA	NA	180	82	388
Lead	25	µg/L	< 5 U	< 0.813 U	< 2 U	< 5 U	< 0.74 U	< 2.5 U	< 2.1 U	< 3.0 U	< 3 U	< 1.8 U
Manganese	300	µg/L	< 15 U	NA	NA	NA	NA	NA	NA	10	15	55.7
Dissolved Metals (Various Methods)												
Chromium, Total	50	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	300	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	25	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	300	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

		Location ID	P-104	P-104	P-104	P-104	P-104	P-104	P-104	P-104
		Sample Name	633027MW104XX	633027MW104XD	633027P104XX	633027P104XD	633027P104XX	633027P104XD	633027P104	633027P104D
		Parent Sample ID		633027MW104XX		633027P104XX		633027P104XX		633027P104
		Sample Date	12/20/2011	12/20/2011	3/27/2013	3/27/2013	6/24/2014	6/24/2014	9/8/2015	9/8/2015
Analyte	**NYSDEC AWQS[1]**	**Unit**								
VOCs (SW8260)										
1,1,1-Trichloroethane (TCA)	5	µg/L	< 1 U	< 1 U	< 0.36 U	< 0.36 U	< 0.36 U	< 0.36 U	< 0.36 UJ	< 0.36 UJ
1,1-Dichloroethane	5	µg/L	< 1 U	< 1 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 UJ	< 0.2 UJ
Trichloroethylene (TCE)	5	µg/L	< 1 U	< 1 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.22 UJ	< 0.22 UJ
Total Metals (Various Methods)										
Chromium, Total	50	µg/L	< 10 U	< 10 U	< 0.816 U	< 0.816 U	< 0.9 U	< 0.9 U	< 0.4 U	< 0.4 U
Iron	300	µg/L	156	193	NA	NA	NA	NA	NA	NA
Lead	25	µg/L	< 5 U	< 5 U	< 0.813 U	< 0.813 U	< 2 U	< 2 U	< 5 U	5 J
Manganese	300	µg/L	< 15 U	< 15 U	NA	NA	NA	NA	NA	NA
Dissolved Metals (Various Methods)										
Chromium, Total	50	µg/L	NA	NA	NA	NA	NA	NA	NA	NA
Iron	300	µg/L	NA	NA	NA	NA	NA	NA	NA	NA
Lead	25	µg/L	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	300	µg/L	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

(1) NYSDEC Ambient Water Quality Standard Class GA (Standard/guidance values) (Technical and Operational Guidance Series 1.1.1).
µg/L = Microgram(s) per liter.
AWQS = Ambient water quality standard
J = Concentration is estimated.
NA = Not analyzed.
U = Analyte not detected.
Concentrations exceeding the screening level are shaded gray.

Table 2-4. Historical Groundwater Concentrations of Contaminants of Concern

			Location ID	P-105	P-105	P-105	P-105	P-105	P-105	P-105	P-105	P-105	P-105	P-105	P-105
			Sample Name	633027MW105XX	633027P105XX	633027P105XX	633027P105XX	633027P105	633027 - P105	633027-P105	P-105	DUP P-105	P-105	Duplicate P-105	633027-P-105
			Parent Sample ID												
			Sample Date	12/21/2011	3/26/2013	6/23/2014	9/9/2015	12/19/2016	3/27/2018	6/18/2019	8/20/2021	8/20/2021	9/16/2022	9/16/2022	1/18/2024
Analyte	**NYSDEC AWQS[1]**	**Unit**													
VOCs (SW8260)															
1,1,1-Trichloroethane (TCA)	5	µg/L	< 1 U	< 0.36 U	< 0.36 U	< 0.36 UJ	< 0.22 U	< 0.36 U	< 0.21 U	< 0.82 U	< 0.82 U	< 0.17 U	< 0.17 U	< 0.54 U
1,1-Dichloroethane	5	µg/L	< 1 U	< 0.2 U	< 0.2 U	< 0.2 UJ	< 0.28 U	< 0.2 U	< 0.2 U	< 0.38 U	< 0.38 U	< 0.14 U	< 0.14 U	< 0.57 U
Trichloroethylene (TCE)	5	µg/L	< 1 U	< 0.22 U	< 0.22 U	< 0.22 UJ	< 0.33 U	< 0.22 U	< 0.2 U	< 0.46 U	< 0.46 U	< 0.19 U	< 0.19 U	< 0.53 U
Total Metals (Various Methods)															
Chromium, Total	50	µg/L	< 10 U	< 0.816 U	< 0.9 U	< 0.4 U	2.1 J	< 1.4 U	< 0.59 U	< 1.0 U	< 1.0 U	< 2.5 U	< 2.5 U	< 2 U
Iron	300	µg/L	< 100 U	NA	NA	NA	NA	NA	NA	170	150	180	190	1610
Lead	25	µg/L	< 5 U	< 0.813 U	< 2 U	< 5 U	< 0.74 U	< 2.5 U	< 2.1 U	< 3.0 U	< 3.0 U	< 3 U	< 3 U	< 1.8 U
Manganese	300	µg/L	15.4	NA	NA	NA	NA	NA	NA	260	230	420	400	435
Dissolved Metals (Various Methods)															
Chromium, Total	50	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	300	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	25	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	300	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

			Location ID	P-106S	P-106S	P-106S	P-106S	P-106S	P-106S	P-106S	P-106S	P-106S	P-106S
			Sample Name	633027MW106SXX	633027P106SXX	633027P106SXX	633027P106SXX	633027P106S	633027 - P106S	633027-P106S	P-106S	P-106S	633027-P-106S
			Parent Sample ID										
			Sample Date	12/20/2011	3/27/2013	6/24/2014	9/9/2015	12/19/2016	3/27/2018	6/18/2019	8/20/2021	9/16/2022	2/1/2024
Analyte	**NYSDEC AWQS[1]**	**Unit**											
VOCs (SW8260)													
1,1,1-Trichloroethane (TCA)	5	µg/L	2.2	0.64 J	1.5	1.7 J	0.44 J	< 0.36 U	0.64 J	< 0.82 U	< 0.17 U	0.93 J
1,1-Dichloroethane	5	µg/L	< 1 U	< 0.2 U	< 0.2 U	< 0.2 UJ	< 0.28 U	< 0.2 U	< 0.2 U	< 0.38 U	< 0.14 U	< 0.57 U
Trichloroethylene (TCE)	5	µg/L	< 1 U	0.6 J	0.97 J	0.92 J	0.68 J	< 0.22 U	0.7 J	< 0.46 U	< 0.19 U	0.83 J
Total Metals (Various Methods)													
Chromium, Total	50	µg/L	< 10 U	< 0.816 U	1 J	< 0.4 U	2.1 J	< 1.4 U	< 0.59 U	1.8 J	< 2.5 U	5
Iron	300	µg/L	< 100 U	NA	NA	NA	NA	NA	NA	44 J	< 19 U	386
Lead	25	µg/L	< 5 U	< 0.813 U	< 2 U	< 5 U	< 0.74 U	< 2.5 U	< 2.1 U	< 3.0 U	< 3 U	< 1.8 U
Manganese	300	µg/L	< 15 U	NA	NA	NA	NA	NA	NA	15	28	15.9
Dissolved Metals (Various Methods)													
Chromium, Total	50	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	300	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	25	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	300	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

(1) NYSDEC Ambient Water Quality Standard Class GA (Standard/guidance values) (Technical and Operational Guidance Series 1.1.1).
µg/L = Microgram(s) per liter.
AWQS = Ambient water quality standard
J = Concentration is estimated.
NA = Not analyzed.
U = Analyte not detected.
Concentrations exceeding the screening level are shaded gray.

Table 2-4. Historical Groundwater Concentrations of Contaminants of Concern

			Location ID	P-106D	P-106D	P-106D	P-106D	P-106D	P-106D	P-106D	P-106D	P-106D	P-106D	
			Sample Name	633027MW106DXX	633027P106DXX	633027P106DXX	633027P106D	633027P106D	633027 - P106D	633027-P106D	P-106D	P-106D	633027-P-106D	
			Parent Sample ID											
			Sample Date	12/21/2011	3/27/2013	6/24/2014	9/9/2015	12/19/2016	3/27/2018	6/18/2019	8/20/2021	9/16/2022	2/1/2024	
Analyte	**NYSDEC AWQS[1]**	**Unit**												
VOCs (SW8260)														
1,1,1-Trichloroethane (TCA)	5	µg/L	< 1 U	< 0.36 U	< 0.36 U	< 0.36 UJ	< 0.22 U	< 0.36 U	< 0.21 U	< 0.82 U	< 0.17 U	< 0.54 U		
1,1-Dichloroethane	5	µg/L	< 1 U	< 0.2 U	< 0.2 U	< 0.2 UJ	< 0.28 U	< 0.2 U	< 0.2 U	< 0.38 U	< 0.14 U	< 0.57 U		
Trichloroethylene (TCE)	5	µg/L	< 1 U	< 0.22 U	< 0.22 U	< 0.22 UJ	< 0.33 U	< 0.22 U	< 0.2 U	< 0.46 U	< 0.19 U	< 0.53 U		
Total Metals (Various Methods)														
Chromium, Total	50	µg/L	< 10 U	< 0.816 U	< 0.9 U	< 0.4 U	4.1	1.7 J	< 0.59 U	1.6 J	< 2.5 U	20.4		
Iron	300	µg/L	508	NA	NA	NA	NA	NA	NA	470	620	4600		
Lead	25	µg/L	< 5 U	< 0.813 U	< 2 U	< 5 U	4.1	< 2.5 U	< 2.1 U	< 3.0 U	< 3 U	4.2		
Manganese	300	µg/L	< 15 U	NA	NA	NA	NA	NA	NA	8.8	12	76.7		
Dissolved Metals (Various Methods)														
Chromium, Total	50	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
Iron	300	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
Lead	25	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
Manganese	300	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
			Location ID	P-107S	P-107S	P-107S	P-107S	P-107S	P-107S	P-107S	P-107S	P-107S	P-107S	P-107S
			Sample Name	633027MW107SXX	633027P107SXX	633027P107SXX	633027P107S	633027P107S	633027 - P107S	633027-P107S	P-107S	P-107S	633027-P-107S	633027-FD-01
			Parent Sample ID											633027-P-107S
			Sample Date	12/21/2011	3/27/2013	6/24/2014	9/9/2015	12/20/2016	3/28/2018	6/19/2019	8/20/2021	9/16/2022	1/18/2024	1/18/2024
Analyte	**NYSDEC AWQS[1]**	**Unit**												
VOCs (SW8260)														
1,1,1-Trichloroethane (TCA)	5	µg/L	1.6	0.93 J	1.5	1.6 J	1.6	0.44 J	1.4	1.7	1.7	0.83 J	0.82 J	
1,1-Dichloroethane	5	µg/L	2.9	1.4 J	2	1.9 J	0.75 J	0.32 J	1.2	0.79 J	1.1	< 0.57 U	< 0.57 U	
Trichloroethylene (TCE)	5	µg/L	9.3	7.4	7.8	9.5 J	14.1	7.1	7.5	14	12	6.2	6.1	
Total Metals (Various Methods)														
Chromium, Total	50	µg/L	< 10 U	6.6 J	5 J	< 0.4 U	8.6	2.4 J	1.1 J	1.6 J	< 2.5 U	< 2 U	< 2 U	
Iron	300	µg/L	520	NA	NA	NA	NA	NA	NA	60	2100	363	91.2	
Lead	25	µg/L	< 5 U	< 0.813 U	< 2 U	6 J	< 0.74 U	< 2.5 U	< 2.1 U	< 3.0 U	< 3 U	< 1.8 U	< 1.8 U	
Manganese	300	µg/L	249	NA	NA	NA	NA	NA	NA	29	160	137	60.9	
Dissolved Metals (Various Methods)														
Chromium, Total	50	µg/L	NA	< 0.816 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Iron	300	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Lead	25	µg/L	NA	< 0.813 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Manganese	300	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	

Notes:

(1) NYSDEC Ambient Water Quality Standard Class GA (Standard/guidance values) (Technical and Operational Guidance Series 1.1.1).
µg/L = Microgram(s) per liter.
AWQS = Ambient water quality standard
J = Concentration is estimated.
NA = Not analyzed.
U = Analyte not detected.
Concentrations exceeding the screening level are shaded gray.

Table 2-4. Historical Groundwater Concentrations of Contaminants of Concern

		Location ID	P-107D	P-107D	P-107D	P-107D	P-107D	P-107D	P-107D	P-107D	P-107D	P-107D
		Sample Name	633027MW107DXX	633027P107DXX	633027P107DXX	633027P107D	633027P107D	633027 - P107D	633027-P107D	P-107D	P-107D	633027-P-107D
		Parent Sample ID										
		Sample Date	12/21/2011	3/27/2013	6/23/2014	9/9/2015	12/20/2016	3/28/2018	6/18/2019	8/20/2021	9/16/2022	2/1/2024
Analyte	**NYSDEC AWQS[1]**	**Unit**										
VOCs (SW8260)												
1,1,1-Trichloroethane (TCA)	5	µg/L	< 1 U	< 0.36 U	< 0.36 U	< 0.36 UJ	< 0.22 U	< 0.36 U	< 0.21 U	< 0.82 U	< 0.17 U	< 0.54 U
1,1-Dichloroethane	5	µg/L	< 1 U	< 0.2 U	< 0.2 U	< 0.2 UJ	< 0.28 U	< 0.2 U	< 0.2 U	< 0.38 U	< 0.14 U	< 0.57 U
Trichloroethylene (TCE)	5	µg/L	< 1 U	< 0.22 U	< 0.22 U	< 0.22 UJ	< 0.33 U	< 0.22 U	< 0.2 U	< 0.46 U	< 0.19 U	< 0.53 U
Total Metals (Various Methods)												
Chromium, Total	50	µg/L	< 10 U	11.3	25	< 0.4 U	5.8	< 1.4 U	< 0.59 U	5.4	< 2.5 U	16
Iron	300	µg/L	8980	NA	NA	NA	NA	NA	NA	1100	3200	7830
Lead	25	µg/L	5.7	< 0.813 U	10 J	< 5 U	7.2	< 2.5 U	< 2.1 U	< 3.0 U	< 3 U	5.6
Manganese	300	µg/L	150	NA	NA	NA	NA	NA	NA	16	62	235
Dissolved Metals (Various Methods)												
Chromium, Total	50	µg/L	< 10 U	< 0.816 U	< 0.9 U	NA	NA	NA	NA	NA	NA	NA
Iron	300	µg/L	380	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	25	µg/L	< 5 U	< 0.813 U	< 2 U	NA	NA	NA	NA	NA	NA	NA
Manganese	300	µg/L	< 15 U	NA	NA	NA	NA	NA	NA	NA	NA	NA

		Location ID	P-108	P-108	P-108	P-108
		Sample Name	633027MW108XX	633027P108XX	633027P108XX	633027P108XX
		Parent Sample ID				
		Sample Date	12/20/2011	3/27/2013	6/25/2014	9/9/2015
Analyte	**NYSDEC AWQS[1]**	**Unit**				
VOCs (SW8260)						
1,1,1-Trichloroethane (TCA)	5	µg/L	< 1 U	< 0.36 U	< 0.36 U	< 0.36 UJ
1,1-Dichloroethane	5	µg/L	< 1 U	< 0.2 U	< 0.2 U	< 0.2 UJ
Trichloroethylene (TCE)	5	µg/L	< 1 U	< 0.22 U	< 0.22 U	< 0.22 UJ
Total Metals (Various Methods)						
Chromium, Total	50	µg/L	< 10 U	< 0.816 U	< 0.9 U	< 0.4 U
Iron	300	µg/L	< 100 U	NA	NA	NA
Lead	25	µg/L	< 5 U	< 0.813 U	< 2 U	< 5 U
Manganese	300	µg/L	62	NA	NA	NA
Dissolved Metals (Various Methods)						
Chromium, Total	50	µg/L	NA	NA	NA	NA
Iron	300	µg/L	NA	NA	NA	NA
Lead	25	µg/L	NA	NA	NA	NA
Manganese	300	µg/L	NA	NA	NA	NA

Notes:

(1) NYSDEC Ambient Water Quality Standard Class GA (Standard/guidance values) (Technical and Operational Guidance Series 1.1.1).
µg/L = Microgram(s) per liter.
AWQS = Ambient water quality standard
J = Concentration is estimated.
NA = Not analyzed.
U = Analyte not detected.
Concentrations exceeding the screening level are shaded gray.

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Table 4-1. Environmental Sampling and Analysis Plan

Monitoring Wells - 15 Month			
Well ID	**Metals* (6010B)**	**VOC (8260B)**	**Well Purpose**
P-103	X	X	To evaluate concentrations of site-related contaminants on-site
P-105	X	X	To evaluate concentrations of site-related contaminants in upgradient background groundwater
P-106S	X	X	To evaluate concentrations of contaminants in shallow groundwater downgradient of groundwater collection Trench 2
P-106D	X	X	To evaluate concentrations of contaminants in bedrock groundwater downgradient of groundwater collection Trench 2
P-107S	X	X	To evaluate concentrations of contaminants in shallow groundwater downgradient of groundwater collection Trench 2
P-107D	X	X	To evaluate concentrations of contaminants in bedrock groundwater downgradient of groundwater collection Trench 2
GW-01	X	X	To evaluate concentrations of contaminants in groundwater downgradient of the groundwater collection trenches and upgradient of the nearest residences
Blanks			
ID	**Metals* (6010B)**	**VOC (8260B)**	**Purpose**
Rinse Blank	X	X	Quality Control

Notes:
*Cadmium, chromium, copper, lead, nickel and zinc.
An 'X' marked in a column indicates the analysis to be performed for that sample location.
ID = Identification
VOCs = Volatile organic compound

Table 5-1. Groundwater Treatment System Components*

No.	Quantity	Item
1	All	Piping is 1½- in. Schedule 40 PVC unless otherwise noted
2	10	90° Schedule 40 PVC coupler
3	5	Schedule 40 PVC "T" coupler
4	3	Marsh Safe Case PG-3, 316 Stainless Steel Gauge, 0-100 psi
5	2	½ -in. Hayward Valve
6	3	1½-in. Hayward Valve
7	1	Hayward dual basket strainer with control valve. 1½-in. connections. Baskets are 40 micron stainless steel mesh
8	4	1½-in. quick connect camlock couplers
9	Approximately 7 ft	1½-in. transfer hose (labeled flex hose on schematic)
10	1	1½-in. Badger model M-70 flow meter
11	1	Total flow register (RTR for Badger M120 flow meter) with 25 ft of cable
12	1	115v Dayton sump pump (4HU73)
13	1	Dynamaster wall mounted fan.
14	1	Pressure transmitter (PTD25-20-0015H)
15	1	Temperature transmitter (TTD-20-N40160F-H)
16	2	Lengths cable for the pressure and temperature transmitters (CD12M-013-070-C1)
17	1	Temperature probe (RTD0100-10-0303-H)
18	1	DC input module (DO-10ND3) in panel

Notes:
*Components as of 11 December 2012
in. = inches
No. = Number
psi = Pounds per square inch
PVC = Polyvinyl chloride

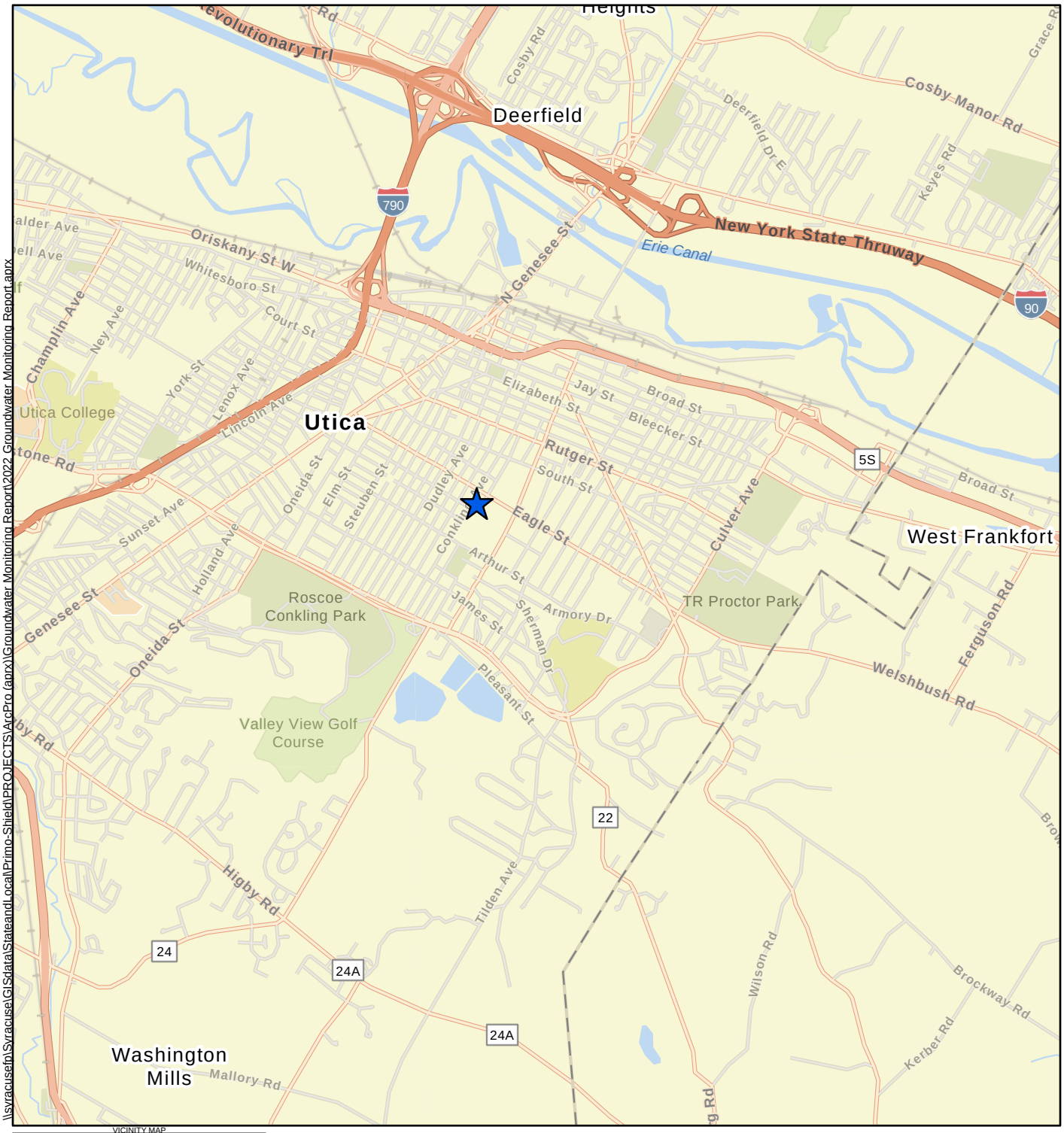
Table 7-1. Schedule of Monitoring/Inspection Reports

Task/Report	Reporting Frequency*
Inspection Report	Monthly
LTM Results	In the Annual Report or PRR for the year the LTM was conducted
PRR	Every 5 years, or as otherwise determined by the NYSDEC

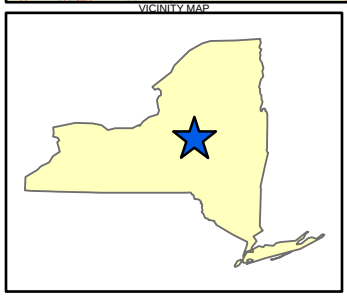
Notes:
* The frequency of events will be conducted as specified until otherwise approved by the NYSDEC Project Manager.
LTM = Long-Term Monitoring
NYSDEC = New York State Department of Environmental Conservation
PRR = Periodic Review Report

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Figures



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Legend

Site Location

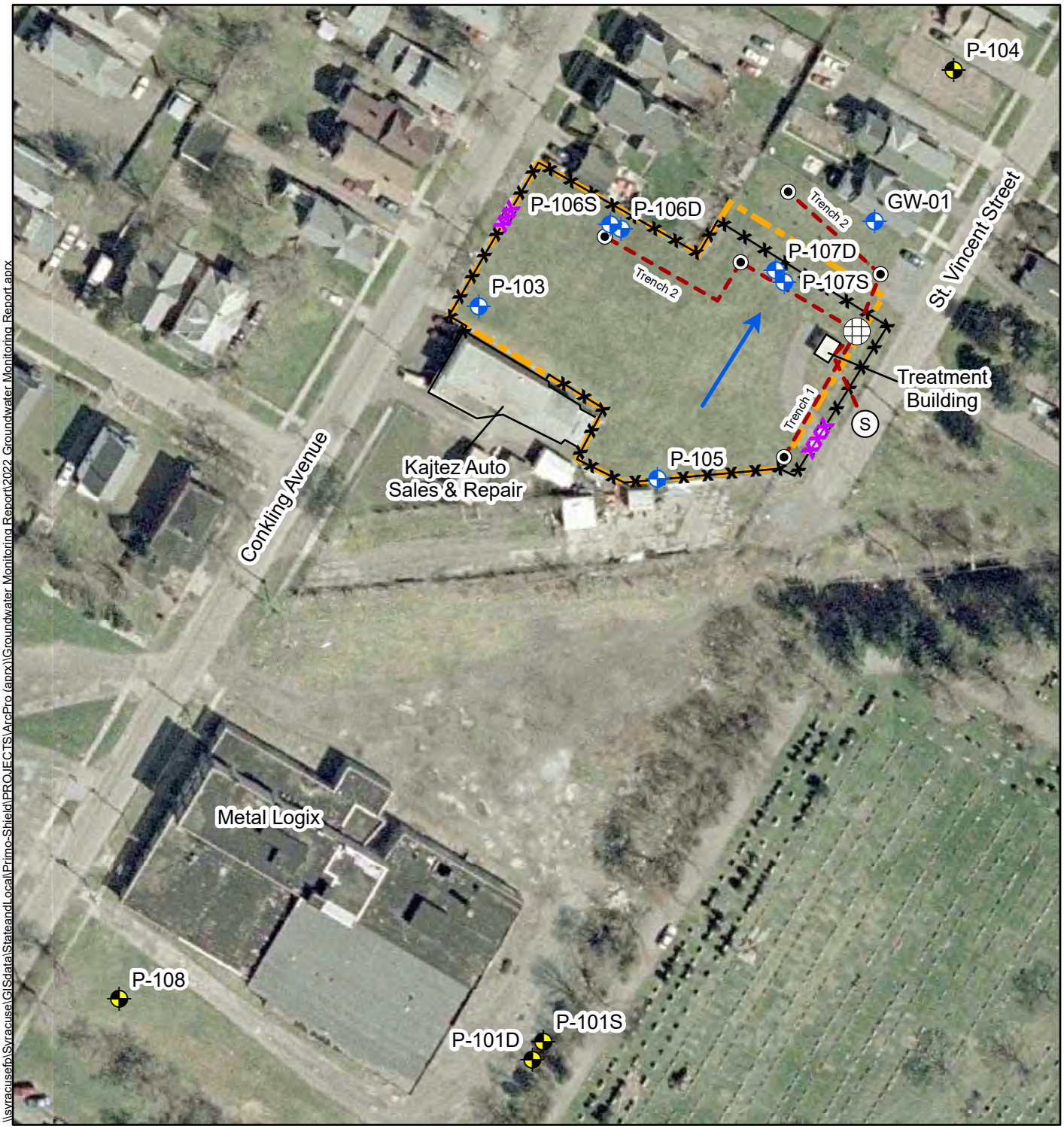
0 0.5 1
Miles

N

Figure 1-1
Site Location
Primoshield Inc. (633027)
Utica, New York

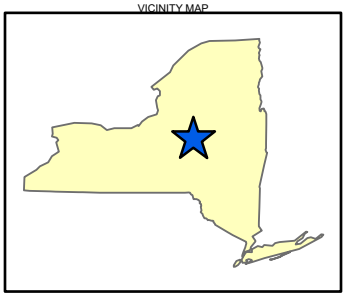
Map Date: 2/27/2023
Projection: NAD 83 State Plane
New York Central 3102 (US Feet)
Source: Esri

NEW YORK STATE Department of Environmental Conservation



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VICINITY MAP



Legend

- Site Boundary
- Building Footprint
- Fence Perimeter
- Fence Gate
- Underground Collection Trench
- Approximate Groundwater Flow Direction
- Site Location
- Discharge to Sanitary Sewer
- 4-foot Diameter Manhole
- Cleanout Access Point
- Decommissioned Well (October 2016)
- Monitoring Well

0 50 100
Feet

N

NEW YORK STATE Department of Environmental Conservation

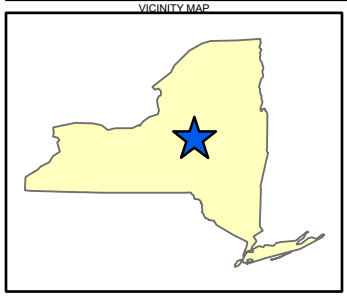
Figure 1-2
Site Features and Monitoring Locations
Primoshield Inc. (633027)
Utica, New York

Map Date: 3/11/2024
Projection: NAD 83 State Plane New York Central 3102 (US Feet)
Source: Esri



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VICINITY MAP



0 40 80
Feet
N

Legend

- Site Boundary
- Fence Perimeter
- Building Footprint
- Discharge to Sanitary Sewer
- 4-foot Diameter Manhole
- Underground Collection Trench
- Site Location
- GW Elevation (Shallow wells only)
- Approximate Groundwater Flow Direction
- Fence Gate
- Deep Monitoring Well
- Shallow Monitoring Well

Figure 2-1
Groundwater Elevation Contour Map (August 2021)
Primoshield Inc. (633027)
Utica, New York

Map Date: 3/11/2024
Projection: NAD 83 State Plane New York Central 3102 (US Feet)
Source: Esri

NEW YORK STATE Department of Environmental Conservation

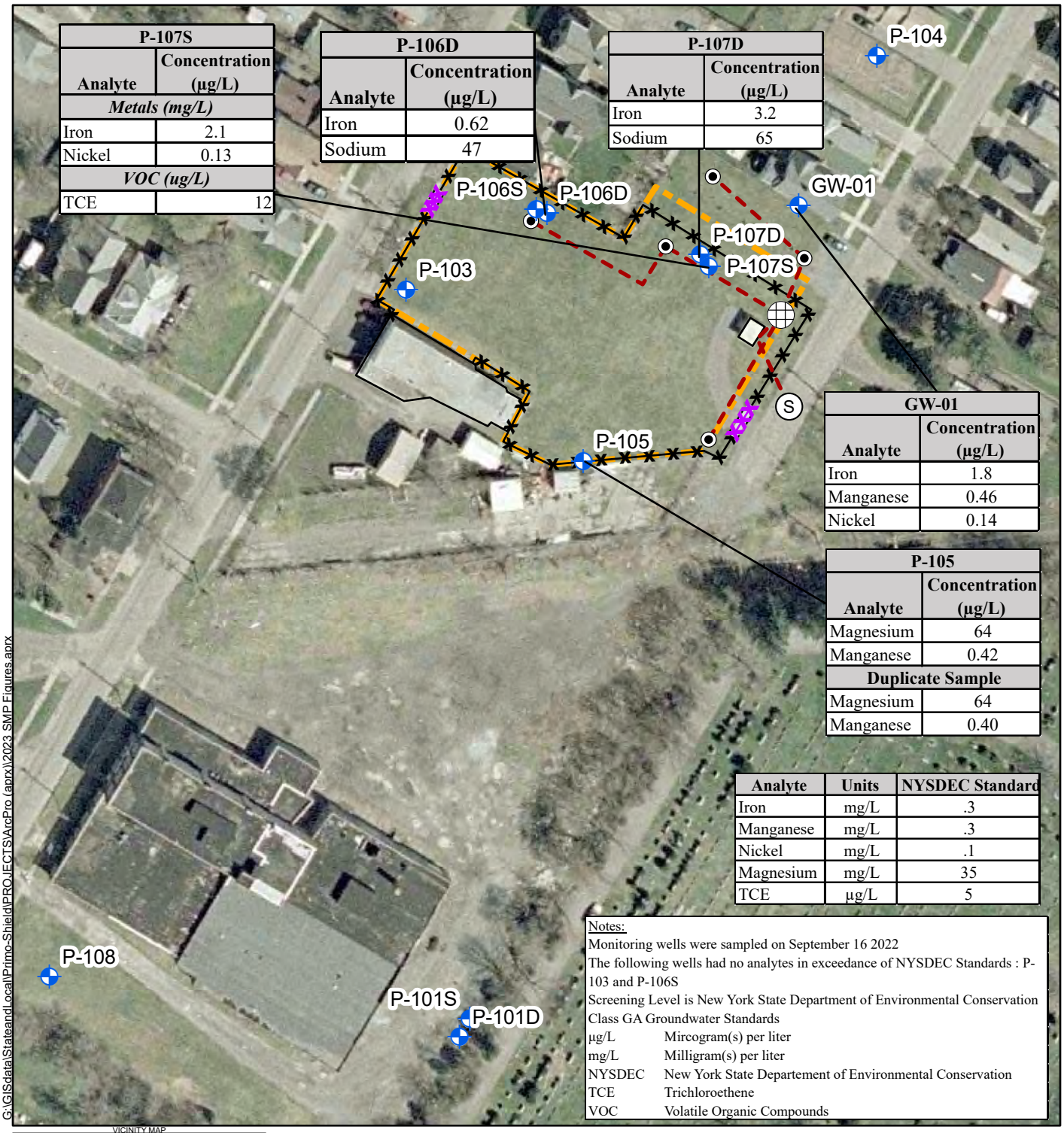
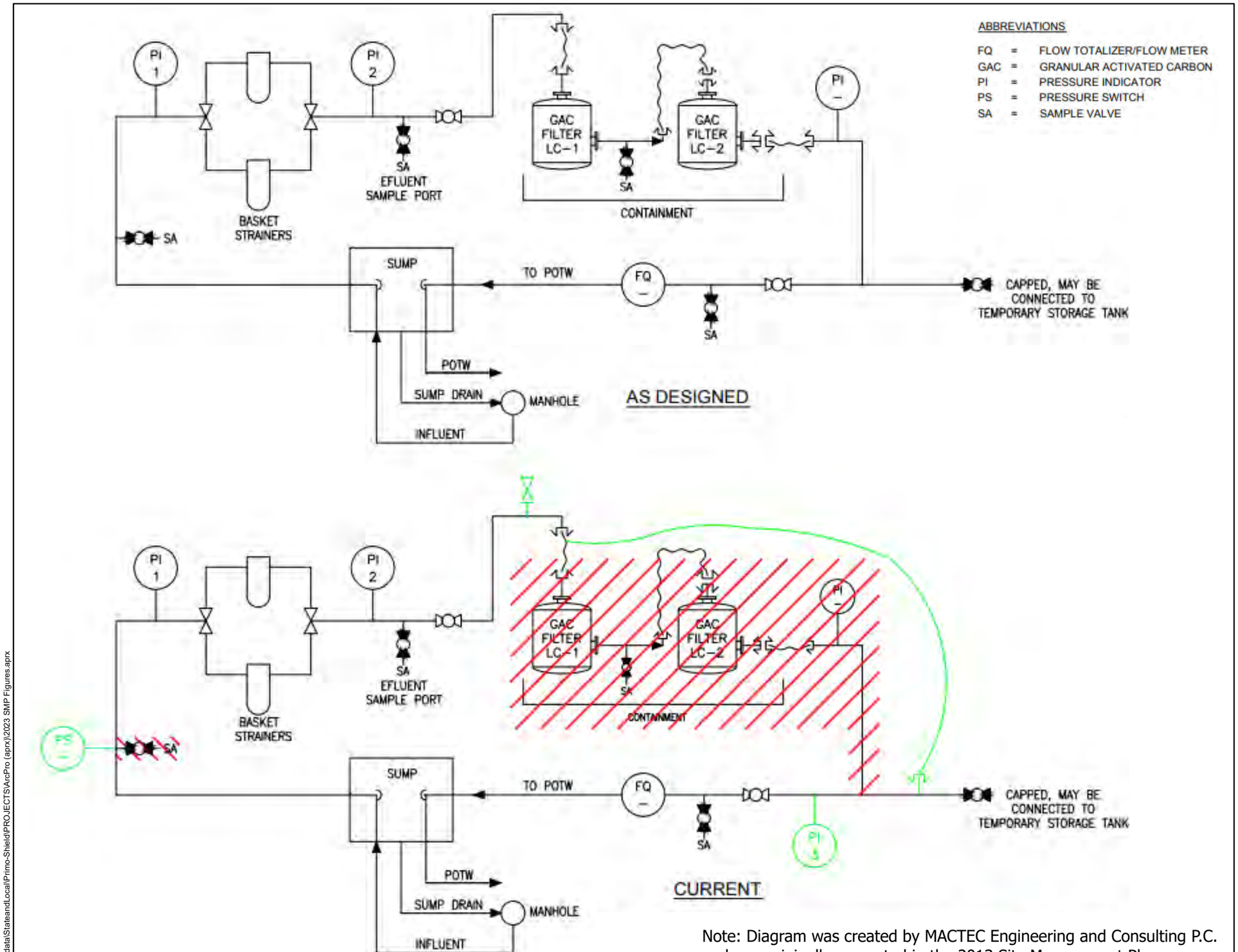


Figure 2-2
Exceedances of Class GA Groundwater Standards
September 2022

Primoshield Inc. (633027)
Utica, New York

Map Date: 12/18/2023
Projection: NAD 83 State Plane
New York Central 3102 (US Feet)
Source: ERSI

NEW YORK STATE Department of Environmental Conservation

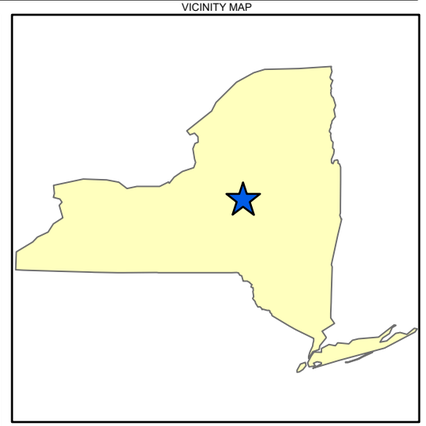


ABBREVIATIONS

FQ	=	FLOW TOTALIZER/FLOW METER
GAC	=	GRANULAR ACTIVATED CARBON
PI	=	PRESSURE INDICATOR
PS	=	PRESSURE SWITCH
SA	=	SAMPLE VALVE

Note: Diagram was created by MACTEC Engineering and Consulting P.C. and was originally presented in the 2013 Site Management Plan.

VICINITY MAP



Legend

= BALL VALVE - NORMALLY OPEN
= BALL VALVE - NORMALLY CLOSED
= HOSE AND KAMLOCK FITTINGS
= AIR RELEASE
= BYPASSED COMPONENTS

NOTE:
GREEN = COMPONENTS HAVE BEEN ADDED

Map Date: 12/18/2023
Projection:
Source:

NEW YORK STATE Department of Environmental Conservation

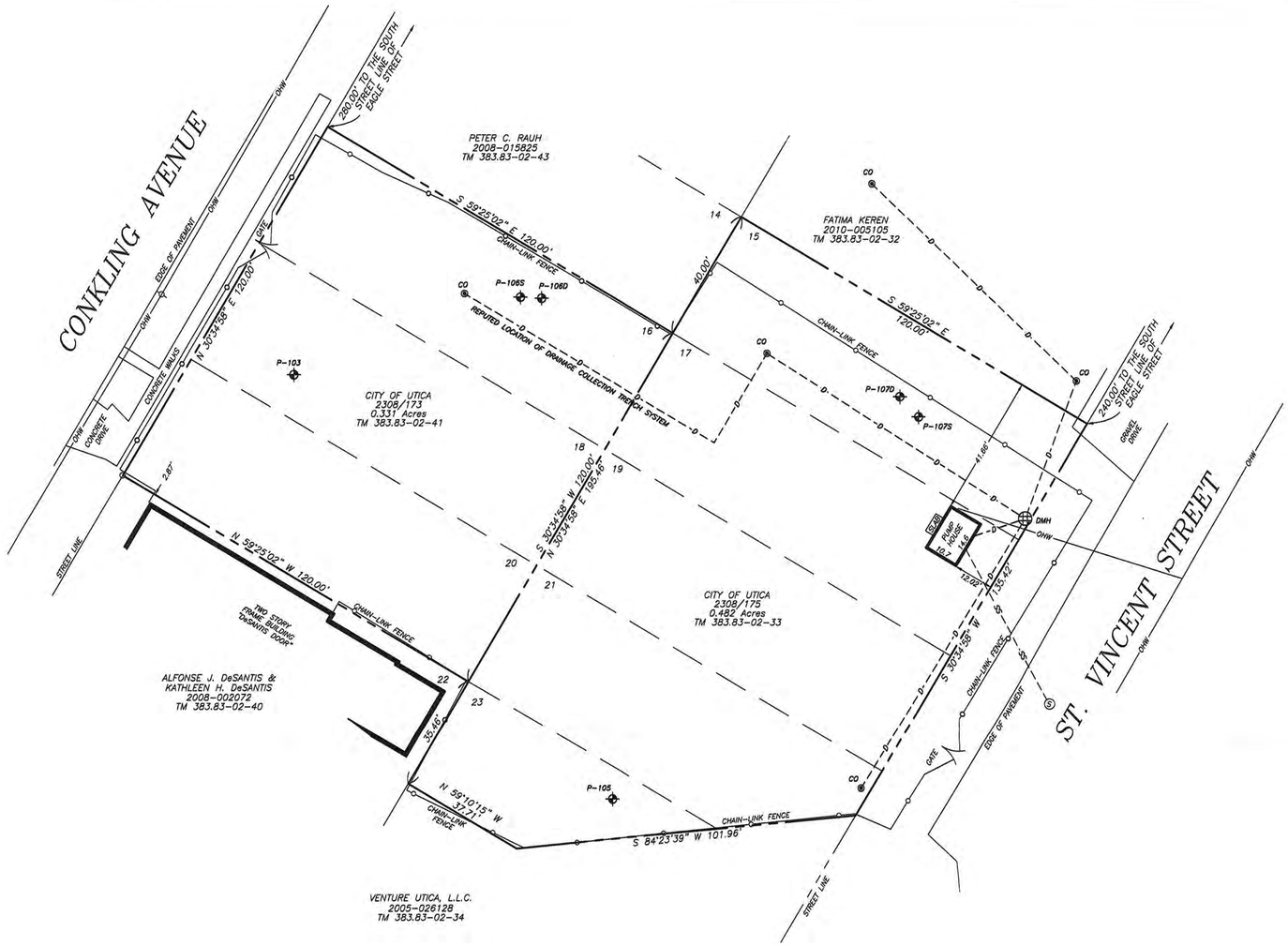
Figure 5-1
Treatment Process Flow Diagram
Primoshield Inc. (633027)
Utica, New York

G:\GIS\data\StateandLocal\Primo-Shield\PROJECTS\ArcPro (aprx)\2023 SMP Figures.aprx

Appendix A

Site Survey

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SURVEYOR'S DESCRIPTIONS

PARCEL 383.83-02-41

LOTS 16, 18 and 20, BLOCK 5
CITY of UTICA
ONEIDA COUNTY, NEW YORK

Beginning at a point located in the east street line of Conkling Avenue, at the southwest corner of lands now or formerly owned by Peter C. Rauh, as recorded in the Oneida County Clerk's Office as instrument 2008-015825. Said point being S 30° 34' 58" W, 280.00', from the south street line of Eagle Street, and running;

Thence, S 59° 25' 02" E, 120.00', along the south line of said Rauh, to a point located at the southeast corner of said Rauh;

Thence, S 30° 34' 58" W, 120.00', along the west line of lands now or formerly owned by the City of Utica, as recorded in the Oneida County Clerk's Office in liber 2308 of deeds at page 175, to a point located at the northeast corner of lands now or formerly owned by Alfonse J. DeSantis and Kathleen H. DeSantis, as recorded in the Oneida County Clerk's Office as instrument 2008-002072;

Thence, N 59° 25' 02" W, 120.00', along the north line of said DeSantis, to a point located at the northwest corner of said DeSantis, in the east street line of Conkling Avenue;

Thence, N 30° 34' 58" E, 120.00', along the east street line of Conkling Avenue, to the point and place of beginning.

Containing 0.331 Acres of land.

PARCEL 383.83-02-33

LOTS 15, 17 & 19, and Part of lots 21 & 23, BLOCK 5
CITY of UTICA
ONEIDA COUNTY, NEW YORK

Beginning at a point located in the west street line of St. Vincent Street, at the southeast corner of lands now or formerly owned by Fatima Keren, as recorded in the Oneida County Clerk's Office as instrument 2010-005105. Said point being S 30° 34' 58" W, 240.00', from the south street line of Eagle Street, and running;

Thence, S 30° 34' 58" W, 135.42', along the west street line of St. Vincent Street, to a point located at the northeast corner of lands now or formerly owned by Venture Utica, L.L.C., as recorded in the Oneida County Clerk's Office as instrument 2005-026128;

Thence, S 84° 23' 39" W, 101.96', along the north line of said Venture Utica, L.L.C., to an angle point;

Thence, N 59° 10' 15" W, 37.71', along the north line of said Venture Utica, L.L.C., to a point located at the northwest corner of said Venture Utica, L.L.C., in the east line of lands now or formerly owned by Alfonse J. DeSantis and Kathleen DeSantis, as recorded in the Oneida County Clerk's Office as instrument 2008-002072;

Thence, N 30° 34' 58" E, 195.46', along the east line of said DeSantis, the east line of lands now or formerly owned by the City of Utica as recorded in the Oneida County Clerk's Office in liber 2308 of deeds at page 173 and the east line of lands now or formerly owned by Peter C. Rauh, as recorded in the Oneida County Clerk's Office as instrument 2008-015825, to a point located at the southwest corner of said Keren;

Thence, S 59° 25' 02" E, 120.00', along the south line of said Keren, to the point and place of beginning.

Containing 0.482 Acres of land.

THE UNDERSIGNED SURVEYOR HEREBY CERTIFIES THAT THIS MAP IS MADE FROM AN ACTUAL SURVEY MADE ON THE GROUND OF THE PROPERTY SHOWN HEREON COMPLETED MAY 29, 2014.

JOHN S. DAMIANO LS
LS 050283

UNAUTHORIZED ALTERATIONS OR ADDITIONS TO A SURVEY MAP BEARING A LICENSED LAND SURVEYORS SEAL IS A VIOLATION OF SECTION 7209, SUBDIVISION 2 OF THE NEW YORK STATE EDUCATION LAW.

STATE OF NEW YORK · JOHN S. DAMIANO · LICENSED LAND SURVEYOR · 050283

NOTES:
THE ENGINEERING AND INSTITUTIONAL CONTROLS FOR THE EASEMENT ARE SET FORTH IN MORE DETAIL IN THE SITE MANAGEMENT PLAN ("SMP"). A COPY OF THE SMP MUST BE OBTAINED BY ANY PARTY WITH AN INTEREST IN THE PROPERTY. THE SMP MAY BE OBTAINED FROM THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, DIVISION OF ENVIRONMENTAL REMEDIATION, SITE CONTROL SECTION, 625 BROADWAY, ALBANY, NY 12233 OR BY SENDING AN E-MAIL REQUEST TO DERWEB@GW.DEC.STATE.NY.US

ENGINEERING CONTROLS/INSTITUTIONAL CONTROLS:
- *Land use is restricted to industrial use*
- *Groundwater use for is restricted unless treated for its intended use*
- *Access to the property must be given to the NYSDEC*
- *The owner shall not interfere or impair the engineering controls which include a manhole, pump house, underground trenches and associated piping and equipment, and monitoring wells.*

THE PROPERTY IS SUBJECT TO A DECLARATION OF COVENANTS AND RESTRICTIONS AND ENVIRONMENTAL EASEMENT HELD BY THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION PURSUANT TO TITLE 36 OF ARTICLE 71 OF THE NEW YORK ENVIRONMENTAL LAW.

LEGEND

- IRON PIPE FOUND
- P-## MONITORING WELL
- UTILITY POLE
- —OHW— OVERHEAD WIRES
- CO CLEAN-OUT
- DMH 4' DRAIN MANHOLE
- ----D---- UG COLLECTION TRENCH
- SANITARY MANHOLE
- ----SS---- SANITARY SEWER LINE (APPROXIMATE, NOT MARKED)
- ----- LOT LINE
- ——— PROPERTY LINE
- ——— ADJACENT PROPERTY LINE

GENERAL NOTES

1) SURVEY COMPLETED WITHOUT BENEFIT OF ABSTRACT OF TITLE.

2) GRID NORTH ESTABLISHED FROM THE NEW YORK STATE PLANE COORDINATE SYSTEM, CENTRAL ZONE, NAD-83.

3) SURVEY CONDUCTED MAY 29, 2014 BY JOHN DAMIANO, LS.

SCALE
20 10 0 20 FT.

REVISIONS

VALLEY COTTAGE — YEC, INC. — NEW YORK

PRIMOSHIELD SITE SURVEY

CITY OF UTICA
ONEIDA COUNT, NEW YORK

DATE:	SCALE:	DRAWN BY:	CHECKED BY:	JOB NO.
JUNE 2014	1" = 20'	MBW	JD	A0487

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Appendix B

Decision Document

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Department of Environmental Conservation

Division of Hazardous Waste Remediation

Primoshield Plating Site

Site Number 6-33-027

City of Utica

Oneida County, New York

Record of Decision

March 1995

New York State Department of Environmental Conservation

GEORGE E. PATAKI, *Governor* MICHAEL D. ZAGATA, *Commissioner*

Site Contacts*

Name	Contact Information	Required Notification**
Jasmine Stefansky New York State Department of Environmental Conservation Project Manager	518-402-9575 jasmine.stefansky@dec.ny.gov	All Notifications
Jeffrey Dyber New York State Department of Environmental Conservation Project Manager's Supervisor	518-402-9621 jeffrey.dyber@dec.ny.gov	All Notifications
Kelly Lewandowski New York State Department of Environmental Conservation Site Control	518-402-9569 kelly.lewandowski@dec.ny.gov	Notifications 1 and 8
Anthony Perretta New York State Department of Health Project Manager	518-402-7860 BEEI@health.ny.gov	Notifications 4, 6, and 7
Adam Etringer EA Engineering and Geology, P.C. Project Manager	315-565-6564 aetringer@eaest.com	All Notifications

Notes:

* Notifications are subject to change and will be updated as necessary.

** Numbers in this column reference the numbered bullets in the notification list in this section.

PRIMOSHIELD PLATING SITE
CITY OF UTICA - TITLE 3 PROJECT
SITE NO.: 6-33-027

RECORD OF DECISION
MARCH 1995

PREPARED BY:
NEW YORK STATE DEPARTMENT OF
ENVIRONMENTAL CONSERVATION
DIVISION OF HAZARDOUS WASTE REMEDIATION

DECLARATION STATEMENT - RECORD OF DECISION

Primoshield Plating Site
City of Utica, Oneida County, New York
Title 3 Project
Site Code: 6-33-027

Statement of Purpose and Basis:

The Record of Decision (ROD) presents the selected remedial action for the Primoshield Plating Inactive Hazardous Waste Disposal Site which was chosen in accordance with the New York State Environmental Conservation Law (ECL). The remedial program selected is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40 CFR 300).

This decision is based upon the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for the Primoshield Plating Inactive Hazardous Waste Site and upon public input to the Proposed Remedial Action Plan (PRAP) presented by the NYSDEC. A bibliography of the documents included as a part of the Administrative Record is included in Appendix A of the ROD.

Assessment of the Site:

Actual or threatened release of hazardous waste constituents from this site, if not addressed by implementing the response action selected in this ROD, presents a current or potential threat to public health and the environment.

Description of Selected Remedy:

Based upon the results of the Remedial Investigation/Feasibility Study (RI/FS) for the Primoshield Plating Site and the criteria identified for evaluation of alternatives, the NYSDEC has selected the following remedy for the Site:

- Excavate approximately the top one foot of contaminated surface soil from the Primoshield Site and similar areas of impacted surface soils from the adjacent private property for off-site disposal at an approved facility. Backfill excavated areas with compacted clean fill and a vegetated topsoil cover.

- Identify, locate and properly terminate (or separate) all existing utilities on-site. Excavate and remove on-site sewer lines (and any associated contaminated soils) for disposal at an approved off-site facility. Separation of currently operational on-site sewer lines (and/or other utilities) may also be required.

- In consultation and cooperation with homeowners, thoroughly clean walls, floor and sumps in the adjacent residence basement (low pressure wash and rinse etc.). Following cleaning, seal the interior south basement wall of the adjacent residence with a waterproof sealant or coating. Remove existing basement sump sediments (and any other basement cleaning residuals) for disposal at approved off-site facilities.

- Excavate and dispose of off-site, contaminated floor pit soils and other contaminated soils beneath or adjacent to the floors and foundation walls of the three existing Primoshield Site buildings (controlled demolition of these three existing buildings will be required to complete this part of the site remediation).

- Install and operate a shallow groundwater interceptor trench and collection system. Periodically remove collected groundwater to the Oneida County POTW by truck for final treatment and disposal.

- Monitor site groundwater and any seepage into the adjacent residence basement.

New York State Department of Health Acceptance:

The New York State Department of Health (NYSDOH) concurs with the remedy selected for this site as being protective of human health.

Declaration

The selected remedy is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies, to the maximum extent practicable, and satisfies the statutory preference for remedies that reduce toxicity, mobility or volume as a principal element.

3/30/95
Date

Michael J. O'Toole, Jr.
Director
Division of Hazardous Waste Remediation

REPORT CONTENTS

Section	Title	Page
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Section 2:	Site History	1
Section 3:	Current Status	2
Section 4:	Enforcement Status	6
Section 5:	Summary of the Remediation Goals	6
Section 6:	Summary of the Evaluation of Alternatives	7
Section 7:	Summary of the Government Decision for the Selected Remedy	12
Section 8:	Highlights of Community Participation	14

Appendices

Appendix A:	Administrative Record
Appendix B:	Responsiveness Summary

ILLUSTRATIONS

Figures

Figure 1: Site Location Map

Figure 2: Elevated Heavy Metals Concentrations in Surface Soils

Figure 3: Metals & Volatile Organic Compound Plume in Shallow Groundwater

Figure 4: (Not Utilized)

Figure 5: Conceptual Design

Tables

Table 1: Contaminants of Concern at the Primoshield Site (6-33-027)

Table 2: Human Health Risk, 1212 St. Vincent Street

Table 3: Human Health Risk, Adjacent Residence

Table 4: Primoshield Site, Remedial Alternatives, Major Components

Table 5: Remedial Cost Estimates

SECTION 1: SITE LOCATION AND DESCRIPTION

Primoshield Inc. is a former Metal Electroplating facility located at 1212 St. Vincent Street; Utica, New York 13501. The site is located in a mixed commercial/residential area within the City of Utica and is also located in Oneida County and NYSDEC Region 6. Due to past operations and the presence of hazardous wastes at the site, it has been listed as a Class 2 Inactive Hazardous Waste Site (Code No.: 6-33-027) on the NYSDEC registry of inactive hazardous waste sites. The site is bordered by Conkling Avenue on the northwest and St. Vincent Street to the south and east. The DePaul commercial building and property border the site on the southwest and two residential properties border the site on the northeast (see Figures 1 & 2). The site, as defined in the registry, consists of the Primoshield Plating property and the adjacent DePaul Building cinder and gravel parking lot which together total approximately 2.4 acres. The Mohawk River is located downgradient from and approximately one and one half miles to the north of the site. The former Bossert Manufacturing Plant (Site Code: 6-33-029) is located approximately one mile to the west of the Primoshield Site and is also a hazardous waste site and a City of Utica Title 3 Project.

SECTION 2: SITE HISTORY

2.1: Operational/Disposal History

Primoshield Inc. was a metal electroplating facility that operated from the early 1970s until August 1985. The Primoshield property consists of a factory or production building, a small office building, a small laboratory and a storage trailer all of which are in an advanced state of disrepair.

A large number of drums and open vats (some containing acids, cyanide solutions and spent plating solutions) were left behind when the facility was abandoned by its owners following a fire which occurred during August of 1985.

Local citizen concerns regarding health and safety issues associated with this site were transmitted to the NYSDEC. Following an initial site reconnaissance and sampling effort by NYSDEC in December of 1985, laboratory sample results indicated a very high risk to the public from the site at that time. Consequently, on March 12, 1986 the NYSDEC formally petitioned the U.S. EPA Region II Office to perform an Emergency Response and Removal Action at the Primoshield Site, including but not limited to, the cleanup and removal of the surficial and containerized hazardous wastes and the installation of a fence and gate system to resecure the site.

2.2: Remedial History

During 1986 and 1987 the USEPA conducted an emergency response and removal action at the Primoshield Site. All of the containerized waste and most of the accessible surficial waste materials were removed from the site during this initial cleanup and taken to approved off-site disposal

facilities. Site security was also established by the installation of a chain link fence and gate system. In November 1987, U.S. EPA emergency response and cleanup actions at the Primoshield Site were completed and jurisdiction for further remedial action at the site was returned to NYSDEC.

Following the fire which occurred in August 1985, the Primoshield facility was abandoned by its owners and the City of Utica subsequently assumed ownership of the property due to non-payment of taxes. In December of 1989, the NYSDEC signed a negotiated Order on Consent with the City of Utica which agreed to perform a Remedial Investigation/Feasibility Study (RI/FS) to further investigate and remediate residual hazardous waste contamination remaining at the site. The City of Utica applied for and received State assistance (75% sharing of eligible costs) under Title 3 of the New York State (NYS) 1986 Environmental Quality Bond Act (EQBA) (State Assistance Contract No. C300241) to complete an RI/FS at the Primoshield Site. The City of Utica subsequently retained O'Brien and Gere Engineers Inc. (Syracuse, N.Y.) and Harza Northeast Inc. (Utica, N.Y.) to provide engineering services and technical support.

In April 1991 an initial site reconnaissance for the RI/FS program was conducted at the site. The reconnaissance consisted of a walkover of the Site and surrounding areas, underground storage tank sampling and a preliminary building structural survey. Based on the results of the Site reconnaissance, previous U.S. EPA sampling efforts, previous U.S. EPA response reports, and a comprehensive file and literature search, the following RI/FS program documents were developed: Program Scope and Work Plan (WP), Project Title 3 Budget, Health and Safety Plan (HASP), Quality Assurance Project Plan (QAPP), Field Sampling Plan (FSP), Site History, and Waste Management Plan (WMP).

SECTION 3: CURRENT STATUS

In response to a determination that the presence of hazardous waste at the Site presents a significant threat to human health, the City of Utica has recently completed a Remedial Investigation/Feasibility Study (RI/FS).

3.1: Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site.

The RI was conducted in a single phase beginning with a site baseline survey which was initiated during September/October 1992 and ending with groundwater sample collection and analyses during September 1993. Some additional sample collection and analyses (primarily for metals in surface soils and TCLP testing of building materials) was conducted after April 1993 to fill in gaps in the data base. A one day on-site air quality sampling and monitoring program conducted on August 29, 1994 was the final field data collection (to date) for the Primoshield Site Remedial Investigation.

The following activities were conducted as part of or in support of the Remedial Investigation (RI) at the Primoshield Site (more complete information can be found in the RI Report):

- *Perform a Site Baseline Survey & Establish a Sampling Grid*
- *Perform a Soil Vapor Survey and a Geophysical Survey and install Ground Water Monitoring Wells [Includes subsurface soil sampling and analyses and groundwater sampling and analyses]*
- *Complete Surface Soil Sampling and Analyses. (Consultants & NYSDOH)*
- *Perform Sediment Sampling (manholes, catch basin, and building sumps); Perform Residential Basement Sampling (sump, water and sediment)*
- *Sample Building Structural Materials*
- *Perform a Human Health Risk Assessment (HRA)*
- *Complete a Fish and Wildlife Impact Analysis [Step I]*

In order to determine which media (soil, groundwater, etc.) contain contamination at levels of concern, the analytical data obtained from the RI were compared to Standards, Criteria, and Guidance (SCGs). Groundwater, drinking water and surface water SCGs which were identified for the Primoshield site were based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part V of the NYS Sanitary Code. For the evaluation and interpretation of soil and sediment analytical results, NYSDEC soil cleanup guidelines for the protection of groundwater, background conditions, and risk-based remediation criteria were used to develop remediation goals for soil and sediment. Based upon the limited amount of data generated from on-site air quality monitoring during the site investigation (RI), ambient air quality does not appear to be adversely affected by the site at this time. However, due to the close proximity of neighboring residences, real time ambient air quality monitoring (e.g. particulates, heavy metals, and VOCs) will be required during remedial construction. Acceptable air quality parameter levels during remedial construction will be based on health and safety criteria for both on-site workers and for nearby residents.

Based upon the results of the remedial investigation in comparison to the SCGs and potential public health and environmental exposure routes, certain specific areas and media of the site require remediation. These are summarized below. More complete information can be found in the RI Report.

Chemical concentrations are reported in parts per billion (ppb), parts per million (ppm), and parts per billion by volume (ppbv) for air samples. For comparison purposes, SCGs (where available) are given for each medium.

Site related contaminants of concern in surface soil were identified (based on the results of the RI) as cadmium, chromium, nickel and cyanide. Site-related contaminants in groundwater above class GA groundwater standards included trichloroethene, 1,1,1-trichloroethane, 1,1 dichloroethane and chromium. Water and sediment samples collected from the sumps in the basement of the adjacent residence indicated elevated concentration levels for both volatile organic compounds (VOCs) (1,1-dichloroethane; 1,1,1 trichloroethane; and trichloroethene) and heavy metals/inorganics (cadmium, chromium, lead, nickel, and cyanide). These elevated concentration levels of both VOCs and heavy metals/inorganics in both the

groundwater and the sediment in the basement of the adjacent residence indicate the need to address these two media during site remediation.

Average and maximum concentration values for parameters of concern in various media are contained in Table 1 attached. Where appropriate, site background concentration levels and/or applicable regulatory guidelines or criteria are also listed in this table.

Surface soils are primarily contaminated with inorganics (metals and cyanide) and with the exception of a few relatively small areas, the contamination in surface soil which exceeds site cleanup criteria is generally limited to the top 12 inches. The total estimated areal extent of impacted surface soil is approximately 4,100 square yards. The current total volume estimate of contaminated surface soils is approximately 1,600 cubic yards. The plan area of the shallow groundwater plume at the site is currently estimated to be approximately one-half acre in size and to contain a saturated thickness of approximately six feet beginning at approximately four feet below existing grade. Contamination of the shallow groundwater system is due primarily to a limited number of Volatile Organic Compounds (VOCs) and metals (see Table 1). The shallow surficial overburden strata (generally less than 20 feet in total thickness) at the site are underlain by approximately 50 or more feet of dense silt/clay rich glacial till which functions as a barrier or aquitard preventing the vertical migration of contaminated groundwater at the site. Both the surficial soil contamination and the shallow groundwater contamination extend a short distance to the north from the Primoshield property onto the adjoining property.

Current analytical data for the site and adjacent areas developed during the RI, indicate that surface soil cleanup criteria as outlined in NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 92-4046 are not being met both on the Primoshield Site itself and on the adjoining residential property to the North. The RI data also indicate that current NYS Class GA Ground Water Standards for a number of parameters are not being met at the site and at the adjoining property. (See Table 1 attached).

A comprehensive Human Health Risk Assessment (HRA) was performed as part of the RI for this site. A detailed discussion of the results of the Risk Assessment is contained in the RI report. A summary of current risks at the Primoshield property and at the adjacent property is contained in Tables 2 and 3 attached. Current human health risks at the Primoshield Site and at the adjoining property exceed levels considered to be acceptable by both the NYSDOH and the USEPA. Following the implementation and operation of the remedial actions proposed for the Primoshield Site, risk levels both on-site and off-site should be reduced to acceptable levels.

3.2. Interim Remedial Measures:

Interim Remedial Measures (IRMs) are conducted at sites when a source of contamination or exposure pathway can be effectively addressed before completion of the RI/FS.

A number of IRMs were under consideration during the RI/FS at the Primoshield Site. The following two IRMs were implemented:

1. On June 15, 1993 an interim structural brace (tubular metal scaffolding system) was installed in roughly the center of the main production building, to transfer roof loading from an isolated unbraced vertical column which appeared to be close to failure.

2. On April 19, 1994 a site surficial cleanup was held at the Primoshield Site. Scrap metal and scrap lumber were collected and stockpiled for later recycling and/or disposal. Brush was cleared and stockpiled and miscellaneous waste and debris were collected and stockpiled for later disposal off-site.

3.3 Summary of Human Exposure Pathways:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the health risks can be found in Section 8 - "Risk Assessment" of the September 1994 RI Report.

An exposure pathway is the process by which an individual comes into contact with a contaminant. The five elements of an exposure pathway are: 1) the source of contamination; 2) the environmental media and transport mechanisms; 3) the point of exposure; 4) the route of exposure; and 5) the receptor population. These elements of an exposure pathway may be based on past, present, or future events.

Completed pathways which are known to or may exist at the site include:

- Adjacent residence - Complete exposure pathways are incidental soil ingestion, dermal contact with soils, and dermal contact with basement sump sediments.

- Primoshield Property - Trespassers to this portion of the site are potential receptors. Currently there is a slight potential for trespassers to be exposed to residues in surface soils via incidental ingestion and dermal contact.

See Tables 8-1 through 8-4 in the September 1994 RI Report for a more specific discussion of the Primoshield Risk Assessment Exposure Pathway Analysis.

Current USEPA Risk Guidelines (both cancer & non-cancer) are exceeded at the Primoshield property and the adjacent residence. See Tables 2 and 3 attached for specific risk levels.

3.4 Summary of Environmental Exposure Pathways:

This section summarizes the types of environmental exposures which may be presented by the site. The Habitat Based Assessment included in the RI presents a more detailed discussion of the potential impacts from the site to fish and wildlife resources. The following potential pathway for environmental exposure has been identified:

- Discharge of heavy metals and VOCs from the site through the existing sewer lines into the Oneida County sewer system and then either directly or indirectly into the Mohawk River.

This pathway will be broken during remedial construction when the existing site sewer lines are excavated for disposal at an approved facility off-site. Existing site connections to the Oneida County sewer system will be terminated and the excavations restored to the original grade with compacted clean fill and a vegetated topsoil surface layer.

A Step I Fish and Wildlife Impact Analysis (FWIA) was completed in accordance with NYSDEC guidelines as part of the RI (see RI Section 7) to identify potential ecological receptors that inhabit the study area and vicinity and to evaluate the potential for impact on these receptors based on study area conditions and exposure pathways.

FWIA conclusions included:

- The majority of the Site and adjacent land area is extensively developed resulting in their classification as cultural cover types.

- Other than the Mohawk River, (noted previously) there are no nearby surface waters or wetlands present in the study area that could be affected by the Site.

- The Site is only minimally used by urbanized bird species because of the poor habitat quality, lack of food sources, and availability of better habitat in adjacent areas.

- No complete exposure pathways (other than the Mohawk River noted previously) were identified because of the general lack of ecological receptors on the Site.

Based upon the results of the Step 1 Fish and Wildlife Impact Analysis, no additional Fish and Wildlife Impact assessment has been determined to be necessary at this time.

SECTION 4: ENFORCEMENT STATUS

The City of Utica has retained outside counsel to pursue Potentially Responsible Parties (PRPs). PRPs are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The NYSDEC and the City of Utica entered into a negotiated Consent Order on December 27, 1989. The Order obligates the City of Utica to implement a full remedial program at the Primoshield Site and through a State Assistance Contract allows reimbursement to the City of Utica (from the 1986 EQBA Title 3 Program) of up to 75 percent of the eligible cost of the remediation.

SECTION 5: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10. These goals are established under the overall goal of meeting all standards, criteria, and guidance (SCGs) and protecting human health and the environment.

At a minimum, the remedy selected should eliminate or mitigate all significant threats to the public health and to the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The goals selected for this site are:

- Reduce, control, or eliminate the contamination present within the soils on site.

- Eliminate the threat to surface waters by eliminating any future contaminated surface run-off from the contaminated soils on site, and any potential future discharge from site sewer lines to the Oneida County Sewer System.

- Eliminate the potential for direct human contact with the contaminated soils on site.

- Mitigate the impacts of contaminated groundwater to the environment and to nearby residents.

- Prevent, to the extent possible, migration of contaminants in the soils to groundwater.

- Provide for attainment of SCGs for groundwater quality at the limits of the area of concern (AOC).

- Remediate the site and adjoining property to provide for future delisting and unrestricted use.

SECTION 6: SUMMARY OF THE EVALUATION OF ALTERNATIVES

Potential remedial alternatives for the Primoshield Site were identified, screened and evaluated in a Feasibility Study. This evaluation is presented in the report entitled Primoshield Final Feasibility Study (FS) January 1995. A summary of the detailed analysis follows.

6.1: Description of Alternatives

The potential remedies are intended to address the contaminated surface soils, sediments, other soils (e.g. sewer line or seepage pit soils) and groundwater at the site. The following is a brief description of each of the four (4) remedial alternatives proposed for the Primoshield Site:

Alternative 1 - No Action

The no action alternative is evaluated as a procedural requirement and as a basis for comparison.

Under this alternative the site would remain in its present condition and human health and the environment would not be provided any additional protection.

For the Primoshield Site, this alternative would consist of the following components:

- Establish Deed Restrictions (these would apply to the Primoshield property only)

- Continue to restrict access to the site by means of a long term program to maintain the existing fence and gate system (this would apply to the Primoshield property only) and

- Implement a long term groundwater monitoring program at the site and at the adjacent residence.

The cost to implement Alternative 1 has been estimated as follows based on an interest rate of 5% and a projected life cycle of 30 years (both are estimated values):

Present Worth (Total)	=	$ 118,000
Capital Costs	=	$ 5,000
Annual O&M Costs	=	$ 31,000

It is estimated that approximately 6 months to 1 year would be required to implement proposed Alternatives 2, 3, or 4. It is estimated that significantly less time would be required to implement proposed Alternative 1.

Alternative 2 - Surface Soil Removal

Alternative 2 involves the excavation and stockpiling of contaminated surface soils (generally the top 12 inches in most areas) and the removal of these materials off-site for final treatment and/or disposal at approved facilities. The following additional components are common to Alternatives 2, 3, and 4:

- Backfill excavated areas with compacted clean fill and a vegetated surface topsoil layer.
- Excavation, removal and disposal of on-site sewer lines and any associated contaminated soils.
- Removal and off-site disposal of resident basement sump sediments.
- Clean walls, floor and sumps of resident basement (in consultation and cooperation with homeowners).
- Install groundwater interceptor/collection trench and associated underground storage tank.
- Periodically transport collected groundwater by truck to the Oneida County POTW for treatment and discharge.
- Provide a long term (currently estimated at 15 years maximum) monitoring program for the resident basement sumps and site groundwater.
- Excavate and remove contaminated soil from building floor pits, beneath floor slabs, and from below and adjacent to building foundations for subsequent off-site treatment and/or disposal.
- Segregate and package any RCRA listed hazardous wastes for manifesting and subsequent shipment off-site to approved TSD facilities.

The cost to implement Alternative 2 has been estimated as follows based on an interest rate of 5% and a projected life cycle of 15 years (both are estimated values):

Present Worth (Total) = $ 1,059,000
Capital Cost = $ 637,000
Annual O&M Cost = $ 62,000

Alternative 3 - Surface Soil Cover

Alternative 3 differs from Alternative 2 in that; instead of excavation, removal and off-site treatment and/or disposal of the contaminated 12 inch surface soil layer from the site and adjoining area to the north; these areas of contaminated soil would be left in place and covered over with a clean vegetated soil cover (estimated thickness of 12 inches). Alternative 3 would also require that deed restrictions and security

fencing be maintained at the site long term (plus 30 years). These last two restrictions could only be applied to the Primoshield property itself (which is currently owned by the City of Utica) but not to adjoining properties which are not currently owned by the City of Utica.

The cost to implement Alternative 3 has been estimated as follows based on an interest rate of 5% and a project life cycle of 15 years (both are estimated values):

Present Worth (Total) = $ 845,000
Capital Cost = $ 422,000
Annual O&M Cost = $ 62,000

Alternative 4 - Surface Soil Treatment

Alternative 4 differs from Alternative 2 in that; instead of excavation, removal and off-site treatment and/or disposal of the contaminated 12 inch surface soil layer from the site and adjoining area to the north; these areas of contaminated soil would be excavated and the soils treated "Ex-situ" to chemically bind or fix the heavy metal contaminants in the soil matrix. Following treatment, the heavy metal contaminants would be resistant to movement or transport from the stabilized soil mass or matrix. After treatment, the stabilized soil would be recompacted in place and covered with a surface vegetated soil layer.

The cost to implement Alternative 4 has been estimated as follows based on an interest rate of 5% and a project life cycle of 15 years (both are estimated values):

Present Worth (Total) = $ 982,000
Capital Cost = $ 575,000
Annual O&M Cost = $ 64,000

Refer to Table 4 (attached) for a detailed listing or comparison of the components of the four (primary) remedial alternatives currently being proposed for the Primoshield Site (6-33-027).

A detailed cost comparison of the proposed remedial alternatives for this site is provided in Table 5 (attached).

6.2. Evaluation of Remedial Alternatives

The criteria used to compare the potential remedial alternatives are defined in the regulation that directs the remediation of inactive hazardous waste sites in New York State (6NYCRR Part 375). For each of the criteria, a brief description is provided followed by an evaluation of the alternatives against that criterion. A detailed discussion of the evaluation criteria and comparative analysis is contained in the January 1995 Feasibility Study (FS).

The first two evaluation criteria are termed threshold criteria and must be satisfied in order for an alternative to be considered for selection.

1. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether or not a remedy will meet applicable environmental laws, regulations, standards, and guidance.

Alternative 1 (No Action) would not meet Evaluation Criteria 1 (Compliance with SCGs). Alternative 2 (Surface Soil Excavation and Removal) would meet Evaluation Criteria 1. Alternative 3 (Surface Soil Vegetated Cover) would not meet Evaluation Criteria 1 (Failure due to elevated metals contamination in surface soils). Alternative 4 (Surface Soil Excavation, Ex situ Treatment, and Replacement) would meet Evaluation Criteria 1.

2. Protection of Human Health and the Environment. This criterion is an overall evaluation of the health and environmental impacts to assess whether each alternative is protective.

Alternative 1 would not meet Evaluation Criteria 2 (Protection of Human Health and the Environment). Alternative 2 would meet Evaluation Criteria 2. Alternative 3 would be likely to meet Evaluation Criteria 2 in the short term (5 to 10 year period following remedial construction) but may not meet Evaluation Criteria 2 in the long term should the site experience cover erosion. This is primarily the result of the large amount of untreated contaminated material (primarily surface soil) which would remain at the site following remedial construction. Alternative No. 3 is also less protective of groundwater than Alternative No. 2. Alternative 4 would meet Evaluation Criteria 2.

3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared with the other alternatives.

Alternative 1 would not achieve remedial objectives and would be only minimally effective in the short term. Other potential short term adverse impacts of Alternative 1 would be minimal to none. Alternatives 2, 3, and 4 would all be effective in the short term. Remedial construction activities associated with Alternatives (2, 3 or 4) would result in some potential short term impacts (primarily to the neighboring community). These potential short term impacts (e.g., dust, noise, etc) are considered to be approximately the same order of magnitude for each of these three alternatives, are amenable to at least partial mitigation with currently available technology, and are considered to be generally acceptable for the short duration required for remedial construction. Except for site groundwater, remedial objectives (for Alternatives 2, 3, and 4) should be achieved following the completion of remedial construction activities. It is currently estimated that (for Alternatives 2, 3, or 4) remediation of site groundwater would be completed within approximately a 15 year period following the completion of remedial construction activities. This estimate may be optimistic for Alternative 3.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of alternatives after implementation of the response actions. If wastes or treated residuals remain on site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the controls intended to limit the risk, and 3) the reliability of these controls.

Alternative 1 would not be an effective or permanent remedy for the long term. Due to the inadequacy of remedial measures associated with Alternative 1, large quantities of contaminated materials would remain on-site indefinitely following remediation. Residual risk levels would remain high to very high (in particular with respect to nearby human populations) and the adequacy and reliability of controls intended to limit the risk would be marginally adequate to inadequate. Alternative 2 would provide a permanent and effective remedy for the long term. Alternative 3 would be only a partially effective remedy for the long term. Contaminated surface soils would be covered with a shallow (1 foot) vegetated topsoil layer. Due to remaining contaminated materials and associated residual risk levels, this proposed remedy is considered to be of moderate to low reliability and adequacy over the long term. Alternative 4 would provide a permanent and effective remedy for the long term. The descending order of preference for the four remedial alternatives being considered (with respect to long term effectiveness and permanence) is as follows: Alternative 2, 4, 3 and 1.

5. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

Alternative 1 would not result in a reduction of toxicity, mobility or volume of contaminated materials at the site. Alternative 2 would result in reductions of toxicity, mobility and volume of contaminated materials (primarily surface soils) following remediation. Alternative 3 would not reduce the toxicity of contaminated materials at the site. It would result in a partial reduction of mobility of the contaminants (primarily in the surface soil). Also, it is likely that the period of time required to remediate site groundwater would be longer than that required for Alternatives 2 and 4.

Alternative 4 would result in a reduction of mobility of contaminants and possibly a reduction in toxicity (primarily for contaminated surface soils). This remedy would also result in an increase in volume of contaminated materials (primarily surface soils) at the site.

6. Implementability. The technical and administrative feasibility of implementing each alternative is evaluated. Technically, this includes the difficulties associated with the construction, the reliability of the technology, and the ability to monitor the effectiveness of the remedy. Administratively, the availability of the necessary personal and material is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc..

All four Alternatives could be readily implemented from both a technical and an administrative standpoint. It should be noted that deed restrictions and access restrictions (fencing and gates) can only be applied to the Primoshield property itself. These restrictions can not be applied to neighboring properties without the consent of the current owners.

7. Cost. Capital and operation and maintenance (O&M) costs are estimated for each alternative and compared on a present worth basis. Although cost is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the remaining criteria, cost effectiveness can be used as the basis for the final decision. The costs for each alternative are presented in Table 5.

The total (Capital plus O&M) costs for the four alternatives (1 through 4) are summarized below:

- Alternative 1, No Action - $118,000
- Alternative 2, Surface Soil Removal - $1,059,000
- Alternative 3, Surface Soil Cover - $845,000
- Alternative 4, Surface Soil Treatment - $982,000

8. Community Acceptance - Concerns of the community regarding the RI/FS reports and the Proposed Remedial Action Plan (PRAP) were evaluated during a Public Meeting and 30 day Public Comment Period. A " Responsiveness Summary" has been prepared that describes public comments received and how the Department has addressed the concerns raised.

SECTION 7: SUMMARY OF THE GOVERNMENT DECISION FOR THE SELECTED REMEDY

Based upon the results of the RI/FS, and the evaluation presented in Section 7, the NYSDEC is proposing Alternative 2 as the remedy for this site.

This selection is based upon the evaluation contained in Section 7 and the conclusion that Alternative 2 best satisfies the initial two threshold criteria and the five primary balancing criteria. It is also anticipated that Alternative 2 would be most acceptable (of the four alternatives considered) to the City of Utica and to the neighboring community. Alternative 1 (No Action) would be significantly less costly than the other three alternatives being considered, but it was rejected as unsuitable since it would not be able to satisfy the two basic threshold criteria (1&2). Alternatives 2, 3 and 4 were all significantly more expensive (approximately $1 million to 0.85 million) than Alternative 1 ($118,000) but the cost difference between Alternatives 2, 3 and 4 is relatively small with Alternative 3 being the least expensive at $0.845 million (total cost) and Alternative 2 being the most expensive at $1.059 million (total cost). Alternative 2 would have the greatest Long-term Effectiveness and Permanence and also the greatest reduction of toxicity, mobility or volume of the three alternatives remaining. All three remaining alternatives can be readily implemented. However, of these three alternatives, Alternatives 2 and 3 would appear to be the most readily implementable. If alternative 2 is fully implemented, no waiver of standards (SCGs) would be required.

Further reasons for not selecting Alternatives 3 and 4 are as follows:

Alternative 4 has the potential to alter localized runoff patterns due to grade changes caused by replacement of the treated waste volumes. In addition, placement of the treated wastes on-site alters existing local topography and further reduces future redevelopment options for this property. Selection of Alternative 4 would also make future delisting of this site from the registry less likely when compared to the selection of Alternative 2.

Alternative 3 would leave significant quantities of untreated waste on-site following Remedial Construction. This action would require waiver of SCGs and would likely result in prolonging the groundwater collection and treatment needs. This in turn would result in even higher O&M costs than are currently shown in Table 5. Future delisting of this site from the registry would be difficult if not impossible. Future redevelopment options for this property would be restricted significantly.

The estimated present worth cost to implement the selected remedy is $1.059 million. The cost to construct the remedy is estimated to be $637,000 and the estimated average annual operation and maintenance cost for 15 years is $62,000 per year. The Present Worth of the Annual O&M Costs for 15 years at 5% interest is $421,000.

The elements of the selected remedy are as follows:

1. A Remedial Design (RD) program to verify the components of the conceptual design and provide the details necessary for the construction, operation, maintenance, and monitoring of the selected remedy.

2. Site Remedial Construction or Remedial Action.

3. Any uncertainties identified during the RI/FS will be resolved during Remedial Design/Construction.

The following is a summary of the elements or components of Remedial Alternative 2:

- Excavate approximately the top one foot of surface soil from the Primoshield Site and similar areas of impacted surface soils from the adjacent residential property for off-site disposal at an approved facility.

- Backfill excavated areas with compacted clean fill and a vegetated topsoil cover.

- Identify, locate and properly terminate (or separate) all existing utilities on-site.

- Excavate and remove on-site sewer lines (and any associated contaminated soils) for disposal at an approved off-site facility. Separation of currently operational on-site sewer lines (and/or other utilities) may also be required.

- In consultation and cooperation with the homeowners of the affected residential property, thoroughly clean walls, floor and sumps in the adjacent residence basement (low pressure wash and rinse etc.).

- Following cleaning, seal the interior south basement wall of the adjacent residence with a waterproof sealant or coating.

- Remove existing basement sump sediments (and any other basement cleaning residuals) for disposal at approved off-site facilities.

- Excavate and remove contaminated floor pit soils and other contaminated soils beneath or adjacent to the floors and foundation walls of the three existing Primoshield Site buildings (controlled demolition of these three existing buildings will be required to complete this part of the site remediation).

- Install and operate a shallow groundwater interceptor trench and collection system.

- Periodically remove collected groundwater to the Oneida County POTW by truck for final treatment and disposal.

- Monitor site groundwater and any seepage into the adjacent residence basement.

- Dispose of excavated soils and other remediation residuals (including any RCRA listed hazardous wastes) at approved off-site facilities.

Following Remedial Construction a long term monitoring program will be instituted. This program will allow the effectiveness of the selected remedy to be monitored. This long term monitoring program will be a component of the operations and maintenance (O&M) for the site and will be developed by the City of Utica (in cooperation with the NYSDEC and NYSDOH) during Remedial Design and Construction .

SECTION 8: HIGHLIGHTS OF COMMUNITY PARTICIPATION

The NYSDEC relies on public input to ensure that the remedies selected for this site meet the needs and concerns of the community and that the remedies are an effective solution to the problem.

As part of the RI/FS, a Citizen Participation Plan (CPP) was prepared in November 1993. The principal objectives of the Citizen Participation Plan were:

1. To provide area residents with an understanding of the New York State Superfund process. Such an understanding promotes realistic public expectations about the activities, complexities and time involved with site investigation.

2. To provide accurate understandable information concerning the RI/FS program to interested citizens. NYSDEC provided information through project updates and public meetings.

3. To provide the community with information needed to express their views and to discuss issues of concern with NYSDEC, NYSDOH and the City of Utica during the RI/FS process. Documents and data were made available for public review and comment. Citizens and public officials were asked to express their views and to discuss issues of concern with the City of Utica, NYSDOH, and NYSDEC.

4. To establish a good relationship with the local media so that accurate information about Primoshield Site RI/FS activities would be reported.

The following public participation activities were carried out:

1. Document repositories were established at the City of Utica Public Library, the Utica City Clerk's Office, and the NYSDEC Region 6 Headquarters in Watertown, N.Y. Pertinent reports and documents related to the RI/FS were placed there during the project.

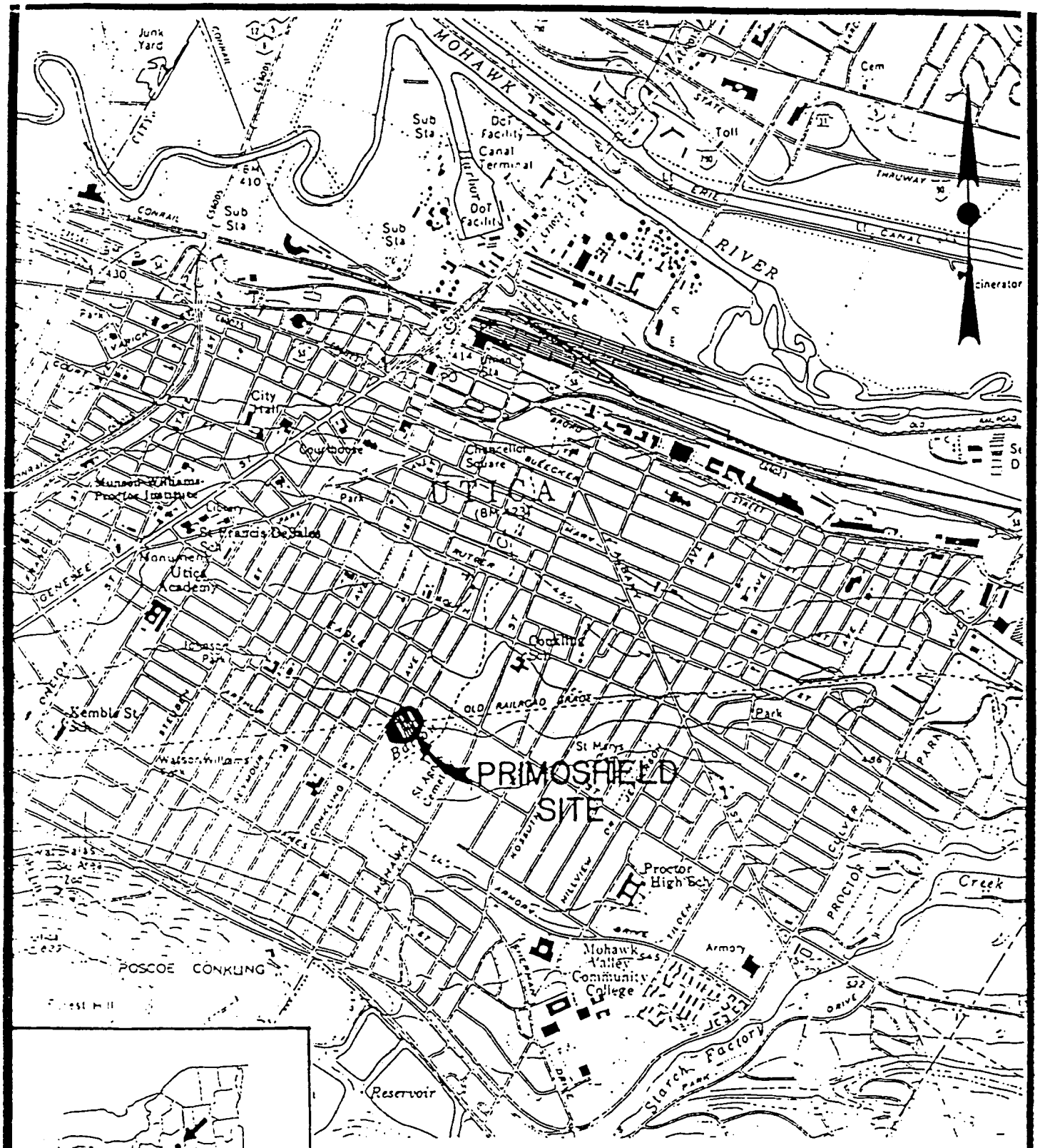
2. Two public meetings were held at the City of Utica Office Building in Utica, N.Y. The first meeting on January 21, 1993 was an initial information session to discuss site history and background and proposed RI/FS activities. A detailed set of fact sheets was distributed to the public in conjunction with the initial public meeting. This was followed by a project update fact sheet which was distributed to the public in February 1994. The second public meeting was held on February 2, 1995. Its purpose was to solicit public review and comment on NYSDEC's proposed remedial alternative.

3. A Proposed Remedial Action Plan (PRAP) was issued on January 26, 1995. A 30 day public comment period was provided.

4. Questions and answers recorded during the February 2, 1995 public meeting and during the 30 day public comment period (January 26, 1995 to February 27, 1995) were used to develop the Responsiveness Summary presented in Appendix B of this document.

Based on the information received during this process, there has been no significant change in the selected remedy for this site relative to the proposed remedy presented at the February 2, 1995 public meeting.

FIGURES



REFERENCE:
N.Y.S.D.O.T. 7.5 min. Quad. UTICA EAST, 1978 ed. U.S.G.S. TOPOGRAPHIC

O'BRIEN & GERE / Stetson-Harza	DATE	SITE LOCATION MAP	FIGURE 1
	DRAWN LRM		
	NO. 6057		

BRUNING 73817 FORM # 3726

TABLES

Table 1
Contaminants of Concern at the Primoshield Site (6-33-027)

Media or Matrix	Contaminant	Concentration		Units	Criterion	Basis
		Avg.	Max.			
Surface Soil	Cadmium	4.9	131	mg/kg	10	DHWR
	Chromium	19.1	205	mg/kg	50	DHWR
	Nickel	242.4	2680	mg/kg	27.3 (30)	SB
	Cyanide	6.2	182	mg/kg	1.2 (1.5)	SB
	Lead	201.2	3730	mg/kg	500	DHWR
Groundwater	Trichloroethene	28	93	ug/l	5 (S)	GA
	1,1,1 Trichloroethane	61.8	180	ug/l	5 (S)	GA
	1,1 Dichloroethane	9.5	10	ug/l	5 (S)	GA
	Chromium	32.8	136	ug/l	50 (S)	GA
	Lead	13.0	43.5	ug/l	25 (S)	GA
	Iron (* 18,200)	16,934	74,100	ug/l	300 (S)	GA
	Manganese (*748)	1,500	12,900	ug/l	300 (S)	GA

Table 1 (continued)
Contaminants of Concern at the Primoshield Site (6-33-027)

Media or Matrix	Contaminant	Concentration		Units	Criterion	Basis
		Avg.	Max.			
Sump Sediments or Solids	1,1-dichloroethane	0.75	1	ug/kg	0.2	TAGM
	1,1,1 trichloroethane	43.3	65	ug/kg	0.8	TAGM
	trichloroethene	8.7	22	ug/kg	0.7	TAGM
	benzene	ND	ND	ug/kg	0.06	TAGM
	chloroform	3	3	ug/kg	0.3	TAGM
	Cadmium	25.7	32.4	mg/kg	10	DHWR
	Chromium	63.1	159	mg/kg	50	DHWR
	Lead	1525.8	4750	mg/kg	500	DHWR
	Nickel	2986.5	10,500	mg/kg	27.3 (30)	SB
	Cyanide	2	3	mg/kg	1.2 (1.5)	SB
Basement Seepage, Sump Water, Ground-water	1,1-dichloroethane	0.75	1	ug/l	5 (S)	GA
	1,1,1 trichloroethane	32	56	ug/l	5 (S)	GA
	trichloroethene	3.3	5.1	ug/l	5 (S)	GA
	benzene	7.4	7.4	ug/l	0.7 (S)	GA
	chloroform	2.4	2.4	ug/l	7 (S)	GA
	Cadmium	ND	ND	ug/l	20 (S)	GA
	Chromium	106	172	ug/l	100 (S)	GA
	Lead	659.2	1550	ug/l	50 (S)	GA
	Nickel	4740	13,900	ug/l	2,000 (S)	GA
	Cyanide	15.8	15.8	ug/l	400 (S)	GA

Table 1 (continued)
Contaminants of Concern at the Primoshield Site (6-33-027)

Notes:

1. TAGM = NYSDEC TAGM 92-4046. Numbers given represent recommended soil cleanup levels. For metals, the TAGM specifies the soil cleanup objective to be the higher of Site Background (SB) or risk-based TAGM levels.

2. SB = Site Background concentration level.

3. GA = NYS Class GA groundwater (GW) values obtained from NYSDEC Ambient Water Quality Standards and Guidance Values (October 1993).

4. (S) = Standard; DHWR = Current Division of Hazardous Waste Remediation (DHWR) guidance value.

5. Numbers in ( ) indicate rounded Criterion Values.

6. (*) Indicates that site background values listed exceed current standards.

7. Since specific guidance values are not currently available for sediments, similar guidance values for soils have been used for comparison purposes.

Table 2
Human Health Risk
1212 St. Vincent Street

Primoshield Property

Exposure Pathway	Receptor	Upper bound excess Cancer risk	(Non Cancer) Upper bound hazard index
Incidental Ingestion of Soils	Adults	$5x10^{-5}$	$7x10^{-2}$
	Children	$1x10^{-4}$	1 *
	Trespassers	$1x10^{-6}$	$5x10^{-3}$
Dermal Contact with Soils	Adults	$1x10^{-3}$ *	$7x10^{-2}$
	Children	$5x10^{-4}$ *	$2x10^{-1}$
	Trespassers	$3x10^{-5}$	$5x10^{-3}$
Inhalation of 1,1,1-TCA	Adults	N/A	$8x10^{-4}$
	Children	N/A	$7x10^{-4}$

Notes:

1. Source: Primoshield Site (6-33-027) Final Feasibility Study (FS) Report, January 1995.

2. Hazard Index is a measure of non-carcinogenic human health risk.

3. * Indicates existing USEPA Risk Guidelines are exceeded.

Revised: January 31, 1995

Table 3
Human Health Risk

Adjacent residence

Exposure Pathway	Receptor	Upper bound excess Cancer risk	(Non Cancer) Upper bound hazard index
Ingestion of Soils	Adults	$5x10^{-4}$ *	0.2
	Children	$2x10^{-3}$ *	3 *
Dermal Contact with Soils	Adults	$1x10^{-2}$ *	0.6
	Children	$5x10^{-3}$ *	1 *
Dermal Contact with Basement Sediments	Adults	$5x10^{-7}$	$2x10^{-2}$
	Children	$2x10^{-7}$	$5x10^{-2}$
Inhalation of Basement Air	Adults	N/A	$3x10^{-4}$
	Children	N/A	$1x10^{-3}$

Notes:

1. Source: Primoshield Site (6-33-027) Final Feasibility Study (FS) Report, January 1995.

2. Hazard Index is a measure of non-carcinogenic human health risk.

3. * Indicates existing USEPA Risk Guidelines are exceeded.

Revised: January 31, 1995

Table 4

Primoshield Site (6-33-027), Remedial Alternatives, Major Components

Alternative 1 No Action	Alternative 2 Surface Soil Removal	Alternative 3 Surface Soil Cover	Alternative 4 Surface Soil Treatment
• Groundwater Monitoring & Site Access Restrictions	• Excavate top 1 foot of contaminated surface soil from the site and the adjoining property to the North	• Install a 1 foot vegetated soil cover directly over the contaminated surface soils on site and on the adjoining property to the North	• Excavate top 1 foot of contaminated surface soil from the site and the adjoining property to the North
• Maintain a Perimeter Fence and Gate (Site) Long Term	• Transport contaminated soil off-site for final treatment and/or disposal	• Maintain a Perimeter Fence and Gate (Site) Long Term	• Treat soils "Ex situ" to fix or bind chemically metals into the soil mass or matrix
• Implement Deed Restrictions (Site) Long Term		• Implement Deed Restrictions (Site) Long Term	• Replace stabilized soils
			• Cover with 1 foot vegetated soil layer
	• Backfill excavated areas with compacted clean fill and a vegetated surface topsoil layer	• Backfill excavated areas with compacted clean fill and a vegetated surface topsoil layer	• Backfill excavated areas with compacted clean fill and a vegetated surface topsoil layer
	• Identify, locate, and properly terminate (or separate) all existing utilities on-site.	• Identify, locate, and properly terminate (or separate) all existing utilities on-site.	• Identify, locate, and properly terminate (or separate all existing utilities on-site.

Table 4 (continued)

Primoshield Site (6-33-027), Remedial Alternatives, Major Components

Alternative 1 No Action	Alternative 2 Surface Soil Removal	Alternative 3 Surface Soil Cover	Alternative 4 Surface Soil Treatment
	• Excavation, removal and disposal of on-site sewer lines and any associated contaminated soils. Separate any active sewer lines.	• Excavation, removal and disposal of on-site sewer lines and any associated contaminated soils. Separate any active sewer lines.	• Excavation, removal and disposal of on-site sewer lines and any associated contaminated soils. Separate any active sewer lines.
	• Removal and off-site disposal of resident basement sump sediments	• Removal and off-site disposal of resident basement sump sediments	• Removal and off-site disposal of resident basement sump sediments
	• Clean walls, floor and sumps of resident basement (low pressure)	• Clean walls,floor and sumps of resident basement (low pressure)	• Clean walls, floor and sumps of resident basement (low pressure)
	• Install groundwater interceptor/collection trench and associated underground storage tank	• Install groundwater interceptor/collection trench and associated underground storage tank	• Install groundwater interceptor/collection trench and associated underground storage tank
	• Periodically transport collected groundwater by truck to the Oneida County POTW for treatment and discharge	• Periodically transport collected groundwater by truck to the Oneida County POTW for treatment and discharge	• Periodically transport collected groundwater by truck to the Oneida County POTW for treatment and discharge

Table 4 (continued)

Primoshield Site (6-33-027), Remedial Alternatives, Major Components

Alternative 1 No Action	Alternative 2 Surface Soil Removal	Alternative 3 Surface Soil Cover	Alternative 4 Surface Soil Treatment
	• Provide a long term (currently estimated at 15 years) monitoring program for the resident basement sumps and site ground-water	• Provide a long term (currently estimated at 15 years) monitoring program for the resident basement sumps and site ground-water	• Provide a long term (currently estimated at 15 years) monitoring program for the resident basement sumps and site ground-water
	• Excavate and remove contaminated soil from building floor pits, beneath floor slabs, and from below and adjacent to building foundations for subsequent off-site treatment and/or disposal	• Excavate and remove contaminated soil from building floor pits, beneath floor slabs, and from below and adjacent to building foundations for subsequent off-site treatment and/or disposal	• Excavate and remove contaminated soil from building floor pits, beneath floor slabs, and from below and adjacent to building foundations for subsequent off-site treatment and/or disposal
	• Segregate and package any RCRA listed hazardous wastes for manifesting and subsequent shipment off-site to an approved TSDF	• Segregate and package any RCRA listed hazardous wastes for manifesting and subsequent shipment off-site to an approved TSDF	• Segregate and package any RCRA listed hazardous wastes for manifesting and subsequent shipment off-site to an approved TSDF

Primoshield Site: 6-33-027
City of Utica, New York - Title 3 Project
NYSDEC Region 6, Oneida County

TABLE 5 - REMEDIAL COST ESTIMATES

	Alternative 1 No Action	Alternative 2 Surface Soil Removal	Alternative 3 Surface Soil Cover	Alternative 4 Surface Soil Treatment
Capital Cost	$5,000	$637,000	$422,000	$575,000
Annual Operation & Maintenance Cost *	$31,000	$62,000	$62,000	$64,000
Present Worth of O&M Cost for 15 Years (UNO) (i=5%)	$113,000 (30 years)	$421,000	$424,000	$408,000
Total Estimated Cost	* $118,000	* $1,059,000	* $845,000	* $982,000

Notes:

1. * For Alternative 1, Annual Operation and Maintenance (O&M) Costs are assumed to be required for a 30 year period. For Alternatives 2, 3 or 4, O&M Costs have been assumed to be required for a 15 year period following remedial construction.

2. Cost Estimates prepared by O'Brien & Gere Engineers Inc. on January 20, 1995. Assumed interest rate = i = 5%.

APPENDIX A

ADMINISTRATIVE RECORD INDEX

Appendix A

Administrative Record Index

Primoshield Plating

Site No.: 6-33-027

City of Utica - Title 3 Project

Oneida County, New York

The following documents are included in the Administrative Record:

1. Work Plan - Primoshield Remedial Investigation/Feasibility Study (RI/FS); 1212 St. Vincent Street; Utica, New York; O'Brien & Gere Engineers Inc.; Dated: September 1992, Updated: December 1992

   Also Includes:

   A. Quality Assurance Project Plan (QAPP)

   B. O'Brien & Gere Engineers Inc. - Health and Safety Plan (HASP)

   C. Stetson Harza - Health and Safety Plan (HASP)

2. Site History - Primoshield RI/FS; O'Brien & Gere Engineers Inc.; January 1993

3. Field Sampling Plan (FSP), Primoshield Site RI/FS, O'Brien & Gere Engineers Inc., May 1993

4. Citizen Participation Plan (CPP) for the Primoshield Site (RI/FS), NYSDEC, November 1993

5. Primoshield Site, Remedial Investigation (RI) Report, O'Brien & Gere Engineers Inc. and Harza Northeast Inc., September 1994

6. Primoshield Site, Feasibility Study (FS) Report, O'Brien & Gere Engineers Inc. and Harza Northeast Inc., January 1995

APPENDIX B

RESPONSIVENESS SUMMARY

Appendix B

Primoshield Site
(#6-33-027)

City of Utica - Title 3 Project
Oneida County, New York

Responsiveness Summary

This Responsiveness Summary was prepared in order to respond to the public's comments about the New York State Department of Environmental Conservation's (NYSDEC's) Proposed Remedial Action Plan (PRAP) to remediate contaminated surface soils and shallow groundwater at the Primoshield Site.

NYSDEC invited the public to comment about the proposal through a mailing to the site's contact list and at a public meeting held on February 2, 1995. This Responsiveness Summary addresses public comments received at that meeting and during the public comment period which ran from January 26, 1995 until February 27, 1995.

* * * * * * * * * * *

Questions and Answers from the Primoshield Site Public Meeting held from 7:00 PM to 9:30 PM on February 2, 1995 in the Utica City Office Building, 1 Kennedy Plaza, Utica, N.Y.

1. Question

Do the contaminants at the Primoshield site pose a health risk?

Answer

The answer to this question is yes. Risks due to exposure to hazardous waste contaminants can generally be divided into two broad classes or categories. Acute or short term risks generally produce symptoms or impacts after relatively short duration periods of exposure (e.g. seconds, minutes or hours). Chronic or long term risks generally produce symptoms or impacts after relatively long duration periods of exposure (e.g. weeks, months, or years). Prior to the USEPA Emergency Response and Removal actions completed at the Primoshield Site during 1986 and 1987, both acute and chronic risk levels from the site were very high. The actions taken by the USEPA in cooperation with the City of Utica and the State of New York very significantly reduced acute and chronic risk levels from the site. However, the actions taken by the USEPA were not intended to and did not completely reduce elevated risk levels associated with the site. Consequently, a detailed site investigation (termed an RI/FS [Remedial Investigation/Feasibility Study]) was conducted to identify and quantify remaining risk levels and to devise remedial measures or actions to reduce these remaining risks to acceptable levels.

Current risk levels on the site and adjacent to the site (although not extremely high) do exceed levels considered to be acceptable to both the USEPA and the NYSDOH (see Tables 2 and 3 in the ROD for a summary of current risk levels on and adjacent to the site). More detailed information concerning site risk levels can be found in Section 3 of the ROD and in Section 8 of the RI report. Note: Bob Griffiths of NYSDOH responded to this question at the public meeting.

2. Question

Does the site present a risk to neighborhood pets (e.g. such as might occur if a pet drank from ponded surface water on the site).

Answer

The answer is that under some circumstance, such as in the example provided in the question, the Primoshield site could present potential risks to neighborhood pets. In general, these risk levels are considered to be low and primarily chronic or long term. The safest approach however is to keep pets (and people) off the site until remedial measures have been completed. A fence and gate system installed at the site by the USEPA and currently maintained by the City of Utica has provided a short term solution to reducing risk levels by preventing unauthorized access to the site. Following the completion of Remedial Construction, risk levels for both humans and pets should be reduced to acceptable levels. Note: This question was also answered by Bob Griffiths of NYSDOH at the public meeting.

3. Question

Could or does the flow of surface water from the Primoshield site affect other properties located downgradient from the site. For example, could this flow of surface water from the site potentially affect gardens downgradient and could this be a potential route of exposure?

Answer

The short answer to this question is yes, but some explanation and clarification is also required. The detailed investigation which was conducted both on-site and in adjoining areas off-site as part of the RI has clearly demonstrated that site related contaminants have been transported from the site onto areas adjacent to and downgradient from the site. A great deal of this surface water transport likely occurred during the time when active plating operations were being conducted at Primoshield Inc. and during the time period between the shut-down of operations at Primoshield and the emergency response and removal actions conducted by the USEPA. However, because residual surface soil contamination remained on site following the USEPA emergency response and removal actions in 1986 and 1987, it is likely that some low level movement or transport of surface soil contaminants has continued to the present time. The remedial alternative selected in the ROD will remove surface soil contamination from the site and from adjacent contaminated areas. This will result in the permanent removal of this source of contamination and breaking of this exposure pathway. Currently some of the off-site soils are located in areas which have been used as gardens. Following the completion of remedial construction, these areas of surface soil contamination will have been removed

and will be replaced with clean soil materials. Bob Griffiths of NYSDOH discussed this issue at the February 2, 1995 public meeting in Utica.

4. Question

A question was raised if there are other PRPs (besides the City of Utica) associated with the Primoshield Site?

Answer

The answer to this question is yes. It has been known for a considerable period of time that a number of other parties were involved with the Primoshield Site during the period when it operated as a metal electroplating industrial facility (from the early 1970s until August 1985). In September 1993 the City of Utica retained the law firm Petrone & Petrone P.C. to assist in conducting a search and investigation of other PRPs for the Primoshield Site. Following the completion of the initial phase of this investigation, Notice Letters (of intent to file suit on behalf of the City of Utica) were sent to 13 additional PRPs by Petrone & Petrone P.C. in early November 1994. If this lawsuit is successful, it could potentially result in the recovery of significant amounts of City of Utica and New York State taxpayer dollars which were required to investigate and remediate residual hazardous waste contamination at this site. It should also be noted that the City of Utica became a PRP for this site when the City seized the property due to non-payment of taxes after the previous owners abandoned the property.

5. Question/Answer

A request was made to provide some additional degree of explanation regarding the photographic slide showing site sewer lines that was shown at the public meeting. The slide is basically a schematic of an engineering drawing for the project (Figure 24 - Sewer Plan and Surface Drainage) which shows existing sewer lines in the site area based on available historical information and data. A question was also raised regarding possible unknown buried utilities on the Primoshield Site including a possible functional sanitary sewer line on the southeast part of the Primoshield Site near St. Vincent Street. Project team members were not aware of any currently functional utilities on the Primoshield Site. Based upon this new information provided at the public meeting, additional investigations of on-site utilities will be conducted during the spring of 1995 utilizing all information

available from local residents and utility companies. This topic had been addressed in the PRAP and the ROD. An increased level of attention will be paid to this issue during Remedial Design and Construction. John Brady from Harza Northeast responded to this question at the public meeting on February 2, 1995. Figure 24 will also be updated in the future as additional information becomes available.

6. Question/Answer

A question was raised regarding the movement of groundwater in the shallow aquifer at the site and whether or not adequate hydrostatic (or hydrogeologic) investigations were conducted as part of the site investigation process. A significant amount of hydrologic and geologic investigation was conducted during 1993 and 1994 as part of the site Remedial Investigation (RI) process. These investigations were adequate to characterize the current condition of the shallow groundwater aquifer at the Primoshield Site. Additional detailed information regarding these investigations can be found in the Final Remedial Investigation (RI) Report for the Primoshield Site dated September 1994. See in particular "Part 2 - Study Area Investigations" and "Part 4 - Field Investigation Results". For summary information concerning shallow groundwater at the site, refer to Figures 3 and 4 in the Final Feasibility Study (FS) Report for the Primoshield Site dated January 1995 and to Table 1 in the ROD for specific chemical contaminants and corresponding concentration levels. The site groundwater monitoring wells will remain in operation during and following remedial construction to assess the effectiveness of the remedial actions taken.

7. Question

From historic experience with the site, neighborhood residents observed that at one time a number of small streams ran through the area. Were any of these streams found during the site investigation? Also, could these filled-in streambeds provide a route for the movement of contamination off-site?

Answer

No buried streambeds or channels were detected in the immediate proximity of the site during the site investigation (RI) program. Available maps (including USGS topographic maps of this area) indicate that the nearest buried stream channel is located at some distance from the Primoshield Site. If this buried stream channel was located closer to and

downgradient from the Primoshield Site, it could represent a potential pathway for the movement of contaminants from the site. We will continue to monitor this situation during Remedial Design and Construction and will make changes as necessary if new information becomes available regarding this issue.

8. Question

Why wasn't the old laboratory structure demolished and removed during the RI program? It poses a fire hazard, lowers property values and raises insurance costs for adjacent businesses.

Answer

The impact of the existing Primoshield Site structures (including the laboratory structure) on the neighborhood and adjacent properties is recognized by the City of Utica, New York State Department of Health and New York State Department of Environmental Conservation. Serious consideration was given to removing both the laboratory building and the office building as an Interim Remedial Measure (IRM) during the Remedial Investigation program at the Site. After extensive consideration, it was determined that an early removal of these two building would increase the cost and schedule for the overall remediation of the site. Consequently, it was determined that the remediation (including demolition) of these buildings could best be accomplished as part of the overall RI/FS site remediation process.

9. Also included in the Responsiveness Summary are the following letters:

a. Letter from: Ms. Gail Rodriguez to: Mr. John Zegarelli, Utica City Engineer, dated January 31, 1995. Ref. Primoshield Site.

b. Reply letter from: Mr. John Zegarelli, Utica City Engineer, to: Ms. Gail Rodriguez dated March 2, 1995; and

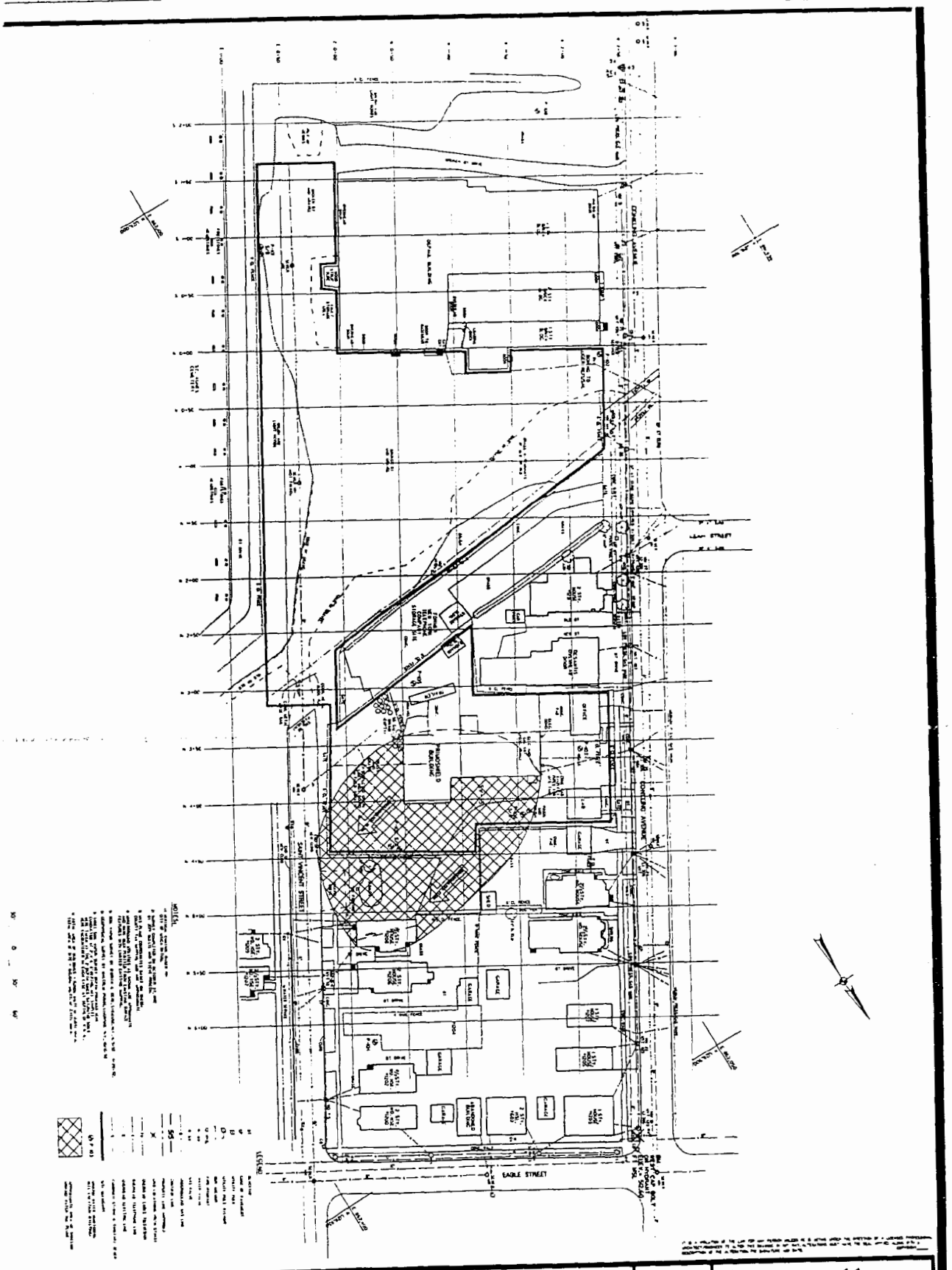
c. Memorandum from: Mr. Donald E. Weimer City of Utica, Board of Water Supply, to: Mr. John Zegarelli, Utica City Engineer, dated January 31, 1995. (See previous Question and Answer No. 5 for a response to this Memorandum.)

FIGURE 2
ELEVATED HEAVY METALS CONCENTRATIONS IN SURFACE SOILS

CITY OF UTICA – TITLE 3 PROJECT
PRIMOSHIELD REMEDIAL INVESTIGATION
1212 ST. VINCENT STREET
UTICA, NEW YORK 13501

COUNTY OF ONEIDA NYSDEC REGION 6 SITE CODE 6-33-027 STATE OF NEW YORK

Stetson-Harza
A HARZA COMPANY
99 Genesee Street, Utica, NY (315)(315) 797-5800
Rensselaer Technology Park
250 Jordan Rd, Troy, NY (518)(518) 283-8080



CITY OF UTICA - TITLE 3 PROJECT
PRIMOSHIELD REMEDIAL INVESTIGATION
1212 ST. VINCENT STREET
UTICA NEW YORK 13501

COUNTY OF ONEIDA NYSDEC REGION 6 SITE CODE 6-33-071 STATE OF NEW YORK

Stetson-Harza
A HARZA COMPANY
90 Genesee Street, Utica, NY 13501(315) 797-5800
Rensselaer Technology Park
250 Jordan Rd., Troy, NY (518) 283-8080

FIGURE 3
METALS & VOLATILE ORGANICS COMPOUNDS (VOCs) IN SHALLOW GROUND WATER

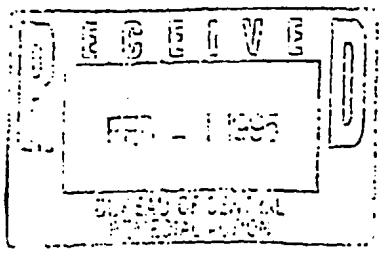
CITY OF UTICA – TITLE 3 PROJECT
PRIMOSHIELD REMEDIAL INVESTIGATION
1212 ST. VINCENT STREET
UTICA, NEW YORK 13501

FIGURE 6
CONCEPTUAL
DESIGN

Stetson-Harza
A HARZA COMPANY
99 Genesee Street, Utica, NY (315)(315) 797-5800
Rensselaer Technology Park

January 31, 1995

John Zegarelli, City Engineer
City of Utica, Dept. of Engineering
City Hall
1 Kennedy Plaza
Utica, N.Y. 13502



RE: Primoshield Site Harza No. 6057

Dear Mr. Zegarelli:

After reviewing the proposed remedial action plan you mailed to me on 1/27/95, I have several comments and continued concerns.

It appears that "Alternative 2" Surface Soil Removal is the ONLY alternative acceptable of the four presented.

Alternative 2 addresses the soil removal, sewer lines removal and associated contaminated soil removal. However, the waterlines feeding my home do not appear to be addressed. I also question the thorough cleaning via pressure wash and rinse of my basement walls, floor and sumps. Given the age and apparent porousness of the basement walls, I can't believe a thorough cleaning is possible or that pressure washing and rinsing wouldn't weaken, if not collapse the existing basement walls.

I believe the removal of the basement walls and floor and contaminants present in waters and soil, and replacing with new materials, the floor and walls would be the acceptable alternative. I also feel this may very well be more cost effective than the proposal in alternative 2. The "new" walls and floor should subsequently be sealed as suggested in the action plan.

Continued monitoring of the soil and ground waters as well as air quality inside and outside of the surrounding properties is necessary subsequent to the "clean up". The results of the monitoring should be made available to the surrounding and effected property owners.

Health concerns are first and foremost on my mind and living in the residence immediately adjacent to this site is a DAILY

worry. My family has been exposed in excess of 10 years to the hazards not limited to lead and cyanide!! Future health problems are a major concern for us as well as the fact that my home is monetarily worthless and has been since 1985 when this situation was recogonized.

I anticipate that IF the "clean up" project is "successful" and monitoring proves favorable results, my house would be deemed "liveable". However, I sincerely doubt that resale of my home would be successful in my lifetime and possibly longer.

I would expect this would be considered in the tax assessment of my property for the past ten years and in the future. I would also expect that monetary consideration for this tragic situation would be made to myself and my husband at very least.

I will close this letter with the belief that this health hazard and eyesore will finally and expeditiously be rectified.

Sincerely,

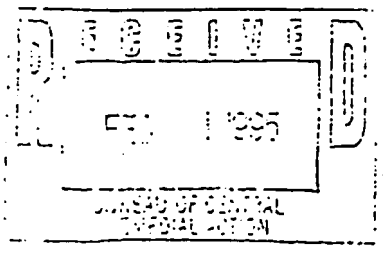
Gail Rodriguez

Gail Rodriguez
1208 St. Vincent Street
Utica, N.Y. 13501
315-733-2457

cc: Jim Reagan, P.E.
NYSDEC, Div. Haz. Waste Remediation
50 Wolf Road
Albany, N.Y. 12233-7010

Robert Griffiths
NYSDOH, BEEI
2 University Place
Albany, N.Y. 12203-3313

Louis LaPolla, Mayor
City of Utica
1 Kennedy Plaza
Utica, N.Y. 13502



CITY OF UTICA
1 Kennedy Plaza • Utica, New York 13502
Department of Engineering
315-792-0152

LOUIS D. LaPOLLA, Mayor

JOHN L. ZEGARELLI
City Engineer

CP File

March 2, 1995

Ms. Gail Rodriguez
1208 St. Vincent Street
Utica, New York 13501

RE: City of Utica, New York-Title 3 Project;
N.Y.S.D.E.C. Region 6, Oneida County Primoshield Site,
Remedial Investigation/Feasibility Study (RI/FS)
Site Code 6-33-027

Dear Ms. Rodriguez:

Acknowledge receipt of your letter dated January 31, 1995 outlaying your concerns regarding the Primoshield Site Remedial Investigation/Feasibility Study and Proposed Remedial Action Plan. Your letter was referred to New York State Department of Environmental Conservation, New York State Department of Health, O'Brien & Gere Engineers and Harza Northeast Engineers for their comments and response.

The following response is a consensus of opinions from all parties:

1. The following discussion relates to issues raised in paragraph no. 3: Residential water lines were not addressed in the PRAP, because at this time, there is no evidence to indicate that any existing residential water lines are being impacted or affected by the Primoshield Site. Also, all of the residences in this area of Utica are currently serviced by the City of Utica water supply system. All of the lateral connections from the street water mains to the individual homes operate under conditions of significant positive pressure which would also serve to prevent any contamination (if present) from entering or contacting any parts of the water supply system. Also, as a point of clarification, the only sewer lines which are currently proposed for removal are the existing sewer lines on the Primoshield property itself. If any of these site sewer lines are currently active, some sewer line separation may also be required.

2. As noted in the letter, the PRAP currently recommends cleaning via pressure wash and rinse of the walls, floor, and sumps of the basement of the 1208 St. Vincent Street residence. The owners expressed some concern that the pressure involved in this cleaning process could possibly damage the existing structure. No specific pressure level is specified in the PRAP.

This level of detail is not appropriate for the PRAP. It is, however, appropriate for the design documents and that level of detail will be specified in those documents. To clarify the record, it was never the intention to utilize high or very high pressures in this cleaning process for the residential basement. A low pressure or moderate pressure wash and rinse process for the basement walls, floor and sumps was originally intended for the proposed residential basement cleaning. This original concept has not changed. Pressures used for this cleaning process will be well below levels which could cause damage to the existing structure. Also, during Remedial Design and prior to the implementation of Remedial Construction, the property owners will be consulted regarding the specific details of the proposed cleaning process. Any remaining concerns of the property owners will be resolved at that time, to the maximum extent practical. Also, efforts will be made to keep the neighboring property owners fully informed throughout the entire site remediation process. Finally, if any damage is inadvertently done to any of the neighboring properties during Remedial Construction; it will be the responsibility of the City of Utica to repair this damage as part of the site Remedial Construction.

3. *Based upon the information currently available to us, we do not believe that the floor and walls of the basement at the 1208 St. Vincent residence require replacement. Current laws and fiscal constraints (including the 1986 Environmental Quality Bond Act (EQBA) prohibit the expenditure of funds not directly required to remediate contamination from inactive hazardous waste sites.*

4. *Additional testing (monitoring) of surface soils will be required during site Remedial Construction to ensure that all soils which exceed site clean-up criteria are removed for appropriate off-site disposal. It is not possible to know in advance precisely how long it will take to remediate the very limited shallow contaminated groundwater plume at the site. It has been estimated in the PRAP, that approximately 15 years will be required to remediate groundwater at this site, and this estimate is probably conservative. Monitoring of groundwater will continue for as long as groundwater remediation is required at the site. All of the site data (including all testing and monitoring results) are now and will in the future be available to the neighboring homeowners and to the public in general.*

5. *Health concerns or issues related to this site have been discussed in a fairly detailed manner in the Primoshield Site PRAP dated January 26, 1995 (see Section 4 for additional information regarding potential human health impacts). A very detailed discussion of site health risks can be found in Section 8 - "Risk Assessment" of the September, 1994 Remedial Investigation (RI) Report. Also Bob Griffiths and other staff from the New York State Department of Health office in Albany are available to discuss health issues related to the site with neighbors and other interested persons at any time.*

6. Issues such as property values (or sale) and property tax assessment are outside of the scope of the State's inactive hazardous waste site remediation program. Nevertheless, we do recognize the impact of these factors on property owners near the site. The City of Utica does have a tax assessment grievance procedure. Grievances can be filed annually with the City Assessor's office. I suggest you contact the City Assessor for the specific grievance procedures and the period when grievances can be filed.

I hope that all of the above answers your concerns. We are always available to answer any of your questions. Please contact me at your earliest convenience with any additional questions or concerns.

Sincerely,

John L. Zeccrelli
City Engineer

JLZ:dk

cc: Jim Reagan, N.Y.S.D.E.C.
Jeff Banikowski, O'Brien & Gere
John Brady, Harza Northeast
Robert Griffiths, N.Y.S.D.O.H.
Louis Petrone, Petrone & Petrone P.C.
Louis D. LaPolla, Mayor
Joseph Hobika, Corporation Counsel

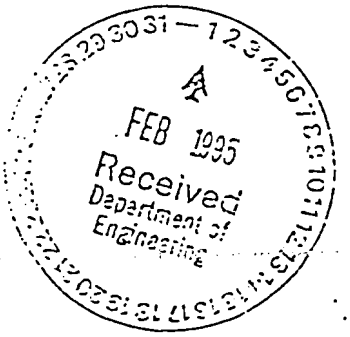
Site F.S. File &
C.P. File

Board of Water Supply

City of Utica

ONE KENNEDY PLAZA • POST OFFICE BOX 345 • UTICA, NEW YORK 13503
TELEPHONE (315) 792-0301

MEMORANDUM



TO: John Zegarelli, Secretary
Board of Contract and Supply

FROM: Donald E. Weimer
Principal Engineer

DATE: January 31, 1995

RE: Bosserts Manufacturing and Primoshield Sites
Water Service Lines

As the City nears action to implement excavation and removal of contaminated soil and ground water from the Bosserts and Primoshield sites, it is strongly recommended that you include within the contract scope of work the disconnect and capping of the still active water service lines into these sites.

Any waterline subject to a "backflow condition" could cause contaminated ground water to flow back into the public water supply, unless the recommended disconnections are accomplished.

Thank you for your attention to these matters.

DEW/sdw

cc: Robert M. Pierce

Appendix C

Site Contacts

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Site Contacts*

Name	Contact Information	Required Notification**
Jasmine Stefansky New York State Department of Environmental Conservation Project Manager	518-402-9575 jasmine.stefansky@dec.ny.gov	All Notifications
Jeffrey Dyber New York State Department of Environmental Conservation Project Manager's Supervisor	518-402-9621 jeffrey.dyber@dec.ny.gov	All Notifications
Kelly Lewandowski New York State Department of Environmental Conservation Site Control	518-402-9569 kelly.lewandowski@dec.ny.gov	Notifications 1 and 8
Anthony Perretta New York State Department of Health Project Manager	518-402-7860 BEEI@health.ny.gov	Notifications 4, 6, and 7
Adam Etringer EA Engineering and Geology, P.C. Project Manager	315-565-6564 aetringer@eaest.com	All Notifications

Notes:

* Notifications are subject to change and will be updated as necessary.

** Numbers in this column reference the numbered bullets in the notification list in this section.

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Appendix D

City of Utica Tax Map

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Primoshield 633027 - Parcels

Source: Oneida County GIS Tax Map https://hoccpp.maps.arcgis.com/apps/webappviewer/index.html?id=18e988c601f54b62a60f36f39fce5a92

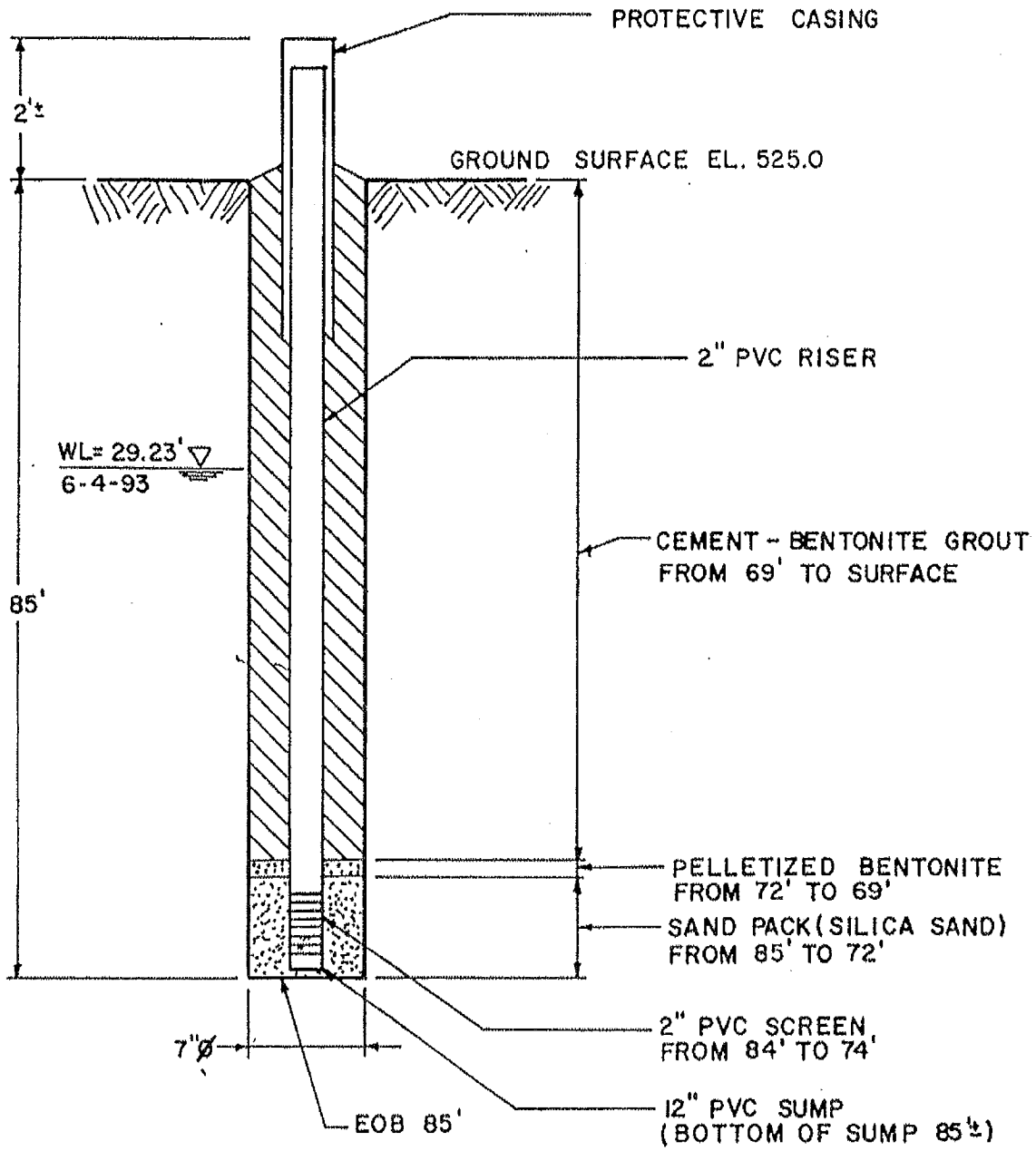
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Appendix E

Well Logs

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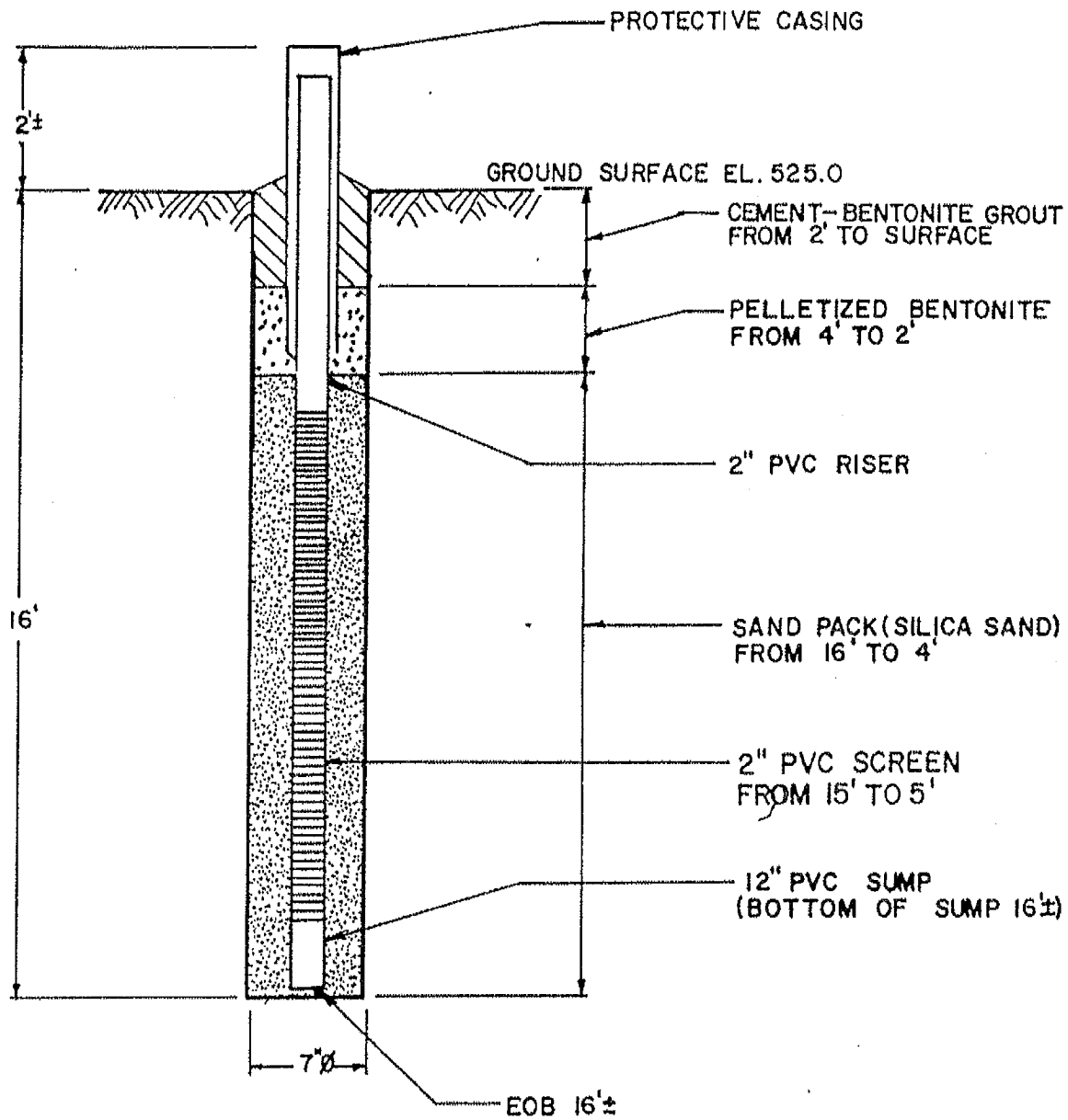
P - 101D



NOT TO SCALE

Stetson-Harza A HARZA COMPANY 161 Genesee Street, Utica, NY 13501 (315) 797-5800 Rensselaer Technology Park 250 Jordan Rd., Troy, NY 12180 (518) 283-8000	DATE 6/15/93 DRAWN JLB NO. 6057	PRIMOSHIELD RI/FS SITE CODE 6-33-027 1212 ST. VINCENT ST UTICA, N.Y. 13501 WELL CONSTRUCTION	FIG. 1

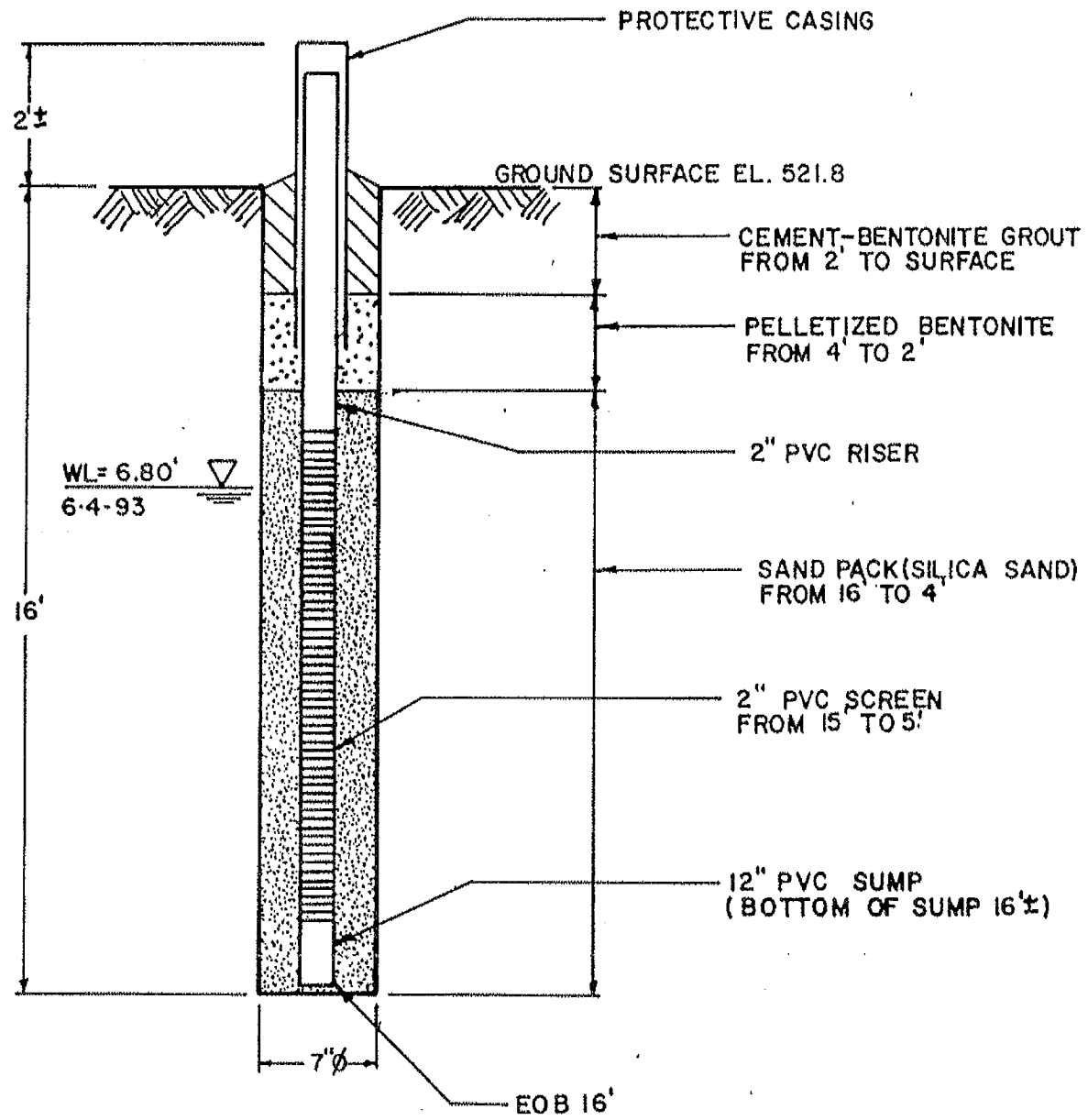
P-101S
(DRY WELL)



NOT TO SCALE

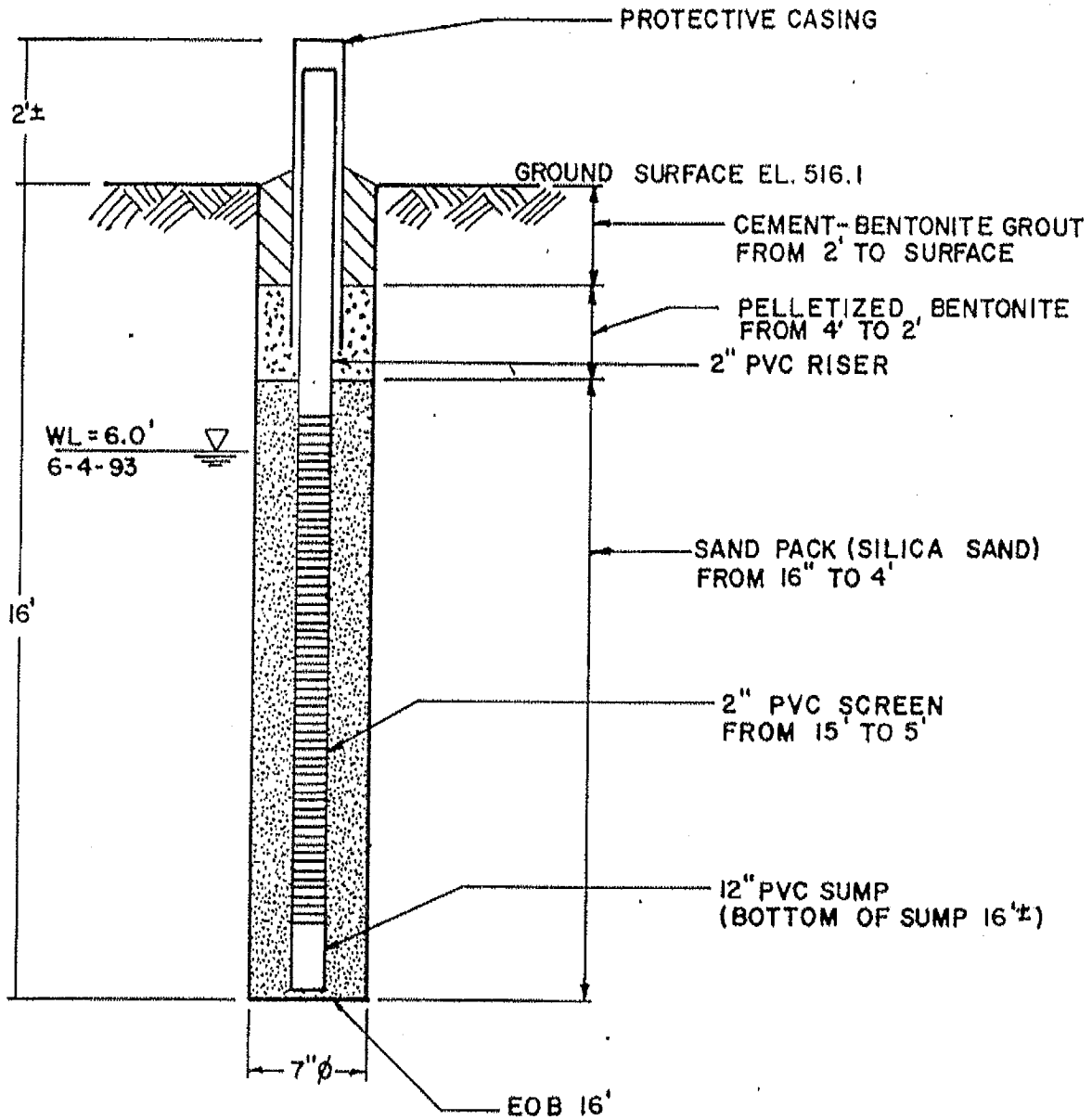
Stetson-Harza, A HARZA COMPANY, 161 Genesee Street, Utica, NY 13501 (315) 797-5000; Rensselaer Technology Park, 250 Jordan Rd., Troy, NY 12180 (518) 283-5080	DATE 6/15/93 DRAWN JLB NO. 6057	PRIMOSHIELD RI/FS SITE CODE 6-33-027 1212 ST. VINCENT ST UTICA, N.Y. 13501 WELL CONSTRUCTION	FIG. 2

P-103



Stetson-Harza A HARZA COMPANY 181 Genesee Street, Utica, NY 13501 (315) 797-5800 Rensselaer Technology Park 250 Jordan Rd., Troy, NY 12180 (518) 283-8080	DATE 6/15/93 DRAWN JLB NO. 6057	PRIMOSHIELD RI/FS SITE CODE 6-33-027 1212 ST. VINCENT ST UTICA, N.Y. 13501 WELL CONSTRUCTION	FIG. 3

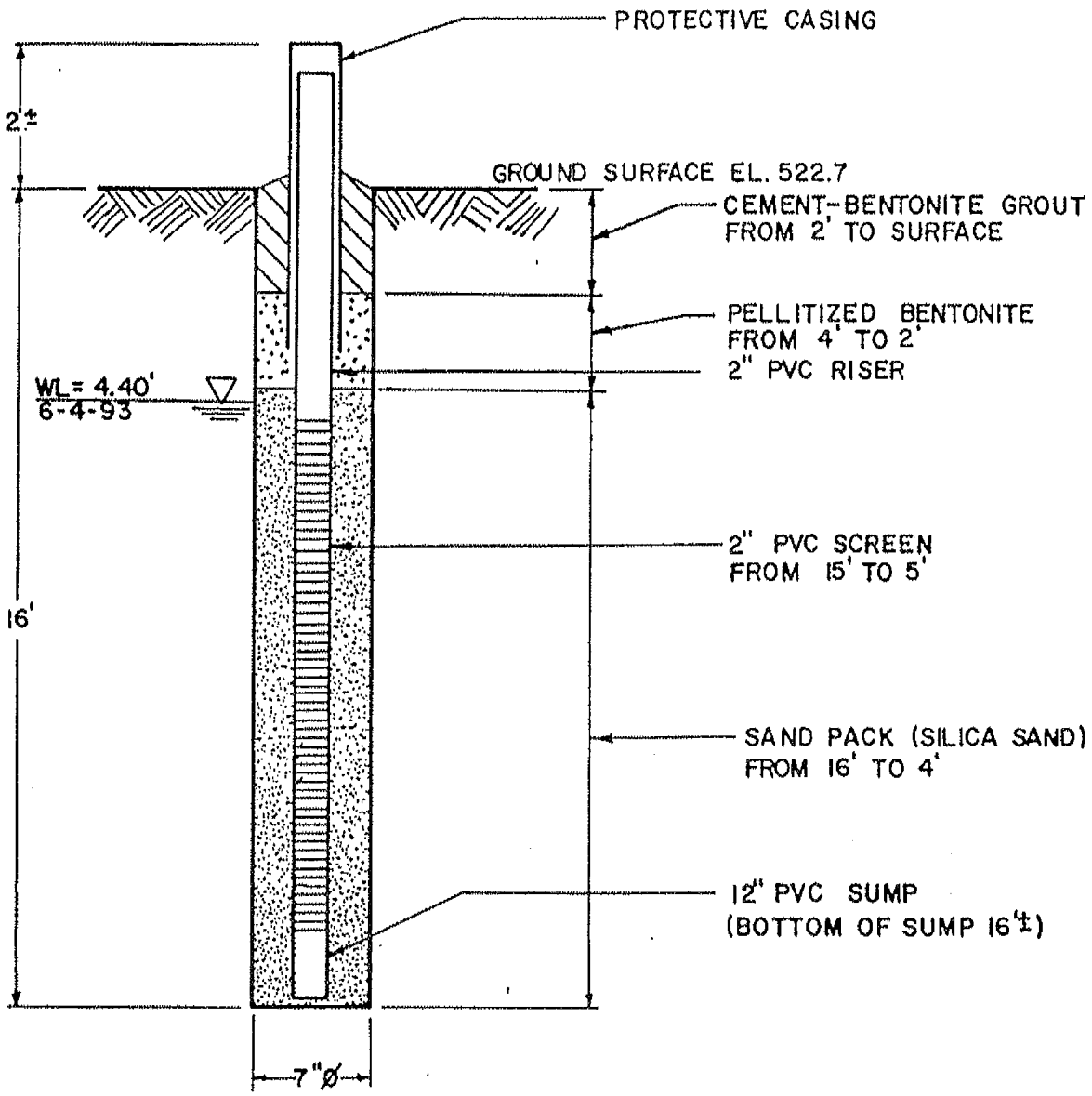
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NOT TO SCALE

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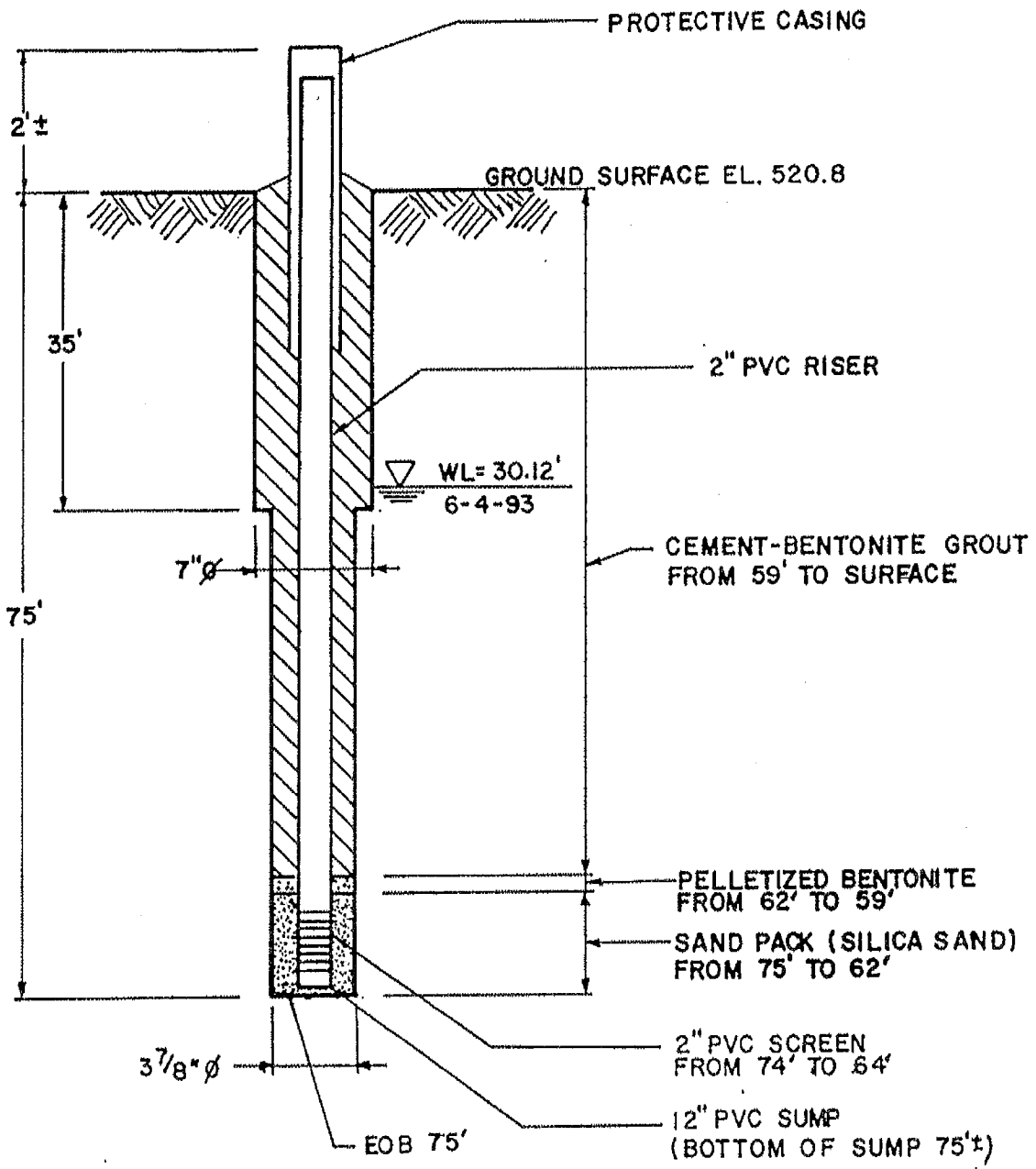
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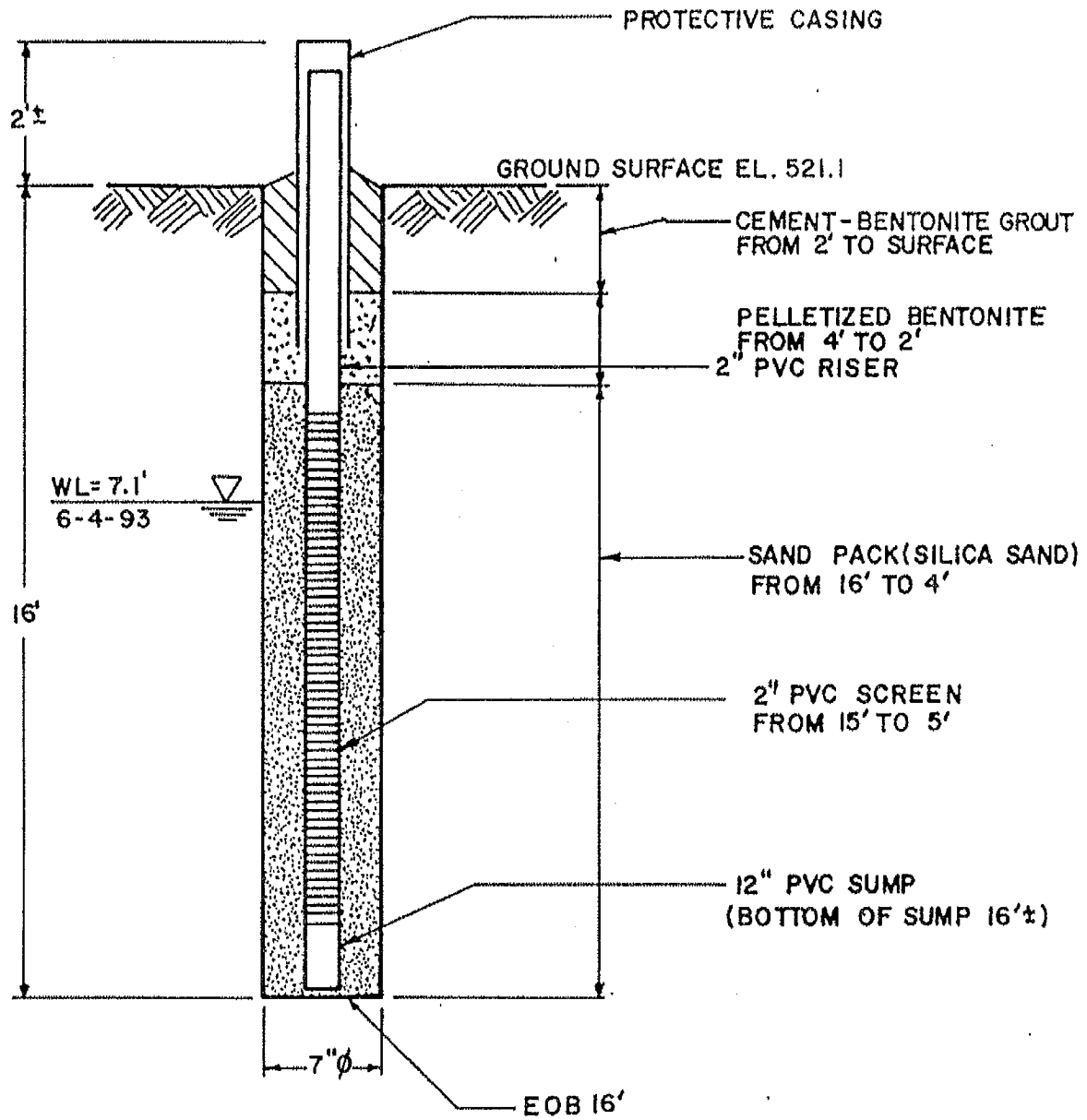
P-106D



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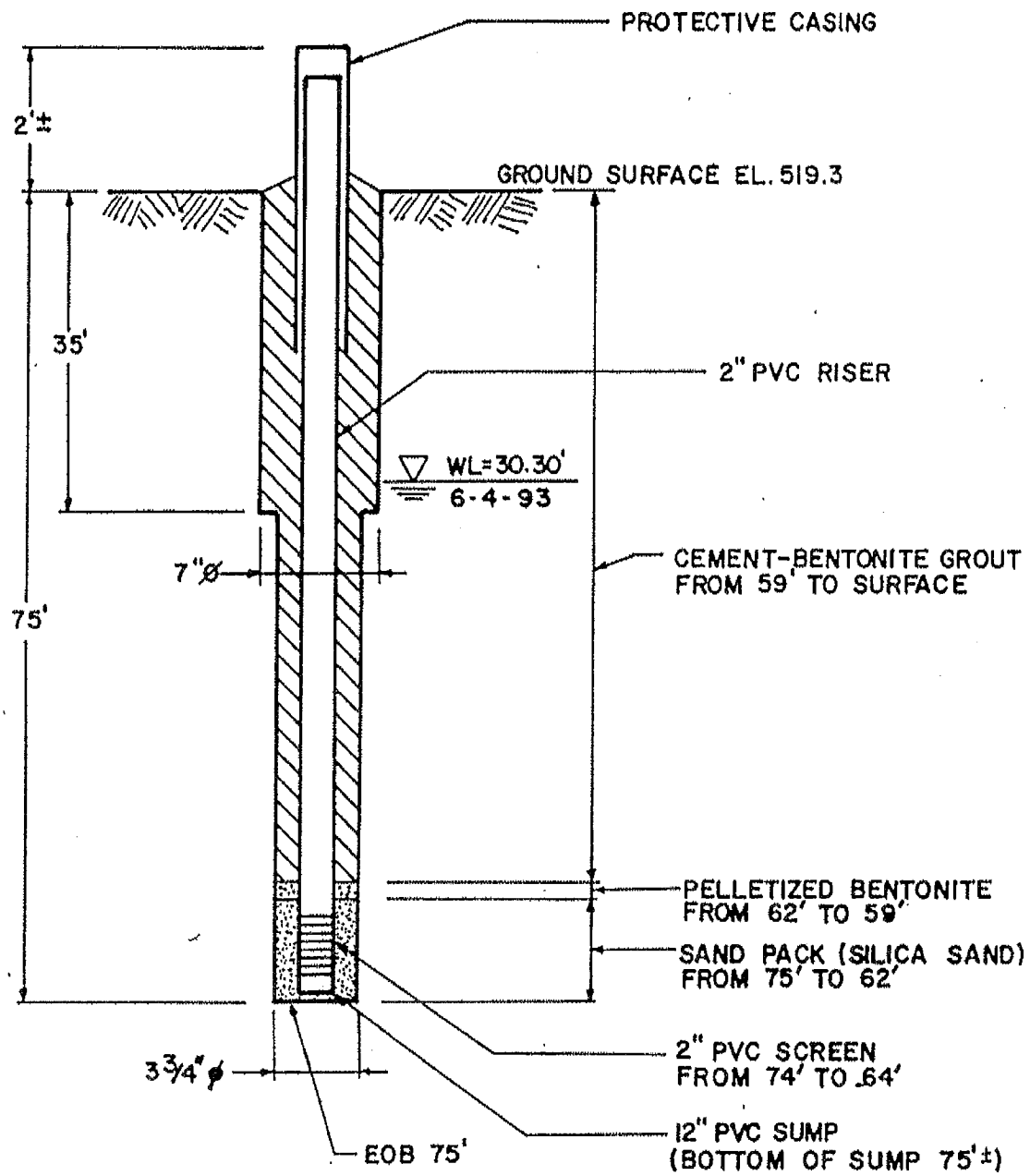
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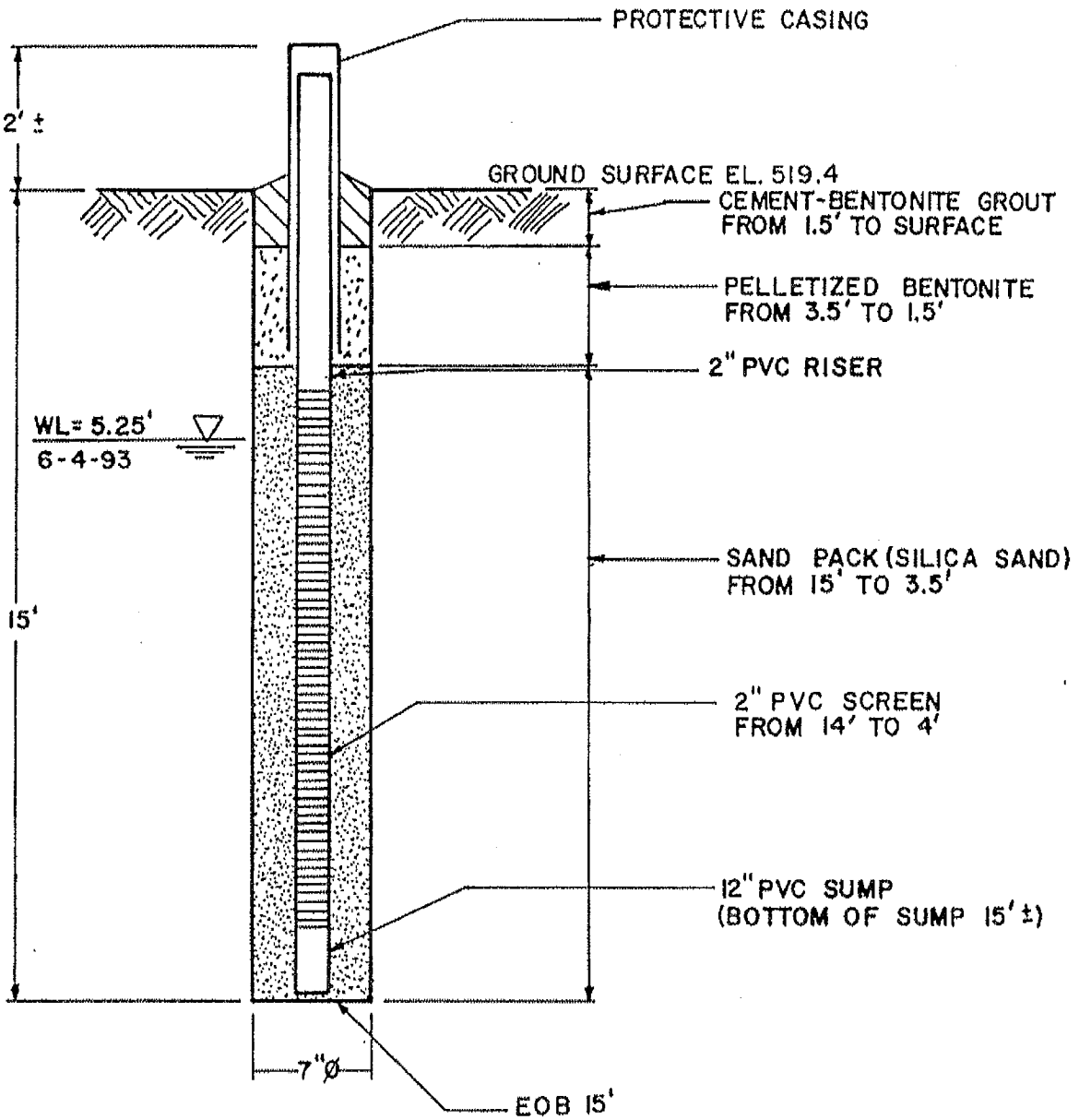
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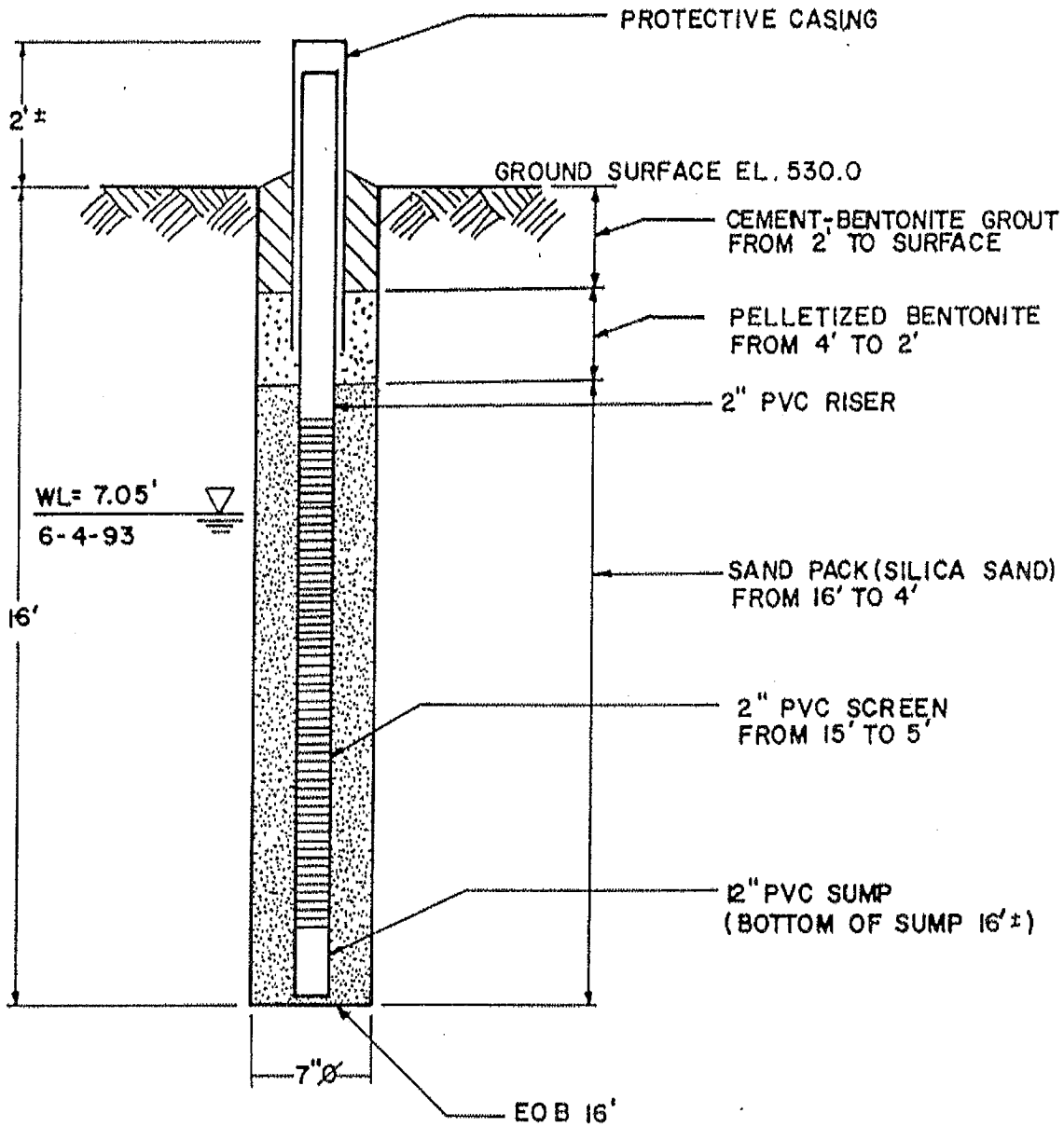
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NOT TO SCALE

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NOT TO SCALE

Stetson-Harza A HARZA COMPANY 151 Genesee Street, Utica, NY 13501 (315) 797-5800 Rensselaer Technology Park 250 Jordan Rd., Troy, NY 12180 (518) 283-6000	DATE 6/15/93 DRAWN JLB NO. 6057	PRIMOSHIELD RI/FS SITE CODE 6-33-027 1212 ST. VINCENT ST UTICA, N.Y. 13501 WELL CONSTRUCTION	FIG. 10

WELL/PIEZOMETER CONSTRUCTION DIAGRAM
FLUSHMOUNT

LOCATION ID: GW-01

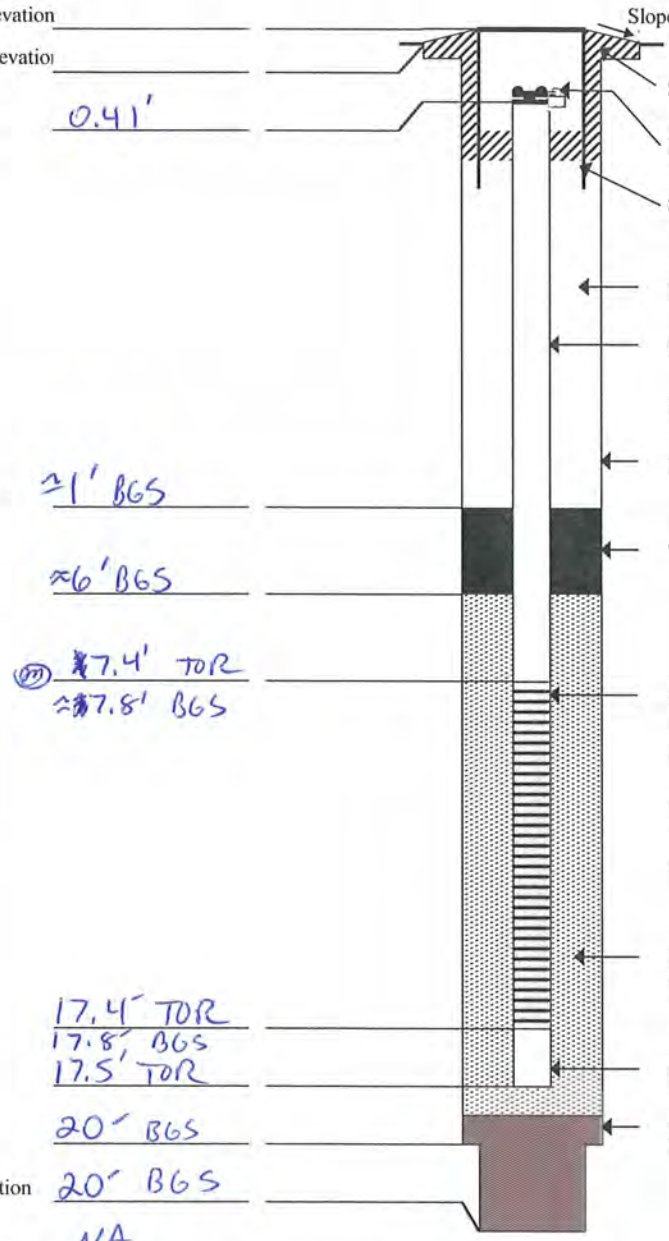
Project Name: PRIMOSHIELD
Project Location: Utica, NY
Project Number: 36121222251 Task Number .04
Subcontractor: Nothnagle Drilling Method: Direct Push
Development Method: Pump dry Development Date: 9/10/15
Bucking Posts/Ballards: NA
Notes: Microwell installed in new drought conditions

Date Started: 9/8/15 Date Completed: 9/8/15
Logged By: J. Rawcliffe
Checked By: Checked Date:

Measuring Point Information

Measuring Point (MP) Type: Top Of Riser
MP Elevation (ft):

Item	Depth BMP (ft)	Elevation (ft)	Description
Surface Casing Elevation			
Ground Surface Elevation			
Riser Pipe (Top)	0.41'		
Top of Well Seal	≈1' BGS		
Top of Sand Pack	≈6' BGS		
Top of Screen	~~7.4'~~ TOR ≈~~7.8'~~ BGS		
Base of Screen	17.4' TOR 17.8' BGS		
End Cap	17.5' TOR		
Drilled Depth	20' BGS		
Bottom of Exploration	20' BGS		
Bedrock Surface	NA		



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MACTEC
511 Congress Street, Portland Maine 04101

FIGURE 4.8
WELL/PIEZOMETER CONSTRUCTION DIAGRAM - FLUSHMOUNT
NYSDEC QUALITY ASSURANCE PROJECT PLAN

SOIL BORING LOG

MACTEC
511 Congress Street, Portland Maine 04101

Project Name: Primoshield		Boring ID: GW-01
Project Location: Utica, NY		Page No. 1
Project No.: 3612122251	Client: NYS DEC	of: 2
Boring Location: 50' N of P-107S/107D	Refusal Depth: NA	Total Depth: 20'
Weather: Hazy, hot, humid 80-85°F	Soil Drilled: 20'	Method: Direct Push
Subcontractor: Nothnagle		Protection Level: D
Driller: Jeff Schwietzer	Date Started: 9/8/15	Date Completed: 9/8/15
Rig Type/Model: Geoprobe 6610DT	Logged By: J. Rawcliffe	Checked By: BPW 9/29/15
Reference Elevation:	Water Level: >17.5' TOR	Time: 9/9/15 1815
	15.51' TOR	9/10/15 1115

Sample Information					Monitoring							
Depth (feet bgs) 0.0	Sample Number	Penetration/ Recovery (feet)			NA				Sample Description and Classification	USCS Group Symbol	Remarks
1	MC-1	3.3/4.0	–	–	–	–	–	–	0-0.4' Brown topsoil/fill. Sand and silt with roots. Dry.	Fill	
2									0.4-0.8 Gravel layer		
3									0.8-4.0 Brown to dark brown fine sand and silt with some to a little gravel and medium to coarse sand. Massive dry becoming moist near bottom. Apparent Fill		
4										Fill	
5	MC-2	0.4/4.0	–	–	–	–	–	–	Appear to have gone through a cobble or gravel layer. Very little recovery consisting of dry gray rock fragments		
6											
7										Fill?	
8											
9	MC-3	4.0/4.0	–	–	–	–	–	–	8-10.5 light brownish gray to light olive gray fine sand and silt with some med. to coarse sand and gravel, Dry, Massive.		
10									10.5-10.7 Gravel layer, Dry.		
11									10.7-12' Brown to olive brown silty fine sand with a little med. to coarse sand and a trace of gravel. Very moist to wet	SM/GM	
12											
13	MC-4	4.0/4.0	–	–	–	–	–	–	Gray/Brown to olive gray silty fine sand with some medium to coarse sand and gravel, very moist		
14									Grades to light olive gray silty fine sand matrix with a little medium to coarse sand and gravel (TILL). Moist, massive	SM/GM	
15											
16											

NOTES:

SOIL BORING LOG

MACTEC
511 Congress Street, Portland Maine 04101

Project Name: Primoshield		Boring ID: GW-01
Project Location: Utica, NY		Page No. 2
Project No.: 3612122251	Client: NYS DEC	of: 2
Boring Location: 50' N of P-107S/107D	Refusal Depth: NA	Total Depth: 20' BGS
Weather: Hazy, hot, humid 80-85°F	Soil Drilled: 20'	Method: Direct Push
Subcontractor: Nothnagle		Protection Level: D
Driller: Jeff Schwietzer	Date Started: 9/8/15	Date Completed: 9/8/15
Rig Type/Model: Geoprobe 6610DT	Logged By: J. Rawcliffe	Checked By: BPW 9/29/15
Reference Elevation:	Water Level: ~~17.75'~~ 17.5' TOR 15.91' TOR	Time: 9/9/15 1515 9/10/15 1115
		Bore Hole ~~ID~~/OD: 2.25"
		Casing Size: 1.5"/2.25"
		Sampler: MacroCore
		Sampler ID/OD: 1.5"/2.25"

Sample Information: Depth (feet bgs)	Sample Number	Penetration/ Recovery (feet)	Monitoring: NA	Sample Description and Classification	USCS Group Symbol	Remarks
~~0.0~~ 17 18 19 20	MC-5	4.0/4.0		light olive gray to light brownish gray silty fine sand with a little medium to coarse sand and gravel. (TILL) Moist, massive, dense.		Soils appear to be very tight/dense unlikely to yield much water.
				Bottom of boring = 20' BGS No Refusal. Installing 1" ID Sch 40 PVC microwell screen ≈ 8-18' BGS sand ≈ 20-6' BGS bentonite ≈ 6-1' BGS		
				9/9/15 GW-01 measurements BOW = 17.50' TOR Stickup on casing = 0 GW to TOR = (Dry) TOC to TOR = 0.41'		

NOTES:

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Appendix F

Excavation Work Plan

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Primo-shield, Inc.
Oneida County
Utica, New York

Excavation Work Plan
NYSDEC Site No. 633027

NYSDEC State Superfund Standby Contract
(Work Assignment No. 1602534)

Prepared for

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12207

Prepared by

EA Engineering and Geology P.C.
333 West Washington Street, Suite 300
Syracuse, New York 13202
315-431-4610

May 2025
Version: FINAL
EA Project No. 1602534

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F-4 MATERIALS EXCAVATION AND LOAD-OUT 3
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Table F-1. Notifications

LIST OF ACRONYMS AND ABBREVIATIONS

CAMP	Community Air Monitoring Plan
CFR	Code of Federal Regulations
DER	Division of Environmental Remediation
EA	EA Engineering and Geology, P.C.
EWP	Excavation Work Plan
HASP	Health and Safety Plan
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYCRR	New York Codes of Rules and Regulations
P.E.	Professional Engineer
PFAS	Per- and polyfluoroalkyl substances
Site	Primo-shield, Inc. Site
SMP	Site Management Plan

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INTRODUCTION

This Excavation Work Plan (EWP) is provided as an Appendix to the Site Management Plan (SMP) for the Primo-shield, Inc. Site. This plan represents a procedure for any activity that would disturb the Site where contamination may be present. Any work will be required to follow the procedures outlined below. In summary, the New York State Department of Environmental Conservation (NYSDEC) will be notified of the work and detailed work plans, including waste disposal management, will be required for submittal. At minimum all work plans, Health and Safety Plans (HASPs), Community Air Monitoring Plans (CAMPs), and any other applicable document related to the proposed work will need to, at minimum, meet the requirements of NYSDEC.

F-1 NOTIFICATION

At least 15 days prior to the start of any activity that is anticipated to encounter remaining contamination or breach or alter the site's cover system, the site owner or their representative will notify the NYSDEC contacts listed in **Table F-1** includes contact information for the above notification. This information will be updated as necessary to provide accurate contact information. A full listing of site-related contact information is provided in Appendix C of the SMP.

Table F-1. Notifications*

Name	Contact Information
Jasmine Stefansky, NYSDEC Project Manager	518-402-9575; jasmine.stefansky@dec.ny.gov
Jeffrey Dyber, NYSDEC Project Manager's Supervisor	518-402-9698; jeffrey.dyber@dec.ny.gov
Kelly Lewandowski, NYSDEC Site Control	518-402-9569; kelly.lewandowski@dec.ny.gov
Gregory Rys, NYSDOH Project Manager	315-619-3194; gregory.rys@health.ny.gov
Adam Etringer, EA Project Manager	315-565-6564, aetringer@eaest.com

Notes:
* Notifications are subject to change and will be updated, as necessary.
EA = EA Engineering and Geology, P.C.
NYSDOH = New York State Department of Health

This notification will include:

- A detailed description of the work to be performed, including the location and areal extent of excavation, plans/drawings for site re-grading, intrusive elements or utilities to be installed below the soil cover, estimated volumes of contaminated soil to be excavated, any modifications of truck routes, and any work that may impact an engineering control.

- A summary of environmental conditions anticipated to be encountered in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of grossly contaminated media, and plans for any pre-construction sampling.

- A schedule for the work, detailing the start and completion of all intrusive work and submittals (e.g., reports) to the NYSDEC documenting the complete intrusive work.

- A summary of the applicable components of this EWP.

- A statement that the work will be performed in compliance with this EWP, 29 Code of Federal Regulations (CFR) 1910.120 and 29 CFR 1926 Subpart P.

- A copy of the contractor's HASP, in electronic format, if it differs from the HASP provided in Appendix K of the SMP.

- Identification of disposal facilities for potential waste streams.

- Identification of sources of any anticipated backfill, along with the required request to import form and all supporting documentation including, but not limited to, chemical testing results.

The NYSDEC Project Manager will review the notification and may impose additional requirements for the excavation that are not listed in this EWP. The alteration, restoration, and modification of engineering controls must conform with Article 145 Section 7209 of the Education Law regarding the application professional seals and alterations.

F-2 SOIL SCREENING METHODS

Visual, olfactory, and instrument-based (e.g., photoionization detector) soil screening will be performed during all excavations into known or potentially contaminated material (remaining contamination) or a breach of the cover system. A qualified environmental professional as defined in 6 New York Code of Rules and Regulations (NYCRR) Part 375, a Professional Engineer (P.E.) who is licensed and registered in New York State, or a qualified person who directly reports to a P.E. who is licensed and registered in New York State will perform the screening. Soil screening will be performed when invasive work is done and will include all excavation and invasive work performed during development, such as excavations for foundations and utility work, after issuance of the Certificate of Completion.

Soils will be segregated based on previous environmental data and screening results into material that requires off-site disposal and material that requires testing to determine if the material can be reused on-site as soil beneath a cover or if the material can be used as cover soil. Further discussion of off-site disposal of materials and on-site reuse is provided below.

F-3 SOIL STAGING METHODS

Soil stockpiles will be continuously encircled with a berm and/or silt fence. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by the NYSDEC.

F-4 MATERIALS EXCAVATION AND LOAD-OUT

A Qualified Environmental Professional as defined in 6 NYCRR Part 375, a P.E. who is licensed and registered in New York State, or a qualified person who directly reports to a P.E. who is licensed and registered in New York State will oversee all invasive work and the excavation and load-out of all excavated material.

The owner of the property and remedial party (if applicable) and its contractors are responsible for safe execution of all invasive and other work performed under this Plan.

The presence of utilities and easements on the Site will be investigated by the qualified environmental professional. It will be determined whether a risk or impediment to the planned work under this SMP is posed by utilities or easements on the Site. A Site utility stakeout will be completed for all utilities prior to any ground intrusive activities at the Site.

Loaded vehicles leaving the Site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and New York State Department of Transportation requirements (and all other applicable transportation requirements).

A truck wash will be operated on-site, as appropriate. The qualified Environmental Professional will be responsible for ensuring that all outbound trucks will be washed at the truck wash before leaving the Site until the activities performed under this section are complete. Truck wash waters will be collected and disposed of off-site in an appropriate manner.

Locations where vehicles enter or exit the Site shall be inspected daily for evidence of off-site soil tracking.

The qualified environmental professional will be responsible for ensuring that all egress points for truck and equipment transport from the Site are clean of dirt and other materials derived from the Site during intrusive excavation activities. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to site-derived materials. Material accumulated from the street cleaning and egress cleaning activities will be disposed off-site at a permitted landfill facility in accordance with all applicable local, State, and Federal regulations.

F-5 MATERIALS TRANSPORT OFF-SITE

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Material transported by trucks exiting the Site will be secured with tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

All trucks loaded with site materials will exit the vicinity of the Site using only approved truck routes. Truck routes should take into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; (f) overall safety in transport; and (g) community input where necessary.

Trucks will be prohibited from stopping and idling near residences outside the project site.

Egress points for truck and equipment transport from the site will be kept clean of dirt and other materials during site remediation and development.

Queuing of trucks will be performed on-site in order to minimize off-site disturbance. Off-site queuing will be prohibited.

F-6 MATERIALS DISPOSAL OFF-SITE

All material excavated and removed from the Site will be treated as contaminated and regulated material and will be transported and disposed off-site in a permitted facility in accordance with all local, State and Federal regulations. If disposal of material from this Site is proposed for unregulated off-site disposal (i.e., clean soil removed for development purposes), a formal request with an associated plan will be made to the NYSDEC Project Manager. Unregulated off-site management of materials from this Site will not occur without formal NYSDEC Project Manager approval.

Off-site disposal locations for excavated soils will be identified in the pre- excavation notification. This will include estimated quantities and a breakdown by class of disposal facility if appropriate, (e.g., hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, construction and demolition debris recovery facility) Actual disposal quantities and associated documentation will be reported to the NYSDEC in the Periodic Review Report. This documentation will include, but will not be limited to waste profiles, test results, facility acceptance letters, manifests, bills of lading and facility receipts.

Non-hazardous historic fill and contaminated soils taken off-site will be handled consistent with 6 NYCRR Parts 360, 361, 362, 363, 364 and 365. Material that does not meet Unrestricted soil cleanup objectives is prohibited from being taken to a New York State construction and demolition debris recovery facility (6 NYCRR Subpart 360-15 registered or permitted facility).

F-7 MATERIALS REUSE ON-SITE

The qualified environmental professional as defined in 6 NYCRR Part 375 will ensure that procedures defined for materials reuse in this SMP are followed and that unacceptable material (i.e., contaminated) does not remain on-site. Contaminated on-site material, including historic fill and contaminated soil, that is acceptable for reuse on-site will be placed below the landfill cap, and will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines with prior approval from the NYSDEC Project Manager.

Proposed materials for reuse on-site must be sampled for full suite analytical parameters including per- and polyfluoroalkyl substances (PFAS) and 1,4-dioxane. The sampling frequency will be in accordance with Division of Environmental Remediation (DER)-10 Table 5.4(e)10 unless prior approval is obtained from the NYSDEC Project Manager for modification of the sampling frequency. The analytical results of soil/fill material testing must meet the Site use criteria presented in NYSDEC DER-10 Appendix 5 – Allowable Constituent Levels for Imported Fill or Soil for all constituents listed, and the NYSDEC Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (November 2022 or date of current version, whichever is later) guidance values. Approvals for modifications to the analytical parameters must be obtained from the NYSDEC Project Manager prior to the sampling event.

Soil/fill material for reuse on-site will be segregated and staged as described above. The anticipated size and location of stockpiles will be provided in the 15-day notification to the NYSDEC Project Manager. Stockpile locations will be based on the location of site excavation activities and proximity to nearby site features. Material reuse on-site will comply with requirements of NYSDEC DER-10 Section 5.4(e)4. Any modifications to the requirements of DER-10 Section 5.4(e)4 must be approved by the NYSDEC Project Manager.

Any demolition material proposed for reuse on-site will be sampled for asbestos and the results will be reported to the NYSDEC for acceptance. Concrete crushing or processing on-site will not be performed without prior NYSDEC approval. Organic matter (e.g., wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the Site will not be reused on-site.

F-8 FLUIDS MANAGEMENT

All liquids to be removed from the Site, including but not limited to, excavation dewatering, decontamination waters and groundwater monitoring well purge and development waters, will be handled, transported and disposed off-site at a permitted facility in accordance with applicable local, state, and federal regulations. Dewatering, purge and development fluids will not be recharged back to the land surface or subsurface of the Site, and will be managed off-site, unless prior approval is obtained from NYSDEC.

Discharge of water generated during large-scale construction activities to surface waters (i.e., a local pond, stream or river) will be performed under a State Pollutant Discharge Elimination System permit.

F-9 COVER SYSTEM RESTORATION

No cover system currently exists on the Site.

F-10 BACKFILL FROM OFF-SITE SOURCES

All materials proposed for import onto the Site will be approved by the Qualified Environmental Professional, as defined in 6 NYCRR Part 375, and will be in compliance with provisions in the SMP prior to receipt at the Site. A Request to Import/Reuse Fill or Soil form, which can be found at http://www.dec.ny.gov/regulations/67386.html, will be prepared and submitted to the NYSDEC Project Manager allowing a minimum of 5 business days for review. A copy of the form is presented in Appendix G of the SMP.

Material from industrial sites, spill sites, other environmental remediation sites, or potentially contaminated sites will not be imported to the Site.

All imported soils will meet the backfill and cover soil quality standards established in 6 NYCRR 375-6.7(d) and DER-10 Appendix 5 for industrial use. Soils that meet 'general' fill requirements under 6 NYCRR Part 360.13, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the Site without prior approval by NYSDEC Project Manager. Soil material will be sampled for the full suite of analytical parameters, including PFAS and 1,4-dioxane. Solid waste will not be imported onto the Site.

Trucks entering the Site with imported soils will be securely covered with tight fitting covers. Imported soils will be stockpiled separately from excavated materials and covered to prevent dust releases.

F-11 STORMWATER POLLUTION PREVENTION

Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by the NYSDEC. All necessary repairs shall be made immediately.

Accumulated sediments will be removed as required to keep the barrier and hay bale check functional.

All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials.

Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

Erosion and sediment control measures identified in the SMP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected

to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters.

Silt fencing or hay bales will be installed around the entire perimeter of the construction area.

F-12 EXCAVATION CONTINGENCY PLAN

If underground tanks or other previously unidentified contaminant sources are found during post-remedial subsurface excavations or development related construction, excavation activities will be suspended until sufficient equipment is mobilized to address the condition. The NYSDEC project manager will be promptly notified of the discovery.

Sampling will be performed on product, sediment and surrounding soils, etc. as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a full list of analytes (Target Analyte List metals, Target Compound List volatiles and semivolatiles [including 1,4-dioxane], Target Compound List pesticides and polychlorinated biphenyls, and PFAS), unless the site history and previous sampling results provide sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC Project Manager for approval prior to sampling. Any tanks will be closed as per NYSDEC regulations and guidance.

Identification of unknown or unexpected contaminated media identified by screening during invasive site work will be promptly communicated by phone within 2 hours to NYSDEC's Project Manager. Reportable quantities of petroleum product will also be reported to the NYSDEC spills hotline. These findings will be also included in the Periodic Review Report.

F-13 COMMUNITY AIR MONITORING PLAN

A CAMP shall be prepared in accordance with Appendix 1A of DER-10, Generic Community Air Monitoring Plan. The CAMP shall include at a minimum continuous monitoring of volatile organic compounds and particulates downwind of any ground-intrusive activities, and periodic monitoring of volatile organic compounds during non-intrusive activities. Air sampling station locations will be adjusted on a daily or more frequent basis based on actual wind directions to provide an upwind and at least two downwind monitoring stations.

Exceedances of action levels listed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers.

F-14 ODOR CONTROL PLAN

This Odor Control Plan is capable of controlling emissions of nuisance odors off-site. Specific odor control methods to be used on a routine basis will include the use of odor-control foam, BioSolve (or approved equal), or other methods approved by NYSDEC. If nuisance odors are identified at the site boundary, or if odor complaints are received, work will be halted, and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have

been abated. NYSDEC and NYSDOH will be notified of all odor events and of any other complaints about the project. Implementation of all odor controls, including the halt of work, is the responsibility of the remedial party's Remediation Engineer, and any measures that are implemented will be discussed in the Periodic Review Report.

All necessary means will be employed to prevent on- and off-site nuisances. At a minimum, these measures will include: (a) limiting the area of open excavations and size of soil stockpiles; (b) shrouding open excavations with tarps and other covers; and (c) using foams to cover exposed odorous soils. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-site disposal; (e) use of chemical odorants in spray or misting systems; and (f) use of staff to monitor odors in surrounding neighborhoods.

If nuisance odors develop during intrusive work that cannot be corrected, or where the control of nuisance odors cannot otherwise be achieved due to on-site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering the excavation and handling areas in a temporary containment structure equipped with appropriate air venting/filtering systems.

F-15 DUST CONTROL PLAN

Particulate monitoring must be conducted according to the CAMP provided above, and in accordance with Appendix 1A of DER-10, Generic Community Air Monitoring Plan. If particulate levels at the Site exceed the thresholds listed in the CAMP or if airborne dust is observed on the Site or leaving the Site, the dust suppression techniques listed below will be employed. The remedial party will also take measures listed below to prevent dust production on the Site.

A dust suppression plan that addresses dust management during invasive on-site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved using a dedicated on-site water truck for road wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.

- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.

- Gravel will be used on roadways to provide a clean and dust-free road surface.

- On-site roads will be limited in total area to minimize the area required for water truck sprinkling.

Appendix G

Site Management Forms

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New York Department of Environmental Conservation
Inactive Hazardous Waste Site
Inspection Form-Treatment Systems

Site Name: *Primoshield Inc.*		**NYSDEC Site Number:** *633027*	**NYSDEC PM:** *Jasmine Stefansky*
Site Location: *1212 St. Vincent Street, Utica, NY*		**Site Classification # : 4**	**Primary Site Contact:**
Site Inspection Date:	**Purpose of Inspection:**		
Name of Inspector:	**Title:**	**Agency/Company:**	**Address:**
Phone Number:			

Treatment Systems

System Status				**General Observations:**
System in operation during visit?	*Yes*	*No*		
Manned on a fulltime basis?	*No*			
Pump working?	*Yes*	*No*		
Initial flow rate (gpm):				
Totalizer reading (gallons)				
Discharge Monitoring				
Discharge to the POTW?	*Oneida County Sewer District Permit GW-040*			
Was permit performance monitoring conducted?	*Yes*	*No*		
Condition of Operational Controls				
Condition of gauges?	*Good*	*Poor*	*NE*	
Condition of flow meters	*Good*	*Poor*	*NE*	
Condition of system alarms?	*Good*	*Poor*	*NE*	
Condition of flow pipes and hoses?	*Good*	*Poor*	*NE*	
Pipes labeled with direction of flow and contents?	*No*		*NE*	
Condition of valves?	*Good*	*Poor*	*NE*	
Evidence of leaking?	*Yes*	*No*	*NE*	
Condition of extraction/sump pump?	*Good*	*Poor*	*NE*	
Lighting in Work Areas Adequate?	*Yes*	*No*	*NE*	
Collection Vault and Pump				
Vault condition - ground surface	*Good*	*Poor*	*NE*	
Vault condition - inside (visual observation from ground level)?	*Good*	*Poor*	*NE*	
Collection/Discharge Trenches				
Condition of clean-out covers?	*Good*	*Poor*	*NE*	
Evidence of sedimentation?	*Yes*	*No*	*NE*	

Site Features

Site Security and Fence				**General Observations:**
Condition of the access gates and locks?	*Good*	*Poor*	*NE*	
Condition building?	*Good*	*Poor*	*NE*	
Condition of the perimeter fence	*Good*	*Poor*	*NE*	
Is vegetation infringing on the fence?	*Yes*	*No*	*NE*	
Was a monitoring well inspection completed?	*Yes - see attached*		*No*	

NE- not evaluated, provide explanation

Additional Observation Notes:

New York Department of Environmental Conservation
Inactive Hazardous Waste Site
Inspection Form-Treatment Systems

Previously observed: Review and comment as to status (include photo documentation)
1. Is there vegetation infringing on the perimeter fence? Remove infringing vegetation that can be removed without the use of power tools.

Photograph Log:
Photograph 1
Photograph 2
Photograph 3
Photograph 4
Photograph 5
Photograph 6
Photograph 7
Photograph 8
Photograph 9
Photograph 10

Performance Monitoring
Were check samples collected during this visit? Yes No
Sample type collected *(circle or write in other)* : Groundwater Effluent
List Parameters/Methods Collected Per Media:
Analytical Laboratory/Location:
Sample Observations:

EFFLUENT SAMPLING RECORD

PROJECT NAME	**Primoshield Inc.**
PROJECT NUMBER	
SAMPLER NAME	
SAMPLER SIGNATURE	
CHECKED BY:	**DATE:**

Monitoring Location _____

Sample ID _____

Sample Date/Time _____

_____

SKETCH/NOTES:

ANALYTICAL PARAMETERS

	PARAMETER	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED
	VOCs	624		
	Metals*	200.7		
	pH	150.1		
	Cyanide	9010		

FIELD DATA RECORD - LOW FLOW GROUNDWATER SAMPLING

JOB NUMBER

PROJECT: NYSDEC Primoshield Inc.

FIELD SAMPLE NUMBER

SITE ID: (MW) P-

SITE TYPE: WELL

DATE

ACTIVITY: START END

SAMPLE TIME

WATER LEVEL / PUMP SETTINGS

MEASUREMENT POINT
- ☐ TOP OF WELL RISER
- ☐ TOP OF PROTECTIVE CASING

PROTECTIVE CASING STICKUP (FROM GROUND) ____ FT

CASING / WELL DIFFER. ____ FT

INITIAL DEPTH TO WATER ____ FT

WELL DEPTH (TOR) ____ FT

PID AMBIENT AIR ____ PPM

WELL DIAM. ____ IN

FINAL DEPTH TO WATER ____ FT

SCREEN LENGTH ____ FT

PID WELL MOUTH ____ PPM

WELL INTERGRITY:

	YES	NO	N/A
CAP			
CASING			
LOCKED			
COLLAR			

DRAWDOWN VOLUME ____ GAL
(initial - final x 0.16 {2-inch} or x 0.65 {4-inch})

RATIO OF DRAWDOWN VOLUME TO TOTAL VOLUME PURGED

PRESSURE TO PUMP ____ PSI

TOTAL VOL. PURGED ____ GAL
(purge volume (milliliters per minute) x time duration (minutes) x 0.00026 gal/milliliter)

REFILL SETTING

DISCHARGE SETTING

PURGE DATA

TIME	DEPTH TO WATER (ft)	PURGE RATE (mL/min)	TEMP. (°C) (+/- 3 degrees)	SP. CONDUCT. (mS/cm) (+/- 3%)	pH (units) (+/- 0.1 units)	DISS. O_2 (mg/L) (+/- 10%)	TURBIDITY (ntu) (+/- 10% <10	REDOX (mv) (+/- 10 mv)	COMMENTS

EQUIPMENT DOCUMENTATION

TYPE OF PUMP	TYPE OF TUBING	TYPE OF PUMP MATERIAL	TYPE OF BLADDER MATERIAL
☐ GEOPUMP (peristaltic)	☐ LOW DENSITY POLYETHYLENE	☐ STAINLESS STEEL	☐ TEFLON
☐ QED BLADDER	☐ OTHER _____	☐ OTHER _____	☐ OTHER _____

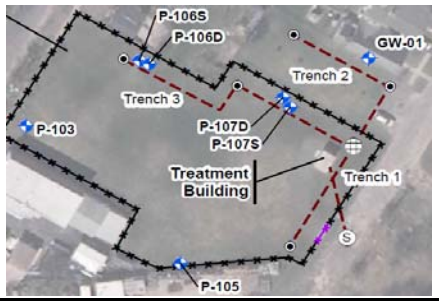
ANALYTICAL PARAMETERS

	METHOD NUMBER	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	
☐ VOC	8260B	HCl to pH <2	2 x 40ml	☐	
☐ TAL METALS (Cd, Cr, Cu, Pb, Ni, Zn)	6010B/7470A/7141A	HNO3 to pH <2	500 ml poly	☐	
☐ TAL METALS (Dissolved)	6010B/7470A/7141A	HNO3 to pH <2	500 ml poly	☐	Field Filtered
☐ _____	_____	_____	_____	☐	
☐ _____	_____	_____	_____	☐	

NOTES:

SIGNATURE: _____

LOCATION SKETCH



Groundwater Well Inspection Form
Primo-shield, Inc. (633027)
1212 St. Vincent St, Utica, New York

EA Engineering and Geology, P.C.
Syracuse, New York

Inspector Name(s):

Date:

Well ID	Ground Elevation[1] (ft AMSL)	Estimated Measurement Point Elevation[2]	Water level (ft below TOC)	Depth to Bottom (ft below TOC)	Well ID clearly labeled (Y/N)	Well Lock (Y/N)	Cap on Well Riser (G/F/P)	Cap on protective casing (G/F/P)	Protective Casing (G/F/P)	Concrete Pad (G/F/P)	Comments
GW-01	517	517									
P-103	521.8	524.3									
P-105	522.7	525.1									
P-106S	521.1	524.8									
P-106D	520.8	524.3									
P-107S	519.4	522.1									
P-107D	519.3	522.0									

Notes:
1) Ground Elevation from monitoring well logs included in Monitoring Plan for Primoshield Plating January 2004.
2) Measurement Point Elevation calculated using the ground elevation and field measurements of casing stickup and the distance from the top of riser to the top of casing;

AMSL = Above mean sea level
ft = Foot (feet)
NM = not measured
TOC = Top of casing
TOR = Top of riser
F = fair
G = good
N = No
P = Poor
Y = Yes

Summary of Green Remediation Metrics for Site Management

Site Name: _____ Site Code: _____
Address: _____ City: _____
State: _____ Zip Code: _____ County: _____

Initial Report Period (Start Date of period covered by the Initial Report submittal)
Start Date: _____

Current Reporting Period
Reporting Period From: _____ To: _____

Contact Information
Preparer's Name: _____ Phone No.: _____
Preparer's Affiliation: _____

I. Energy Usage: Quantify the amount of energy used directly on-site and the portion of that derived from renewable energy sources.

	Current Reporting Period	**Total to Date**
Fuel Type 1 (e.g. natural gas (cf))		
Fuel Type 2 (e.g. fuel oil, propane (gals))		
Electricity (kWh)		
Of that Electric usage, provide quantity:		
Derived from renewable sources (e.g. solar, wind)		
Other energy sources (e.g. geothermal, solar thermal (Btu))		

Provide a description of all energy usage reduction programs for the site in the space provided on Page 3.

II. Solid Waste Generation: Quantify the management of solid waste generated on-site.

	Current Reporting Period (tons)	**Total to Date (tons)**
Total waste generated on-site		
Operation, maintenance, and monitoring-generated waste		
Of that total amount, provide quantity:		
Transported off-site to landfills		
Transported off-site to other disposal facilities		
Transported off-site for recycling/reuse		
Reused on-site		

Provide a description of any implemented waste reduction programs for the site in the space provided on Page 3.

III. Transportation/Shipping: Quantify the distances travelled for delivery of supplies, shipping of laboratory samples, and the removal of waste.

	Current Reporting Period (miles)	**Total to Date (miles)**
Standby Engineer/Contractor		
Laboratory Courier/Delivery Service		
Waste Removal/Hauling		

Provide a description of all mileage reduction programs for the site in the space provided on Page 3. Include specifically any local vendor/services utilized that are within 50 miles of the site.

IV. Water Usage: Quantify the volume of water used on-site from various sources.

	Current Reporting Period (gallons)	**Total to Date (gallons)**
Total quantity of water used on-site		
Of that total amount, provide quantity:		
Public potable water supply usage		
Surface water usage		
On-site groundwater usage		
Collected or diverted storm water usage		

Provide a description of any implemented water consumption reduction programs for the site in the space provided on Page 3.

V. Land Use and Ecosystems: Quantify the amount of land and/or ecosystems disturbed and the area of land and/or ecosystems restored to a pre-development condition (i.e. Green Infrastructure).

	Current Reporting Period (acres)	**Total to Date (acres)**
Land disturbed		
Land restored		

Provide a description of any implemented land restoration/green infrastructure programs for the site in the space provided on Page 3.

Description of green remediation programs reported above (Attach additional sheets if needed)
Energy Usage:
Waste Generation:
Transportation/Shipping:
Water usage:
Land Use and Ecosystems:
Other:

CERTIFICATION BY CONTRACTOR
I, _____ (**Name**) do hereby certify that I am _____ (**Title**) of the Company/Corporation herein referenced and contractor for the work described in the foregoing application for payment. According to my knowledge and belief, all items and amounts shown on the face of this application for payment are correct, all work has been performed and/or materials supplied, the foregoing is a true and correct statement of the contract account up to and including that last day of the period covered by this application. _____ **Date** **Contractor**

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Appendix H

Operations and Maintenance Manual

Department of Environmental Conservation

Division of Environmental Remediation

Primoshield Plating, Inc. Site
Contract No. 1

Site No. 6-33-027
City of Utica
Oneida County, New York

Operation & Maintenance Manual

March 1999

New York State Department of Environmental Conservation
GEORGE E. PATAKI, *Governor* JOHN P. CAHILL, *Commissioner*

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1.0 BACKGROUND

1.1 Site Location and Description

Primoshield Inc. is a former Metal Electroplating facility located at 1212 St. Vincent Street; Utica, New York 13501. The site is located in a mixed commercial/residential area within the City of Utica and is also located in Oneida County and NYSDEC Region 6. Due to past operations and the presence of hazardous wastes at the site, it has been listed as a Class 2 Inactive Hazardous Waste Site (Code No.: 6-33-027) on the NYSDEC registry of inactive hazardous waste sites. The site is bordered by Conkling Avenue on the northwest and St. Vincent Street to the south and east. The DePaul building and property border the site on the southwest and two residential properties border the site on the northeast (see Figure 1). The site, as defined in the registry, consists of the Primoshield Plating property and the adjacent DePaul Building cinder and gravel parking lot which together total approximately 1.5 acres. The site is located in a primarily residential neighborhood which also contains a number of commercial properties and the St. Agnes R.C. cemetery immediately to the southeast. The Mohawk River is located downgradient from and approximately one and one half miles to the north of the site.

1.1 Site History

Primoshield Inc. was a metal electroplating facility that operated from the early 1970s until August 1985. The Primoshield property consisted of a factory or production building, a small office building, a small laboratory and a small storage trailer all of which were in an advanced state of disrepair.

A large number of drums and open vats (some containing acids, cyanide solutions and spent plating solutions) were left behind when the facility was abandoned by its owners following a fire which occurred during August of 1985.

Local citizen concerns regarding health and safety issues associated with this site were transmitted to the NYSDEC. Following an initial site reconnaissance and sampling effort by NYSDEC in December of 1985, laboratory sample results obtained indicated a very high risk to the public from the site at that time. Consequently, on March 12, 1986 the NYSDEC formally petitioned the U.S. EPA Region II Office requesting that the USEPA perform an Emergency Response and Removal Action at the Primoshield Site, including but not limited to the cleanup and removal of all the surficial and containerized hazardous wastes and the installation of a fence and gate system to resecure the site.

During 1986 and 1987 the USEPA conducted an emergency response and removal action at the Primoshield Site. All of the containerized waste and most of the accessible surficial waste materials were removed from the site during this initial cleanup and taken to approved off-site disposal facilities. Site security was also established by the installation of a chain link fence and gate system. In November 1987 U.S. EPA emergency response and cleanup funds for the Primoshield Site were exhausted and jurisdiction for further remedial action at the site was returned to NYSDEC.

Following the fire which occurred in August 1985, the Primoshield facility was abandoned by its owners and the City of Utica subsequently assumed ownership of the property due to non-payment of taxes. In December of 1989 the NYSDEC signed a negotiated Order on Consent with the City of Utica which agreed to perform a Remedial Investigation/Feasibility Study (RI/FS) to further investigate and remediate residual hazardous waste contamination remaining at the site. The City of Utica applied for State assistance (75% sharing of eligible costs) under Title III of the New York State (NYS) 1986 Environmental Quality Bond Act (EQBA). On May 3, 1991 State Assistance Contract No. C300241 was entered into by the New York State Department of Environmental Conservation and the City of Utica for the City of Utica to complete an RI/FS at the Primoshield Site under Title III of the NYS 1986 EQBA. The City of Utica subsequently retained O'Brien and Gere Engineers Inc. (Syracuse, N.Y.) and Stetson Harza Inc. (Utica, N.Y.) to provide engineering services and technical support for the Primoshield Site RI/FS.

The RI was conducted in basically a single phase beginning with a site baseline survey which was initiated during September/October 1992 and ending with a second round of ground water sample collection and analyses during September 1993. Some additional sample collection and analyses (primarily for metals in surface soils and TCLP testing of building materials) was conducted after April 1993 to fill in gaps in the data base. A one day on-site air quality sampling and monitoring program conducted on August 29, 1994 was the final field data collection for the Primoshield Site Remedial Investigation.

Site related contaminants of concern in surface soil were identified (based on the results of the RI) as cadmium, chromium, nickel and cyanide. Site-related contaminants in ground water above class GA ground water standards included trichloroethene, 1,1,1-trichloroethane, 1,1 dichloroethane and chromium. Water and Sediment Samples collected from the sumps in the basement of the 1208 St. Vincent Street residence indicated elevated concentration levels for both VOCs (1,1-dichloroethane; 1,1,1 trichloroethane; and trichloroethene) and heavy metals/inorganics (cadmium, chromium,

lead, nickel, and cyanide). These elevated concentration levels of both VOCs and heavy metals/inorganics in both the ground water and the sediment in the basement of the 1208 St. Vincent Street residence indicate the need to address these two areas during site remediation.

A number of IRMs were under consideration during the RI/FS at the Primoshield Site. After extensive analysis and discussion, only the following two relatively minor IRMs were actually implemented:

1. On June, 1993 an interim structural brace (tubular metal scaffolding system) was installed in roughly the center of the main production building, to transfer roof loading from an isolated unbraced vertical column which appeared to be close to failure.

2. On April 19, 1994 a site surficial cleanup was held at the Primoshield Site. Scrap metal and scrap lumber were collected and stockpiled for later recycling and/or disposal. Brush was cleared and stockpiled and miscellaneous waste and debris was collected and stockpiled for later disposal off-site.

The Record of Decision (ROD) for the site was signed on March 30, 1995. The selected remedy outlined in the ROD included the following items:

- Excavation and disposal of hazardous and non-hazardous soils;
- building demolition; and
- installation and operation of a groundwater treatment system.

The site was re-assigned as a State Superfund (SSF) project in November 1996 because the city of Utica had inadequate funds to perform construction. Therefore, under a SSF contract, Ontario Specialty Consulting/Industrial Site Services (OSC/ISS) performed remedial construction work at the Primoshield Site. Work was substantially complete on September 16, 1998 and finally complete on December 15, 1998.

2.0 GROUNDWATER MONITORING

This section describes the processes by which groundwater at the Primoshield Plating site will be monitored. For the first year, the wells will be sampled and analyzed quarterly for various heavy metals and VOCs.

2.1 Monitoring Plan Elements

2.1.1 Monitoring Wells

The initial groundwater monitoring network will consist of eleven (11) of the existing monitoring wells at the site (see Figure 1 in Appendix A): P-101-S, P-101-D, P-102, P-103, P-104, P-105, P-106-S, P-106-D, P-107-S, P-107-D, and P-108 (S=shallow and D=deep). The depth of the seven (7) shallow wells are approximately 15 feet while the three (3) deep wells range from 75 to 85 feet. Groundwater monitoring well P-102 is approximately 39 feet deep. The location of all monitoring wells can be seen on Figure 1 in Appendix A. The monitoring well construction logs and previous monitoring well sampling data is included in Appendix C and Appendix D respectively.

The groundwater monitoring network is intended to be dynamic, and a periodic (i.e., annual) evaluation should be made of the usefulness of the data derived from the network. If it is determined that the water quality data from a well do not change significantly from one sampling event to another, that well could be considered for removal from the network.

2.1.2 Sampling Schedule

Groundwater samples from the monitoring network will be collected and analyzed quarterly for a period of one year beginning at the completion of the final remedy. After the first year's results have been analyzed and evaluated by New York State Department of Environmental Conservation (NYSDEC) and the New York State Department of Health (NYSDOH), a determination will be made to either continue sampling at the same or a different frequency.

2.1.3 Groundwater Analyses

Analytical parameters for the first year of sampling will include total VOCs total metals. A standard 28-day turnaround will be provided on all analyses from the verified time of sample receipt (VTSR) at the laboratory.

Analysis shall be in accordance with New York State Department of Environmental Conservation Analytical Services Protocol (NYSDEC ASP) October 1995 edition. Methods 95-1 or EPA 8260 for TCL Volatile Organic Compounds and CLP-M for TAL Metals. Standard analyte reporting will be done with no data package submitted.

2.1.4 Laboratory Qualifications

The analytical laboratory to be used for the analyses must maintain NYSDOH Environmental Laboratory Approval Program (ELAP) certification for all subcategories of solid and hazardous waste. Certification is also required for ASP Contract Laboratory Program (CLP) metals, since this category is part of the ELAP program. The ELAP quality assurance objectives should be met for all analyses.

2.1.5 Data Reporting and Record Keeping

Data collected during groundwater sampling activities should be reported in letter report format to both NYSDEC and NYSDOH. Reports should be sent to:

Gerald Rider, P.E.
Chief, Operation and Maintenance Section
Bureau of Hazardous Site Control
Division of Environmental Remediation
50 Wolf Road
Albany, New York 12233-7010

Darrell Sweredoski
RHWR
New York State Department of Environmental Conservation
Region 6
State Office Building
Watertown, New York 13601

John Sheehan
Environmental Exposure Investigation
New York State Department of Health
2 University Place
Albany, New York 12203

The reports should include a brief introduction and discussions of the field activities, sampling results, and quality assurance/quality control (QA/QC) results.

Field activities should be documented in a field sampling log book, a copy of which should be submitted with the data report. The full analytical data packages should also be submitted with their respective data reports.

A summary report of groundwater quality and flow direction will be provided at the end of the one-year O&M period.

2.2 Groundwater Sampling and Procedures

Sampling of the monitoring wells will consist of:

- Measurement of depth to water level and total depth of the well (to calculate well volume);
- Evacuation of static water (purging); and
- Sample collection.

2.2.1 Water Level Measurement and Well Volume Calculation

Water level measurements will be collected from each of the eleven monitoring wells and the groundwater collection sump prior to purging and sampling. The measurements will be recorded using the following procedures:

- Record date, time, weather conditions, and any other well-specific pertinent information;
- Locate reference mark at the top of the well casing;

- Lower electronic water level indicator probe into well, making sure the cord attached to the probe does not scrape the sides of the well casing;
- When an audible signal is detected, stop lowering the probe;
- Pull on the probe until the audible signal ceases;
- Lower probe slowly again, stopping as soon as an audible signal is detected;
- Hold cord to side of well casing where reference mark is etched;
- Record measurement (to the nearest 0.01 foot) as depth to water in field logbook;
- Repeat procedure three times for consistency; measurement should remain constant;
- Record the total depth of the well (to the nearest 0.01 foot) by lowering the probe to the bottom of the well and positioning the cord next to the reference mark on the well casing and measuring; and
- After completing both measurements at each well, decontaminate the probe to avoid any possible cross-contamination.

2.2.2 Purging

Before a groundwater sample is collected, the static water must be purged from the well to ensure that a representative groundwater sample is obtained. Three to five well volumes must be purged before collecting a sample. Prior to sampling each well, the bailers or pump must be properly decontaminated to prevent contamination from previous sampling events. Water removed during purging should be drummed and treated by the groundwater treatment system.

The volume of water in the well is calculated using the formula:

$V = T r^2 (0.163)$

Where:

V = Volume of water in the well (gallons);

T = Water column height (feet);

r = Inside radius of the well casing (inches); and

0.163 = A constant conversion factor that compensates for the $\pi r^2 \times T$ well- volume calculation and converts the volume from cubic feet to gallons.

2.2.3 Physical Parameters

Groundwater temperature, pH, specific conductance, and turbidity will be measured during sampling. Sample collection procedures are as follows:

- Place polyethylene sheeting (or similar covering) on the ground to avoid surface contamination, if necessary;
- When transferring water from the bottom loading bailer to sample containers, care will be taken to avoid agitating the sample;
- All observable physical characteristics (e.g., color, sheen, odor, turbidity) of the groundwater at the time of sampling will be recorded; and
- Weather conditions (i.e., air temperature, sky conditions, recent precipitation, drought conditions) at the time of sampling will be recorded.

2.2.4 QA/QC Samples

Field QA/QC samples will include one trip blank per daily sample shipment, which will be analyzed for total metals and total VOCs. In addition, one field duplicate and one matrix spike/matrix spike duplicate (MS/MSD) sample set will be collected and analyzed for the same parameters as the groundwater samples.

2.2.5 Decontamination

Sampling methods and equipment have been chosen to minimize decontamination requirements and prevent the possibility of cross-contamination. Sampling equipment used at more than one location (including the water level indicator) will be decontaminated between locations using the following procedure:

- Washing in a trisodium phosphate (TSP) solution;
- Rinsing with potable water; and
- Air drying.

All waters generated by decontamination procedures will be disposed of with well purge waters, and all expendable materials (e.g., Tyvek, gloves, etc.) generated during sampling will be bagged and properly disposed of as solid waste.

2.3 Maintenance

Maintenance of the groundwater monitoring system will occur each time the wells are sampled. These inspections will consist of the following:

- Assessing the condition of each well for all items listed on the Well Inspection Checklist;
- Note all problems for each well, detailing all discrepancies and items requiring maintenance; and
- Ensuring each well is labeled properly with a paint stick to aid crews in identifying the wells.

2.3.1 Physical Inspection

The inspection of all wells should note the following criteria, which should be recorded:

- Which, if any, wells require painting;
- Which, if any, wells require new locks;
- Which, if any, wells require protective casings;
- Which, if any, wells require new well caps;
- Which, if any, wells have an obstruction inside the well (may need replacing);
- Which, if any, wells have water in the annulus (need drainage hole);
- Which, if any, wells require new concrete pads; and
- Which, if any, wells require protective posts to be installed.

2.4 Monitoring Report

A Monitoring Report shall be produced each time a round of sampling is performed. It will contain a concise summary of all findings of the sampling event. A Groundwater Sampling Log Sheet (see Appendix B) shall be filled out completely and all discrepancies/comments regarding the condition of each well should be properly noted. The completed Groundwater Sampling Log Sheet will be part of the monitoring report.

3.0 GWTS OPERATION & MAINTENANCE

3.1 Groundwater Treatment System Description

The groundwater treatment system is designed to be operated continuously, without attendance of an operator, for approximately one month or longer before routine maintenance (e.g., cleaning basket strainers, replacing GAC units, routine maintenance). The system has the capability to notify the operator, through the automatic dialing alarm unit system, when predetermined alarm conditions exist. These alarms indicate that there may be malfunctions in the groundwater treatment system or that maintenance of the system may be required.

The groundwater treatment system includes three collection trenches, a collection sump, and active treatment system. The system includes the following major components:

- Submersible groundwater pump;
- Duplex basket strainers;
- Two-stage Granular Activated Carbon (GAC) units (plus one spare unit);
- Flow meter;
- Treatment building;
- Utilities connection; and
- Control systems.

Contaminated groundwater is intercepted by the collection trenches and flows into a collection sump located outside the treatment building. The submersible pump in the collection sump pumps the contaminated water through the treatment system. First, the water runs through a duplex basket strainer to remove suspended solids greater than 40 Microns. Next, it flows through two granular activated carbon (GAC) vessels. The purpose of this is to remove the Volatile Organic Compounds (VOCs) in the groundwater. Finally, the treated effluent flows by gravity to the Oneida County Sewer System where it will undergo final treatment.

Pressure gauges, a flow meter and sampling ports are included as part of the treatment system. The design flow rate for the system is 7.5 gallons/minute and the pressure in the lines should never be above 10 psi. These two parameters must be monitored at every visit.

A plan view of the system, a treatment system schematic and an electrical detail are included in this report as Figures 2, 3 and 4 respectively in Appendix A. Also, various product information (instructions, cut sheets, warrantees, pump curves, etc...) is included in Appendix G.

3.2 Groundwater Treatment System Performance Requirements

The influent flow rate should be 7.5 gallons per minute. The flow rate is measured by reading the flow meter and measuring the time elapsed. Flow is regulated by the ball valve located downstream of the basket strainers. The groundwater treatment is designed to remove VOCs and suspended solids from the groundwater and have an effluent quality meeting the criteria specified by the Oneida County Sewer District Groundwater Discharge Permit (see Appendix E). According to OSC/ISS, the effluent quality met the criteria throughout the demonstration period (a copy of all GWTS effluent sample results is included in Appendix F). According to the permit, sampling of the effluent must be done semi-annually and reported to the Oneida County Sewer District.

3.3 System Operation and Maintenance

During normal operation, collect grab samples from the effluent discharge point semi-annually and have them analyzed for: pH, cadmium, chromium, copper, lead, nickel, zinc, cyanide and total VOCs.

Additional inspection/operational requirements are as follows:

- Record flow rates and the cumulative total volume of water treated whenever a maintenance visit to the facility is conducted. If the pump is not running during the visit (the water level in the manhole may be low), turn the pump H-O-A switch to the "H " position to start groundwater through the system.

- Collect grab samples of the influent semi-annually and have them analyzed for the same parameters as the effluent samples.

- Collect grab samples from the effluent of the first GAC vessel, analyze for total VOCs, and make sure there is no breakthrough from drum No. 1. If so, drum 2 becomes drum 1, a new drum becomes drum 2 and drum 1 must be disposed.

- Follow the maintenance procedures specified in the manufacturer's manuals for all equipment.

- Clean the duplex basket strainer as necessary. After cleaning one strainer, switch the flow direction to the other strainer.

- Pump the groundwater collection manhole down to the bottom and visually inspect the manhole on an annual basis. Look specifically for physical damage and sediment buildup. Clean the manhole if sediment buildup is great.

- Cleanout or replace any clogged piping as necessary.

The Groundwater Treatment System Operational Checklist included in Appendix B of this report must be filled out every time the GWTS is inspected or effluent sampling is performed.

4.0 SITE MAINTENANCE

4.1 Site Maintenance Description

The NYSDEC Region six Division of Operations will do the site maintenance at the Primoshield Site. Site Maintenance includes mowing the lawn, picking up garbage and debris before each mowing and repairing the fence when needed.

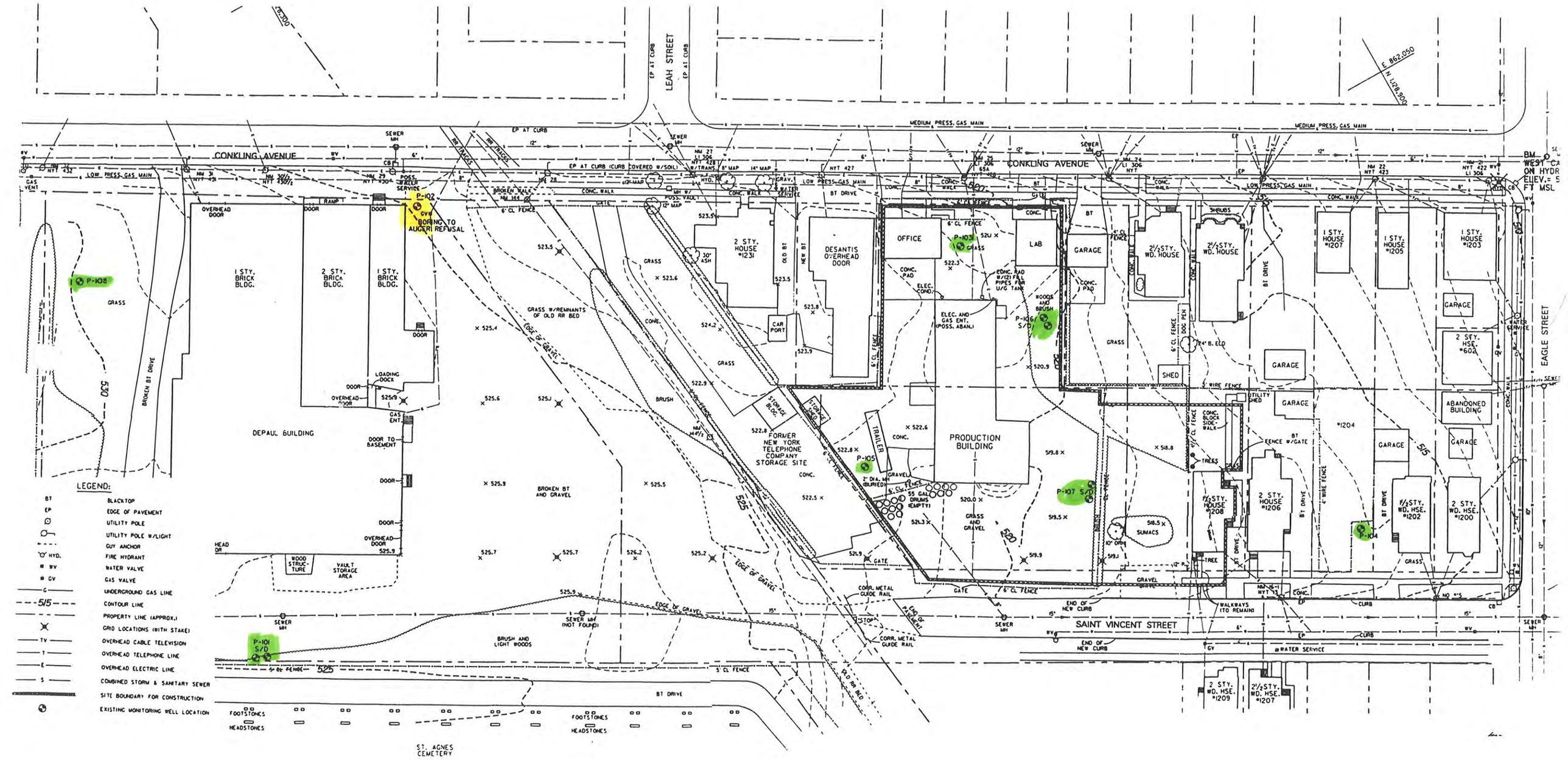
5.0 SITE HEALTH AND SAFETY

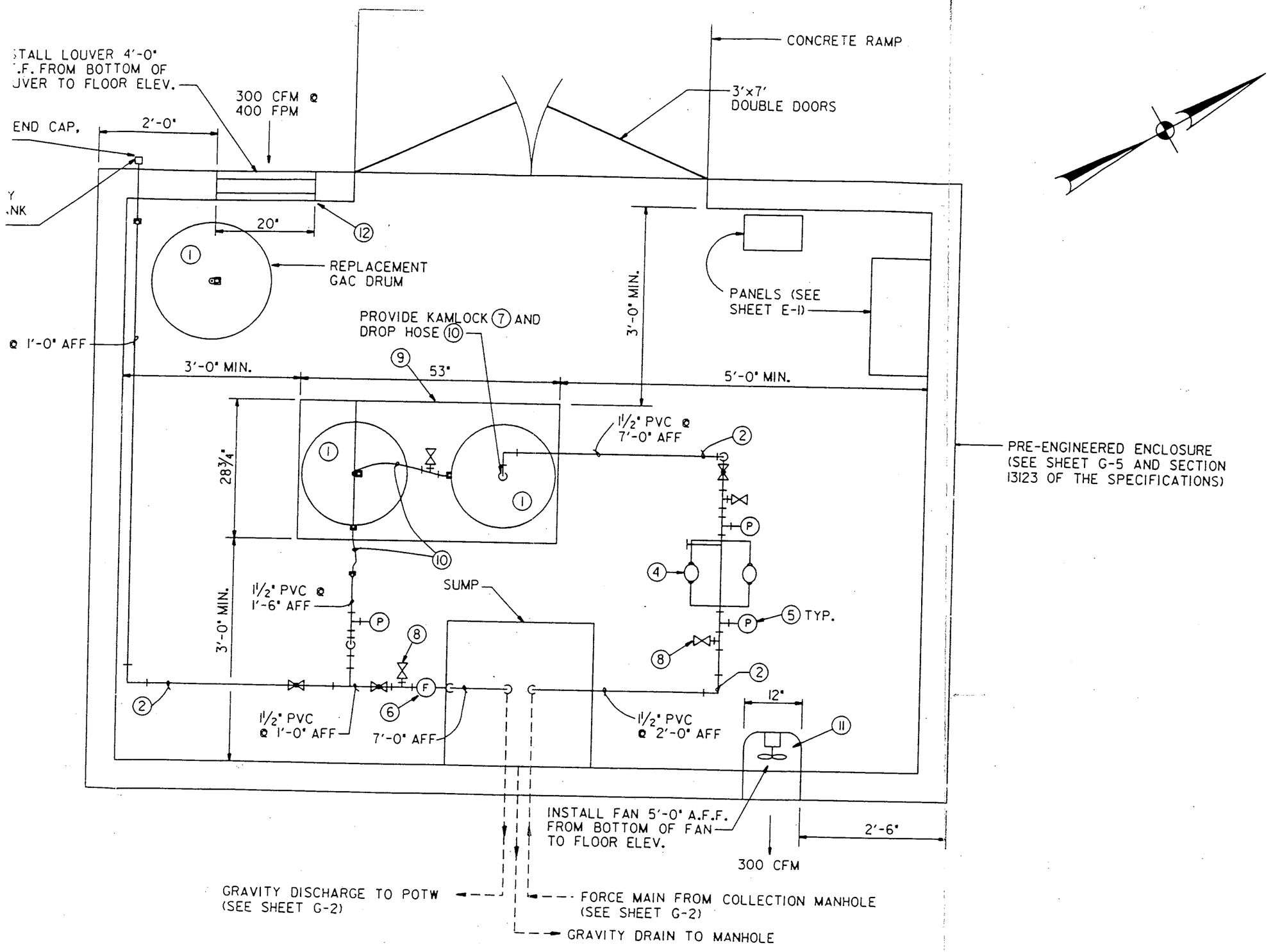
5.1 Site Health and Safety Description

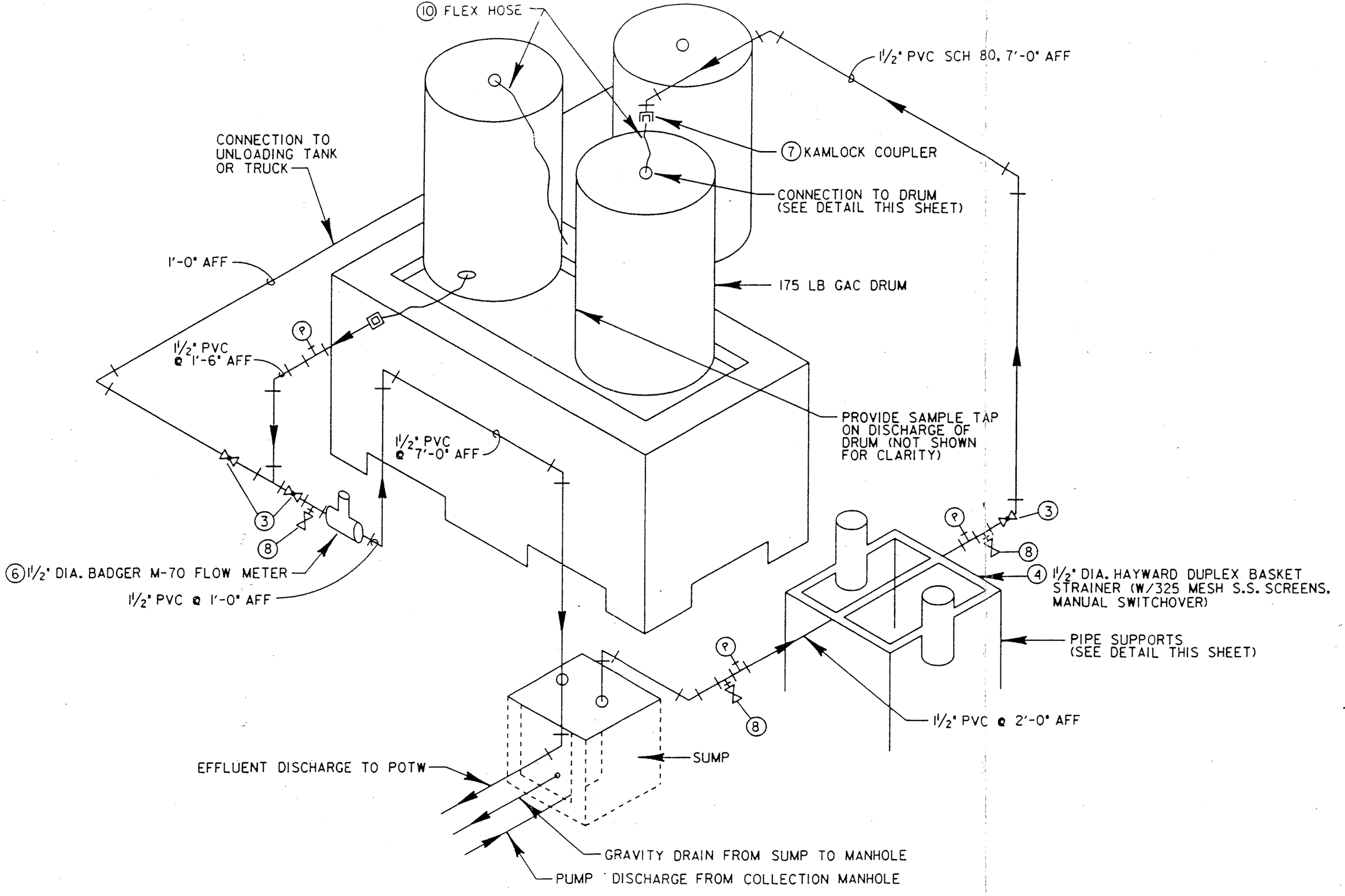
All personnel who perform work at the Primoshield Site must follow the Site Specific Health and Safety/Contingency Plan located in Appendix H of this document.

APPENDIX A

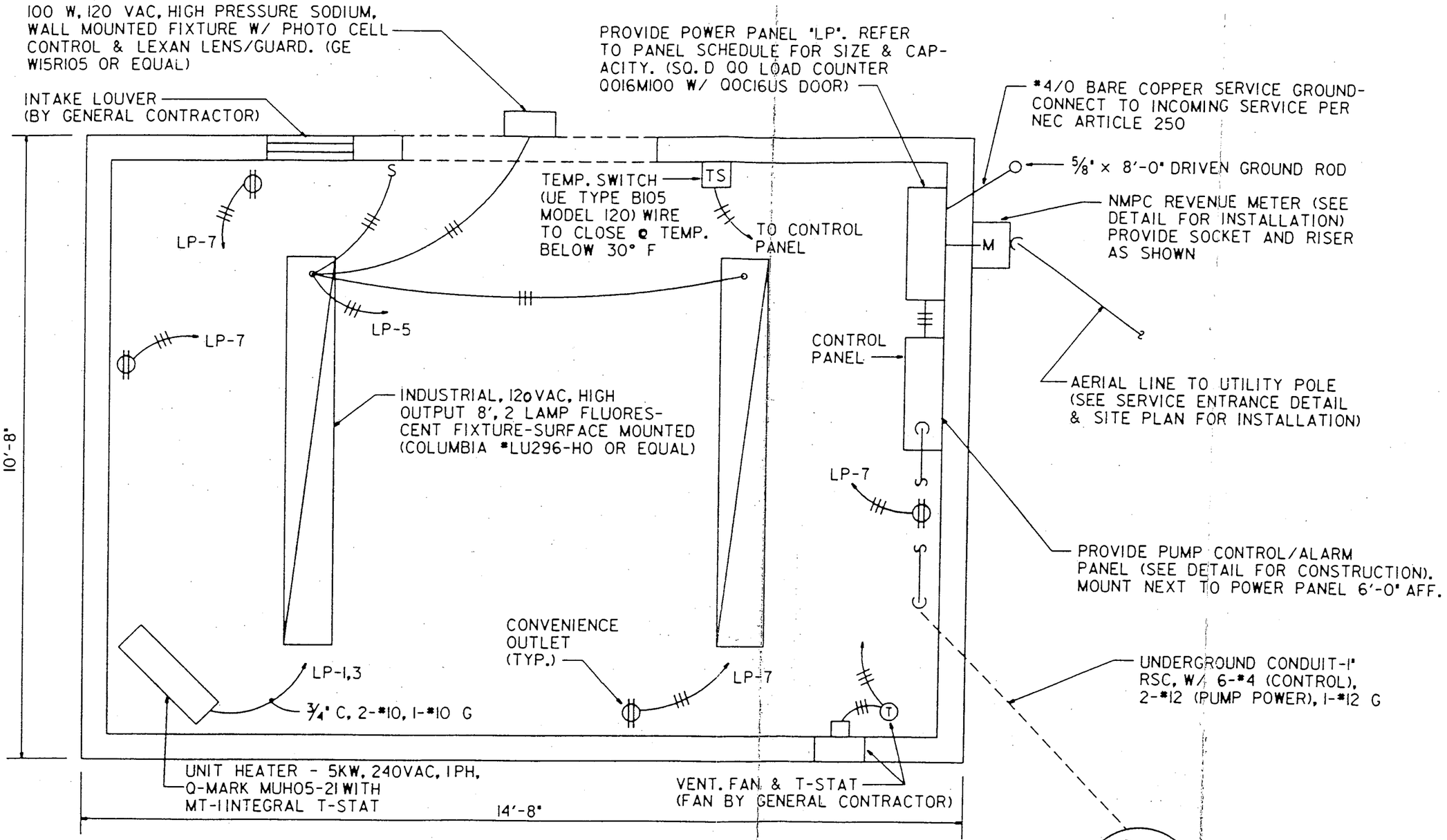
FIGURES


CONKLING AVENUE
LEAH STREET
EAGLE STREET
SAINT VINCENT STREET
E 862,050
N 1,128,900
MEDIUM PRESS. GAS MAIN
LOW PRESS. GAS MAIN
EP AT CURB
EP AT CURB (CURB COVERED W/SOIL)
RR TRACKS
CONC. WALK
6' CL FENCE
BROKEN WALL
GATE
POSS. WATER SERVICE
P-102
GW
BORING TO AUGER REFUSAL
P-108
P-103
P-106/ S/D
P-107 S/D
P-105
P-104
P-101 S/D
OVERHEAD DOOR
DOOR
RAMP
LOADING DOCK
GAS ENT.
DOOR TO BASEMENT
1 STY. BRICK BLDG.
2 STY. BRICK BLDG.
DEPAUL BUILDING
2 STY. HOUSE #1231
DESANTIS OVERHEAD DOOR
OFFICE
LAB
GARAGE
PRODUCTION BUILDING
FORMER NEW YORK TELEPHONE COMPANY STORAGE SITE
STORAGE BLDG.
STORAGE SHED
TRAILER
55 GAL DRUMS (EMPTY)
GRASS W/REMNANTS OF OLD RR BED
EDGE OF GRAVEL
BROKEN BT AND GRAVEL
BRUSH AND LIGHT WOODS
WOOD STRUCTURE
VAULT STORAGE AREA
CAR PORT
CONC. PAD
ELEC. COND.
ELEC. AND GAS ENT. (POSS. ABAN.)
CONC. PAD W/(2) FILL PIPES FOR U/G TANK
WOODS AND BRUSH
GRASS AND GRAVEL
GRAVEL
SHRUBS
SUMACS
TREES
SHED
UTILITY SHED
ABANDONED BUILDING
CONC. BLOCK SIDEWALK
FENCE W/GATE
4' WIRE FENCE
5' WIRE FENCE
24" B. ELD
DOG PEN
BT DRIVE
2½ STY. WD. HOUSE
1½ STY. HOUSE #1208
2 STY. HOUSE #1206
1½ STY. WD. HSE. #1202
2 STY. WD. HSE. #1200
1 STY. HOUSE #1207
1 STY. HOUSE #1205
1 STY. HOUSE #1203
2 STY. HSE. #602
#1204
2 STY. WD. HSE. #1209
2½ STY. WD. HSE. #1207
CORR. METAL GUIDE RAIL
END OF NEW CURB
WALKWAYS (TO REMAIN)
STOP
END OF PAVEMENT
SEWER MH
SEWER MH (NOT FOUND)
WATER SERVICE
CURB
CB
GV
BV
HYD.
FOOTSTONES
HEADSTONES
ST. AGNES CEMETERY
BM WEST CA ON HYDR ELEV.= 5 FT MSL
LEGEND:
BT BLACKTOP
EP EDGE OF PAVEMENT
UTILITY POLE
UTILITY POLE W/LIGHT
GUY ANCHOR
HYD. FIRE HYDRANT
BV WATER VALVE
GV GAS VALVE
G UNDERGROUND GAS LINE
5/5 CONTOUR LINE
PROPERTY LINE (APPROX.)
GRID LOCATIONS (WITH STAKE)
TV OVERHEAD CABLE TELEVISION
T OVERHEAD TELEPHONE LINE
E OVERHEAD ELECTRIC LINE
S COMBINED STORM & SANITARY SEWER
SITE BOUNDARY FOR CONSTRUCTION
EXISTING MONITORING WELL LOCATION


STALL LOUVER 4'-0"
F. FROM BOTTOM OF
UVER TO FLOOR ELEV.
300 CFM @
400 FPM
END CAP,
2'-0"
Y
NK
20"
12
1
REPLACEMENT
GAC DRUM
@ 1'-0" AFF
PROVIDE KAMLOCK 7 AND
DROP HOSE 10
9
53"
3'-0" MIN.
3'-0" MIN.
5'-0" MIN.
CONCRETE RAMP
3'x7'
DOUBLE DOORS
PANELS (SEE
SHEET E-1)
PRE-ENGINEERED ENCLOSURE
(SEE SHEET G-5 AND SECTION
13123 OF THE SPECIFICATIONS)
1½" PVC @
7'-0" AFF
2
28¾"
10
1½" PVC @
1'-6" AFF
SUMP
P
4
5 TYP.
8
F
6
7'-0" AFF
1½" PVC
@ 1'-0" AFF
1½" PVC
@ 2'-0" AFF
12"
11
INSTALL FAN 5'-0" A.F.F.
FROM BOTTOM OF FAN
TO FLOOR ELEV.
2'-6"
300 CFM
GRAVITY DISCHARGE TO POTW
(SEE SHEET G-2)
FORCE MAIN FROM COLLECTION MANHOLE
(SEE SHEET G-2)
GRAVITY DRAIN TO MANHOLE



TREATMENT SYSTEM SCHEMATIC



PARTIAL PLAN - TREATMENT SYSTEM BUILDING

NOT TO SCALE

ITEM	QTY.	DESCRIPTION
1	3	GRANULAR ACTIVATED CARBON CONTACTOR DRUM 175 LBS GAC (55 GAL) CAMERON-YAKIMA WSU-55 OR EQUAL
2	AS REQ'D	1½" PVC PIPE & FITTINGS, SCH. 80, ASTM D-1784 & D-1785 (SEE NOTE 3)
3	3	1½" BALL VALVE, PVC, SOLVENT WELDED JOINTS, TFE SEALS, CHEMTROL S45HV-V OR EQUAL
4	1	DUPLEX BASKET STRAINER (WITH CONTROL VALVE) PVC, 1½" DIA. SOCKET END CONNECTIONS, 325 MESH, 40 MICRON, S.S. SCREENS, HAYWARD OR EQUAL
5	3	PRESSURE GAUGE, 0-100 PSI RANGE WITH CHEMGUARD, 4½" DIA. FACE, TRERICE MODEL 450 S.S. OR EQUAL
6	1	1½" DIA. FACE BADGER MODEL M-70 FLOW METER WITH TOTALIZER OR EQUAL
7	6	1½" DIA. QUICK CONNECT KAMLOCK COUPLER AND ADAPTOR, OPW 633 C AND 633 F (WITH HOSE SHANK) OR EQUAL
8	4	SAMPLE PORT, PVC, ½" NPT × ½" HOSE, CHEMTROL CHEMCOCK VALVE OR EQUAL
9	1	2 DRUM POLYETHYLENE SPILL CONTAINMENT PALLET, NEW PIG MODEL PAK357J OR EQUAL
10	AS REQ'D	1½" CHEMICAL TRANSFER HOSE (TYP.), GOODYEAR XLPE WITH SYNTHETIC FABRIC REINFORCEMENT AND SYNTHETIC RUBBER COVER, OR EQUAL
11	1	PROPELLER WALL MOUNTED FAN, ACME DYNAMASTER F09, 300 CFM @ .125" STATIC PRESSURE, WALL COLLAR, BACKDRAFT DAMPER OR EQUAL
12	1	EXTRUDED ALUMINUM LOUVER, 20" × 20" DRAINABLE BLADE COMBINATION LOUVER, DOWCO C-DWE-46 WITH MANUAL OPERATOR OR EQUAL

NOTES:

1. ALL PIPE ELEVATIONS NOTED ARE DISTANCES FROM THE FINISHED FLOOR TO THE CENTERLINE OF THE PIPE.
2. QUANTITIES SHOWN IN THE BILL OF MATERIALS ARE FOR THIS DRAWING ONLY.
3. ALL PVC PIPE AND FITTINGS SHALL BE MADE FROM CLASS 12454-B MATERIALS OR BETTER IN ACCORDANCE WITH ANSI/ASTM D-1784/D-1785 AND SHALL BE SCHEDULE 80 UNLESS OTHERWISE SPECIFIED.
4. PROVIDE AND INSTALL GRINNELL FIG. 103 OR EQUAL OFFSET PIPE CLAMPS AND RELATED HARDWARE FOR WALL MOUNTED HORIZONTAL AND VERTICAL PIPE RUNS AT 5'-0" INTERVALS.
5. PROVIDE AND INSTALL GRINNELL FIG. 191 OR EQUAL PIPE STANCHIOINS WITH U-BOLT FOR FLOOR PIPE RUNS AT INLET AND OUTLET OF DUPLEX BASKET STRAINER AND FLOW METER.
6. THE CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ALL PIPING AND EQUIPMENT WITH THE INSTALLATION OF ELECTRICAL EQUIPMENT AS SHOWN ON SHEET E-1.

LEGEND

Ⓟ PRESSURE GAUGE

—Ⓕ— FLOW METER WITH TOTALIZER

—⋈— BALL VALVE

APPENDIX B

CHECKLISTS

APPENDIX

Site No. 6-33-027, Primoshield, Inc.

PAGE _____ OF _____

GROUNDWATER SAMPLING LOG SHEET

DATE

SAMPLE LOCATION ID

LOCATION ACTIVITY START END

FIELD QC DATA: ☐ FIELD DUPLICATE COLLECTED DUP ID_____

WATER LEVEL / WELL DATA

WELL DEPTH FT ☐ MEASURED ☐ HISTORICAL ☐ TOP OF WELL ☐ TOP OF CASING _____

PROTECTIVE CASING STICK-UP (FROM GROUND) FT

PROTECTIVE CASING/WELL DIFF. FT

WELL DIA. ☐ 2 INCH ☐ 4 INCH ☐ 6 INCH ☐ _____

WELL INTEGRITY: YES NO N/A

PROT. CASING SECURE ☐ ☐ ☐

CONCRETE COLLAR INTACT ☐ ☐ ☐

WELL LOCKED ☐ ☐ ☐

OTHER:_____

DEPTH TO WATER FT

HISTORICAL WELL DEPTH FT

WELL MATERIAL: ☐ PVC ☐ SS ☐ _____

HEIGHT OF WATER COLUMN FT x ☐ .16 GAL/FT (2 IN) ☐ .65 GAL/FT (4 IN) ☐ 1.5 GAL/FT (6 IN) ☐ ___ GAL/FT (__IN) = GAL/VOL

TOTAL GAL PURGED

AMBIENT AIR VOA PPM

WELL MOUTH PPM

PURGE DATA

PURGE VOLUME	@ ____ GAL	@ ____ GAL	@ ____ GAL	@ ____ GAL	@ ____ GAL
TEMP, DEG C					
pH, UNITS					
SPECIFIC CONDUCTIVITY umhos/cm					
_____					

SAMPLE OBSERVATIONS

☐ CLEAR
☐ COLORED_____
☐ CLOUDY _____
☐ TURBID_____
☐ ODOR _____
☐ OTHER (SEE NOTES)

EQUIPMENT DOCUMENTATION

PURGING SAMPLING

☐ ☐ PERISTALTIC PUMP
☐ ☐ SUBMERSIBLE PUMP
☐ ☐ BAILER
☐ ☐ PVC/SILICON TUBING
☐ ☐ TEFLON/SILICON TUBING
☐ ☐ AIR LIFT
☐ ☐ WATERRA
☐ ☐ IN-LINE FILTER
☐ ☐ PRESS/VAC FILTER
☐ ☐ _____

EQUIPMENT ID
ISCO #_____
KECK # ☐ 2" ☐ 1" #___
☐ QED

DECON FLUIDS USED
☐ LIQUI-NOX
☐ DEIONIZED WATER
☐ HNO3/D.I. WATER
☐ POTABLE WATER
☐ TSP SOLUTION
☐ NONE
☐ _____

WATER LEVEL EQUIP. USED
☐ ELECTRIC COND. PROBE
☐ FLOAT ACTIVATED
☐ KECK INTERFACE PROBE
☐ OTHER

NUMBER OF FILTERS USED _____

ANALYTICAL PARAMETERS

	METHOD NUMBER	FILTERED	PRESERVATION METHOD	VOLUME REQUIRED	SAMPLE COLLECTED	SAMPLE BOTTLE ID NUMBERS
☐					☐	
☐					☐	
☐					☐	
☐					☐	
☐					☐	
☐					☐	
☐					☐	
☐					☐	
☐					☐	
☐					☐	
☐					☐	
☐					☐	

NOTES

SIGNATURE:_____

Groundwater Treatment System Operational Checklist

Item Description	Required Frequency	Unit	Date of Inspection							
Pump working (turn H-O-A switch to "H" position if necessary)	Monthly	Yes or no								
Flow rate recorded	Monthly	gpm								
Total flow recorded through system to date	Monthly	gallons								
Duel basket strainer inspected	Monthly	Yes or no								
Duel basket strainer contents disposed and flow direction switched to the other strainer	As Needed	Yes or no								
Effluent sample collected	Semi-annually	Yes or no								
Influent Sample collected	Semi-annually	Yes or no								
Sample collected after first GAC vessel	Semi-annually	Yes or no								
GAC vessel changed	As needed	Yes or no								
Collection Manhole pumped down and inspected	Annually	Yes or no								

APPENDIX C

MONITORING WELL CONSTRUCTION LOGS

MONITORING WELL CONSTRUCTION DIAGRAMS

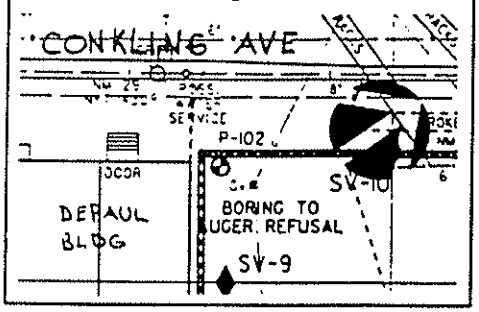
P-102
P-101 D
P-101 S
P-103
P-104
P-105
P-106 D
P-106 S
P-107 D
P-107 S
P-108

Stetson-Harza
A HARZA COMPANY

SOIL BORING LOG

Project: Primoshield, East Utica, New York

Location of Boring:



Date Started: 02/03/93 Time: 1030

Date Completed: 02/04/93 Time: 1100

Drilling Method(s): Hollow Stem Auger 4¼" ID

Hole/Casing Size(s):

Boring No.: P102

Ground Elevation: ~525 feet

Total Depth: 39 feet

Sampling Method(s): Split Spoon

Sampling Dimensions: 1⅜" x 24" Hammer Weight/Drop: 140 lb./30 in.

Surface Conditions: Gravel

Boring Depth (ft)	Sample Depth (ft)	Sample No.	Blows per 6 inches	Recovered (in)	Unified Soil Classification	SOIL DESCRIPTION	PID (ppm)	REMARKS
1		1	54/4	5		dense brown GRAVEL, some CLAY, STONE, tr. CINDERS (FILL)	BG	
2								
3		2	6 10 10 16	20		brown SILT, tr. SAND, some CLAY	BG	
4								
5		3	4 13 14 24	22		light brown Clayey SILT with some SAND and STONE	BG	
6								
7		4	7 32 23 48	23		dense grey Clayey SILT, lt. brown Clayey SILT and SAND, some STONE	BG	
8								

Drilling Contractor: *Environmental Products & Services* Logged By: BEP Checked By: JJB Date:

Stetson-Harza
A HARZA COMPANY

SOIL BORING LOG
(Continued)

Project: Primoshield, East Utica, New York

Boring No.: P102

Sampling Method(s): Split Spoon

Sampling Dimensions: 1⅜" x 24" Hammer Weight/Drop: 140 lb./30 in.

Surface Conditions: Gravel

Boring Depth (ft)	Sample Depth (ft)	Sample No.	Blows per 6 inches	Recovered (in)	Unified Soil Classification	SOIL DESCRIPTION	PID (ppm)	REMARKS
9		5	13 24 30 33	20		grey-brown Clayey SILT and SAND with sm.-lg. STONE (spoon wet)	BG	
10								
11		6	18 20 24 26	24		grey Clayey SILT with sm.-lg. STONE	BG	
12								
13		7	11 26 30 32	23		grey and lt. brown Clayey SILT, some STONE (10" wet)	BG	
14								
15		8	12 23 30 29	21		grey Clayey SILT with STONE	BG	
16								
17		9	12 22 29 37	24		grey Clayey SILT with some fine SAND, sm.-lg. STONES	BG	
18								
19		10	7 16 27 28	18		greyish brown Clayey SILT with sm.-lg. STONES	BG	
20								

Stetson-Harza
A HARZA COMPANY

SOIL BORING LOG
(Continued)

Project: Primoshield, East Utica, New York

Boring No.: P102

Sampling Method(s): Split Spoon

Sampling Dimensions: 1⅜" x 24" Hammer Weight/Drop: 140 lb./30 in.

Surface Conditions: Gravel

Boring Depth (ft)	Sample Depth (ft)	Sample No.	Blows per 6 inches	Recovered (in)	Unified Soil Classification	SOIL DESCRIPTION	PID (ppm)	REMARKS
21		11	5 13 14 24	23		greyish brown Silty CLAY with sm.-lg. STONE	BG	
22								
23		12	14 15 17 25	10		med. brown Silty CLAY with sm.-lg. STONE	BG	
24								
25		13	7 13 29 50/2	18		med. brown Silty CLAY with sm.-lg. STONE	BG	
26								
27		14	36 50/4	12		grey-brown Clayey SILT, some SAND, STONE (partially wet)	BG	
28								
29		15	41 48 50/5	16		grey-brown SAND and SILT with STONE	BG	
30								
31		16	21 50/5	10		grey and red Silty CLAY with sm.-lg. STONE (wet)	NST	Sample to Lab 0848 on 2/4/93 VOA, SV, Pest/ PCB, M^+, CN
32								

Stetson-Harza
A HARZA COMPANY

SOIL BORING LOG
(Continued)

Project: Primoshield, East Utica, New York

Boring No.: P102

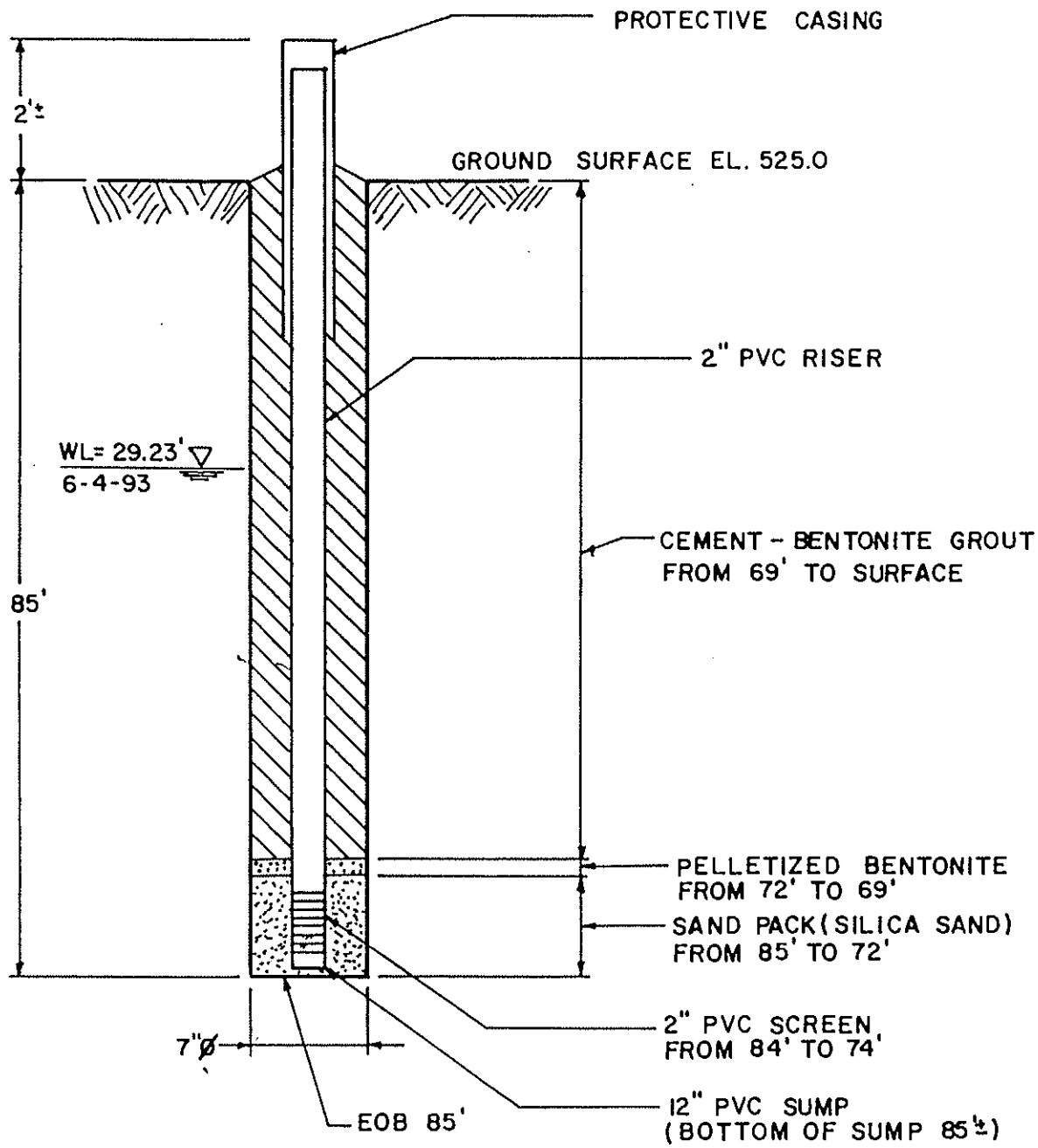
Sampling Method(s): Split Spoon

Sampling Dimensions: 1⅜" x 24" Hammer Weight/Drop: 140 lb./30 in.

Surface Conditions: Gravel

Boring Depth (ft)	Sample Depth (ft)	Sample No.	Blows per 6 inches	Recovered (in)	Unified Soil Classification	SOIL DESCRIPTION	PID (ppm)	REMARKS
33		17	50/4	5		reddish brown Silty CLAY, some sm. STONE	BG	
34								
35		18	50/4	4		grey-brown Clayey SILT with STONE	BG	
36								
37								
38								
39								
40		19	38 50/5	10		grey Silty CLAY with sm.-lg. STONE	BG	
41								
						Boring complete at 39 ft with Auger Refusal Boring grouted back to surface		

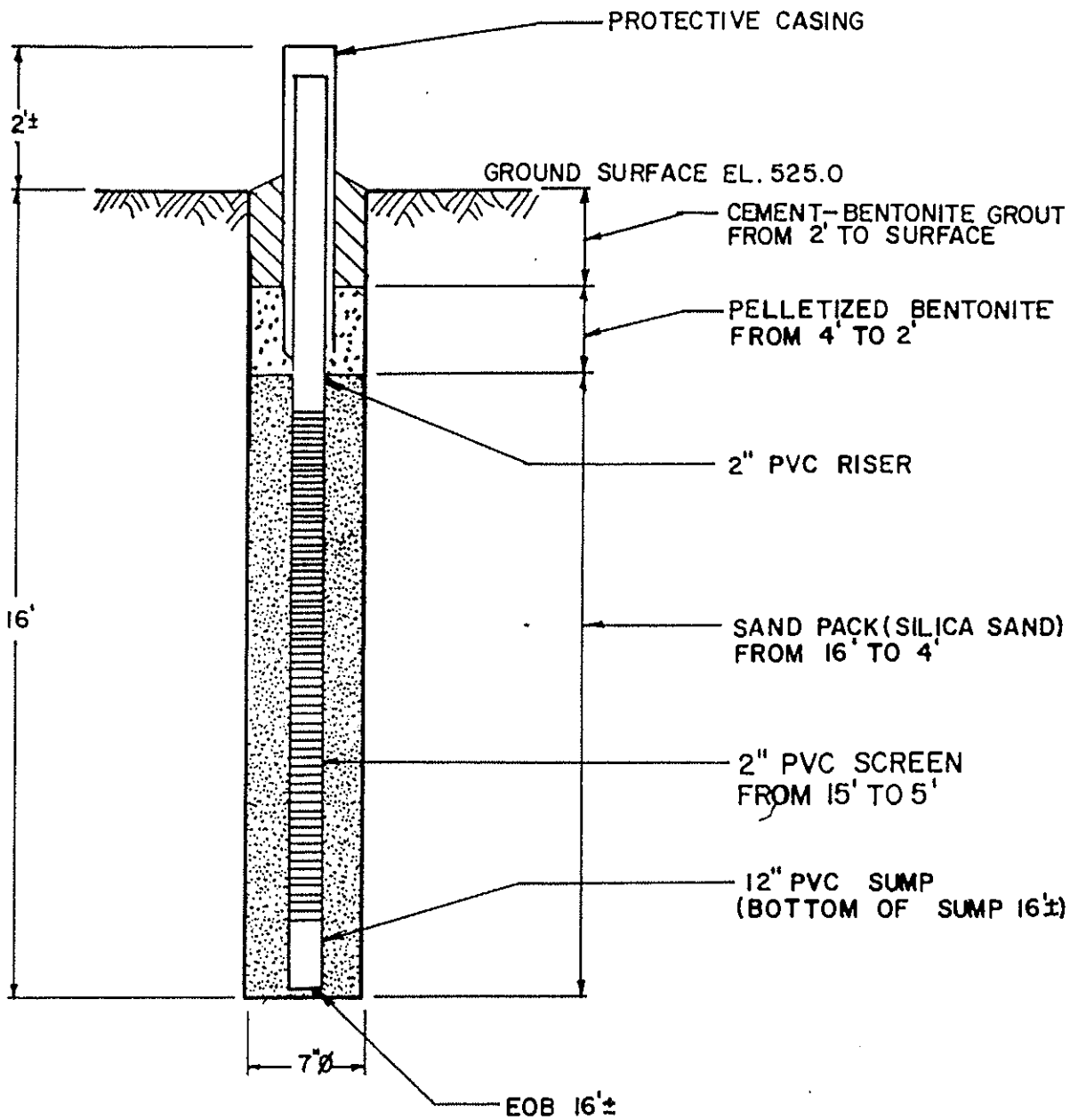
P - 101D



NOT TO SCALE

Stetson-Harza A HARZA COMPANY 181 Genesee Street, Utica, NY 13501 (315) 797-5800 Rensselaer Technology Park 250 Jordan Rd., Troy, NY 12180 (518) 283-8080	DATE 6/15/93 DRAWN JLB NO. 6057	PRIMOSHIELD RI/FS SITE CODE 6-33-027 1212 ST. VINCENT ST UTICA, N.Y. 13501 WELL CONSTRUCTION	FIG. 1

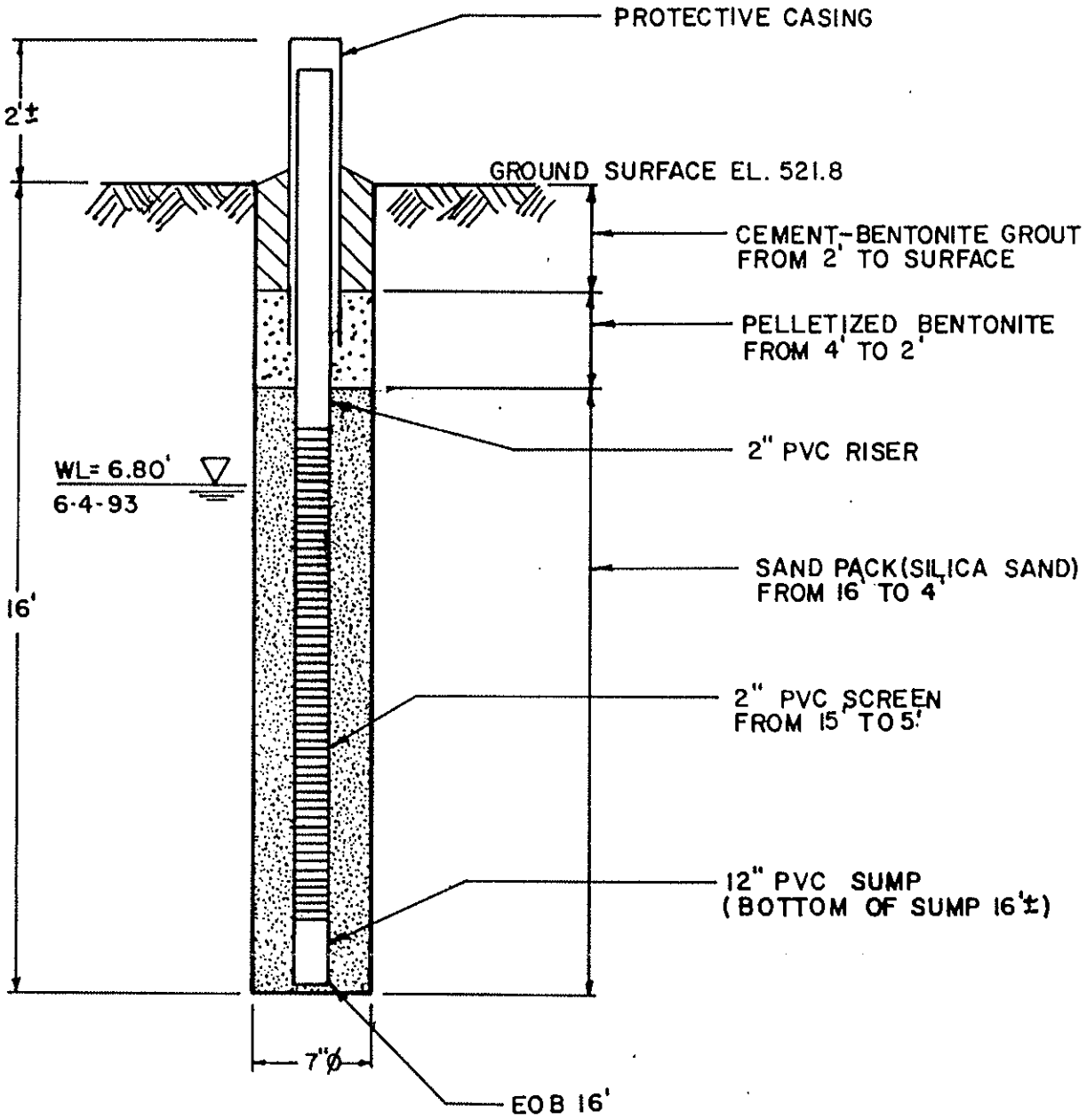
P-101S
(DRY WELL)



NOT TO SCALE

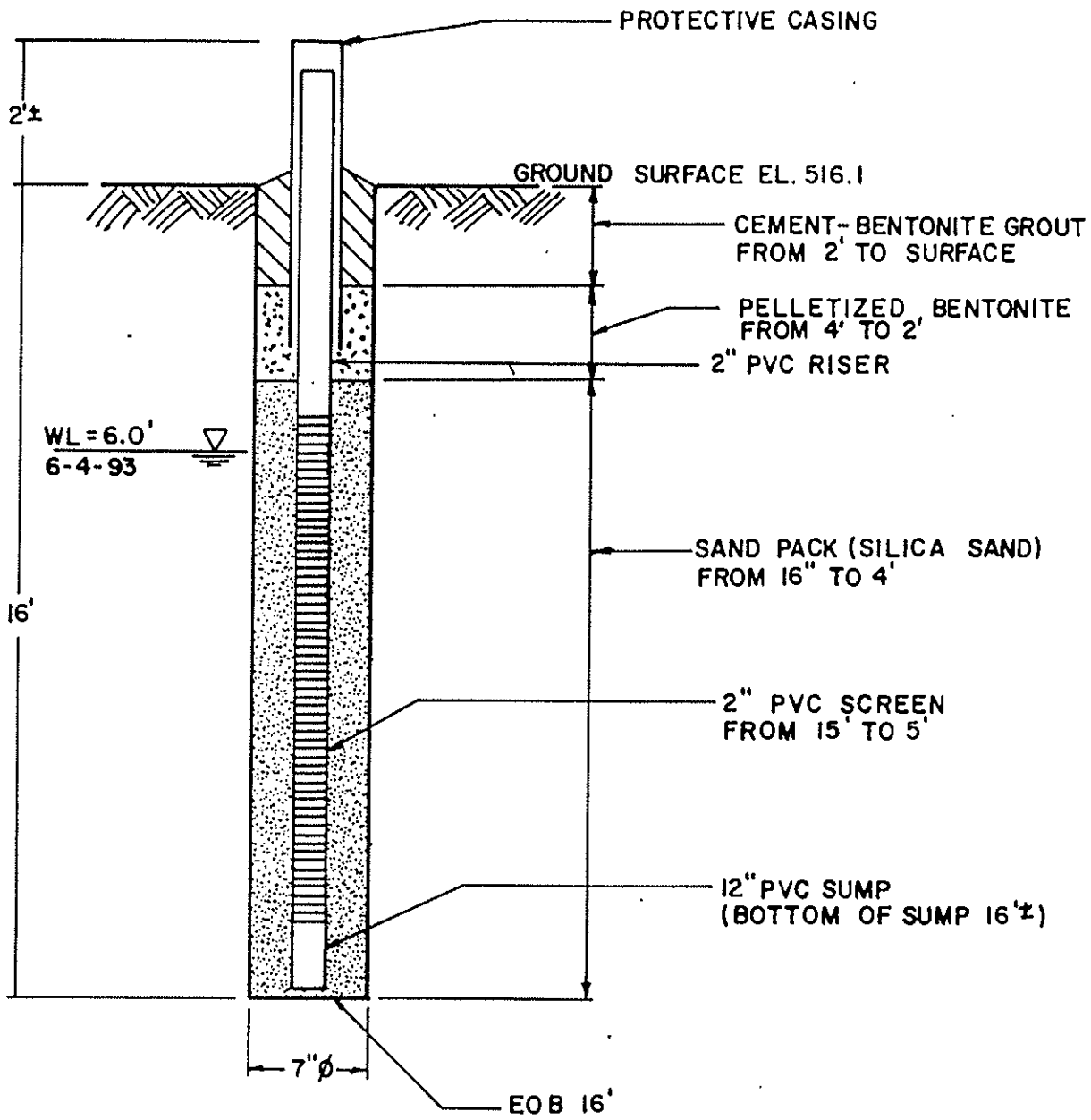
Stetson-Harza A HARZA COMPANY 181 Genesee Street, Utica, NY 13501 (315) 797-5800 Rensselaer Technology Park 250 Jordan Rd., Troy, NY 12180 (518) 283-6080	DATE 6/15/93 DRAWN JLB NO. 6057	PRIMOSHIELD RI/FS SITE CODE 6-33-027 1212 ST. VINCENT ST UTICA, N.Y. 13501 WELL CONSTRUCTION	FIG. 2

P-103



Stetson-Harza A HARZA COMPANY 181 Genesee Street, Utica, NY 13501 (315) 797-5800 Rensselaer Technology Park 250 Jordan Rd., Troy, NY 12180 (518) 283-8080	DATE 6/15/93 DRAWN JLB NO. 6057	PRIMOSHIELD RI/FS SITE CODE 6-33-027 1212 ST. VINCENT ST UTICA, N.Y. 13501 WELL CONSTRUCTION	FIG. 3

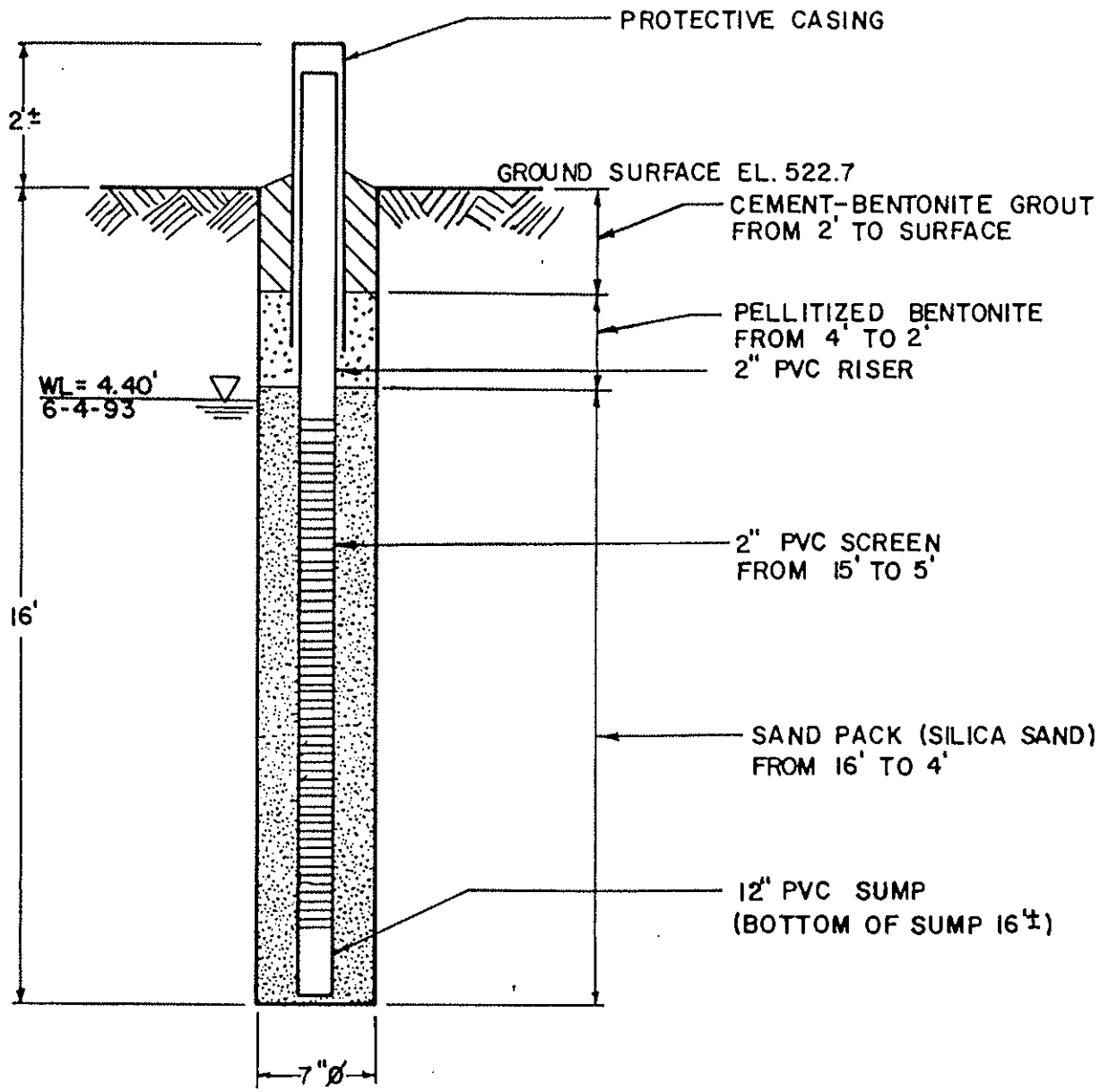
P-104



NOT TO SCALE

Stetson-Harza A HARZA COMPANY 181 Genesee Street, Utica, NY 13501 (315) 797-5800 Rensselaer Technology Park 250 Jordan Rd., Troy, NY 12180 (518) 283-6060	DATE 6/15/93 DRAWN JLB NO. 6057	PRIMOSHIELD RI/FS SITE CODE 6-33-027 1212 ST. VINCENT ST UTICA, N.Y. 13501 WELL CONSTRUCTION	FIG. 4

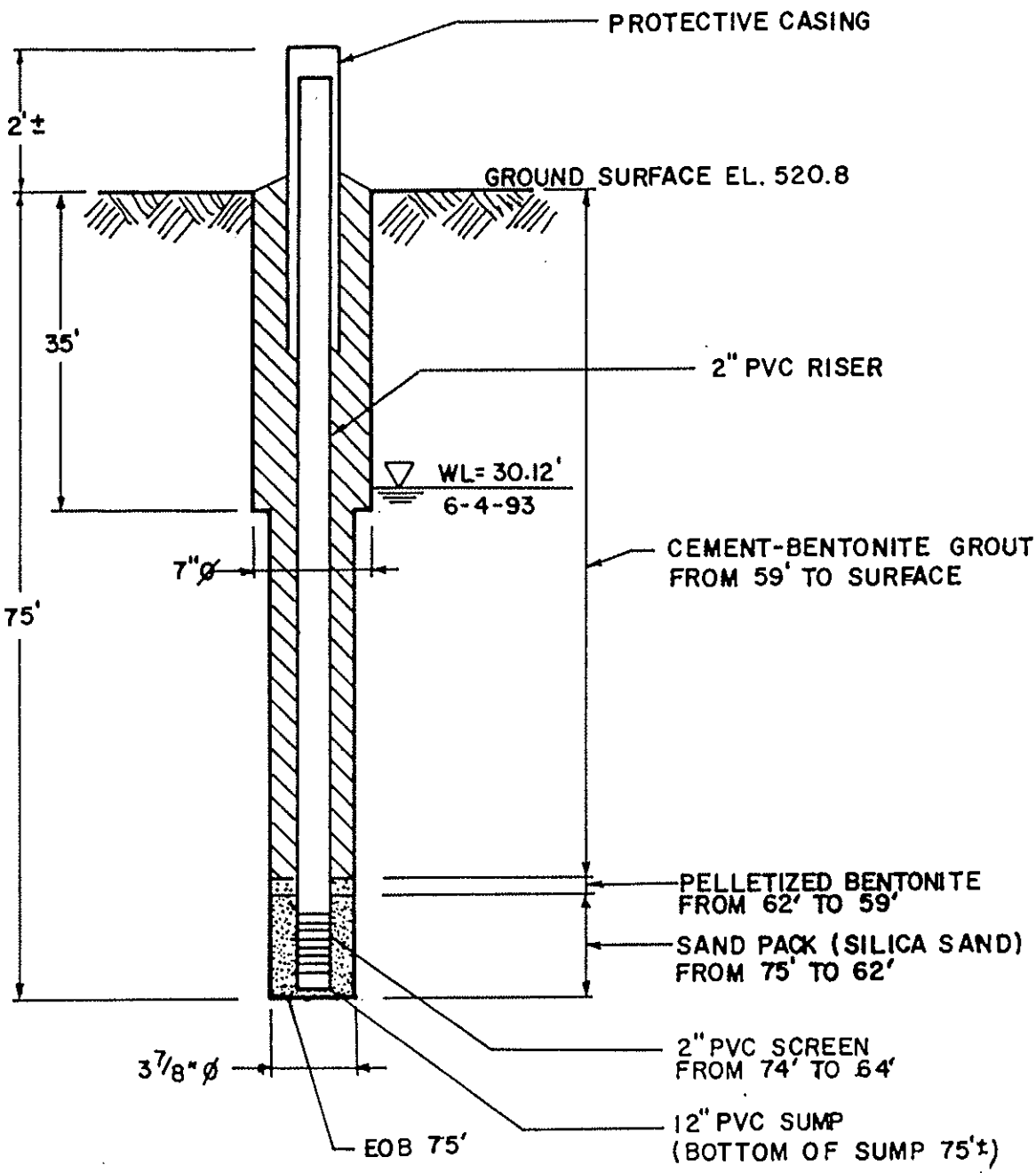
P-105



NOT TO SCALE

Stetson-Harza A HARZA COMPANY 161 Genesee Street, Utica, NY 13501 (315) 797-5800 Rensselaer Technology Park 250 Jordan Rd., Troy, NY 12180 (518) 283-8060	DATE 6/15/93 DRAWN JLB NO. 6057	PRIMOSHIELD RI/FS SITE CODE 6-33-027 1212 ST. VINCENT ST UTICA, N.Y. 13501 WELL CONSTRUCTION	FIG. 5

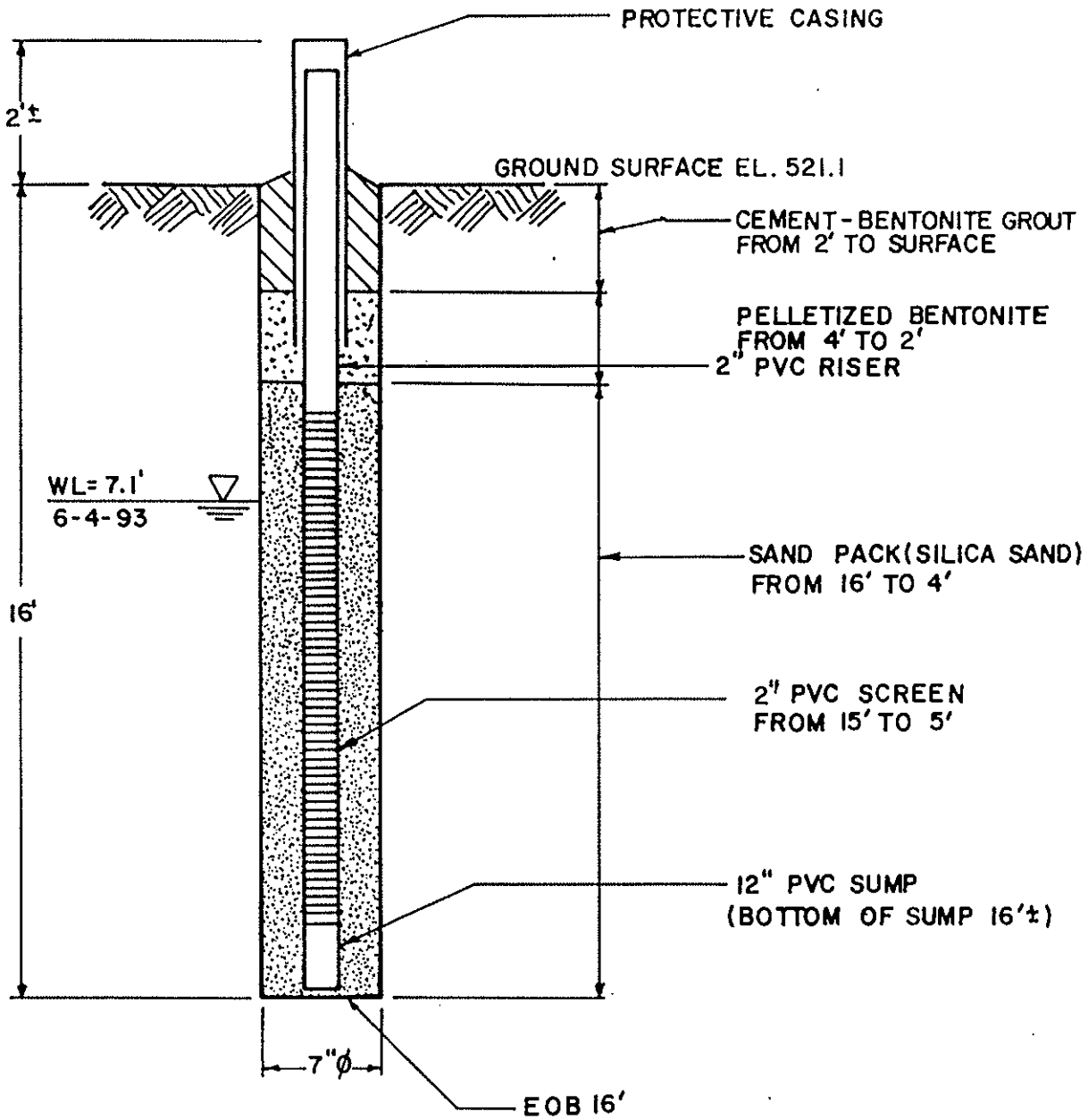
P-106D



NOT TO SCALE

Stetson-Harza A HARZA COMPANY 181 Genesee Street, Utica, NY 13501 (315) 797-5600 Rensselaer Technology Park 250 Jordan Rd., Troy, NY 12180 (518) 283-6060	DATE 6/15/93 DRAWN JLB NO. 6057	PRIMOSHIELD RI/FS SITE CODE 6-33-027 1212 ST. VINCENT ST UTICA, N.Y. 13501 WELL CONSTRUCTION	FIG. 6

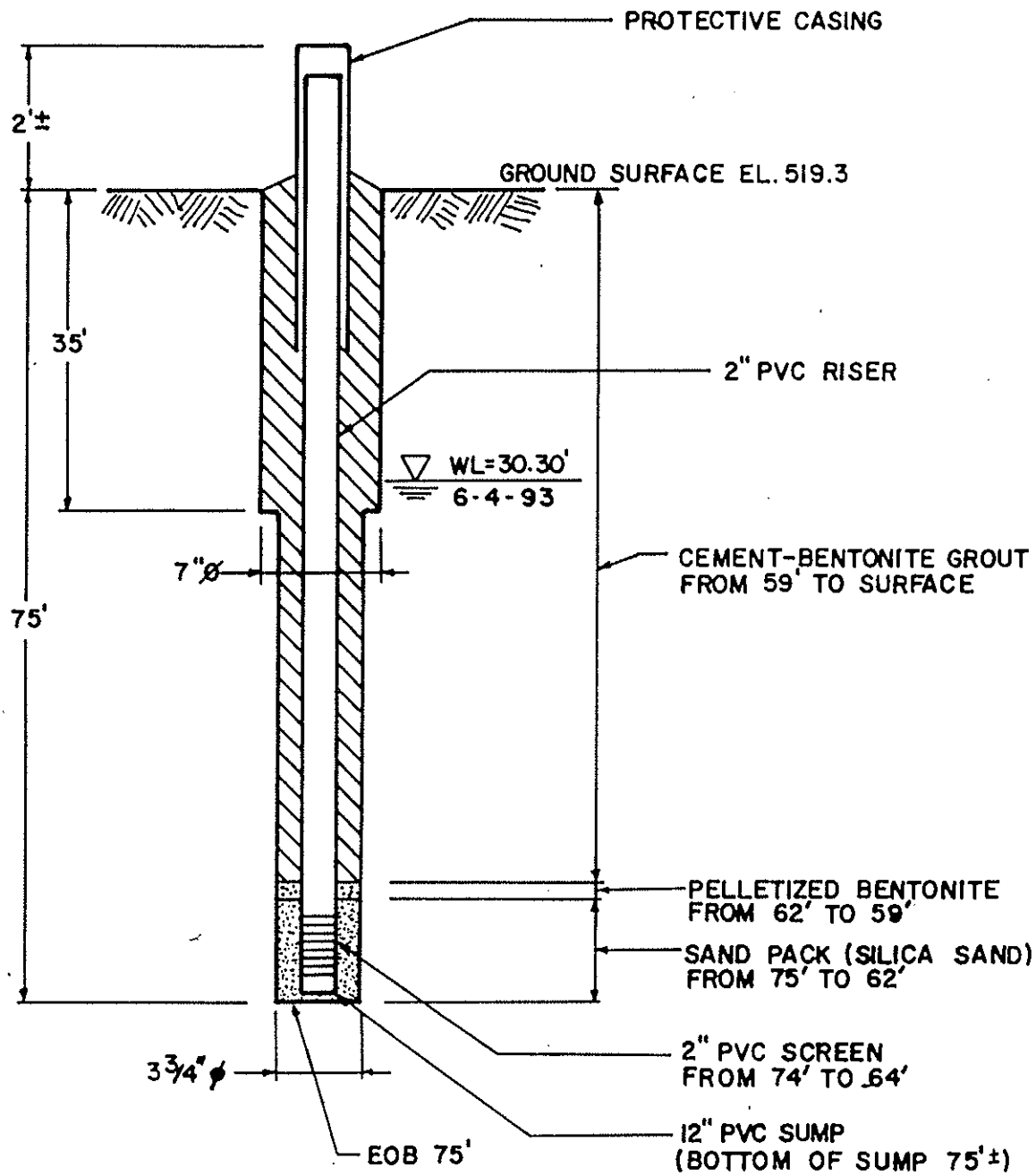
P-106S



NOT TO SCALE

Stetson-Harza, A HARZA COMPANY, 161 Genesee Street, Utica, NY 13501 (315) 797-5600; Rensselaer Technology Park, 250 Jordan Rd., Troy, NY 12180 (518) 283-6060	DATE 6/15/93 DRAWN JLB NO. 6057	PRIMOSHIELD RI/FS SITE CODE 6-33-027 1212 ST. VINCENT ST UTICA, N.Y. 13501 WELL CONSTRUCTION	FIG. 7

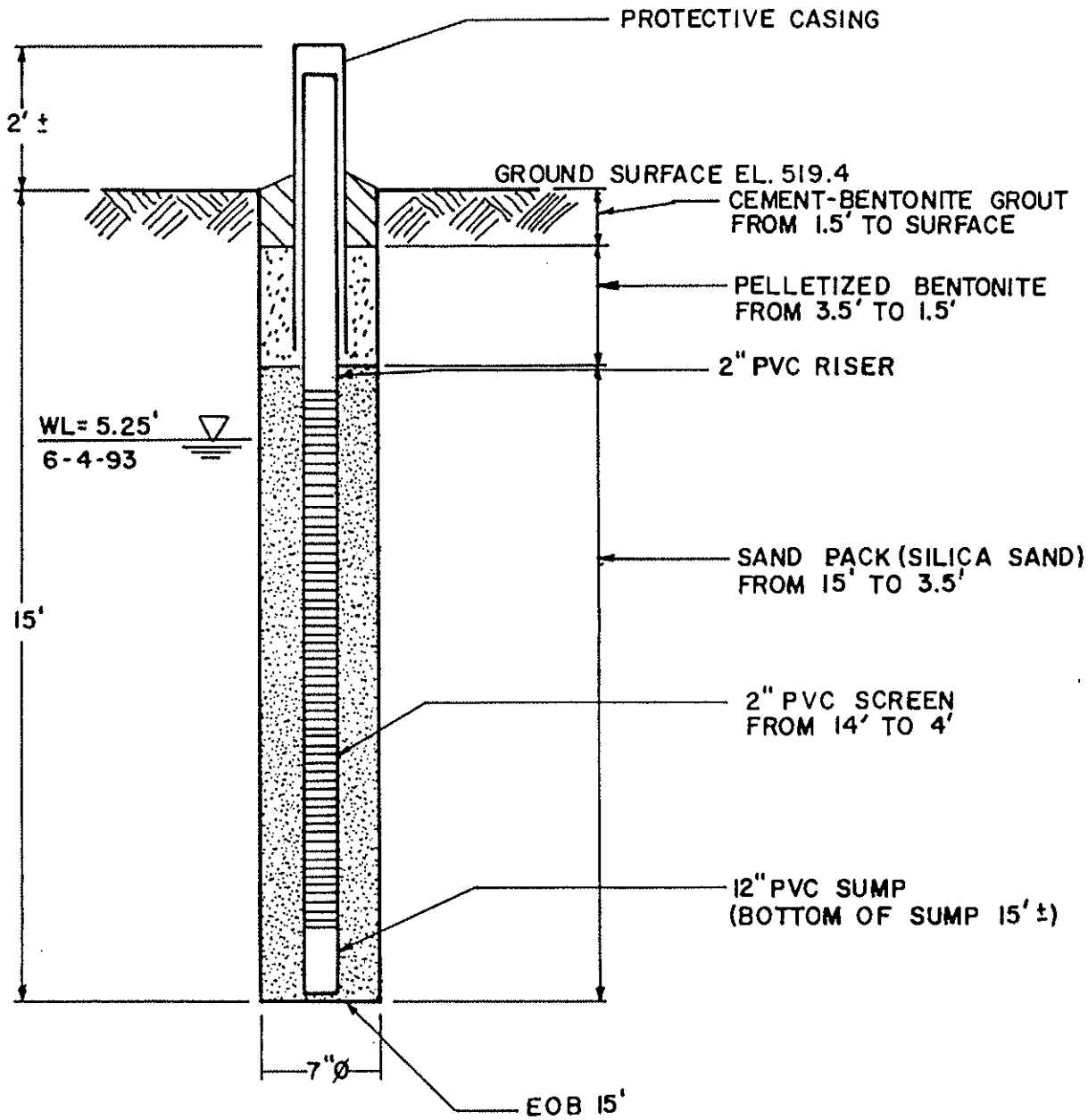
P-107D



NOT TO SCALE

Stetson-Harza A HARZA COMPANY 161 Genesee Street, Utica, NY 13501 (315) 797-5800 Rensselaer Technology Park 250 Jordan Rd., Troy, NY 12180 (518) 283-8080	DATE 6/15/93 DRAWN JLB NO. 6057	PRIMOSHIELD RI/FS SITE CODE 6-33-027 1212 ST. VINCENT ST UTICA, N.Y. 13501 WELL CONSTRUCTION	FIG. 8

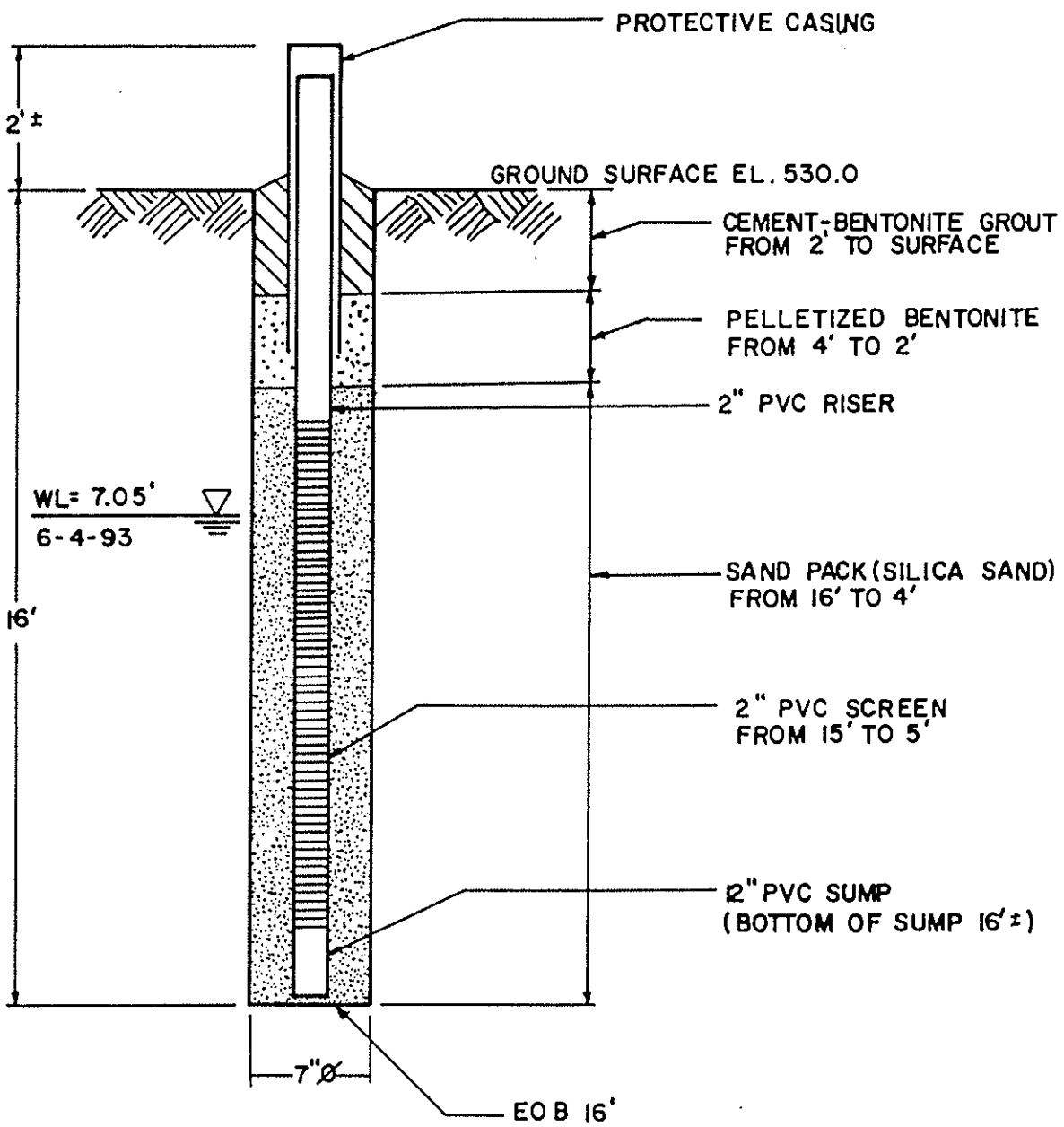
P-107S



NOT TO SCALE

Stetson-Harza A HARZA COMPANY 161 Genesee Street, Utica, NY 13501 (315) 797-5600 Rensselaer Technology Park 250 Jordan Rd., Troy, NY 12180 (518) 283-6060	DATE 6/15/93 DRAWN JLB NO. 6057	PRIMOSHIELD RI/FS SITE CODE 6-33-027 1212 ST. VINCENT ST UTICA, N.Y. 13501 WELL CONSTRUCTION	FIG. 9

P-108



NOT TO SCALE

Stetson-Harza A HARZA COMPANY 161 Genesee Street, Utica, NY 13501 (315) 797-5800 Rensselaer Technology Park 250 Jordan Rd., Troy, NY 12180 (518) 283-8080	DATE 6/15/93 DRAWN JLB NO. 6057	PRIMOSHIELD RI/FS SITE CODE 6-33-027 1212 ST. VINCENT ST UTICA, N.Y. 13501 WELL CONSTRUCTION	FIG. 10

APPENDIX D

PREVIOUS MONITORING WELL SAMPLING DATA

TABLE 2-2
PRIMOSHIELD RI/FS
SITE NO. 633027

GROUNDWATER FIELD MEASUREMENTS

Well Number	Temperature (Celcius)	pH (Units)	Conductance (umhos/cm.)	Turbidity (NTU)
P-101S	——	——	——	——
P-101D	10.5	8.6	1,200	28.0
P-103	5	6.8	960	64.5
P-104	7	6.5	680	21.0
P-105	8	7.1	1,200	6.7
P-106S	6	7.0	1,200	6.4
P-106D	10.2	8.8	570	>200
P-107S	9	6.3	900	4.0
P-107D	13.2	8.5	450	>200
P-108	6	6.4	1,000	36.0

Notes:
1. Measurements are from bailer taken at top of water column at last visit to well during development effort.

2. P1015 was a dry well, therefore no data was obtained.

TABLE 3-1

PRIMOSHIELD RI/FS

SITE NO. 633027

PRIMOSHIELD MONITORING WELL WATER ELEVATIONS

WATER ELEVATIONS (MSL)

WELL NUMBER	TOP OF PVC ELEV.	JUNE 1993	JULY 1993	AUG. 1993	SEPT. 1993	NOV. 1993	DEC. 1993
P-101D	527.28	496.05	497.98	497.63	497.66	498.18	498.88
P-103	523.85	517.05	516.25	515.45	516.78	517.95	517.90
P-104	517.98	511.98	511.58	512.12	512.08	512.56	513.18
P-105	524.36	519.96	519.31	520.36	520.27	520.81	521.06
P-106D	522.96	492.84	492.91	492.46	492.55	493.01	493.56
P-106S	523.14	516.04	515.64	518.01	516.35	517.67	517.64
P-107D	521.61	491.51	491.26	490.93	490.96	491.41	492.01
P-107S	521.43	516.18	515.76	518.81	516.69	517.23	517.13
P-108	532.33	525.28	524.78	523.60	525.25	526.88	527.03

TABLE 4-6
PRIMOSHIELD RI/FS
SITE NO. 633027
FIRST ROUND GROUND WATER RESULTS
VOLATILE ORGANICS

ANALYTE	P101 D	P103	P104	P105	P106D	P106D DUP	P108 S	P107 D	P107 S	P108
Chloromethane	10 U	10 UJ	10 U	10 U	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 U
Bromomethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl chloride	10 U	10 UJ	10 U	10 U	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 U
Chloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methylene chloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acetone	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Carbon disulfide	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	9 J	10 U
1,2-Dichloroethene(total)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroform	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Butanone	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
1,1,1-Trichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	11	10 U	180	10 U
Carbon tetrachloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	2 J	10 U	93	10 U
Dibromochloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
trans-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone	10 UJ	10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U	10 UJ
2-Hexanone	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Tetrachloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	10 UJ	10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U	10 UJ
Toluene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Ethylbenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Styrene	10 UJ	10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U	10 UJ
Xylene(total)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

Notes:
U = Indicates compound was analyzed but not detected.
J = Indicates an estimated value.
R = Rejected
Units = UG/L
Samples were collected by Stetson-Harza between the dates of April 20, 1993 and April 23, 1993.
Samples were analyzed by H2M Labs using NYSDEC ASP CLP 91-1. Data were validated by O'Brien & Gere Engineers.
Sample locations are presented on Figure 15.

TABLE 4-9
PRIMOSHIELD RI/FS
SITE NO. 633027
FIRST ROUND GROUND WATER RESULTS
METALS & CYANIDE

ANALYTE	P101D	P101D (F)	P103	P103 (F)	P104	P104 (F)	P105	P105 (F)	P106D	P106D (F)	P106D DUP	P106D (F) DUP
Aluminum	18300 J	164 J	16800 J	183 J	489 J	96.8 J	700 J	53.9 J	15300 J	438 J	16600 J	231 J
Antimony	16.2 U	16.2 U	16.2 U	16.2 U	16.2 U	16.2 U	16.2 U	16.2 U	16.2 U	16.2 U	16.2 U	16.2 U
Arsenic	5.3 J	2.1 U	5.9 J	2.1 U	2.1 U	2.1 U	7.2 J	7.1 J	4.1 J	2.1 U	3.9 J	2.1 U
Barium	446	464	156 J	63.6 J	40 J	131 J	41.2 J	67 J	148 J	52.9 J	154 J	42.1 J
Beryllium	1.1 J	0.5 U	2.2 J	0.8 J	0.5 J	0.5 U	0.83 J	0.7 J	1 J	0.5 U	1.1 J	0.5 U
Cadmium	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Calcium	47100	25000	133000	93500	45600	45200	84500	80500	27000	5920	28000	5910
Chromium	47.1 J	8.6 U	45.2 J	8.6 U	8.6 UJ	8.6 U	15.4 J	8.6 U	29 J	8.6 U	44.1 J	8.6 U
Cobalt	13.5 J	5.1 U	15.7 J	5.1 U	5.1 U	5.1 U	5.1 U	5.1 U	10 J	5.1 U	10.8 J	5.1 U
Copper	38.3	8.3 J	38.3	7.4 J	10 J	8.3 J	13.2 J	12.1 J	30.5	0.63 J	34.6	2.4 J
Iron	30400	246 J	28300	18.3 J	771	57.6 J	1150	43.5 J	23200	253 J	24000	150 J
Lead	9.2	1.5 UJ	8	1.5 UJ	1.5 J	1.5 U	1.5 UJ	1.5 U	5.8 J	1.5 UJ	8.3 J	1.5 UJ
Magnesium	19000	10300	106000	93500	36300	36200	88900	84600	9320	1600 J	9610	1550 J
Manganese	482	16.6	994	293	83.9	65.9	367	324	334	4 J	350	3 J
Mercury	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	44.8	10.8 U	43.5	15.9 J	10.8 U	10.8 U	10.8 U	13.7 J	35.1 J	10.8 U	46.3	10.8 U
Potassium	27600	22000	11000	6370	2380 J	2410 J	8130	7340	9170	5410	9620	5400
Selenium	0.8 UJ	0.8 U	0.8 U	0.8 U	1.4 J	1.4 J	0.8 UJ	0.8 UJ	R	R	R	R
Silver	2 U	2 UJ	2 J	2 U	2 U	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 U	2 UJ
Sodium	192000	192000	55800	57200	20600	22200	20000	19700	99400	101000	99000	103000
Thallium	2.8 J	2.9 J	4.2 J	1 U	3.6 J	3.2 J	3.3 J	4.3 J	1 U	1 U	1 U	1 U
Vanadium	35.2 J	2.7 U	28.1 J	2.7 U	2.7 U	2.7 U	2.7 U	2.7 U	28.8 J	2.7 U	31.1 J	2.7 U
Zinc	80.2 J	42.5	73.2 J	6.6 U	17.8 J	66.7	17.1 J	67.4	117 J	6.6 U	75.7 J	6.6 U
Cyanide	10 U		10 U		10 U		10 U		10 U		10	

Notes:
U = Indicates compound was analyzed for but not detected.
J = Indicates an estimated value.
R = Rejected
Units = UG/L
Samples were collected by Stetson-Harza between the dates of April 20, 1993 and April 23, 1993.
Samples were analyzed by H2M Labs using NYSDEC ASP CLP Inorganics. Data were validated by O'Brien & Gere Engineers.
Sample locations are presented on Figure 15.

TABLE 4-9 (continued)
PRIMOSHIELD RI/FS
SITE NO. 633027
FIRST ROUND GROUND WATER RESULTS
METALS & CYANIDE

ANALYTE	P106S	P106S (F)	P107D	P107D (F)	P107S	P107S (F)	P108	P108 (F)
Aluminum	1080 J	68.6 J	12500 J	248 J	700 J	163 J	10500 J	225 J
Antimony	16.2 U	16.2 U	16.2 U	16.2 U	16.2 U	16.2 U	16.2 U	16.2 U
Arsenic	2.1 U	2.1 U	5.8 J	2.1 U	3.4 J	3.4 J	5.8 J	2.1 U
Barium	32.4 J	24.7 J	133 J	48.6 J	27.3 J	24.4 J	95.5 J	82 J
Beryllium	1.9 J	1 J	0.67 J	0.5 U	0.7 J	0.63 J	1.3 J	0.5 U
Cadmium	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Calcium	101000	100000	27000	5050	74600	73300	93200	87500
Chromium	19.5 J	8.6 U	31.6 J	8.6 U	8.6 UJ	8.6 U	21.1 J	8.6 U
Cobalt	11.1 J	51 U	8.5 J	5.1 U	5.1 U	5.1 U	9.1 J	5.1 U
Copper	13.6 J	9.8 J	28.6	3.7 J	12.8 J	9 J	27.8	8.2 J
Iron	1840	49.7 J	21100	174 J	976	42.3 J	18200	331 J
Lead	1.5 UJ	1.5 UJ	6.3 J	1.8 J	1.5 UJ	1.5 UJ	5.9	1.5 U
Magnesium	28700	27700	8780	1700 J	12400	12100	99800	88300
Manganese	318	284	328	5.7 J	4990	4810	748	324
Mercury	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	107	82.9	29.8 J	10.8 U	676	688	20.5 J	10.8 U
Potassium	10200	12000	6730	4020 J	5340	5490	7820	4740 J
Selenium	0.8 UJ	R	R	R	0.8 U	R	0.8 UJ	0.8 U
Silver	2 U	2 U	2 UJ	2 UJ	2 U	2 U	2 UJ	2 UJ
Sodium	60800	55300	99200	99800	54600	55900	9780	10700
Thallium	1 U	1 U	1 U	1 U	1 U	1 U	3.2 J	4 J
Vanadium	2.7 U	2.7 U	22.9 J	2.7 U	2.7 U	2.7 U	15.8 J	2.7 U
Zinc	33 J	10.1 J	70.8 J	11.9 J	24.7 J	20.2	46.1 J	119
Cyanide	12.8		10 U		10 U		10 U	

Notes:
U = Indicates compound was analyzed for but not detected.
J = Indicates an estimated value.
R = Rejected
Units = UG/L
Samples were collected by Stetson-Harza between the dates of April 20, 1993 and April 23, 1993.
Samples were analyzed by H2M Labs using NYSDEC ASP CLP Inorganics. Data were validated by O'Brien & Gere Engineers.
Sample locations are presented on Figure 15.

TABLE 4-10
PRIMOSHIELD RI/FS
SITE NO. 633027
SECOND ROUND GROUND WATER RESULTS
VOLATILE ORGANICS

ANALYTE	P101 D	P103	P104	P105	P106D	P106D DUP	P106 S	P107 D	P107 S	P108
Chloromethane	10 U	10 UJ	10 U	10 U	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 U
Bromomethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl chloride	10 U	10 UJ	10 U	10 U	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 U
Chloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methylene chloride	10 U	10 U	10 U	10 U	2 J	2 J	10 U	10 U	2 J	10 U
Acetone	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Carbon disulfide	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10	10 U
1,2-Dichloroethene(total)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroform	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Butanone	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
1,1,1-Trichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	20	10 U	36	10 U
Carbon tetrachloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichloroethene	10 U	10 U	10 U	10 U	10 U	10 U	3 J	10 U	14	10 U
Dibromochloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
trans-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone	10 UJ	10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U	10 UJ
2-Hexanone	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Tetrachloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	10 UJ	10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U	10 UJ
Toluene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Ethylbenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Styrene	10 UJ	10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U	10 UJ
Xylene(total)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

Notes:
U = Indicates compound was analyzed but not detected.
J = Indicates an estimated value.
R = Rejected
Units = UG/L
Samples were collected by Stetson-Harza between the dates of September 21, 1993 and September 24, 1993.
Samples were analyzed by H2M Labs using NYSDEC ASP CLP 91-1. Data were validated by O'Brien & Gere Engineers.
Sample locations are presented on Figure 15.

TABLE 4-13
PRIMOSHIELD RI/FS
SITE NO. 633027
SECOND ROUND GROUND WATER RESULTS
METALS & CYANIDE

ANALYTE	P101D	P101D(F)	P103	P103(F)	P104	P104(F)	P105	P105(F)	P106D	P106D(F)	P106D DUP	P106D(F)DUP
Aluminum	R	23.5 J	R	19.8 U	R	19.8 U	R	19.8 U	R	142 J	R	177 J
Antimony	18.3 U	18.3 U	20.4 J	20.4 J	23.3 J	37.3 J	18.3 U	19.2 J	19.2 J	28 J	28 J	18.3 U
Arsenic	3 U	3 U	3 U	3 U	3 U	3 U	20.8	9.2 J	4.7 J	3 U	5 J	3 U
Barium	287	233	86.9 J	68.7 J	70.9 J	53.4 J	237	38.4 J	136 J	49 J	137 J	56.9 J
Beryllium	1.4 J	0.09 U	1.5 J	1.3 J	0.9 U	0.9 U	4.1 J	0.9 J	1 J	0.9 U	1 J	0.9 U
Cadmium	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	R	3.3 U	3.3 U	3.3 U	3.3 U
Calcium	20300	12700	98200	93000	58400	51400	186000	91000	26600	6810	26100	6940
Chromium	32.6 J	8.9 UJ	9.1 J	8.9 U	14.6 J	8.9 UJ	136 J	8.9 UJ	28.2 J	8.9 UJ	23.7 J	8.9 U
Cobalt	7 U	7 U	7 U	7 U	7 U	7 U	29.8 J	7 U	7.9 J	7 U	7.3 J	7 U
Copper	R	5.6 J	32.1	28.3	R	9.6 J	R	37.2	38.8	2.4 J	79.2	4.5 J
Iron	5610	48.6 U	5880	48.6 U	4230	48.6 U	74100	48.6 U	18800	142	17700	152
Lead	5.2 J	1.9 J	R	0.7 U	3.1 J	0.7 UJ	43.5 J	0.7 UJ	R	0.7 UJ	R	2.6 J
Magnesium	11200	9840	88400	89100	42700	40800	109000	76300	7800	1660 J	7580	1700 J
Manganese	94.2	4.3 U	454	244	159	17.7	2320	510	297	4.3 U	272	7.3 J
Mercury	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 UJ	0.1 U	0.1 UJ	0.1 U	0.1 U
Nickel	24.2 J	10.5 U	28.1 J	21.6 J	10.8 J	10.5 U	95.5	10.5 U	28.8 J	10.5 U	23.8 J	19.8 J
Potassium	35100	37000	8980	8160	3920 J	3140 J	16200	7520	7290	4420 J	7500	4370 J
Selenium	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 UJ	1.6 U	1.6 UJ	1.6 U	1.6 U	1.6 U	1.6 U
Silver	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U
Sodium	185000	192000	60300	62100	27100	28000	22100	21800	101000	104000	102000	101000
Thallium	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U
Vanadium	8.4 U	8.4 J	8.4 U	8.4 U	8.4 U	8.4 U	64.8	8.4 U	21.1 J	8.4 U	23.7 J	8.4 U
Zinc	21.6	8 U	32.8	8 U	21.9	8 U	177	8 J	67.8	8 U	75.9	15.5 J
Cyanide	10 U		10 U		10 U		10 U				10 U	

Notes:
U = Indicates compound was analyzed for but not detected.
J = Indicates an estimated value.
R = Rejected.
Units = UG/L
Samples were collected by Stetson-Harza between the dates of September 21, 1993 and September 24, 1993.
Samples were analyzed by H2M Labs using NYSDEC ASP CLP Inorganics. Data were validated by O'Brien & Gere Engineers.
Sample locations are presented on Figure 15.

TABLE 4-13 (CONT)
PRIMOSHIELD RI/FS
SITE NO. 633027
SECOND ROUND GROUND WATER RESULTS
METALS & CYANIDE

ANALYTE	P106S	P106S(F)	P107D	P107D(F)	P107S	P107S(F)	P108	P108(F)
Aluminum	R	19.8 U	R	299	R	19.8 U	R	113 J
Antimony	28.5 J	18.3 U	18.3 U	18.3 U	18.3 U	18.3 U	33.8 J	19.2 J
Arsenic	3 U	3 U	4.5 J	3 U	3 U	3 U	12.4	3 U
Barium	37.5 J	28.6 J	142 J	51.9 J	58.5 J	43.8 J	165 J	36.6 J
Beryllium	1.6 J	1.3 J	0.9 U	0.9 U	2 J	1.7 J	3.2 J	0.9 U
Cadmium	3.3 U	3.3 U	3.3 U	3.3 U	3.8 J	3.5 J	3.3 U	3.3 U
Calcium	131000	125000	27700	5050	156000	147000	135000	74400
Chromium	9.1 J	8.9 UJ	25.1 J	8.9 U	22.1 J	8.9 UJ	38.9 J	8.9 UJ
Cobalt	8.2 J	7 U	7 U	7 U	7 U	7 U	21.1 J	7 U
Copper	R	R	R	12.8 J	108	36.7	R	10.6 J
Iron	1710	48.6 U	18800	288	3450	48.6 U	46300	195
Lead	0.7 U	0.7 UJ	8.4 J	1 J	R	0.7 UJ	32.8 J	0.7 UJ
Magnesium	55500	54600	8240	1830 J	29100	27000	114000	89800
Manganese	272	143	308	4.9 J	12900	12900	1550	306
Mercury	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 UJ
Nickel	299	276	41	14.4 J	294	275	54.1	10.5 U
Potassium	8540	8400	8220	4640 J	7410	6730	10600	4600 J
Selenium	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 UJ
Silver	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U
Sodium	130000	125000	105000	105000	95500	93200	12500	12500
Thallium	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U
Vanadium	8.4 U	8.4 U	22.7 J	8.4 U	8.4 U	8.4 U	42.6 J	8.4 U
Zinc	16.4 J	11.6 J	66.2	10.3 J	35.1	34.4	107	8 U
Cyanide	15.2		10 U				10 U	

Notes:
U = Indicates compound was analyzed for but not detected.
J = Indicates an estimated value.
R = Rejected.
Units = UG/L
Samples were collected by Stetson-Harza between the dates of September 21, 1993 and September 24, 1993.
Samples were analyzed by H2M Labs using NYSDEC ASP CLP Inorganics. Data were validated by O'Brien & Gere Engineers.
Sample locations are presented on Figure 15.

APPENDIX E

ONEIDA COUNTY SEWER DISTRICT
GROUNDWATER DISCHARGE PERMIT

ONEIDA COUNTY DEPARTMENT OF WATER QUALITY & WATER POLLUTION CONTROL

51 Leland Ave., PO Box 442, Utica, NY 13503-0442
(315) 798-5656 (FAX) 724-9812

Ralph J. Eannace, Jr.
County Executive

Steven P. Devan, P.E.
Commissioner

December 2, 1997

ATTN: MR. JAMES VAN HOESEN
CHIEF, CENTRAL FIELD SERVICES SECTION
BUREAU OF CONSTRUCTION SERVICES
DIVISION OF ENVIRONMENTAL REMEDIATION
NYSDEC
50 WOLF ROAD
ALBANY NY 12233-7010

Re: Groundwater remediation discharge permit
for Primoshield Site c/o NYSDEC

Dear Mr. Van Hoesen:

Enclosed is a permit from the Oneida County Sewer District for wastewater discharged from groundwater cleanup and site remediation projects.

1) The bill for the $100 annual permit fee will be sent separately.

2) The OCSD also issues semi-annual bills for groundwater remediation projects based on the volume of wastewater discharged during the reporting period, as measured and reported by the Permittee, at the 1997 rate of $1.58 per 1,000 gallons listed in the Sewer Usage Rate Schedule.

3) Groundwater permits are issued for a five (5) year period, and are considered cancelled when written notice of project closure is submitted by the permittee. Submit closure notice promptly to avoid unnecessary billing and other correspondence.

4) The permittee is responsible for providing a copy of the permit to his engineering consultant and other regulatory agencies.

Sincerely,

STEVEN P. DEVAN, P.E.
Commissioner, Oneida County
Department of Water Quality
& Water Pollution Control

rdh/jap

cc: Ms Joneen Matthews, City of Utica
Mr. Jeff Banikowski, O'Brien & Gere Enginers

RECEIVED
DEC 4 1997
BUREAU OF
CONSTRUCTION SERVICES

Oneida County Sewer District
Groundwater Remediation Discharge Permit No. GW-040

In accordance with all terms and conditions of Local Law No.4 of 1994, the Oneida County Sewer Use Rules & Regulations; and also with any applicable provisions of Federal, State, or County law or regulation,

PERMISSION IS HEREBY GRANTED TO:

Site Address: PRIMOSHIELD SITE (Site No. 6-33-027)
1212 ST. VINCENT STREET
UTICA NY 13501

Permittee: NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Contact: MR. DARRELL SWEREDOSKI, P.E.
Address: NYSDEC, REGION #6 HEADQUARTERS
STATE OFFICE BUILDING
WATERTOWN NY 13601
Telephone: (315)-785-2522

Contractor: ONTARIO SPECIALTY CONTRACTING/INDUSTRIAL SITE SERVICES INC
Address: 333 GANSON STTREET
BUFFALO NY 14203
Telephone: (716)-856-3333
Fax: (716)-842-1630

for the discharge of wastewater generated during groundwater cleanup and site remediation into the sanitary sewer system tributary to the Oneida County Water Pollution Control Plant, 51 Leland Avenue, Utica, New York.

In addition to the conditions contained in this document, the Oneida County Sewer District is incorporating by reference all applicable provisions of Federal Regulation 40 CFR 403 "General Pretreatment Regulations for Existing and New Sources of Pollution", and Local Law No.4 of 1994, the Oneida County Sewer Use Rules & Regulations, into this permit.

Note; this permit does not relieve the permittee of the responsibility of complying with any other applicable Federal, State or Local Laws, Regulations and/or Ordinances.

This permit is granted in accordance with the application information filed with the office of the Commissioner, Oneida County Water Quality & Water Pollution Control, together with the following named conditions and requirements.

Principal Groundwater Contaminants: Chlorinated Volatile Organics, Lead, Nickel, Chromium, Cyanide.

Permit Modification Tracking System:
Application Letter: 11-24-97
Permit Issue Date: 12-02-97
Expiration Date: 12-02-02

Signature: 

STEVEN P. DEVAN, P.E.
Commissioner, Oneida County
Department of Water Quality
& Water Pollution Control

Conditions for Acceptance of Wastewater Discharged from Groundwater Cleanup & Site Remediation:

1. **Site Information Required:** The Permittee must inform the OCSD of all contaminants found or suspected to be present at the site, and the pretreatment option to be used prior to discharge to the sewers. The Permittee must provide copies of analytical data, and a written descriptive outline about the site and the cleanup procedure. **This information was provided in a 02-16-96 letter from O'Brien & Gere Engineers, and is still considered valid by the NYSDEC.**

2. **Monitoring & Reporting:**

   a) Self-monitor all permit parameters once every other week for the first two months of discharge, and promptly submit the results as received to the OCSD.

   b) After the two month startup period, perform semi-annual self-monitoring. The semi-annual reports are due May 31 & November 30 of each year.

   c) Based on analytical data for the site, the OCSD waives its standard self-monitoring requirements for Combustible Gas %LEL, Odor, and Oil & Grease.

   d) Sampling and analysis of the sewered discharge must be performed using methods presented in 40 CFR 136 for Environmental Analysis.

   e) Monthly flow data must be submitted with the semi-annual report. The flow data may consist of actual flow measurements or best engineering estimates.

3. **Discharge Limits:**

POLLUTANT PARAMETER	LIMIT	NOTES
Total Flow, gal/month	No Limit	
pH	5.0-12.5	
Cadmium, mg/L	1.0	
Chromium, mg/L	5.0	
Copper, mg/L	3.0	
Lead, mg/L	5.0	
Nickel, mg/L	2.0	
Zinc, mg/L	4.0	
Cyanide, mg/L	3.0	
Total VOCs, mg/L	2.0	a,b

   a) Total Volatile Organics is the sum of all detectable VOCs substances as determined using the EPA 624 Method.

   b) As the OCSD does not accept RCRA Hazardous Waste, individual VOCs (see list in 9-b of this permit) must not exceed concentrations listed in the TCLP Regulation (40 CFR 261.24 Table 1).

4. **Other Approvals Prior To Discharge:** As each Town, Village or City discharging to the OCSD owns the sewer lines and collection system, the Permittee must obtain permission from the local governing Municipality in which the cleanup project site is located, to discharge the wastewater into their Municipal sewers.

5. **Charges and Fees:** Rates are established through County Legislation. Billing will be handled separately from permitting, with the current rates as follows:

   a) Permit Administrative Fee: $100 for all or part of the period January 1 thru December 31.

   b) Volume Charge: A semi-annual charge based on the volume of wastewater discharged, as measured and reported by the Permittee. The 1997 rate is $1.58 per 1,000 gallons. If rate changes occur, written notification will be sent.

   c) Late Payment Charge: 10% will be added to all charges which are paid after the late date posted on the bill. Failure to make timely payment may result in permit revocation.

6. **Permit Changes:** The OCSD unconditionally reserves the right to amend or rescind this approval without prior notice.

7. **Wastewater Not Approved by This Permit:** Wastewater stored in containers other than treatment system process tanks cannot be directly discharged to the sewer system as a groundwater discharge. It must be hauled under NYSDEC Part 364 & OCSD Hauler Permits for discharge at the designated Hauler Manhole at the OCSD Plant, or hauled to a NYSDEC permitted disposal facility.

8. **Fines and Penalties:** Failure to follow any Permit conditions can result in Enforcement & Penalties against the Permittee as provided for in Local Law No.4 of 1994, the Oneida County Sewer Use Rules & Regulations.

9. **Special Permit Conditions:**

   Clarification & Additions to Standard Permit Conditions:

   a) All wastewater generated from this Superfund site clean-up must be pretreated through carbon columns prior to discharge to the sewers.

   b) The contaminants listed below were stored on site, or detected in soil and/or groundwater samples: Cadmium, Chromium, Lead, Nickel, Zinc, Cyanide; VOCs including Trichloroethene (TCE), 1,1,1-Trichloroethane (TCA), 1,1,1-Dichloroethane (DCA), and Methylene chloride.

   c) The following pollutant groups were below detectable limits: Acid Extractable/Base Neutral (EPA Method 625) and Pesticide/PCBs (EPA Method 608).

   d) The OCSD requires construction of a monitoring facility for taking representative samples of the discharge using manual grab sampling techniques. The sample taps were described in the 02-16-96 O'Brien & Gere application letter.

ONEIDA COUNTY SEWER DISTRICT REPORTING FORM

Submit To:	From	Site
ATTN: PRETREATMENT	NYSDEC	PRIMOSHIELD
ONEIDA COUNTY SEWER DISTRICT	STATE OFFICE BLDG	1212 ST.VINCENT STREET
PO BOX 442	WATERTOWN NY 13601	UTICA NY 13501
UTICA NY 13503		

REPORTING PERIOD: _____ to _____

SAMPLING RESULTS:

For Semi-Annual Reporting, a grab sample of the Primoshield Site Batch Discharge is analyzed for the pollutants listed. Attach signed Report Certification.

In response to any violations incurred, self-monitor for pollutant in violation at least once a week until there are results for three consecutive sampling events which are in full compliance with Permit Limits. Submit all results for all samples taken. The first resampling result is due within thirty (30) days; a complete report with all three resampling results is due within sixty (60) days. Attach signed Report Certification.

ATTACH COPIES OF ALL CITY WATER BILLS, CONTRACT LABORATORY REPORTS, AND MANIFESTS OF HAZARDOUS WASTE SHIPMENTS FOR THE REPORTING PERIOD.

POLLUTANT PARAMETER:	DAILY MAXIMUM LIMIT	ANALYTICAL RESULTS Sample#1	Sample#2	Sample#3
Date Sampled		_____	_____	_____
Sample Number		_____	_____	_____
Discharge Flow (Note 1)		_____	_____	_____
pH	5.0-12.5	_____	_____	_____
Cadmium, mg/L	1.0	_____	_____	_____
Chromium, mg/L	5.0	_____	_____	_____
Copper, mg/L	3.0	_____	_____	_____
Lead, mg/L	5.0	_____	_____	_____
Nickel, mg/L	2.0	_____	_____	_____
Zinc, mg/L	4.0	_____	_____	_____
Cyanide, mg/L	3.0	_____	_____	_____
Total VOCs (Note 2)	2.0	_____	_____	_____

1) Attach monthly flow totalizer data.

2) Total VOCs using EPA Method 624.

Signature: _____ Date: _____

ONEIDA COUNTY SEWER DISTRICT
INDUSTRIAL USER REPORT CERTIFICATION

Submit To:	From	Site
ATTN: PRETREATMENT	NYSDEC	PRIMOSHIELD
ONEIDA COUNTY SEWER DISTRICT	STATE OFFICE BLDG	1212 ST.VINCENT STREET
PO BOX 442	WATERTOWN NY 13601	UTICA NY 13501
UTICA NY 13503		

ATTACH TO REPORT DATED: _____

REPORTING PERIOD: _____ to _____

The following certification of information provided in industrial user reports is made in compliance with the General Pretreatment Regulations.

1. Compliance or Non-Compliance Status: Ref = 40 CFR 403.12(b)(6)

Check A or B. If B is checked, attach a statement describing O&M and/or pretreatment required; include the shortest schedule by which you can provide the required O&M and/or pretreatment.

[ ] A. I certify that Pretreatment Standards are being met on a consistent basis.

[ ] B. I certify that Pretreatment Standards are NOT being met on a consistent basis, and that additional operation and maintenance (O&M) and/or additional pretreatment is required to achieve compliance with Pretreatment Standards and Requirements.

2. Information Certification: Ref = 40 CFR 403.6(a)(2)(ii)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Authorized Signature: _____

Title: _____

Date: _____

PLEASE ATTACH THIS CERTIFICATION TO THE SEMI-ANNUAL & OTHER REPORTS THAT YOU SUBMIT TO THE ONEIDA COUNTY SEWER DISTRICT.

APPENDIX F

GWTS EFFLUENT SAMPLE RESULTS DURING THE DEMONSTRATION PERIOD

Groundwater Treatment System - Effluent Sample Results

Sample No.	Sample Date	Analyzed For
001	08/26/98	Chromium, Lead, Nickel, Cadmium & Zinc
002	08/26/98	Cyanide
003	08/26/98	Cyanide
004	08/26/98	pH
005	08/26/98	Total VOCs
006	08/26/98	Total VOCs
007	09/11/98	Chromium, Lead, Nickel, Cadmium, Zinc & pH
008	09/11/98	Cyanide
009	09/11/98	Cyanide
010	09/11/98	Total VOCs
011	09/11/98	Total VOCs
012	09/21/98	pH
013	09/21/98	Chromium, Lead, Nickel, Cadmium, Copper & Zinc
014	09/21/98	Cyanide
015	09/21/98	Cyanide
016	09/21/98	Total VOCs
017	10/07/98	pH
018	10/07/98	Chromium, Lead, Nickel, Cadmium, Copper & Zinc
019	10/07/98	Cyanide
020	10/07/98	Total VOCs
021	10/20/98	pH
022	10/20/98	Chromium, Lead, Nickel, Cadmium, Copper & Zinc
023	10/20/98	Cyanide
024	10/20/98	Total VOCs
025	11/05/98	Total VOCs
026 A	11/05/98	Cyanide, Chromium, Lead, Nickel, Cadmium, Zinc & pH
026 B	11/20/98	Total VOCs
027 A	11/20/98	Cyanide, Chromium, Lead, Nickel, Cadmium, Zinc & pH
027 B	12/02/98	pH
028	12/02/98	Cyanide
029	12/02/98	Chromium, Lead, Nickel, Cadmium, Copper & Zinc
030	12/02/98	Total VOCs

LOZIER LABORATORIES, INC.

909 CULVER ROAD
ROCHESTER, NEW YORK 14609
TEL (716) 654-6360
FAX (716) 654-6364

NEW YORK STATE
APPROVED
ENVIRONMENTAL LABORATORY
10390

Client: EXPRESSLAB INC.
5611 Water St
Middlesex, NY 14507

Date Received: 8/28/98
Laboratory No.: 22326
Report Date: 9/1/98

Attn: Barbara Collin

Client Project: O.S.C

SAMPLE INFORMATION

Sample Date: 8/26/98
Sample: Client

Matrix: Water

LABORATORY REPORT

Lab ID:	22326-1	22326-2			
Client ID:	Effluent From GWTS 001	Effluent From GWTS 002			
Location:	(001)	(002)			
PARAMETER			Units	Method Number	Analysis Date
Chromium	<0.003		mg/l	EPA 200.7	9/1/98
Lead	<0.003		mg/l	EPA 200.7	9/1/98
Nickel	0.032		mg/l	EPA 200.7	9/1/98
Cadmium	<0.001		mg/l	EPA 200.7	9/1/98
Zinc	0.043		mg/l	EPA 200.7	9/1/98
Cyanide		<0.05	mg/l	SM 4500	8/31/98

Lab ID:	22326-3	22326-4			
Client ID:	Effluent From GWTS 003	Effluent From GWTS 004			
Location:	(003)	(004)			
PARAMETER			Unit	Method Number	Analysis Date
Cyanide	<0.05		mg/l	SM 4500	8/31/98
pH		7.4	S.U.	EPA 150.1	8/28/98

PAGE: 1

Footnotes:

Approved By:

HYDROH LAB ID = 10390

EXPRESSLAB

PO Box 40 5611 Water Street Middlesex NY 14507

Tel: (716) 554-5347 Tel: (800) THE LABS Tel: (800) 843-5227 FAX: (716) 554-4114

SPECIALIZING IN ENVIRONMENTAL SOIL TESTS

NEW YORK STATE LABORATORY #11369

LABORATORY REPORT - METHOD 8260

Cust OSC
Address 333 GANSON ST.
BUFFALO, NY 14203
Attn: RICH CYGAN

Phone 856-3333
FAX 842-1630

PO Number:
Project Numbe 9705
Project Cust: O.S.C.
Project Site: PRIMOSHELD, UTICA
Date FAXED:
Lab Director

DEC 9

SAMPLE DEMOGRAPHICS AND TEST RESULTS

Results in bold type; Detection Limits in small print
Detection Limits* = Soil=ug/kg ppb
*See Individual Limit Water=ug/L ppb

Results shown are: Volatile Organic Analytes
Extraction Method: EPA 5030 Purge & Trap
Analysis Method: EPA 8260 GC/MS

Sample ID (LAB)	20214
Sample ID#1(CUST)	EFFLUENT FROM GWTS
Sample ID#2(CUST)	5
Matrix	WATER
Sampled By	PATRICK FOOTE
Date Sampled	08/26/98 15:15
Date Received	08/28/98 09:00
Date Analyzed	08/31/98
Date Reported	09/01/98

	Results	Det Limit*		Results	Det Limit*
Dichlorodifluoromethane	< DL(U)	2.0	Carbon Tetrachloride	< DL(U)	2.0
Vinyl Chloride	< DL(U)	2.0	1,2-Dichloroethane	< DL(U)	2.0
Chloromethane	< DL(U)	8.0	Trichloroethene	< DL(U)	8.0
Bromomethane	< DL(U)	6.0	1,2-Dichloropropane	< DL(U)	2.0
Chloroethane	< DL(U)	5.0	Dibromomethane	< DL(U)	2.0
Trichlorofluoromethane	< DL(U)	2.0	Bromoform	< DL(U)	10.0
1,1-Dichloroethene	< DL(U)	2.0	Bromodichloromethane	< DL(U)	8.0
Methylene Chloride	< DL(U)	18.0	1,1,2,2-Tetrachloroethane	< DL(U)	10.0
trans-1,2-Dichloroethene	< DL(U)	2.0	Benzene	< DL(U)	4.0
Methyl-tert-butyl ether	< DL(U)	8.0	cis-1,3-Dichloropropene	< DL(U)	2.0
1,1-Dichloroethane	< DL(U)	2.0	Toluene	< DL(U)	5.0
2,2-Dichloropropane	< DL(U)	8.0	trans-1,3-Dichloropropene	< DL(U)	2.0
cis-1,2-Dichloroethene	< DL(U)	2.0	1,1,2-Trichloroethane	< DL(U)	8.0
Methyl ethyl ketone	< DL(U)	40.0	Tetrachloroethene	< DL(U)	2.0
Bromochloromethane	< DL(U)	2.0	1,3-Dichloropropane	< DL(U)	2.0
Chloroform	< DL(U)	2.0	Dibromochloromethane	< DL(U)	8.0
1,1,1-Trichloroethane	< DL(U)	2.0	1,2-Dibromoethane	< DL(U)	8.0
1,1-Dichloropropene	< DL(U)	2.0	Ethylbenzene	< DL(U)	2.0

* DL = Detection Limit

EXPRESSLAB

PO Box 40 5611 Water Street Middlesex NY 14507

Tel: (716) 554-5347 Tel: (800) THE LABS Tel: (800) 843-5227 FAX: (716) 554-4114

SPECIALIZING IN ENVIRONMENTAL SOIL TESTS

NEW YORK STATE LABORATORY #11369

LABORATORY REPORT - METHOD 8260

Cust OSC
Address 333 GANSON ST.
BUFFALO, NY 14203
Attn: RICH CYGAN

Phone 856-3333
FAX 842-1630

PO Number:
Project Numbe 9705
Project Cust: O.S.C.
Project Site: PRIMOSHELD, UTICA
Date FAXED:
Lab Director

SAMPLE DEMOGRAPHICS AND TEST RESULTS

Results in bold type; Detection Limits in small print
Detection Limits* = Soil=ug/kg ppb
*See Individual Limit Water=ug/L ppb

Results shown are: Volatile Organic Analytes
Extraction Method: EPA 5030 Purge & Trap
Analysis Method: EPA 8260 GC/MS

Sample ID (LAB)	20214
Sample ID#1(CUST)	EFFLUENT FROM GWTS
Sample ID#2(CUST)	5
Matrix	WATER
Sampled By	PATRICK FOOTE
Date Sampled	08/26/98 15:15
Date Received	08/28/98 09:00
Date Analyzed	08/31/98
Date Reported	09/01/98

	Results	Det Limit*
m&p-Xylene	< DL(U)	4.0
o-Xylene	< DL(U)	2.0
Styrene	< DL(U)	2.0
Isopropylbenzene	< DL(U)	2.0
n-Propylbenzene	2.1	2.0
1,3,5-Trimethylbenzene	< DL(U)	2.0
tert-Butylbenzene	< DL(U)	2.0
1,2,4-Trimethylbenzene	2.6	2.0
sec-Butylbenzene	< DL(U)	2.0
Chlorobenzene	< DL(U)	2.0
1,1,1,2-Tetrachloroethane	< DL(U)	6.0
Bromobenzene	< DL(U)	2.0
1,2,3-Trichloropropane	< DL(U)	2.0
2-Chlorotoluene	< DL(U)	2.0
4-Chlorotoluene	< DL(U)	2.0
1,3-Dichlorobenzene	< DL(U)	2.0
4-Isopropyltoluene	6.9	2.0
1,4-Dichlorobenzene	8.1	2.0

	Results	Det Limit*
1,2-Dichlorobenzene	9.0	2.0
n-Butylbenzene	6.8	2.0
1,2-Dibromo-3-chloropropane	< DL(U)	10.0
1,2,4-Trichlorobenzene	12.6	4.0
Hexachlorobutadiene	11.2	2.0
Naphthalene	15.5	10.0
1,2,3-Trichlorobenzene	13.3	10.0

< DL(U)= analyzed but not detected
L= estimated value
B=analyte found in blank
E=exceed calibration range

* DL = Detection Limit

EXPRESSLAB

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SPECIALIZING IN ENVIRONMENTAL SOIL TESTS

NEW YORK STATE LABORATORY #11369

LABORATORY REPORT - METHOD 8260

Cust OSC
Address 333 GANSON ST.
BUFFALO, NY 14203
Attn: RICH CYGAN

Phone 856-3333
FAX 842-1630

PO Number:
Project Numbe 9705
Project Cust: O.S.C.
Project Site: PRIMOSHELD, UTICA
Date FAXED:
Lab Director

SAMPLE DEMOGRAPHICS AND TEST RESULTS

Results in bold type; Detection Limits in small print
Detection Limits* = Soil=ug/kg ppb
*See Individual Limit Water=ug/L ppb

Results shown are: Volatile Organic Analytes
Extraction Method: EPA 5030 Purge & Trap
Analysis Method: EPA 8260 GC/MS

Sample ID (LAB)	20215	
Sample ID#1(CUST)	EFFLUENT FROM GWTS	
Sample ID#2(CUST)	6	
Matrix	WATER	
Sampled By	PATRICK FOOTE	
Date Sampled	08/26/98	15:15
Date Received	08/28/98	09:00
Date Analyzed	08/31/98	
Date Reported	09/01/98	

	Results	Det Limit*		Results	Det Limit*
Dichlorodifluoromethane	< DL(U)	2.0	Carbon Tetrachloride	< DL(U)	2.0
Vinyl Chloride	< DL(U)	2.0	1,2-Dichloroethane	< DL(U)	2.0
Chloromethane	< DL(U)	8.0	Trichloroethene	< DL(U)	8.0
Bromomethane	< DL(U)	6.0	1,2-Dichloropropane	< DL(U)	2.0
Chloroethane	< DL(U)	5.0	Dibromomethane	< DL(U)	2.0
Trichlorofluoromethane	< DL(U)	2.0	Bromoform	< DL(U)	10.0
1,1-Dichloroethene	< DL(U)	2.0	Bromodichloromethane	< DL(U)	8.0
Methylene Chloride	< DL(U)	18.0	1,1,2,2-Tetrachloroethane	< DL(U)	10.0
trans-1,2-Dichloroethene	< DL(U)	2.0	Benzene	< DL(U)	4.0
Methyl-tert-butyl ether	< DL(U)	8.0	cis-1,3-Dichloropropene	< DL(U)	2.0
1,1-Dichloroethane	< DL(U)	2.0	Toluene	< DL(U)	5.0
2,2-Dichloropropane	< DL(U)	8.0	trans-1,3-Dichloropropene	< DL(U)	2.0
cis-1,2-Dichloroethene	< DL(U)	2.0	1,1,2-Trichloroethane	< DL(U)	8.0
Methyl ethyl ketone	< DL(U)	40.0	Tetrachloroethene	< DL(U)	2.0
Bromochloromethane	< DL(U)	2.0	1,3-Dichloropropane	< DL(U)	2.0
Chloroform	< DL(U)	2.0	Dibromochloromethane	< DL(U)	8.0
1,1,1-Trichloroethane	< DL(U)	2.0	1,2-Dibromoethane	< DL(U)	8.0
1,1-Dichloropropene	< DL(U)	2.0	Ethylbenzene	< DL(U)	2.0

* DL = Detection Limit

EXPRESSLAB

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SPECIALIZING IN ENVIRONMENTAL SOIL TESTS

NEW YORK STATE LABORATORY #11369

LABORATORY REPORT - METHOD 8260

Cust OSC
Address 333 GANSON ST.
BUFFALO, NY 14203
Attn: RICH CYGAN

Phone 856-3333
FAX 842-1630

PO Number:
Project Numbe 9705
Project Cust: O.S.C.
Project Site: PRIMOSHELD, UTICA
Date FAXED:
Lab Director

SAMPLE DEMOGRAPHICS AND TEST RESULTS

Results in bold type; Detection Limits in small print
Detection Limits* = Soil=ug/kg ppb
*See Individual Limit Water=ug/L ppb

Results shown are: Volatile Organic Analytes
Extraction Method: EPA 5030 Purge & Trap
Analysis Method: EPA 8260 GC/MS

Sample ID (LAB)	20215
Sample ID#1(CUST)	EFFLUENT FROM GWTS
Sample ID#2(CUST)	6
Matrix	WATER
Sampled By	PATRICK FOOTE
Date Sampled	08/26/98 15:15
Date Received	08/28/98 09:00
Date Analyzed	08/31/98
Date Reported	09/01/98

	Results	Det Limit*
m&p-Xylene	< DL(U)	4.0
o-Xylene	< DL(U)	2.0
Styrene	< DL(U)	2.0
Isopropylbenzene	< DL(U)	2.0
n-Propylbenzene	< DL(U)	2.0
1,3,5-Trimethylbenzene	< DL(U)	2.0
tert-Butylbenzene	< DL(U)	2.0
1,2,4-Trimethylbenzene	< DL(U)	2.0
sec-Butylbenzene	< DL(U)	2.0
Chlorobenzene	< DL(U)	2.0
1,1,1,2-Tetrachloroethane	< DL(U)	6.0
Bromobenzene	< DL(U)	2.0
1,2,3-Trichloropropane	< DL(U)	2.0
2-Chlorotoluene	< DL(U)	2.0
4-Chlorotoluene	< DL(U)	2.0
1,3-Dichlorobenzene	< DL(U)	2.0
4-Isopropyltoluene	< DL(U)	2.0
1,4-Dichlorobenzene	< DL(U)	2.0

	Results	Det Limit*
1,2-Dichlorobenzene	< DL(U)	2.0
n-Butylbenzene	3.5	2.0
1,2-Dibromo-3-chloropropane	< DL(U)	10.0
1,2,4-Trichlorobenzene	6.2	4.0
Hexachlorobutadiene	5.4	2.0
Naphthalene	< DL(U)	10.0
1,2,3-Trichlorobenzene	< DL(U)	10.0

< DL(U)= analyzed but not detected
L= estimated value
B=analyte found in blank
E=exceed calibration range

* DL = Detection Limit

DEC

LOZIER LABORATORIES, INC.

909 CULVER ROAD
ROCHESTER, NEW YORK 14609
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FAX (716) 654-6364

NEW YORK STATE
APPROVED
ENVIRONMENTAL LABORATORY
10390

Client: EXPRESSLAB INC.
5911 Water St
Middlesex, NY 14507

Attn: Barbara Collin

Client Project:

Date Received: 9/15/98
Laboratory No.: 22585
Report Date: 9/29/98

SAMPLE INFORMATION

Matrix: Water

Sample Date: 9/11/98
Sampler: Client

LABORATORY REPORT

Lab ID:	22585-1	22585-2			
Client ID:	7	8			
Location:	007	008			
PARAMETER			Units	Method Number	Analysis Date
Lead	0.007		mg/l	EPA 200.7	9/16/98
Nickel	0.075		mg/l	EPA 200.7	9/16/98
Chromium	<0.003		mg/l	EPA 200.7	9/16/98
Cadmium	0.003		mg/l	EPA 200.7	9/16/98
Zinc	0.021		mg/l	EPA 200.7	9/16/98
pH	7.25		S.U.	EPA 150.1	9/15/98
Cyanide		<0.005	mg/l	SM 4500	9/29/98

Lab ID:	22585-3			
Client ID:	9			
Location:	009			
PARAMETER		Units	Method Number	Analysis Date
Cyanide	<0.005	mg/l	SM 4500	9/29/98

PAGE: 1

Approved By:

NYSDOH LAB ID # 10390

EXPRESSLAB

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SPECIALIZING IN ENVIRONMENTAL SOIL TESTS

NEW YORK STATE LABORATORY #11369

LABORATORY REPORT - METHOD 8260

Cust OSC
Address 333 GANSON ST.
BUFFALO. NY 14203
Attn: RICH CYGAN

Phone 856-3333
FAX 842-1630

PO Number:
Project Number 9705
Project Cust: OSC
Project Site: PRIMOSHIELD
Date FAXED:
Lab Director

SAMPLE DEMOGRAPHICS AND TEST RESULTS

Results in bold type; Detection Limits in small print
Detection Limits* = Soil=ug/kg ppb
*See Individual Limit Water=ug/L ppb

Results shown are: Volatile Organic Analytes
Extraction Method: EPA 5030 Purge & Trap
Analysis Method: EPA 8260 GC/MS

Sample ID (LAB)	20647	
Sample ID#1(CUST)	EFFLUENT FROM GWTS	
Sample ID#2(CUST)	10	
Matrix	WATER	
Sampled By	PATRICK FOOTE	
Date Sampled	09/11/98	14:20
Date Received	09/15/98	09:50
Date Analyzed	09/15/98	
Date Reported	09/15/98	

	Results	Det Limit*		Results	Det Limit*
Dichlorodifluoromethane	< DL(U)	2.0	Carbon Tetrachloride	< DL(U)	2.0
Vinyl Chloride	< DL(U)	2.0	1,2-Dichloroethane	< DL(U)	2.0
Chloromethane	< DL(U)	2.0	Trichloroethene	< DL(U)	2.0
Bromomethane	< DL(U)	2.0	1,2-Dichloropropane	< DL(U)	2.0
Chloroethane	< DL(U)	5.0	Dibromomethane	< DL(U)	2.0
Trichlorofluoromethane	< DL(U)	2.0	Bromoform	< DL(U)	2.0
1,1-Dichloroethene	< DL(U)	2.0	Bromodichloromethane	< DL(U)	2.0
Methylene Chloride	< DL(U)	25.0	1,1,2,2-Tetrachloroethane	< DL(U)	2.0
trans-1,2-Dichloroethene	< DL(U)	2.0	Benzene	< DL(U)	4.0
Methyl-tert-butyl ether	< DL(U)	8.0	cis-1,3-Dichloropropene	< DL(U)	2.0
1,1-Dichloroethane	< DL(U)	2.0	Toluene	< DL(U)	5.0
2,2-Dichloropropane	< DL(U)	2.0	trans-1,3-Dichloropropene	< DL(U)	2.0
cis-1,2-Dichloroethene	< DL(U)	2.0	1,1,2-Trichloroethane	< DL(U)	2.0
Methyl ethyl ketone	31.1	20.0	Tetrachloroethene	< DL(U)	2.0
Bromochloromethane	< DL(U)	2.0	1,3-Dichloropropane	< DL(U)	2.0
Chloroform	< DL(U)	2.0	Dibromochloromethane	< DL(U)	2.0
1,1,1-Trichloroethane	< DL(U)	2.0	1,2-Dibromoethane	< DL(U)	2.0
1,1-Dichloropropene	< DL(U)	2.0	Ethylbenzene	< DL(U)	2.0

* DL = Detection Limit

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SPECIALIZING IN ENVIRONMENTAL SOIL TESTS

NEW YORK STATE LABORATORY #11369

LABORATORY REPORT - METHOD 8260

Cust OSC
Address 333 GANSON ST.
BUFFALO, NY 14203
Attn: RICH CYGAN

Phone 856-3333
FAX 842-1630

PO Number:
Project Number 9705
Project Cust: OSC
Project Site: PRIMOSHIELD
Date FAXED:
Lab Director

SAMPLE DEMOGRAPHICS AND TEST RESULTS

Results in bold type; Detection Limits in small print
Detection Limits* =
*See Individual Limit
Soil=ug/kg ppb
Water=ug/L ppb

Results shown are: Volatile Organic Analytes
Extraction Method: EPA 5030 Purge & Trap
Analysis Method: EPA 8260 GC/MS

Sample ID (LAB)	20647	
Sample ID#1(CUST)	EFFLUENT FROM GWTS	
Sample ID#2(CUST)	10	
Matrix	WATER	
Sampled By	PATRICK FOOTE	
Date Sampled	09/11/98	14:20
Date Received	09/15/98	09:50
Date Analyzed	09/15/98	
Date Reported	09/15/98	

	Results	Det Limit*
m&p-Xylene	< DL(U)	4.0
o-Xylene	< DL(U)	2.0
Styrene	< DL(U)	2.0
Isopropylbenzene	< DL(U)	2.0
n-Propylbenzene	< DL(U)	2.0
1,3,5-Trimethylbenzene	< DL(U)	2.0
tert-Butylbenzene	< DL(U)	2.0
1,2,4-Trimethylbenzene	2.1	2.0
sec-Butylbenzene	< DL(U)	2.0
Chlorobenzene	< DL(U)	2.0
1,1,1,2-Tetrachloroethane	< DL(U)	2.0
Bromobenzene	< DL(U)	2.0
1,2,3-Trichloropropane	< DL(U)	2.0
2-Chlorotoluene	< DL(U)	2.0
4-Chlorotoluene	< DL(U)	2.0
1,3-Dichlorobenzene	< DL(U)	2.0
4-Isopropyltoluene	< DL(U)	2.0
1,4-Dichlorobenzene	< DL(U)	2.0

	Results	Det Limit*
1,2-Dichlorobenzene	< DL(U)	2.0
n-Butylbenzene	< DL(U)	2.0
1,2-Dibromo-3-chloropropane	< DL(U)	5.0
1,2,4-Trichlorobenzene	< DL(U)	4.0
Hexachlorobutadiene	< DL(U)	2.0
Naphthalene	< DL(U)	10.0
1,2,3-Trichlorobenzene	< DL(U)	10.0

< DL(U)= analyzed but not detected
L= estimated value
B=analyte found in blank
E=exceed calibration range

* DL = Detection Limit

EXPRESSLAB PO Box 40 5611 Water Street Middlesex NY 14507

Tel: (716) 554-5347 Tel: (800) THE LABS Tel: (800) 843-5227 FAX: (716) 554-4114

SPECIALIZING IN ENVIRONMENTAL SOIL TESTS
NEW YORK STATE LABORATORY #11369

LABORATORY REPORT - METHOD 8260

Cust OSC
Address 333 GANSON ST.
BUFFALO. NY 14203
Attn: RICH CYGAN

Phone 856-3333
FAX 842-1630

PO Number:
Project Number 9705
Project Cust: OSC
Project Site: PRIMOSHIELD
Date FAXED:
Lab Director

SAMPLE DEMOGRAPHICS AND TEST RESULTS

Results in bold type; Detection Limits in small print
Detection Limits* = Soil=ug/kg ppb
*See Individual Limit Water=ug/L ppb

Results shown are: Volatile Organic Analytes
Extraction Method: EPA 5030 Purge & Trap
Analysis Method: EPA 8260 GC/MS

Sample ID (LAB)	20648
Sample ID#1(CUST)	EFFLUENT FROM GWTS
Sample ID#2(CUST)	11
Matrix	WATER
Sampled By	PATRICK FOOTE
Date Sampled	09/11/98 14:22
Date Received	09/15/98 09:50
Date Analyzed	09/15/98
Date Reported	09/15/98

	Results	Det Limit*		Results	Det Limit*
Dichlorodifluoromethane	< DL(U)	2.0	Carbon Tetrachloride	< DL(U)	2.0
Vinyl Chloride	< DL(U)	2.0	1,2-Dichloroethane	< DL(U)	2.0
Chloromethane	< DL(U)	2.0	Trichloroethene	< DL(U)	2.0
Bromomethane	< DL(U)	2.0	1,2-Dichloropropane	< DL(U)	2.0
Chloroethane	< DL(U)	5.0	Dibromomethane	< DL(U)	2.0
Trichlorofluoromethane	< DL(U)	2.0	Bromoform	< DL(U)	2.0
1,1-Dichloroethene	< DL(U)	2.0	Bromodichloromethane	< DL(U)	2.0
Methylene Chloride	< DL(U)	25.0	1,1,2,2-Tetrachloroethane	< DL(U)	2.0
trans-1,2-Dichloroethene	< DL(U)	2.0	Benzene	< DL(U)	4.0
Methyl-tert-butyl ether	< DL(U)	8.0	cis-1,3-Dichloropropene	< DL(U)	2.0
1,1-Dichloroethane	< DL(U)	2.0	Toluene	< DL(U)	5.0
2,2-Dichloropropane	< DL(U)	2.0	trans-1,3-Dichloropropene	< DL(U)	2.0
cis-1,2-Dichloroethene	< DL(U)	2.0	1,1,2-Trichloroethane	< DL(U)	2.0
Methyl ethyl ketone	< DL(U)	20.0	Tetrachloroethene	< DL(U)	2.0
Bromochloromethane	< DL(U)	2.0	1,3-Dichloropropane	< DL(U)	2.0
Chloroform	< DL(U)	2.0	Dibromochloromethane	< DL(U)	2.0
1,1,1-Trichloroethane	< DL(U)	2.0	1,2-Dibromoethane	< DL(U)	2.0
1,1-Dichloropropene	< DL(U)	2.0	Ethylbenzene	< DL(U)	2.0

* DL = Detection Limit

RESULTS WHEN YOU WANT THEM

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Tel: (716) 554-5347 Tel: (800) THE LABS Tel: (800) 843-5227 FAX: (716) 554-4114

SPECIALIZING IN ENVIRONMENTAL SOIL TESTS

NEW YORK STATE LABORATORY #11369

LABORATORY REPORT - METHOD 8260

Cust OSC
Address 333 GANSON ST.
BUFFALO, NY 14203
Attn: RICH CYGAN

Phone 856-3333
FAX 842-1630

PO Number:
Project Number 9705
Project Cust: OSC
Project Site: PRIMOSHIELD
Date FAXED:
Lab Director

SAMPLE DEMOGRAPHICS AND TEST RESULTS

Results in bold type; Detection Limits in small print
Detection Limits* = Soil=ug/kg ppb
*See Individual Limit Water=ug/L ppb

Results shown are: Volatile Organic Analytes
Extraction Method: EPA 5030 Purge & Trap
Analysis Method: EPA 8260 GC/MS

Sample ID (LAB)	20648	
Sample ID#1(CUST)	EFFLUENT FROM GWTS	
Sample ID#2(CUST)	11	
Matrix	WATER	
Sampled By	PATRICK FOOTE	
Date Sampled	09/11/98	14:22
Date Received	09/15/98	09:50
Date Analyzed	09/15/98	
Date Reported	09/15/98	

	Results	Det Limit*
m&p-Xylene	< DL(U)	4.0
o-Xylene	< DL(U)	2.0
Styrene	< DL(U)	2.0
Isopropylbenzene	< DL(U)	2.0
n-Propylbenzene	< DL(U)	2.0
1,3,5-Trimethylbenzene	< DL(U)	2.0
tert-Butylbenzene	< DL(U)	2.0
1,2,4-Trimethylbenzene	< DL(U)	2.0
sec-Butylbenzene	< DL(U)	2.0
Chlorobenzene	< DL(U)	2.0
1,1,1,2-Tetrachloroethane	< DL(U)	2.0
Bromobenzene	< DL(U)	2.0
1,2,3-Trichloropropane	< DL(U)	2.0
2-Chlorotoluene	< DL(U)	2.0
4-Chlorotoluene	< DL(U)	2.0
1,3-Dichlorobenzene	< DL(U)	2.0
4-Isopropyltoluene	< DL(U)	2.0
1,4-Dichlorobenzene	< DL(U)	2.0

	Results	Det Limit*
1,2-Dichlorobenzene	< DL(U)	2.0
n-Butylbenzene	< DL(U)	2.0
1,2-Dibromo-3-chloropropane	< DL(U)	5.0
1,2,4-Trichlorobenzene	< DL(U)	4.0
Hexachlorobutadiene	< DL(U)	2.0
Naphthalene	< DL(U)	10.0
1,2,3-Trichlorobenzene	< DL(U)	10.0

< DL(U)= analyzed but not detected
L= estimated value
B=analyte found in blank
E=exceed calibration range

* DL = Detection Limit

DEC 9

LOZIER LABORATORIES, INC.

909 CULVER ROAD
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TEL (716) 654-6360
FAX (716) 654-6364

NEW YORK STATE
APPROVED
ENVIRONMENTAL LABORATORY
10390

Client: EXPRESSLAB INC.
5611 Water St
Middlesex, NY 14507

Attn: Barbara Catlin

Client Project:

Date Received: 9/25/98
Laboratory No.: 22801
Report Date: 9/29/98

SAMPLE INFORMATION

Sample Date: 9/24/98
Sampler: Client

Matrix:

LABORATORY REPORT

Lab ID:	22801-1	22801-2			
Client ID:	9765-12	9765-13			
Location:	(012)	(013)			
PARAMETER			Units	Method Number	Analysis Date
pH	7.99		S.U.	EPA 150.1	9/25/98
Cadmium		<0.001	mg/l	EPA 200.7	9/28/98
Chromium		0.005	mg/l	EPA 200.7	9/28/98
Zinc		0.048	mg/l	EPA 200.7	9/28/98
Nickel		0.089	mg/l	EPA 200.7	9/28/98
Lead		0.021	mg/l	EPA 200.7	9/28/98
Copper		0.022	mg/l	EPA 200.7	9/28/98

Lab ID:	22801-3				
Client ID:	9765-14&15				
Location:	(014 + 015)				
PARAMETER			Units	Method Number	Analysis Date
Cyanide	<0.005		mg/l	SM 4500	9/29/98

PAGE: 1

Approved By:

NYSDOH LAB ID # 10390

EXPRESSLAB PO Box 40 5611 Water Street Middlesex NY 14507

Tel: (716) 554-5347 Tel: (800) THE LABS Tel: (800) 843-5227 FAX: (716) 554-4114

SPECIALIZING IN ENVIRONMENTAL SOIL TESTS

NEW YORK STATE LABORATORY #11369

LABORATORY REPORT - METHOD 624

Cust OSC
Address 333 GANSON ST
BUFFALO, NY 14203
Attn: RICH CYGAN

Phone 856-3333
FAX 842-1630

PO Number:
Project Number 9705
Project Cust: OSC
Project Site: PRIMOSHIELD-UTICA
Date FAXED:
Lab Director

SAMPLE DEMOGRAPHICS AND TEST RESULTS

Results in bold type; Detection Limits in small print
Detection Limits* = Soil=ug/kg ppb
*See Individual Limit Water=ug/L ppb

Results shown are: Volatile Organic Analytes
Extraction Method: EPA 5030 Purge & Trap
Analysis Method: EPA 8260 GC/MS

Sample ID (LAB)	20976	
Sample ID#1(CUST)	9705-16 & 9705-17	
Sample ID#2(CUST)		
Matrix	WATER	
Sampled By	PATRICK FOOTE	
Date Sampled	09/21/98	10:00
Date Received	09/25/98	09:30
Date Analyzed	09/28/98	
Date Reported	09/29/98	

	Results	Det Limit*		Results	Det Limit*
Dichlorodifluoromethane	< DL(U)	2.0	Carbon Tetrachloride	< DL(U)	2.0
Vinyl Chloride	< DL(U)	2.0	1,2-Dichloroethane	< DL(U)	2.0
Chloromethane	< DL(U)	2.0	Trichloroethene	< DL(U)	35.0
Bromomethane	< DL(U)	2.0	1,2-Dichloropropane	< DL(U)	2.0
Chloroethane	< DL(U)	5.0	Dibromomethane	< DL(U)	2.0
Trichlorofluoromethane	< DL(U)	2.0	Bromoform	< DL(U)	2.0
1,1-Dichloroethene	< DL(U)	2.0	Bromodichloromethane	< DL(U)	2.0
Methylene Chloride	< DL(U)	40.0	1,1,2,2-Tetrachloroethane	< DL(U)	2.0
trans-1,2-Dichloroethene	< DL(U)	2.0	Benzene	< DL(U)	4.0
Methyl-tert-butyl ether	< DL(U)	8.0	cis-1,3-Dichloropropene	< DL(U)	2.0
1,1-Dichloroethane	< DL(U)	2.0	Toluene	5.9	5.0
2,2-Dichloropropane	< DL(U)	2.0	trans-1,3-Dichloropropene	< DL(U)	2.0
cis-1,2-Dichloroethene	< DL(U)	50.0	1,1,2-Trichloroethane	< DL(U)	2.0
Methyl ethyl ketone	< DL(U)	20.0	Tetrachloroethene	< DL(U)	35.0
Bromochloromethane	< DL(U)	2.0	1,3-Dichloropropane	< DL(U)	2.0
Chloroform	< DL(U)	2.0	Dibromochloromethane	< DL(U)	2.0
1,1,1-Trichloroethane	< DL(U)	20.0	1,2-Dibromoethane	< DL(U)	2.0
1,1-Dichloropropene	< DL(U)	2.0	Ethylbenzene	< DL(U)	2.0

* DL = Detection Limit

EXPRESSLAB PO Box 40 5611 Water Street Middlesex NY 14507

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SPECIALIZING IN ENVIRONMENTAL SOIL TESTS
NEW YORK STATE LABORATORY #11369

LABORATORY REPORT - METHOD 624

Cust OSC
Address 333 GANSON ST
BUFFALO, NY 14203
Attn: RICH CYGAN

Phone 856-3333
FAX 842-1630

PO Number:
Project Number 9705
Project Cust: OSC
Project Site: PRIMOSHIELD-UTICA
Date FAXED:
Lab Director

SAMPLE DEMOGRAPHICS AND TEST RESULTS

Results in bold type; Detection Limits in small print
Detection Limits* = Soil=ug/kg ppb
*See Individual Limit Water=ug/L ppb

Results shown are: Volatile Organic Analytes
Extraction Method: EPA 5030 Purge & Trap
Analysis Method: EPA 8260 GC/MS

Sample ID (LAB)	20976	
Sample ID#1(CUST)	9705-16 & 9705-17	
Sample ID#2(CUST)		
Matrix	WATER	
Sampled By	PATRICK FOOTE	
Date Sampled	09/21/98	10:00
Date Received	09/25/98	09:30
Date Analyzed	09/28/98	
Date Reported	09/29/98	

	Results	Det Limit*		Results	Det Limit*
m&p-Xylene	< DL(U)	4.0	1,2-Dichlorobenzene	< DL(U)	2.0
o-Xylene	< DL(U)	2.0	n-Butylbenzene	< DL(U)	2.0
Styrene	< DL(U)	2.0	1,2-Dibromo-3-chloropropane	< DL(U)	5.0
Isopropylbenzene	< DL(U)	2.0	1,2,4-Trichlorobenzene	< DL(U)	4.0
n-Propylbenzene	< DL(U)	2.0	Hexachlorobutadiene	< DL(U)	2.0
1,3,5-Trimethylbenzene	< DL(U)	2.0	Naphthalene	< DL(U)	10.0
tert-Butylbenzene	< DL(U)	2.0	1,2,3-Trichlorobenzene	< DL(U)	10.0
1,2,4-Trimethylbenzene	< DL(U)	2.0			
sec-Butylbenzene	< DL(U)	2.0			
Chlorobenzene	< DL(U)	2.0			
1,1,1,2-Tetrachloroethane	< DL(U)	2.0			
Bromobenzene	< DL(U)	2.0			
1,2,3-Trichloropropane	< DL(U)	2.0			
2-Chlorotoluene	< DL(U)	2.0			
4-Chlorotoluene	< DL(U)	2.0			
1,3-Dichlorobenzene	< DL(U)	2.0			
4-Isopropyltoluene	< DL(U)	2.0			
1,4-Dichlorobenzene	< DL(U)	2.0			

< DL(U)= analyzed but not detected
L= estimated value
B=analyte found in blank
E=exceed calibration range

* DL = Detection Limit

LOZIER LABORATORIES, INC.

909 CULVER ROAD
ROCHESTER, NEW YORK 14609
TEL (716) 654-6360
FAX (716) 654-6354

NEW YORK STATE
APPROVED
ENVIRONMENTAL LABORATORY
10390

Client: EXPRESSLAB INC.
5611 Water St
Middlesex, NY 14507

Attn: Barbara Catlin

Client Project:

Date Received: 10/9/98
Laboratory No.: 23047
Report Date: 10/20/98

SAMPLE INFORMATION

Sample Date: 10/9/98
Sampler: Client

Matrix:

LABORATORY REPORT

	Lab ID:	23047-1	23047-2			
	Client ID:	9705-17	9705-18			
	Location:	(017)	(018)			
PARAMETER				Units	Method Number	Analysis Date
Cyanide				mg/l	SM 4500	
pH		7.2		S.U.	EPA 150.1	10/9/98
CADMIUM			<0.001	mg/l	EPA 200.7	10/13/98
CHROMIUM			<0.003	mg/l	EPA 200.7	10/13/98
ZINC			0.027	mg/l	EPA 200.7	10/13/98
NICKEL			0.114	mg/l	EPA 200.7	10/13/98
LEAD			<0.003	mg/l	EPA 200.7	10/13/98
COPPER			0.024	mg/l	EPA 200.7	10/13/98

	Lab ID:	23047-3			
	Client ID:	9705-19			
	Location:	(019)			
PARAMETER			Units	Method Number	Analysis Date
Cyanide		<0.010	mg/l	SM 4500	10/14/98

Footnotes:

James R. Lozier

Approved By:

EXPRESSLAB

PO Box 40 5611 Water Street Middlesex NY 14507

Tel: (716) 554-5347 Tel: (800) THE LABS Tel: (800) 843-5227 FAX: (716) 554-4114

SPECIALIZING IN ENVIRONMENTAL SOIL TESTS

NEW YORK STATE LABORATORY #11369

LABORATORY REPORT - METHOD 624

Cust O.S.C.
Address 333 GANSON ST.
BUFFALO, NY 14203
Attn: RICH CYGAN

Phone 856-3333
FAX 842-1630

PO Number:
Project Number 9705
Project Cust: NYSDEC
Project Site: PRIMOSHIELD, UTICA
Date FAXED:
Lab Director

SAMPLE DEMOGRAPHICS AND TEST RESULTS

Results in bold type; Detection Limits in small print
Detection Limits* = Soil=ug/kg ppb
*See Individual Limit Water=ug/L ppb

Results shown are: Volatile Organic Analytes
Extraction Method: EPA 5030 Purge & Trap
Analysis Method: EPA 8260 GC/MS

	21305	
Sample ID (LAB)		
Sample ID#1(CUST)	9705 - 20	
Sample ID#2(CUST)		
Matrix	WATER	
Sampled By	PATRICK FOOTE	
Date Sampled	10/07/98	09:45
Date Received	10/09/98	09:15
Date Analyzed	10/12/98	
Date Reported	10/13/98	

	Results	Det Limit*
m&p-Xylene	< DL(U)	8.0
o-Xylene	< DL(U)	4.0
Styrene	< DL(U)	4.0
Isopropylbenzene	< DL(U)	4.0
n-Propylbenzene	< DL(U)	4.0
1,3,5-Trimethylbenzene	< DL(U)	4.0
tert-Butylbenzene	< DL(U)	4.0
1,2,4-Trimethylbenzene	< DL(U)	4.0
sec-Butylbenzene	< DL(U)	4.0
Chlorobenzene	< DL(U)	4.0
1,1,1,2-Tetrachloroethane	< DL(U)	4.0
Bromobenzene	< DL(U)	4.0
1,2,3-Trichloropropane	< DL(U)	4.0
2-Chlorotoluene	< DL(U)	4.0
4-Chlorotoluene	< DL(U)	4.0
1,3-Dichlorobenzene	< DL(U)	4.0
4-Isopropyltoluene	< DL(U)	4.0
1,4-Dichlorobenzene	< DL(U)	4.0

	Results	Det Limit*
1,2-Dichlorobenzene	< DL(U)	4.0
n-Butylbenzene	< DL(U)	4.0
1,2-Dibromo-3-chloropropane	< DL(U)	10.0
1,2,4-Trichlorobenzene	< DL(U)	8.0
Hexachlorobutadiene	< DL(U)	4.0
Naphthalene	< DL(U)	20.0
1,2,3-Trichlorobenzene	< DL(U)	20.0

< DL(U)= analyzed but not detected
L= estimated value
B=analyte found in blank
E=exceed calibration range

* DL = Detection Limit

Lozier Analytical Group

☐ Lozier Laboratories, Inc. #10390 — 888 - 841 - 5227
☐ EXPRESSLAB, Inc. #11369 — 800 - 843 - 5227
☐ Environmental Testing Facilities, Inc. #10312 — 800 - 843 - 5220

Client: EXPRESSLAB INC.
5611 Water St
Middlesex, NY 14507

Attn: Barbara Catlin

Client Project:

Date Received: 10/26/98
Laboratory No.: 23285
Report Date: 10/29/98

SAMPLE INFORMATION

Sample Date: 10/20/98
Sampler: Client

Matrix:

LABORATORY REPORT

PARAMETER	Lab ID: 23285--1 / Client ID: 9705-21 / Location: 021	23285--2 / 9705-22 / 022	Units	Method Number	Analysis Date
Ph	7.34		S.U.	EPA 150.1	10/27/98
Cadmium		<0.001	mg/l	EPA 200.7	10/27/98
Chromium		<0.003	mg/l	EPA 200.7	10/27/98
Lead		0.004	mg/l	EPA 200.7	10/27/98
Nickel		0.158	mg/l	EPA 200.7	10/27/98
Copper		0.012	mg/l	EPA 200.7	10/27/98
Zinc		0.028	mg/l	EPA 200.7	10/27/98

PARAMETER	Lab ID: 23285--3 / Client ID: 9705-23 / Location: 023	Units	Method Number	Analysis Date
Total Cyanide	< 0.01	mg/l	SM 4500	10/27/98

NYSDOH LAB ID # 10390

Approved By: James A. Lozier

EXPRESSLAB PO Box 40 5611 Water Street Middlesex NY 14507

Tel: (716) 554-3347 Tel: (800) THE LABS Tel: (800) 843-5227 FAX: (716) 554-4114

SPECIALIZING IN ENVIRONMENTAL SOIL TESTS

NEW YORK STATE LABORATORY #11369

LABORATORY REPORT - METHOD 624

Cust OSC
Address 333 GANSON ST.
BUFFALO, NY 14203
Attn: RICH CYGAN

Phone 856-3333
FAX 842-1630

PO Number: 9705
Project Number:
Project Cust: NYSDEC
Project Site: PRIMOSHIELD, UTICA
Date FAXED:
Lab Director

SAMPLE DEMOGRAPHICS AND TEST RESULTS

Results in bold type; Detection Limits in small print
Detection Limits* =
*See Individual Limit
Soil=ug/kg ppb
Water=ug/L ppb

Results shown are: Volatile Organic Analytes
Extraction Method: EPA 5030 Purge & Trap
Analysis Method: EPA 8260 GC/MS

Sample ID (LAB)	21808	
Sample ID#1(CUST)	9705 - 24	
Sample ID#2(CUST)		
Matrix	WATER	
Sampled By	PATRICK FOOTE	
Date Sampled	10/20/98	04:15
Date Received	10/26/98	10:10
Date Analyzed	10/26/98	
Date Reported	10/27/98	

	Results	Det Limit*		Results	Det Limit*
Dichlorodifluoromethane	< DL(U)	2.0	Carbon Tetrachloride	< DL(U)	2.0
Vinyl Chloride	< DL(U)	2.0	1,2-Dichloroethane	< DL(U)	2.0
Chloromethane	< DL(U)	8.0	Trichloroethene	< DL(U)	8.0
Bromomethane	< DL(U)	6.0	1,2-Dichloropropane	< DL(U)	2.0
Chloroethane	< DL(U)	5.0	Dibromomethane	< DL(U)	2.0
Trichlorofluoromethane	< DL(U)	2.0	Bromoform	< DL(U)	10.0
1,1-Dichloroethene	< DL(U)	2.0	Bromodichloromethane	< DL(U)	8.0
Methylene Chloride	< DL(U)	18.0	1,1,2,2-Tetrachloroethane	< DL(U)	10.0
trans-1,2-Dichloroethene	< DL(U)	2.0	Benzene	< DL(U)	4.0
Methyl-tert-butyl ether	< DL(U)	8.0	cis-1,3-Dichloropropene	< DL(U)	2.0
1,1-Dichloroethane	< DL(U)	2.0	Toluene	< DL(U)	5.0
2,2-Dichloropropane	< DL(U)	8.0	trans-1,3-Dichloropropene	< DL(U)	2.0
cis-1,2-Dichloroethene	< DL(U)	2.0	1,1,2-Trichloroethane	< DL(U)	8.0
Methyl ethyl ketone	< DL(U)	40.0	Tetrachloroethene	< DL(U)	2.0
Bromochloromethane	< DL(U)	2.0	1,3-Dichloropropane	< DL(U)	2.0
Chloroform	< DL(U)	2.0	Dibromochloromethane	< DL(U)	8.0
1,1,1-Trichloroethane	< DL(U)	2.0	1,2-Dibromoethane	< DL(U)	8.0
1,1-Dichloropropene	< DL(U)	2.0	Ethylbenzene	< DL(U)	2.0

* DL = Detection Limit

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SPECIALIZING IN ENVIRONMENTAL SOIL TESTS

NEW YORK STATE LABORATORY #11369

LABORATORY REPORT - METHOD 624

Cust OSC
Address 333 GANSON ST.
BUFFALO, NY 14203
Attn: RICH CYGAN

Phone 856-3333
FAX 842-1630

PO Number: 9705
Project Number:
Project Cust: NYSDEC
Project Site: PRIMOSHIELD, UTICA
Date FAXED:
Lab Director

SAMPLE DEMOGRAPHICS AND TEST RESULTS

Results in bold type; Detection Limits in small print
Detection Limits* = Soil=ug/kg ppb
*See Individual Limit Water=ug/L ppb

Results shown are: Volatile Organic Analytes
Extraction Method: EPA 5030 Purge & Trap
Analysis Method: EPA 8260 GC/MS

	21808	
Sample ID (LAB)		
Sample ID#1(CUST)	9705 - 24	
Sample ID#2(CUST)		
Matrix	WATER	
Sampled By	PATRICK FOOTE	
Date Sampled	10/20/98	04:15
Date Received	10/26/98	10:10
Date Analyzed	10/26/98	
Date Reported	10/27/98	

	Results	Det Limit*
m&p-Xylene	< DL(U)	4.0
o-Xylene	< DL(U)	2.0
Styrene	< DL(U)	2.0
Isopropylbenzene	< DL(U)	2.0
n-Propylbenzene	< DL(U)	2.0
1,3,5-Trimethylbenzene	< DL(U)	2.0
tert-Butylbenzene	< DL(U)	2.0
1,2,4-Trimethylbenzene	< DL(U)	2.0
sec-Butylbenzene	< DL(U)	2.0
Chlorobenzene	< DL(U)	2.0
1,1,1,2-Tetrachloroethane	< DL(U)	6.0
Bromobenzene	< DL(U)	2.0
1,2,3-Trichloropropane	< DL(U)	2.0
2-Chlorotoluene	< DL(U)	2.0
4-Chlorotoluene	< DL(U)	2.0
1,3-Dichlorobenzene	< DL(U)	2.0
4-Isopropyltoluene	< DL(U)	2.0
1,4-Dichlorobenzene	< DL(U)	2.0

	Results	Det Limit*
1,2-Dichlorobenzene	< DL(U)	2.0
n-Butylbenzene	< DL(U)	2.0
1,2-Dibromo-3-chloropropane	< DL(U)	10.0
1,2,4-Trichlorobenzene	< DL(U)	4.0
Hexachlorobutadiene	< DL(U)	2.0
Naphthalene	< DL(U)	10.0
1,2,3-Trichlorobenzene	< DL(U)	10.0

< DL(U)= analyzed but not detected
L= estimated value
B=analyte found in blank
E=exceed calibration range

* DL = Detection Limit

EXPRESSLAB

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SPECIALIZING IN ENVIRONMENTAL SOIL TESTS

NEW YORK STATE LABORATORY #11369

LABORATORY REPORT - METHOD 8260

Cust O.S.C.
Address 333 GANSON ST.
BUFFALO, NY 14203
Attn: RICHARD CYGAN

Phone 856-3333
FAX 842-1630

PO Number: 9705
Project Number:
Project Cust: NYS DEC
Project Site: PRIMOSHIELD
Date FAXED:
Lab Director

SAMPLE DEMOGRAPHICS AND TEST RESULTS

Results in bold type; Detection Limits in small print

Detection Limits* = Soil=ug/kg ppb
*See Individual Limit Water=ug/L ppb

Results shown are: Volatile Organic Analytes
Extraction Method: EPA 5030 Purge & Trap
Analysis Method: EPA 8260 GC/MS

Sample ID (LAB)	22144
Sample ID#1(CUST)	9705 - 25
Sample ID#2(CUST)	
Matrix	WATER
Sampled By	KEITH OLIVER
Date Sampled	11/05/98 01:15
Date Received	11/10/98 09:20
Date Analyzed	11/10/98
Date Reported	11/11/98

	Results	Det Limit*
Dichlorodifluoromethane	< DL(U)	2.0
Vinyl Chloride	< DL(U)	2.0
Chloromethane	< DL(U)	8.0
Bromomethane	< DL(U)	6.0
Chloroethane	< DL(U)	5.0
Trichlorofluoromethane	< DL(U)	2.0
1,1-Dichloroethene	< DL(U)	2.0
Methylene Chloride	< DL(U)	18.0
trans-1,2-Dichloroethene	< DL(U)	2.0
Methyl-tert-butyl ether	< DL(U)	8.0
1,1-Dichloroethane	< DL(U)	2.0
2,2-Dichloropropane	< DL(U)	8.0
cis-1,2-Dichloroethene	< DL(U)	2.0
Methyl ethyl ketone	< DL(U)	40.0
Bromochloromethane	< DL(U)	2.0
Chloroform	< DL(U)	2.0
1,1,1-Trichloroethane	< DL(U)	2.0
1,1-Dichloropropene	< DL(U)	2.0

	Results	Det Limit*
Carbon Tetrachloride	< DL(U)	2.0
1,2-Dichloroethane	< DL(U)	2.0
Trichloroethene	< DL(U)	8.0
1,2-Dichloropropane	< DL(U)	2.0
Dibromomethane	< DL(U)	2.0
Bromoform	< DL(U)	10.0
Bromodichloromethane	< DL(U)	8.0
1,1,2,2-Tetrachloroethane	< DL(U)	10.0
Benzene	< DL(U)	4.0
cis-1,3-Dichloropropene	< DL(U)	2.0
Toluene	< DL(U)	5.0
trans-1,3-Dichloropropene	< DL(U)	2.0
1,1,2-Trichloroethane	< DL(U)	8.0
Tetrachloroethene	< DL(U)	2.0
1,3-Dichloropropane	< DL(U)	2.0
Dibromochloromethane	< DL(U)	8.0
1,2-Dibromoethane	< DL(U)	8.0
Ethylbenzene	< DL(U)	2.0

* DL = Detection Limit

EXPRESSLAB

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SPECIALIZING IN ENVIRONMENTAL SOIL TESTS

NEW YORK STATE LABORATORY #11369

LABORATORY REPORT - METHOD 8260

Cust O.S.C.
Address 333 GANSON ST.
BUFFALO, NY 14203
Attn: RICHARD CYGAN

Phone 856-3333
FAX 842-1630

PO Number: 9705
Project Number:
Project Cust: NYS DEC
Project Site: PRIMOSHIELD
Date FAXED:
Lab Director

SAMPLE DEMOGRAPHICS AND TEST RESULTS

Results in bold type; Detection Limits in small print
Detection Limits* = Soil=ug/kg ppb
*See Individual Limit Water=ug/L ppb

Results shown are: Volatile Organic Analytes
Extraction Method: EPA 5030 Purge & Trap
Analysis Method: EPA 8260 GC/MS

Sample ID (LAB)	22144
Sample ID#1(CUST)	9705 - 25
Sample ID#2(CUST)	
Matrix	WATER
Sampled By	KEITH OLIVER
Date Sampled	11/05/98 01:15
Date Received	11/10/98 09:20
Date Analyzed	11/10/98
Date Reported	11/11/98

	Results	Det Limit*
m&p-Xylene	< DL(U)	4.0
o-Xylene	< DL(U)	2.0
Styrene	< DL(U)	2.0
Isopropylbenzene	< DL(U)	2.0
n-Propylbenzene	< DL(U)	2.0
1,3,5-Trimethylbenzene	< DL(U)	2.0
tert-Butylbenzene	< DL(U)	2.0
1,2,4-Trimethylbenzene	< DL(U)	2.0
sec-Butylbenzene	< DL(U)	2.0
Chlorobenzene	< DL(U)	2.0
1,1,1,2-Tetrachloroethane	< DL(U)	6.0
Bromobenzene	< DL(U)	2.0
1,2,3-Trichloropropane	< DL(U)	2.0
2-Chlorotoluene	< DL(U)	2.0
4-Chlorotoluene	< DL(U)	2.0
1,3-Dichlorobenzene	< DL(U)	2.0
4-Isopropyltoluene	< DL(U)	2.0
1,4-Dichlorobenzene	< DL(U)	2.0

	Results	Det Limit*
1,2-Dichlorobenzene	< DL(U)	2.0
n-Butylbenzene	< DL(U)	2.0
1,2-Dibromo-3-chloropropane	< DL(U)	10.0
1,2,4-Trichlorobenzene	< DL(U)	4.0
Hexachlorobutadiene	< DL(U)	2.0
Naphthalene	< DL(U)	10.0
1,2,3-Trichlorobenzene	< DL(U)	10.0

< DL(U)= analyzed but not detected
L= estimated value
B=analyte found in blank
E=exceed calibration range

* DL = Detection Limit

LOZIER LABORATORIES, INC.

909 CULVER ROAD
ROCHESTER, NEW YORK 14609
TEL (716) 654-6360
FAX (716) 654-6364

NEW YORK STATE
APPROVED
ENVIRONMENTAL LABORATORY
10390

Client: EXPRESSLAB INC.
5611 Water St
Middlesex, NY 14507

Date Received: 11/10/98
Laboratory No.: 1181
Report Date: 11/12/98

Attn: Barbara Coffin

Client Project: 0

SAMPLE INFORMATION

Sample Date: 11/5/98
Sampler: Client

Matrix:

LABORATORY REPORT

Lab ID: 1181-1
Client ID: 22145
Location: 026 A

PARAMETER		Units	Method Number	Analysis Date
Cyanide	0.03	mg/l	SM 4500	11/11/98
Ph	7.65	SU	EPA 150.1	11/10/98
Cadmium	0.002	mg/l	EPA 200.7	11/11/98
Lead	0.012	mg/l	EPA 200.7	11/11/98
Nickel	0.202	mg/l	EPA 200.7	11/11/98
Chromium	0.004	mg/l	EPA 200.7	11/11/98
Zinc	0.084	mg/l	EPA 200.7	11/11/98

Lab ID:
Client ID:
Location:

PARAMETER		Units	Method Number	Analysis Date

NYSDOH LAB ID # 10390

Approved By: James A. Lozier

EXPRESSLAB

PO Box 40 5611 Water Street Middlesex NY 14507

Tel: (716) 554-5347 Tel: (800) THE LABS Tel: (800) 843-5227 FAX: (716) 554-4114

SPECIALIZING IN ENVIRONMENTAL SOIL TESTS

NEW YORK STATE LABORATORY #11369

LABORATORY REPORT - METHOD 624

Cust O.S.C.
Address 333 GANSON ST.
BUFFALO, NY 14203
Attn: RICHARD CYGAN

Phone 856-3333
FAX 842-1630

PO Number: 9705
Project Number:
Project Cust: NYS DEC
Project Site: PRIMOSHIELD
Date FAXED: DEC - 9 1998
Lab Director

SAMPLE DEMOGRAPHICS AND TEST RESULTS

Results in bold type; Detection Limits in small print
Detection Limits* = Soil=ug/kg ppb
*See Individual Limit Water=ug/L ppb

Results shown are: Volatile Organic Analytes
Extraction Method: EPA 5030 Purge & Trap
Analysis Method: EPA 8260 GC/MS

	22562	
Sample ID (LAB)		
Sample ID#1(CUST)	9705 - 26	
Sample ID#2(CUST)		
Matrix	WATER	
Sampled By	KEITH OLIVER	
Date Sampled	11/20/98	16:30
Date Received	11/25/98	10:50
Date Analyzed	11/30/98	
Date Reported	12/01/98	

026B

	Results	Det Limit*		Results	Det Limit*
Dichlorodifluoromethane	< DL(U)	2.0	Carbon Tetrachloride	< DL(U)	2.0
Vinyl Chloride	< DL(U)	2.0	1,2-Dichloroethane	< DL(U)	2.0
Chloromethane	< DL(U)	8.0	Trichloroethene	< DL(U)	8.0
Bromomethane	< DL(U)	6.0	1,2-Dichloropropane	< DL(U)	2.0
Chloroethane	< DL(U)	5.0	Dibromomethane	< DL(U)	2.0
Trichlorofluoromethane	< DL(U)	2.0	Bromoform	< DL(U)	10.0
1,1-Dichloroethene	< DL(U)	2.0	Bromodichloromethane	< DL(U)	8.0
Methylene Chloride	< DL(U)	18.0	1,1,2,2-Tetrachloroethane	< DL(U)	10.0
trans-1,2-Dichloroethene	< DL(U)	2.0	Benzene	< DL(U)	4.0
Methyl-tert-butyl ether	< DL(U)	8.0	cis-1,3-Dichloropropene	< DL(U)	2.0
1,1-Dichloroethane	< DL(U)	2.0	Toluene	< DL(U)	5.0
2,2-Dichloropropane	< DL(U)	8.0	trans-1,3-Dichloropropene	< DL(U)	2.0
cis-1,2-Dichloroethene	< DL(U)	2.0	1,1,2-Trichloroethane	< DL(U)	8.0
Methyl ethyl ketone	< DL(U)	40.0	Tetrachloroethene	< DL(U)	2.0
Bromochloromethane	< DL(U)	2.0	1,3-Dichloropropane	< DL(U)	2.0
Chloroform	< DL(U)	2.0	Dibromochloromethane	< DL(U)	8.0
1,1,1-Trichloroethane	< DL(U)	2.0	1,2-Dibromoethane	< DL(U)	8.0
1,1-Dichloropropene	< DL(U)	2.0	Ethylbenzene	< DL(U)	2.0

* DL = Detection Limit

EXPRESSLAB

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SPECIALIZING IN ENVIRONMENTAL SOIL TESTS
NEW YORK STATE LABORATORY #11369

LABORATORY REPORT - METHOD 624

Cust O.S.C.
Address 333 GANSON ST.
BUFFALO, NY 14203
Attn: RICHARD CYGAN

Phone 856-3333
FAX 842-1630

PO Number: 9705
Project Number:
Project Cust: NYS DEC
Project Site: PRIMOSHIELD
Date FAXED:
Lab Director

SAMPLE DEMOGRAPHICS AND TEST RESULTS

Results in bold type; Detection Limits in small print
Detection Limits* = Soil=ug/kg ppb
*See Individual Limit Water=ug/L ppb

Results shown are: Volatile Organic Analytes
Extraction Method: EPA 5030 Purge & Trap
Analysis Method: EPA 8260 GC/MS

Sample ID (LAB)	22562	
Sample ID#1(CUST)	9705 - 26	
Sample ID#2(CUST)		
Matrix	WATER	
Sampled By	KEITH OLIVER	
Date Sampled	11/20/98	16:30
Date Received	11/25/98	10:50
Date Analyzed	11/30/98	
Date Reported	12/01/98	

026 B

	Results	Det Limit*
m&p-Xylene	< DL(U)	4.0
o-Xylene	< DL(U)	2.0
Styrene	< DL(U)	2.0
Isopropylbenzene	< DL(U)	2.0
n-Propylbenzene	< DL(U)	2.0
1,3,5-Trimethylbenzene	< DL(U)	2.0
tert-Butylbenzene	< DL(U)	2.0
1,2,4-Trimethylbenzene	< DL(U)	2.0
sec-Butylbenzene	< DL(U)	2.0
Chlorobenzene	< DL(U)	2.0
1,1,1,2-Tetrachloroethane	< DL(U)	6.0
Bromobenzene	< DL(U)	2.0
1,2,3-Trichloropropane	< DL(U)	2.0
2-Chlorotoluene	< DL(U)	2.0
4-Chlorotoluene	< DL(U)	2.0
1,3-Dichlorobenzene	< DL(U)	2.0
4-Isopropyltoluene	< DL(U)	2.0
1,4-Dichlorobenzene	< DL(U)	2.0

	Results	Det Limit*
1,2-Dichlorobenzene	< DL(U)	2.0
n-Butylbenzene	< DL(U)	2.0
1,2-Dibromo-3-chloropropane	< DL(U)	10.0
1,2,4-Trichlorobenzene	< DL(U)	4.0
Hexachlorobutadiene	< DL(U)	2.0
Naphthalene	< DL(U)	10.0
1,2,3-Trichlorobenzene	< DL(U)	10.0

< DL(U)= analyzed but not detected
L= estimated value
B=analyte found in blank
E=exceed calibration range

* DL = Detection Limit

LOZIER LABORATORIES, INC.

909 CULVER ROAD
ROCHESTER, NEW YORK 14609
TEL (716) 654-8350
FAX (716) 654-8354

NEW YORK STATE
APPROVED
ENVIRONMENTAL LABORATORY
10390

Client: EXPRESSLAB INC.
5611 Water St
Middlesex, NY 14507

Attn: Barbara Catlin

Client Project:

Date Received: 11/25/98
Laboratory No.: 1411
Report Date: 12/1/98

SAMPLE INFORMATION

Sample Date: 11/25/98
Sampler: Client

Matrix:

LABORATORY REPORT

Lab ID: 1411-1
Client ID: 22563
Location: 027 A

PARAMETER		Units	Method Number	Analysis Date
Total Cyanide	0.03	mg/l	SM 4500	11/30/98
pH	7.09	S.U.	EPA 150.1	11/25/98
Chromium	0.006	mg/l	EPA 200.7	11/30/98
Cadmium	<0.001	mg/l	EPA 200.7	11/30/98
Lead	0.014	mg/l	EPA 200.7	11/30/98
Nickel	0.195	mg/l	EPA 200.7	11/30/98
Zinc	0.072	mg/l	EPA 200.7	11/30/98

Lab ID:
Client ID:
Location:

PARAMETER		Units	Method Number	Analysis Date

James R. Lozier

NYSDOH LAB ID # 10390

Approved By: _____

LOZIER LABORATORIES, INC.

909 CULVER ROAD
ROCHESTER, NEW YORK 14609
TEL (716) 654-6360
FAX (716) 654-8364

NEW YORK STATE
APPROVED
ENVIRONMENTAL LABORATORY
10390

Client: EXPRESSLAB INC.
5611 Water St
Middlesex, NY 14507

Attn: Barbara Catlin

Client Project:

Date Received: 12/4/98
Laboratory No.: 1515
Report Date: 12/10/98

SAMPLE INFORMATION

Sample Date: 12/2/98
Sampler: Client

Matrix:

LABORATORY REPORT

PARAMETER	Lab ID: 1515-1 Client ID: 22744 Location: 027 B	1515-2 22745 028	Units	Method Number	Analysis Date
Cyanide		<0.010	mg/l	SM 4500	12/9/98
pH	7.22		S.U.	EPA 150.1	12/4/98

PARAMETER	Lab ID: 1515-3 Client ID: 22746 Location: 029	Units	Method Number	Analysis Date
Copper	0.026	mg/l	EPA 200.7	12/7/98
Cadmium	<0.001	mg/l	EPA 200.7	12/7/98
Chromium	<0.003	mg/l	EPA 200.7	12/7/98
Lead	0.005	mg/l	EPA 200.7	12/7/98
Nickel	0.153	mg/l	EPA 200.7	12/7/98
Zinc	0.051	mg/l	EPA 200.7	12/7/98

Footnotes:

Approved By: Jessica A. Lozier

NYSDOH LAB ID # 10390

EXPRESSLAB

PO Box 40 5611 Water Street Middlesex NY 14507

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SPECIALIZING IN ENVIRONMENTAL SOIL TESTS

NEW YORK STATE LABORATORY #11369

LABORATORY REPORT - METHOD 624

Cust O.S.C.
Address 333 GANSON ST.
BUFFALO, NY 14203
Attn: RICHARD CYGAN

Phone 856-3333
FAX 842-1630

DEC 23 1998

PO Number: 9705
Project Number:
Project Cust: NYS DEC
Project Site: PRIMOSHIELD, UTICA
Date FAXED:
Lab Director

SAMPLE DEMOGRAPHICS AND TEST RESULTS

Results in bold type; Detection Limits in small print
Detection Limits* = Soil=ug/kg ppb
*See Individual Limit Water=ug/L ppb

Results shown are: Volatile Organic Analytes
Extraction Method: EPA 5030 Purge & Trap
Analysis Method: EPA 8260 GC/MS

Sample ID (LAB)	22747	
Sample ID#1(CUST)	9705 - 30	
Sample ID#2(CUST)		
Matrix	WATER	
Sampled By	PATRICK FOOTE	
Date Sampled	12/02/98	09:30
Date Received	12/04/98	09:50
Date Analyzed	12/07/98	
Date Reported	12/08/98	

	Results	Det Limit*		Results	Det Limit*
Dichlorodifluoromethane	< DL(U)	2.0	Carbon Tetrachloride	< DL(U)	2.0
Vinyl Chloride	< DL(U)	2.0	1,2-Dichloroethane	< DL(U)	2.0
Chloromethane	< DL(U)	8.0	Trichloroethene	< DL(U)	8.0
Bromomethane	< DL(U)	6.0	1,2-Dichloropropane	< DL(U)	2.0
Chloroethane	< DL(U)	5.0	Dibromomethane	< DL(U)	2.0
Trichlorofluoromethane	< DL(U)	2.0	Bromoform	< DL(U)	10.0
1,1-Dichloroethene	< DL(U)	2.0	Bromodichloromethane	< DL(U)	8.0
Methylene Chloride	< DL(U)	18.0	1,1,2,2-Tetrachloroethane	< DL(U)	10.0
trans-1,2-Dichloroethene	< DL(U)	2.0	Benzene	< DL(U)	4.0
Methyl-tert-butyl ether	< DL(U)	8.0	cis-1,3-Dichloropropene	< DL(U)	2.0
1,1-Dichloroethane	< DL(U)	2.0	Toluene	< DL(U)	5.0
2,2-Dichloropropane	< DL(U)	8.0	trans-1,3-Dichloropropene	< DL(U)	2.0
cis-1,2-Dichloroethene	< DL(U)	2.0	1,1,2-Trichloroethane	< DL(U)	8.0
Methyl ethyl ketone	< DL(U)	40.0	Tetrachloroethene	< DL(U)	2.0
Bromochloromethane	< DL(U)	2.0	1,3-Dichloropropane	< DL(U)	2.0
Chloroform	< DL(U)	2.0	Dibromochloromethane	< DL(U)	8.0
1,1,1-Trichloroethane	< DL(U)	2.0	1,2-Dibromoethane	< DL(U)	8.0
1,1-Dichloropropene	< DL(U)	2.0	Ethylbenzene	< DL(U)	2.0

* DL = Detection Limit

EXPRESSLAB

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SPECIALIZING IN ENVIRONMENTAL SOIL TESTS

NEW YORK STATE LABORATORY #11369

LABORATORY REPORT - METHOD 624

Cust O.S.C.
Address 333 GANSON ST.
BUFFALO, NY 14203
Attn: RICHARD CYGAN

Phone 856-3333
FAX 842-1630

PO Number: 9705
Project Number:
Project Cust: NYS DEC
Project Site: PRIMOSHIELD, UTICA
Date FAXED:
Lab Director

SAMPLE DEMOGRAPHICS AND TEST RESULTS

Results in bold type; Detection Limits in small print
Detection Limits* = Soil=ug/kg ppb
*See Individual Limit Water=ug/L ppb

Results shown are: Volatile Organic Analytes
Extraction Method: EPA 5030 Purge & Trap
Analysis Method: EPA 8260 GC/MS

	22747	
Sample ID (LAB)		
Sample ID#1(CUST)	9705 - 30	
Sample ID#2(CUST)		
Matrix	WATER	
Sampled By	PATRICK FOOTE	
Date Sampled	12/02/98	09:30
Date Received	12/04/98	09:50
Date Analyzed	12/07/98	
Date Reported	12/08/98	

	Results	Det Limit*
m&p-Xylene	< DL(U)	4.0
o-Xylene	< DL(U)	2.0
Styrene	< DL(U)	2.0
Isopropylbenzene	< DL(U)	2.0
n-Propylbenzene	< DL(U)	2.0
1,3,5-Trimethylbenzene	< DL(U)	2.0
tert-Butylbenzene	< DL(U)	2.0
1,2,4-Trimethylbenzene	< DL(U)	2.0
sec-Butylbenzene	< DL(U)	2.0
Chlorobenzene	< DL(U)	2.0
1,1,1,2-Tetrachloroethane	< DL(U)	6.0
Bromobenzene	< DL(U)	2.0
1,2,3-Trichloropropane	< DL(U)	2.0
2-Chlorotoluene	< DL(U)	2.0
4-Chlorotoluene	< DL(U)	2.0
1,3-Dichlorobenzene	< DL(U)	2.0
4-Isopropyltoluene	< DL(U)	2.0
1,4-Dichlorobenzene	< DL(U)	2.0

	Results	Det Limit*
1,2-Dichlorobenzene	< DL(U)	2.0
n-Butylbenzene	< DL(U)	2.0
1,2-Dibromo-3-chloropropane	< DL(U)	10.0
1,2,4-Trichlorobenzene	< DL(U)	4.0
Hexachlorobutadiene	< DL(U)	2.0
Naphtbalene	< DL(U)	10.0
1,2,3-Trichlorobenzene	< DL(U)	10.0

< DL(U)= analyzed but not detected
L= estimated value
B=analyte found in blank
E=exceed calibration range

* DL = Detection Limit

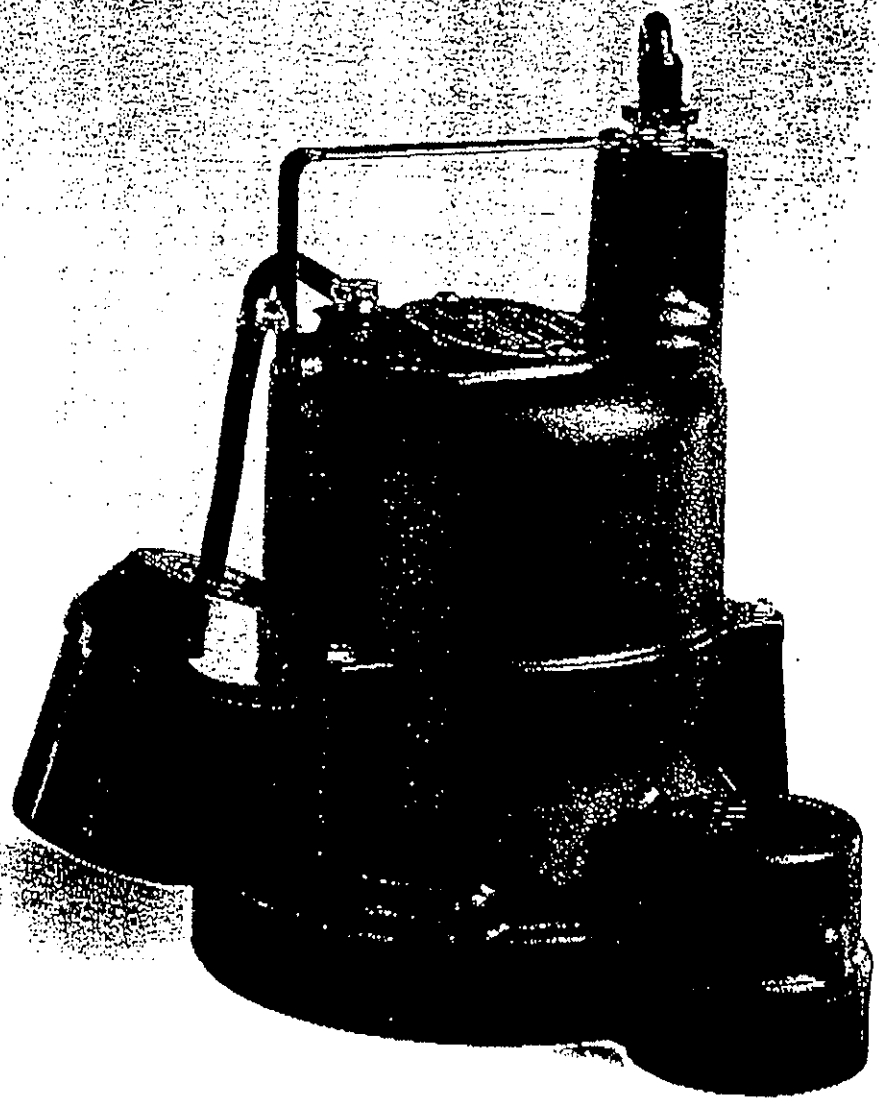
APPENDIX G

GROUNDWATER TREATMENT SYSTEM
PRODUCT INFORMATION

HYDROMATIC SW25/33

Submersible Sump/Effluent Pump

- Basement Sumps
- Septic Tank Effluent
- Industrial Circulators
- Transfer Tanks



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GS



SW25/33 SUBMERSIBLE SUMP/EFFLUENT PUMP

The Hydromatic SW25/33 submersible pump is specifically designed to meet the demands of residential sump and septic tank effluent applications. The 1-1/2 inch NPT discharge pump is available with either a 1/4 or 1/3 horsepower, energy-efficient motor, in both automatic and manual configurations; and can handle capacities up to 47 gallons per minute and heads to 26 feet.

The SW25/33 features a heavy-duty cast iron construction that provides the durability for a long service life, as well as assisting in dissipating heat from the motor, for cooler operation. The pump's anti-clog, vortex-design impeller is made from a tough non-corrosive, thermoplastic material, which is capable of providing long, trouble-free service even in demanding applications.

The SW25/33's oil-filled motor provides superior cooling characteristics, allowing the motor to run cool and quiet in extended service. This oil-filled design also provides permanent lubrication of the shaft bearings, minimizing maintenance and extending the service life of the pump. In addition, to protect against overheating, the motor windings contain an automatic reset thermal overload.

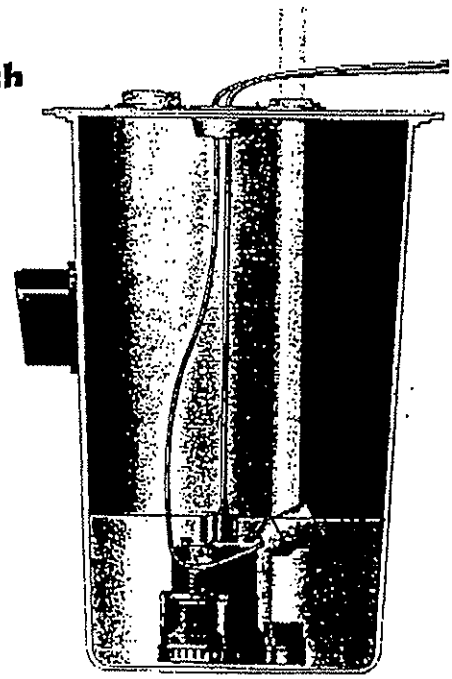
Automatic models feature an easily adjustable, wide-angle float switch incorporating a unique piggyback plug arrangement. This plug allows for simple conversion to manual operation by simply removing the switch plug and inserting the motor plug directly into the electrical outlet. This feature provides an easy way of periodically cycling the pump to ensure it is operating properly.

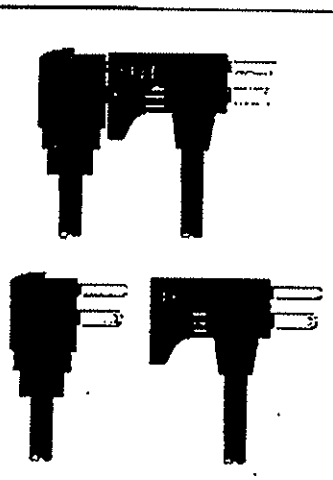
SW25/33 TYPICAL INSTALLATION

Wide-angle Piggyback Float Switch

The SW25/33 uses a tilt-sensitive wide-angle float switch, which is hermetically sealed inside a non-corrosive polypropylene float. As liquid level rises, float changes angle until the switch makes circuit. The switch is not sensitive to rotation (no "up" side), which simplifies installation. Its reliability is proven to 500,000 cycles.

The wide-angle system operates between 115 and 125 degrees. Drawdown range is 6 to 14 inches, variable with length tethered to pump (5 inch maximum); and can be adjusted in seconds. Pumping differentials up to 35 inches can be obtained when the float is tethered to the discharge pipe. For maximum pump life, adjust tether length for deepest drawdown.

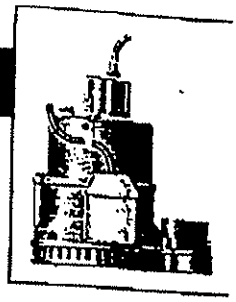




Piggyback Switch Plug

The Hydromatic wide-angle float switch features a unique piggyback, plug arrangement. The pump power cord plugs into the back of the switch plug to provide automatic operation. To operate the pump manually, simply plug the pump power cord directly into the electrical outlet, bypassing the switch plug. The piggyback plug provides ease of service and allows the pump to be cycled manually on a periodic basis to ensure proper operation.

FEATURES/BENEFITS



The SW25/33 is a completely submersible pump for use in basement sump or septic tank effluent applications; and is available in automatic or manual configurations.

Automatic models feature a wide-angle float switch with piggyback plug-in arrangement. Switch is adjustable, easy to service and allows for simple conversion to manual operation.

Water-resistant power cord with molded plug is available in 10 or 20 foot lengths, and is easily field serviceable.

Oil-filled motor provides superior cooling and permanent lubrication of bearings minimizing maintenance and extending service life.

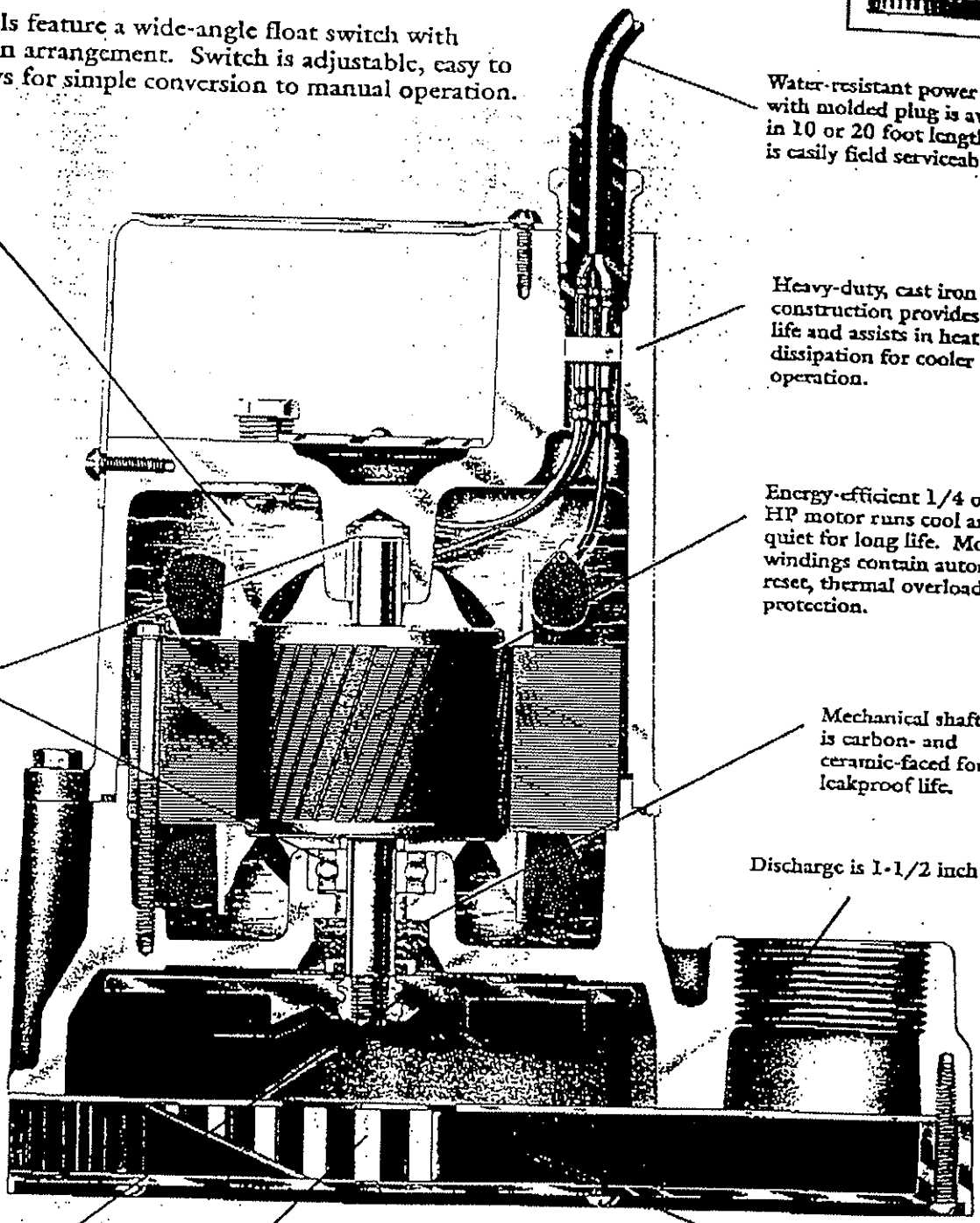
Heavy-duty, cast iron construction provides long life and assists in heat dissipation for cooler motor operation.

Energy-efficient 1/4 or 1/3 HP motor runs cool and quiet for long life. Motor windings contain automatic reset, thermal overload protection.

Lower ball and upper bronze-sleeve bearings support motor shaft, minimizing the effects of impeller thrust loads. This design results in minimum friction and perfect alignment of rotor, for longer service from pump.

Mechanical shaft seal is carbon- and ceramic-faced for long leakproof life.

Discharge is 1-1/2 inch NPT



The anti-clog, vortex-design impeller creates whirlpool pumping action to effectively remove solids-laden wastewater from sump. The impeller is made from a tough, thermoplastic material to prevent corrosion, withstand abrasion and provide long, trouble-free life.

Multiple strainer inlets prevent foreign objects from clogging pump — providing optimum operation and reduced maintenance.

Bottom-suction design alleviates build-up of debris providing optimum pump performance and reduced maintenance.



ENGINEERING DETAILS - SW25/33

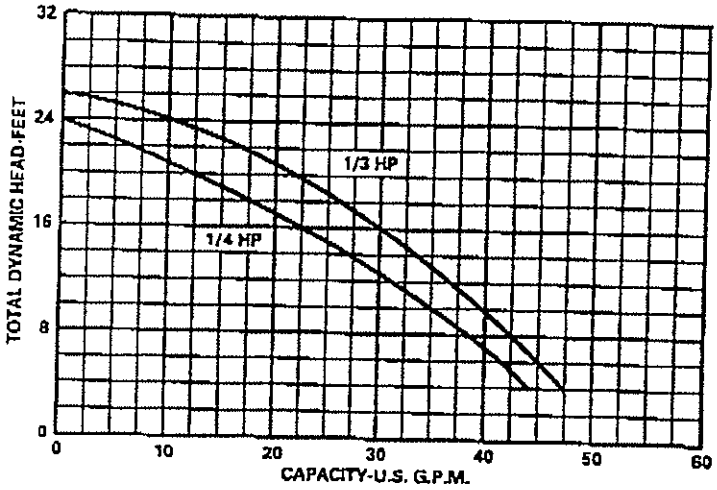
Pump Characteristics

Pump/Motor Unit	Submersible	
Manual Models	SW25M1	~~SW33M1~~
~~Automatic Models~~	~~SW25A1~~	~~SW33A1~~
Horsepower	1/4	1/3
Full Load Amps	8.0	10.0
Motor Type	Shaded Pole (4 pole)	
R.P.M.	1550	
Phase Ø	1	
Voltage	115	
Hertz	60	
Operation	Intermittent	
Temperature	120°F Ambient	
NEMA Design	A	
Insulation	Class A	
Discharge Size	1-1/2" NPT	
Solids Handling	1/2"	
Unit Weight	30 lbs.	
Power Cord	18/3, SJTW, 10' std. (20' optional)	

Materials of Construction

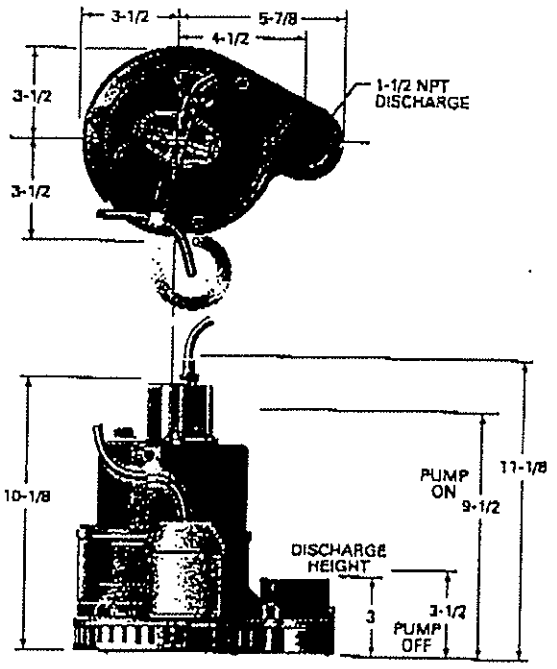
Handle	Steel
Lubricating Oil	Dielectric Oil
Motor Housing	Cast Iron
Pump Casing	Cast Iron
Shaft	Steel
Mechanical Shaft Seal	Seal Faces: Carbon/Ceramic Seal Body: Anodized Steel Spring: Stainless Steel Bellows: Buna-N
Impeller	Thermoplastic
Upper Bearing	Bronze Sleeve Bearing
Lower Bearing	Single Row Ball Bearing
Strainer/Base	Plastic
Fasteners	Stainless Steel

Performance Data



Total Head (feet)		4	6	8	10	12	14	16	18	20	22	24
GPM	1/4 HP	44	41	36	33	29	26	23	18	12	6	0
	1/3 HP	47	45	43	40	37	34	30	26	22	16	10

Dimensional Data



1. All dimensions in inches
2. Component dimensions may vary ± 1/8 inch
3. Not for construction purpose unless certified
4. Dimensions and weights are approximate
5. On/Off level adjustable
6. We reserve the right to make revisions to our products and their specifications without notice

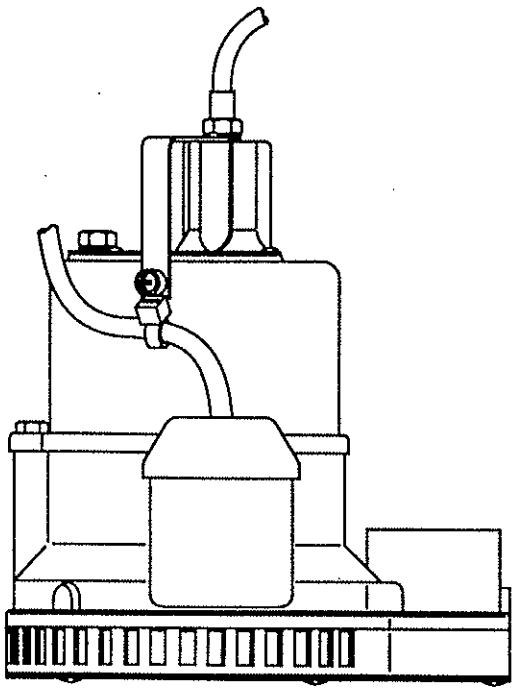
Sump Pump

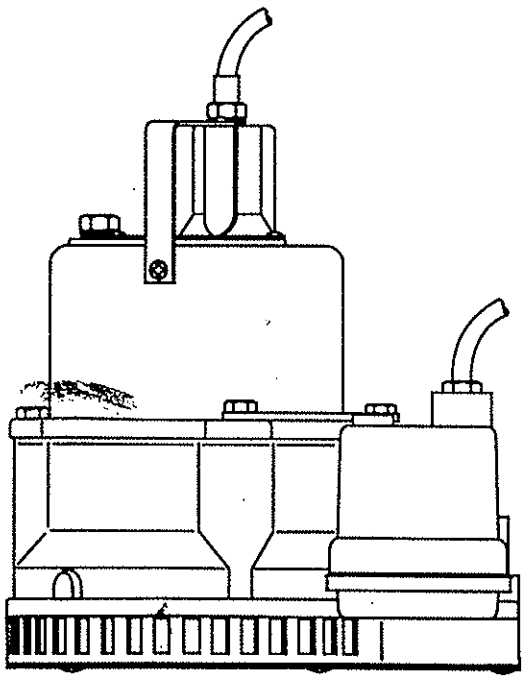
Aurora Pump Model SW25M1

Installation and
Service Manual

HYDROMATIC SW & SD 25/33

Submersible Sump/Effluent Pump





NOTE!
To the installer: Please make sure you provide this manual to the owner of the pumping equipment or to the responsible party who maintains the system.

HYDROMATIC™ PUMPS

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1 Introduction

Warning: Read all instructions before starting any operation on pump. All labels must meet UL standards for warnings.

Before operation, read the following instructions carefully. Reasonable care and safe methods should be practiced. Check local codes and requirements before installation. Servicing should be performed by knowledgeable pump service contractors or authorized service stations.

Always disconnect the pump and controls from its power source before handling or making any adjustments. Always wear rubber boots when there is water on the floor and you must unplug the pump.

Warning: All labels must meet UL standards for warnings. To reduce risk of electrical shock or severe personal injury:

1. This pump has not been investigated for use in swimming pool areas.
2. Connect only to a properly grounded, grounding-type receptacle.
3. Septic tank to be vented in accordance with local plumbing codes.
4. Do not smoke or use sparkable electrical devices or flame in a septic (gaseous) or possible septic sump.
5. A septic sump condition may exist and if entry into sump is necessary, then 1) provide proper safety precautions per OSHA requirements and 2) do not enter sump until these precautions are strictly adhered to.
6. Do not install pump in location classified as hazardous per N.E.C., ANSI/NFPA 70 - 1984.

Failure to heed above cautions could result in injury or death.

2 Installation

These important instructions must be followed for satisfactory performance of your pump. Before installation, check your local electrical and plumbing codes.

1. Provide proper sump.

Minimum Sump Diameter	
SW25A/SW33A	18"
SD25A/SD33A	12"

Approx. Turn-On Level	
SW25A/SW33A	9-1/2"*
SD25A/SD33A	7-7/8"

Approx. Turn-Off Level	
SW25A/SW33A	3-1/2"*
SD25A/SD33A	3-3/8"

2. Make sure float (Model SW25A or SW33A) hangs free. It should not come into contact with side or bottom of sump.
3. Make sure sump is free of string, cloth, nails, gravel, etc. before installing pump.
4. Do not set pump directly on the bottom of sump if it is not solid. Raise the pump by using bricks or concrete blocks underneath it.
5. Use steel or plastic pipe for all connecting lines between pump and sewer outlet.

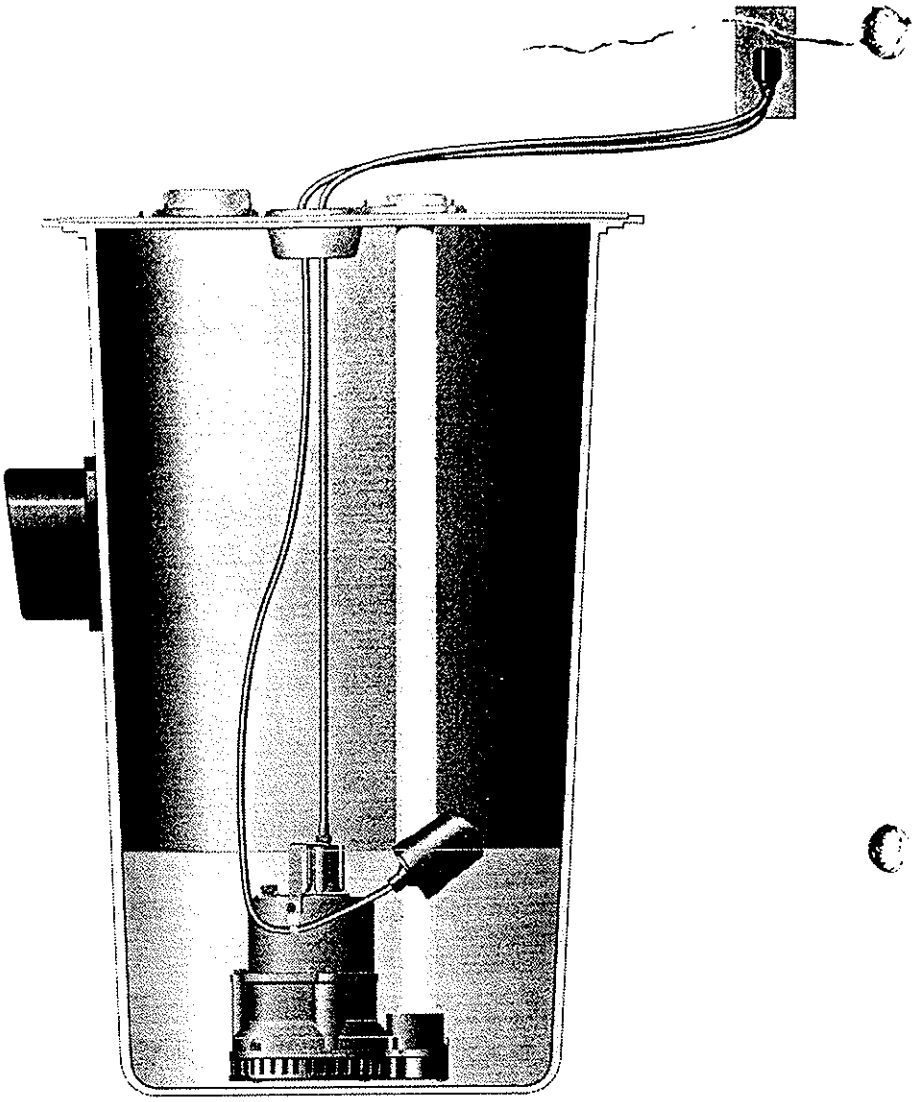
   Note: Some city regulations do not allow installing a pump with plastic pipe. Check local regulations.
6. Hydromatic check valve should be installed in discharge pipe, at least twelve inches above the discharge outlet of the pump.
7. Connect to power source using 3-prong grounded 115 volt AC receptacle. Do not remove ground pin from electrical plug. Do not use an extension cord.
8. For proper automatic operation make sure the pump power cord is plugged into the back of the "piggyback" receptacle on the switch cord.
9. Use pump submerged for pumping waterlike liquids (temperature to 120° F).

   Warning: Risk of Electrical Shock – This pump has not been investigated for use in swimming pool areas.
10. **Caution:** Do not pump flammable liquids, strong chemicals or salt water.
11. In applications where the pump may sit idle for months at a time, it is recommended that the pump(s) be cycled every month to insure pumping system is working properly when needed.

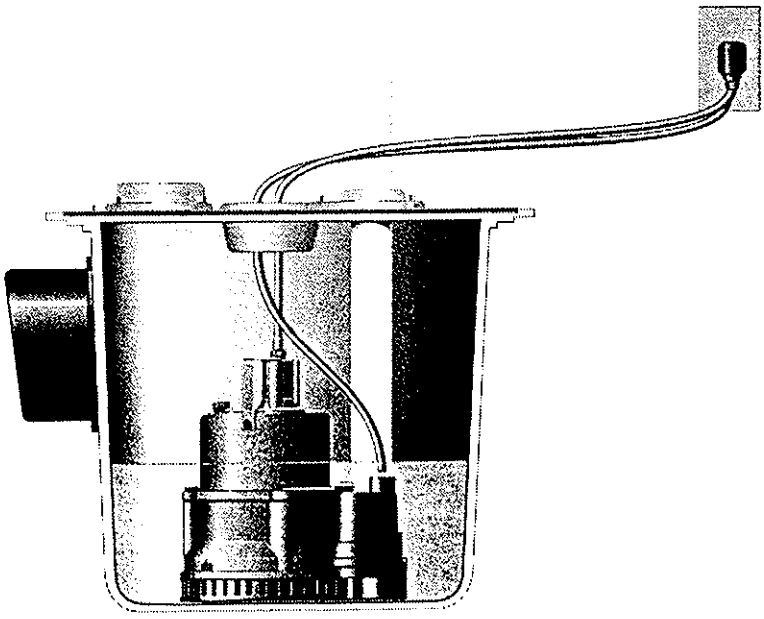
    Note: The Q Alert alarm panel is for indoor use only. For applications and products contact your Hydromatic distributor.
12. An audible alarm system such as the Q Alert for high water conditions should be installed for additional protection against high water conditions.

*Adjustable subject to size limitations of sump pit.

3 Typical Installation



SW25A/SW33A



SD25A/SD33A

4 Service

Servicing should be performed only by knowledgable pump service contractors or authorized service stations.

1. **Warning:** Always disconnect the pump from power source before handling or making any adjustments. Always wear rubber boots when there is water on the floor and you must unplug the pump.

2. Before removing pump from sump for repair, check if the trouble could simply be a blown fuse, tripped circuit breaker, or a power cord not completely inserted into the receptacle.

3. **Note:** Automatic thermal overload protects the sealed-in-oil motor. Running dry will overheat the motor and activate the overload protector until the unit cools.

4. If the unit is being operated by the optional float control or diaphragm switch, unplug the pump from the "piggyback" receptacle and plug the pump directly into the power source. If the pump starts each time it is plugged directly into the receptacle and does not start each time when plugged into the piggyback switch with the float raised up (or the diaphragm switch pressed in) to a start position, replace the complete piggyback switch assembly and retest with new assembly.

5. If pump fails the above two steps, unplug and pull the pump from the sump by the handle. Sandblast, if possible, any dirt or trash from the outside of the pump before proceeding.

6. Check for an obstruction in the impeller cavity by laying the pump on its side and removing the 5 screws (20) to remove the plastic base (18 & 19). If the impeller does not rotate freely, clear the impeller and cavity walls before reassembling the base. Repeat Step 4.

7. **Air Locking:** A sump pump is said to be air locked if air traps in the pump and it cannot get out, thus preventing pump from operation. Hydromatic sump pumps have a small air vent hole in the impeller cavity to let out trapped air. If the hole becomes plugged, pump may air lock. To break the air lock, use a small screwdriver to clear the hole in the impeller cavity. As a secondary precaution in installations of this type – ⅛" hole should be drilled in the discharge pipe below the check valve. The check valve should be 12 to 18 inches above pump discharge. Do not put check valve directly into pump discharge opening.

   Note: In sumps where the pump is operating daily, air locking rarely occurs.

8. If the above tests have not resolved the problem, the problem may be in the electrical components of the pump. Starting with the power cord, inspect for cuts or nicks in the insulation. If the cord is damaged, it must be replaced!

9. Using the ohmmeter, check the resistance of the motor windings by connecting one lead clip to each electric "flat" prong on the power cord plug. The ohmmeter should be on R x 1 setting. Normal reading is as follows:

1/4 HP 115V 1Ø	–	2.1/2.3
1/3 HP 115V 1Ø	–	1.10/1.27

To check for ground, place the ohmmeter on R x 100k, connect one lead clip to the "round" ground prong on the power cord and touch the other lead clip to each "flat" prong individually. If the reading is other than infinity (∞ on the ohmmeter scale), a leakage through stator insulation or moisture in the windings is occuring and the pump must be replaced.



Warning: Before handling these pumps and controls, always disconnect the power first.

Do not smoke or use sparkable electrical devices or flames in a septic (gaseous) or possible septic sump.

Pump does not run or hum.

1. Line circuit breaker may be off, blown or loose.
2. Water level in sump may be too low. Run in more water. Turn on level is 12 to 13 inches above sump bottom.
3. Pump and/or switch cord plug may not be making contact in receptacle.
4. If pump is using the series cord plug, the two plugs may not be plugged tight together.
5. Float may be stuck. Be sure float operates freely in basin.
6. If all symptoms check OK, motor winding may be open; take to service center for check.

Pump runs but does not deliver water.

1. Check valve may be installed backwards. Arrow in valve points in direction of flow.
2. Discharge gate valve, if used, may be closed.
3. Pump may be air locked. Start and stop several times by plugging and unplugging cord. Check vent hole in pump case for plugging.
4. Pump head may be too high. Pump cannot deliver water over 24' (¼ hp.) 26' (⅓ hp.) vertical. Horizontal distance does not affect pumping, except loss due to friction.
5. Inlet in pump base may be clogged. Remove pump and clean out openings.
6. Impeller or volute openings may be plugged or partially plugged. Remove pump and clean per maintenance instructions.

Pump runs and pumps out sump but does not stop.

1. Float is stuck in up position. Be sure float operates freely in basin.

Pump runs but delivers only small amount of water.

1. Pump may be air locked. Start and stop several times by plugging and unplugging cord. Check vent hole in pump case for plugging.
2. Pump head may be too high. Pump cannot deliver water over 24' (¼ hp.) 26' (⅓ hp.) vertical. Horizontal distance does not affect pumping, except loss due to friction.
3. Inlet in pump base may be clogged. Remove pump and clean out openings.
4. Impeller or volute openings may be plugged or partially plugged. Remove pump and clean per maintenance instructions.
5. Pump impeller may be partially clogged causing motor to run slow, resulting in motor overload. Clear impeller.

Fuse blows or circuit breaker trips when pump starts.

1. Inlet in pump base may be clogged. Remove pump and clean out openings.
2. Impeller or volute openings may be plugged or partially plugged. Remove pump and clean per maintenance instructions.
3. Pump impeller may be partially clogged causing motor to run slow, resulting in motor overload. Clear impeller.
4. Fuse size or circuit breaker is too small.
5. Defective motor stator: return to Hydromatic service center for verification.

Motor runs for short time then stops. Then after short period starts again. Indicates tripping overload caused by symptom shown.

1. Inlet in pump base may be clogged. Remove pump and clean out openings.
2. Impeller or volute openings may be plugged or partially plugged. Remove pump and clean per maintenance instructions.
3. Pump impeller may be partially clogged causing motor to run slow, resulting in motor overload. Clear impeller.
4. Defective motor stator: return to Hydromatic service center for verification.

Your pump warranty is void...

If... power cord has been cut or spliced.

If... pump has been used to pump mud, cement, tar, abrasives or chemicals.

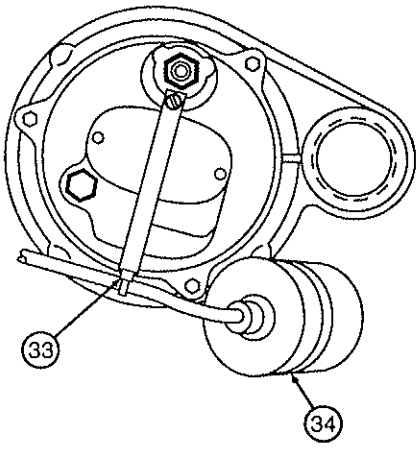
If... pump has been used for pumping of hot water (above 120°F).

If... pump has been dismantled by other than authorized Hydromatic service center or distributor.

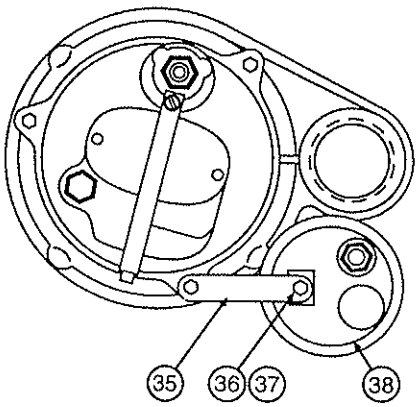
6 Parts List

SW25A/SW33A • SD25A/SD33A • SW25M/SW33M

Ref. No.	Part No.	Description	Qty.
1	13439-000-1	Screw – Machine #10 - 32 3/8"	2
2	–	–	–
3	–	–	–
4	8522-006-3	Handle – Pump	1
5	14077-000-1	Plug – Pipe	1
6	–	–	–
7	–	–	–
9	–	–	–
10	13439-006-1	Screw – Machine #6	1
11	6000-053-1	Wire Ground	1
12	145-024-1	Screw – Hex #8-32 (1/4 HP)	2
12	145-009-1	Screw – Hex #8-32 (1/3 HP)	2
13	176-005-1	Screw – Hex, 1/4 & 20	3
14	5484-001-1	Seal – Shaft (Stationary Seat)	1
15	5484-003-1	Seal – Shaft (Rotating Seat)	1
16	8504-002-2	Case – Volute	1
17	8498-003-1	Impeller	1
18	8520-002-1	Base – Strainer	1
19	8521-001-1	Plate – Bottom (1/4 HP)	1
19	8521-002-1	Plate – Bottom (1/3 HP)	1
20	13439-007-1	Screw – Machine #10 -24 x 1 ¼ self tapping	5
21	–	–	–
22	–	–	–
23	149-001-1	Ring – Seal	1
24	–	–	–
25	12133-001-1	Stator (1/4 HP)	1
25	12136-001-1	Stator (1/3 HP)	1
26	12133-011-1	Rotor (1/4 HP) Shaft & Bearing	1
26	12136-011-5	Rotor (1/3 HP) Shaft & Bearing	1
27	8507-012-5	Housing – Motor	1
29	–	–	–
30	–	–	–
31	13469-100-1	Cord – Power (SD25A1-10', SD33A1-10') SW	1
31	13469-101-1	Cord – Power (SD25A1-20', SD33A1-20') SW	1
32	–	–	–
33	1055-001-1	Tie – Float Cord	1
34	12150-026-7	Float Switch – Wide Angle (10' cord)	1
34	12150-023-7	Float Switch – Wide Angle (20' cord)	1
35	5502-001-1	Bracket	1
36	176-015-1	Screw, 1/4-20 x 3/8	1
37	995-008-1	Lockwasher	1
38	51752-100-7	Switch – Diaphragm (SD25A1-10', SD33A1-10')	1
38	51752-101-7	Switch – Diaphragm (SD25A1-20', SD33A1-20')	1
39	65-024-1	Bearing	1
40	8922-000-1	Spacer	1
41	75-000-1	Cord Nut	1
42	139-013-1	Seal Ring	1



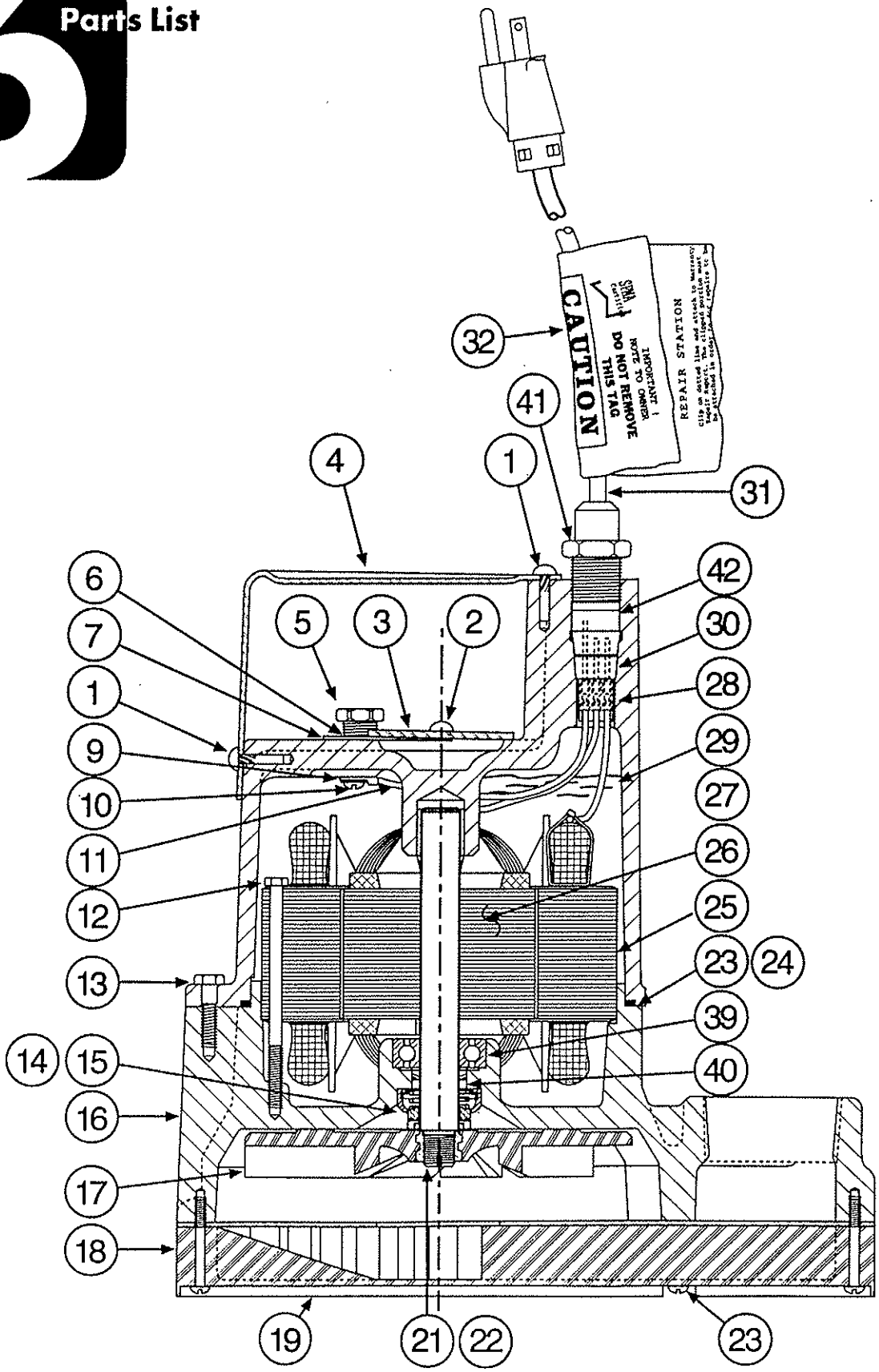
SW25A and SW33A MODELS



SD25A and SD33A MODELS

3/9/95

6 Parts List


CAUTION
DO NOT REMOVE THIS TAG
REPAIR STATION
32
41
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1
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7 Warranty

Hydromatic Pump, a Unit of General Signal, warrants to the original purchaser of each of Hydromatic Pump product(s) that any part thereof which proves to be defective in material or workmanship within one year from date of installation or 18 months from manufacture date, whichever comes first, will be replaced at no charge with a new or remanufactured part, F.O.B. factory. Purchaser shall assume all responsibility and expense for removal, reinstallation and freight. Any item(s) designated as manufactured by others shall be covered only by the express warranty of the manufacturer thereof. This warranty does not apply to damage resulting from accident, alteration, design misuse or abuse.

If the material furnished to the Buyer shall fail to conform to this contract or to any of the terms of this written warranty, Hydromatic Pump shall replace such nonconforming material at the original point of delivery and shall furnish instruction for its disposition. Any transportation charges involved in such disposition shall be for the Buyer's account. The Buyer's exclusive and sole remedy on account or in respect of the furnishing of material that does not conform to this contract, or to this written warranty, shall be to secure replacement thereof as aforesaid. Hydromatic Pump shall not in any event be liable for the cost of any labor expended on any such material or for any incidental or consequential damages to anyone by reason of the fact that such material does not conform to this contract or to this written warranty.

ALL IMPLIED WARRANTIES, INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY AND THE IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO THE SAME EXTENT AS THE EXPRESS WARRANTY CONTAINED HEREIN. Some States do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply.

MANUFACTURER EXPRESSLY DISCLAIMS AND EXCLUDES ANY LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY ARISING IN CONNECTION WITH THIS PRODUCT. INCLUDING WITHOUT LIMITATION, WHETHER IN TORT, NEGLIGENCE, STRICT LIABILITY CONTRACT OR OTHERWISE. Some States do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from State to State.

NOTE:
PUMP MUST BE REPAIRED BY AUTHORIZED HYDROMATIC REPAIR CENTER OR WARRANTY WILL BE VOID. IF REPAIR CENTER IS NOT AVAILABLE, RETURN PUMP TO PLACE OF PURCHASE.


Application
Notes

8 Application Notes

[redacted]

- Your Local Authorized Distributor -

Stock #: HP-INST-195-1 (8/97) - 15M (9/97)

HYDROMATIC PUMPS, INC.
1840 BANEY ROAD
ASHLAND, OHIO 44805 U.S.A.
PHONE: (419) 289-3042
PHONE: (419) 289-8224 (Parts Distribution Center)
FAX: (419) 289-8058 (Parts Distribution Center)

SSPMA Certified PUMP

ISO 9001 QUALITY SYSTEM CERTIFIED HYDROMATIC PUMPS

Part #5625-195-1

HY[illegible]OMATIC

AURORA/HYDROMATIC PUMPS, INC.

Ashland, Ohio

Customer BISCO.

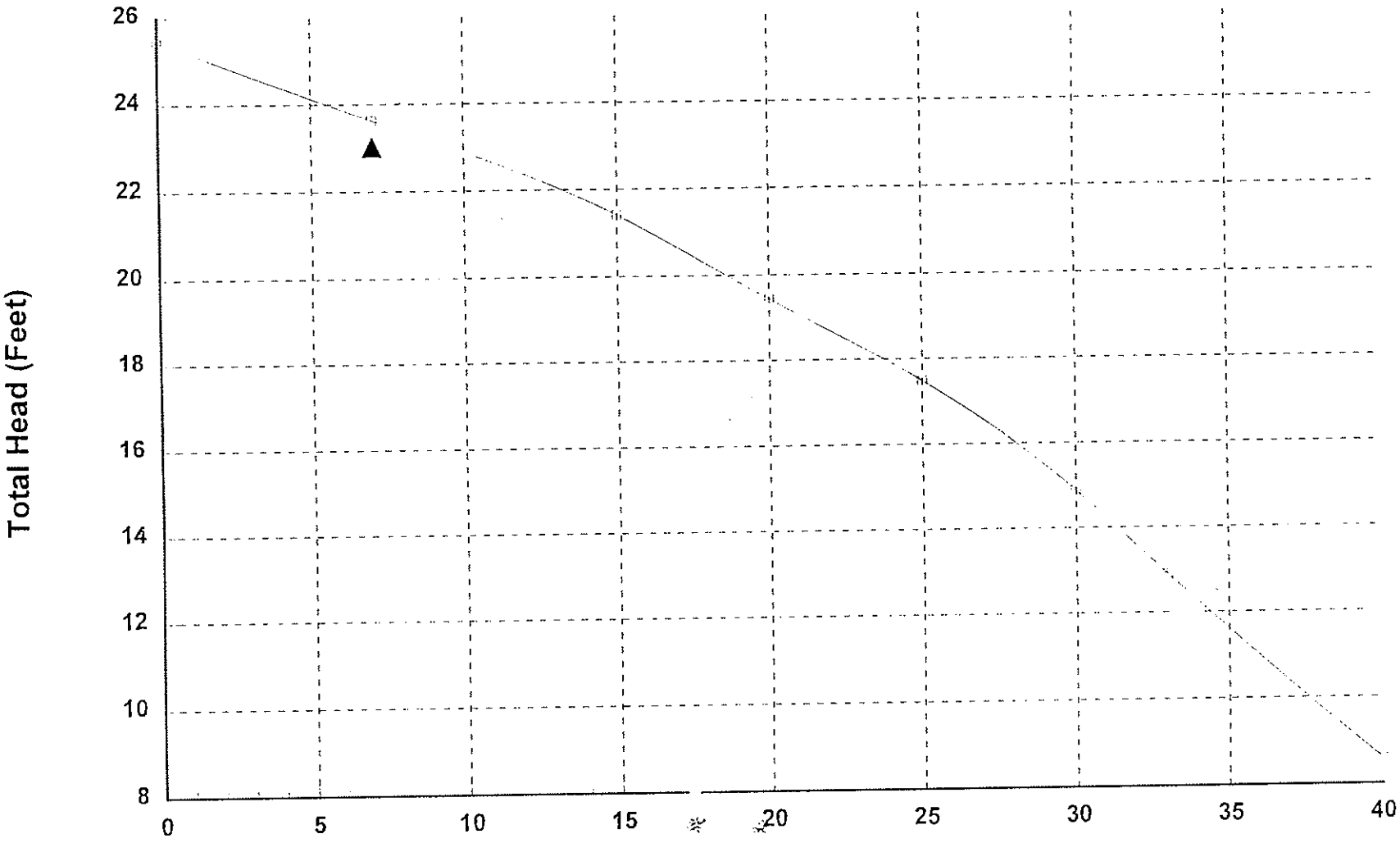
Order # 5775 HPC # 31090

Voltage 115 Phase 1 Imp. Dia. STD.

Watts 540 Amps 7.3 Speed

Pump SW25M-1 S/N 0

Condition of Service 7 GPM @ 23 Ft.



Certified Test SW25M-1/T1

Test Date 7-14-98 Certified Date 7-14-98

Authorized Signature Brandon Lant

Test Voltage 115 Test Frequency 60

Notes: 0

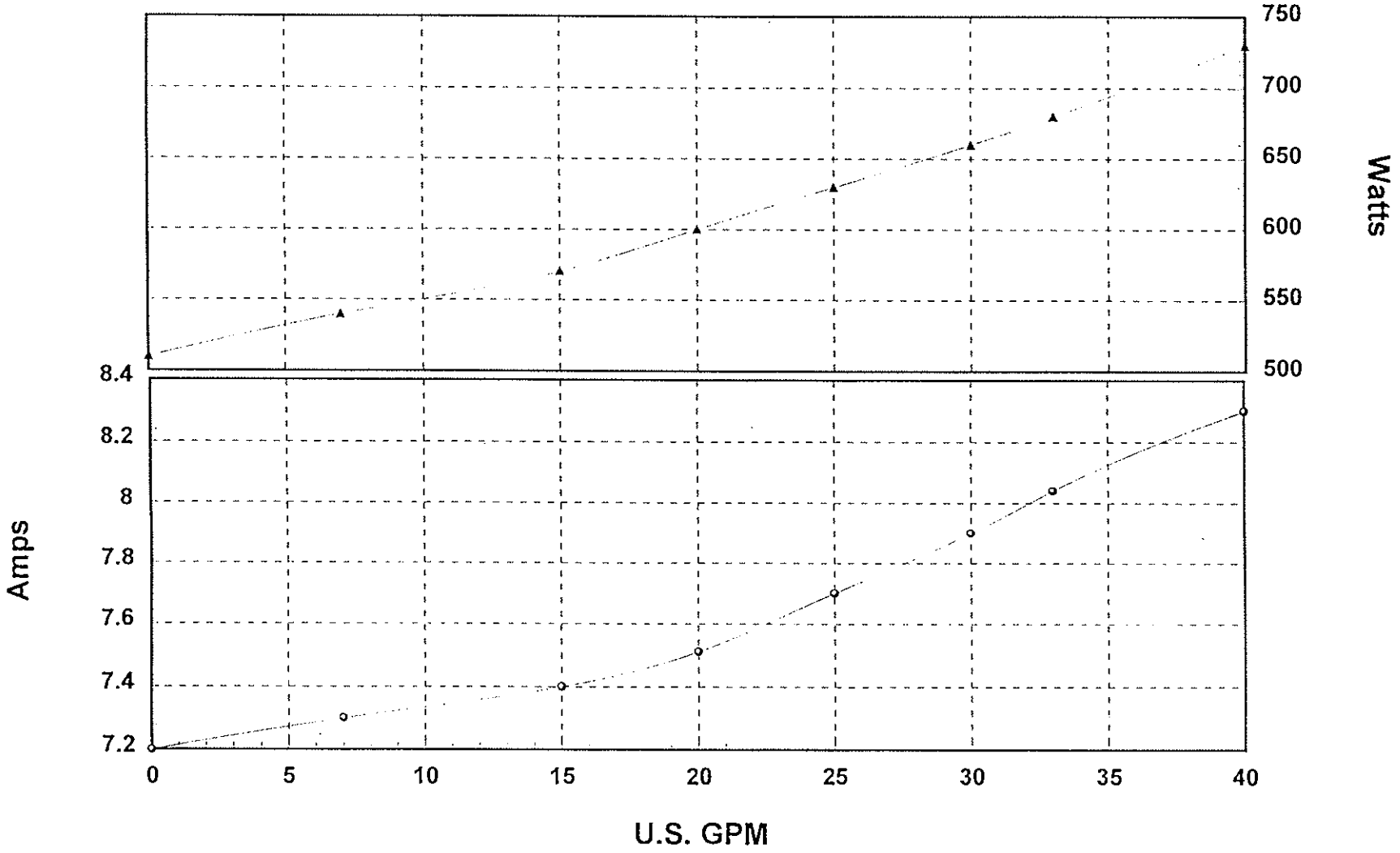
HYDROMATIC

AURORA/HYDROMATIC PUMPS, INC.

Ashland, Ohio

Pump SW25M-1 S/N 0

Condition of Service 7 GPM @ 23 Ft.



Certified Test SW25M-1/T1

Flow Meter

- Badger Model M120

Model Industrial RCDL

Nutating Disc Meter

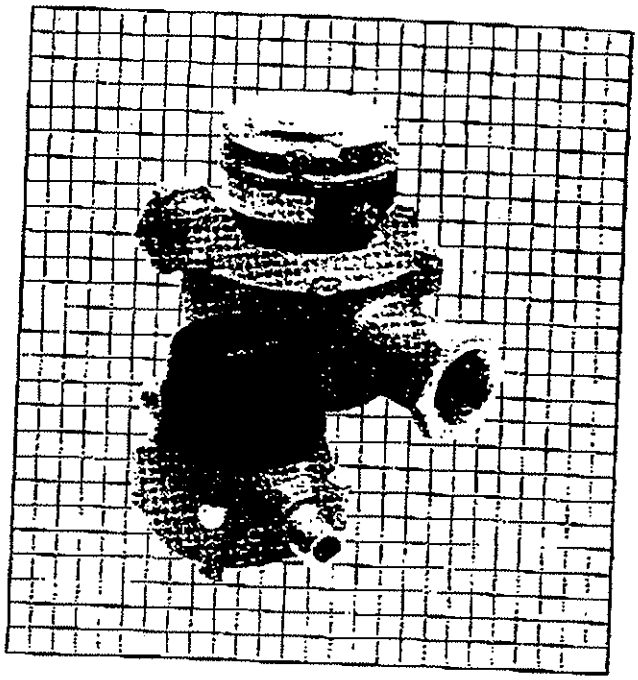
Technical Brief

GENERAL

Badger's RCDL positive displacement meters are one of the most cost effective methods in metering industrial fluids. The RCDL meter's simple but efficient design assures high accuracy and repeatability over the entire meter flow range.

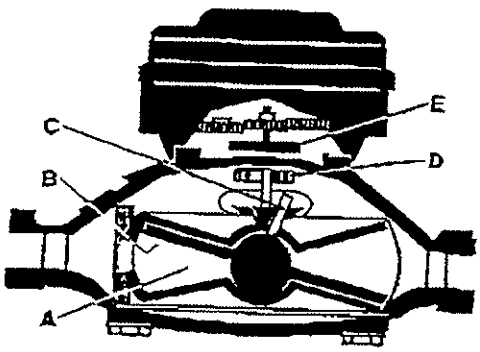
Made in five sizes, 1/2" through 2" for flows up to 170 GPM, these meters are extremely rugged and reliable. With only three internal moving parts, maintenance is seldom required. If necessary, it takes but a few minutes. All parts are designed and built of materials to meet your application, providing you with long life and a trouble-free, precision flow meter.

To complement the RCDL meter line, Badger offers a complete line of accessories that includes totalizers, electromechanical and electronic transmitters, rate of flow indicators and batch/process controllers.



OPERATION

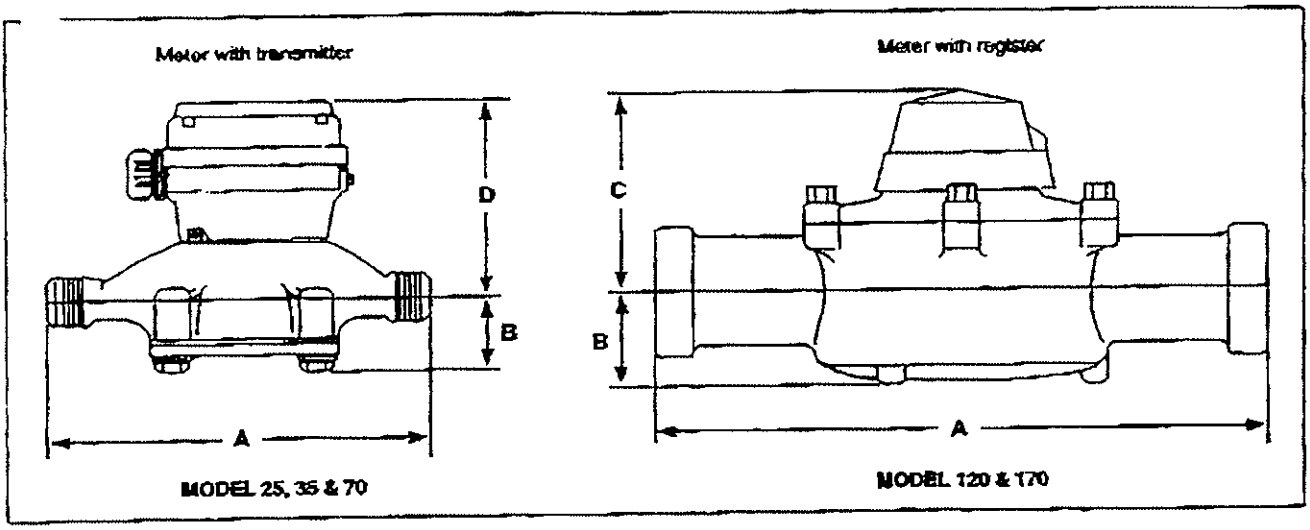
The metering principle, known as positive displacement, is based on the continuous filling and discharging of the measuring chamber. Controlled clearances between the disc and the chamber insure minimum leakage for precise measurement of each volume cycle. As the disc nutates, the center spindle rotates a magnet, whose movement is sensed through the meter wall by a follower magnet or by electronic sensors. Each revolution of the magnet is equivalent to a fixed volume of fluid, which is converted to any engineering unit of measure for totalization, indication or process control.



Liquid flowing through the meter chamber (A) causes a disc (B) to nutate or wobble. This motion, in turn, results in the rotation of a spindle (C) and drive magnet (D). Rotation is transmitted through the wall of the meter to a second magnet (E) which operates the transmitter.

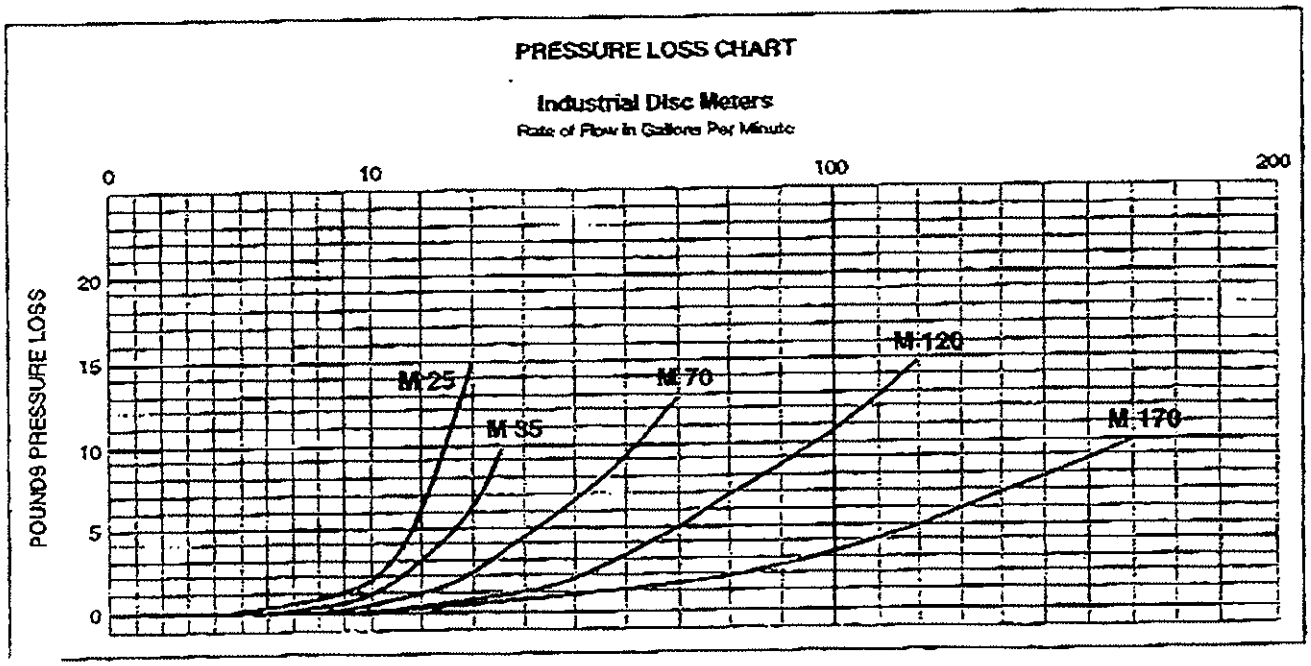
FEATURES

- **Accuracy:** ±1.5% over full range
- **Repeatability:** ±0.5%
- Extended 50:1 flow range
- Operating Temperature: 32° to 120° F.
  32° to 250° F.
  (M 25 Bronze only)
- Maximum Operating Pressure: 150 PSI
- Rugged bronze housing
- Wide range of compatible accessories
- Easily maintained without removing from line
- Durable components for minimal maintenance
- Direct replacement for SC-ER



SPECIFICATIONS

Meter Model	Meter Size Inches	Flow Range GPM	End Connections	DIMENSIONS (INCHES) Laying Length A	Center Line to Base B	Register Height C	Transmitter Height D	Maximum Pressure Loss PSI	Approximate Weight Pounds
M 25	5/8	1/2 - 25	NPT - Male	7.5	1.6	3.3	4.4	15	5
M 25	3/4	1/2 - 30	NPT - Male	7.5	1.6	3.3	4.4	15	5
35	3/4	3/4 - 35	NPT - Male	9.0	1.6	3.6	5.0	10	6
M 70	1	1 - 70	NPT - Male	10.75	2.3	4.2	5.6	13	12
M 120	1 1/2	2 - 120	NPT - Female	12.62	2.4	4.6	6.0	15	23
M 170	2	2 - 170	NPT - Female	15.25	2.9	5.1	6.5	10	30



BadgerMeter, Inc. Industrial Division
4545 W. Brown Deer Road, P. O. Box 23098 Milwaukee, WI 53223-0099
Telephone: (414) 355-0400 • Voice Mail: (414) 355-0410, Extension 637
Fax: (414) 355-7499

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All data subject to change without notice.

Carbon Vessels / Media

- Bisco 55 gallon drum
- Bisco Virgin 8x30 mesh carbon
- **Drum Containment Pallet Model No. BM-2-DP (Big Mouth)**

ACTIVATED CARBON FILTERS: STEEL DRUM SERIES

GENERAL DESCRIPTION

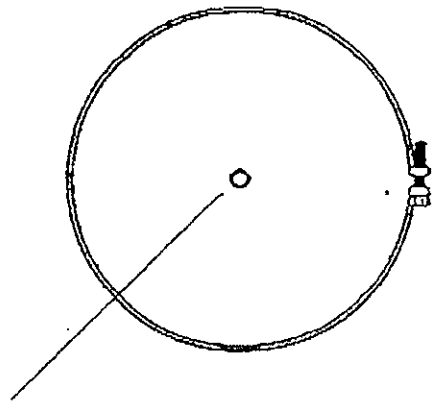
Designed for liquid treatment applications up to 25 GPM, the steel drum series contain all the operating elements found in a full-scale adsorption system. With four models designed to hold between 100 to 350 lbs of media these versatile vessels are ideal for:

- Small wastewater streams
- Groundwater Remediation
- Pilot testing
- Pump tests
- Precipitated metals treatment
- Product refining
- Air-Stripper or Bio-Remediation Polishing
- Emergency Response

FEATURES

Steel Drum Series filters offer several features and benefits for environmental, industrial and municipal users including:

- AF-110 Steel Frame Overwrap for Increased Pressure Handling Capability than a Standard 110 Drum Filter
- Quality UN Rated Steel Drums
- Epoxy Interior Coating
- Baked Exterior Coating
  PVC Distributor System with Large Coverage Area
  Wide Flow Rate Acceptance
- Simple Setup and Operation
- Inlet Distributor Capabilities
- Easy to Ship and Handle for Low Cost Field Work
- Reactivation and Disposal Available
- Pressure Handling Capability
- Wide Range of Contact Media Available

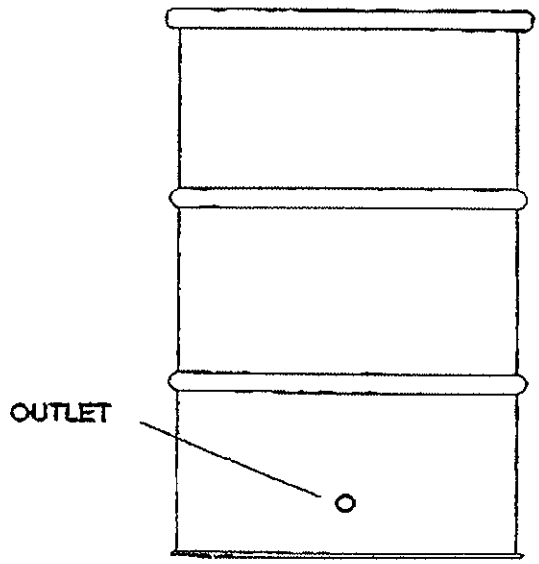


INLET - *(Option: Inlet & Outlet on Top)*

SPECIFICATIONS

Model # (Add "AF-")	30	55	85
Overall Height	30"	35"	40"
Footprint (Square)	20"	24"	28"
Inlet / Outlet Size (FNPT)	2"	2"	2"
Max. Pressure (PSI)	12	12	10
Max. Temperature (F)	125	125	125
Design Flow (GPM) *	5	9	12
Carbon Capacity (Lbs.)	100	175	250
Shipping Weight (Lbs.)	140	225	325

** Design Flow based on 10 min contact time. (2) filters series operation.*



Note: AF-110 metal frame not shown.

BISCO Environmental
60 Stergis Way, Dedham, MA 02026
Tel: 800-225-8006 • Fax: (617) 461-1152

MEDIAS

Drum series filters are available with the following medias:

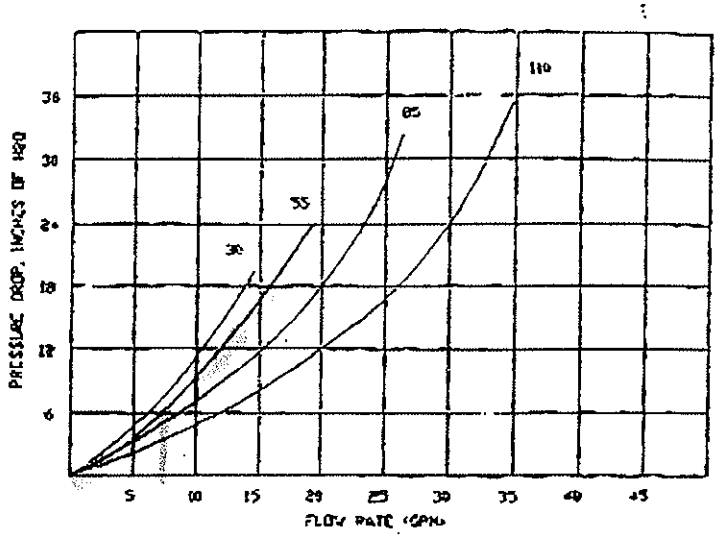
- ~~Re-activated 8 x 30 mesh carbon~~
- Virgin 8 x 30 mesh carbon
- ~~Organiflite clay/anthracite~~
- ~~Filter Lite, iron removal media~~

~~The standard media supplied is re-activated 8 x 30 coal based carbon. Call for pricing on alternate medias.~~

Many other medias are available and our sales staff suggest a media which would best meet the needs of your application.

DRUM SERIES PRESSURE DROP

8 x 30 Activated Carbon (Clean Bed, 55° F)



BISCO Environmental
60 Stergis Way, Dedham, MA 02026
Tel: 800-225-8006 - Fax: (617) 461-1152

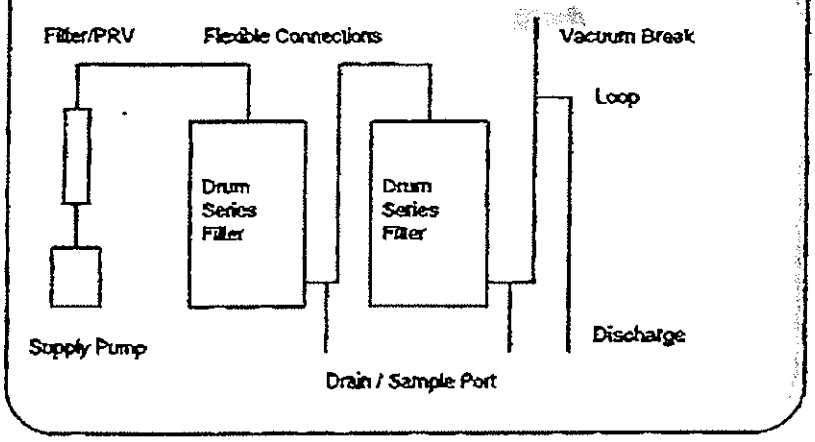
INSTALLATION

Filter should be installed on a level surface capable of supporting the filter at the operational weight. Prior to connection, fill with water and allow to soak for 24 hours. Backflushing the bed is also recommended prior to use.

Connect the filter to the process line. Two filters in 'series' operation is generally recommended. Where there is insufficient back pressure on the discharge line to keep the adsorbers 'wet' the use of a 'loop' is recommended.

Additional accessories such as pressure relief valves and filter housings are also recommended when the pressure may exceed the design limitations or there may be excess particulates in the liquid stream. As always we recommend you review the specific installation with a sales representative.

DRUM SERIES TYPICAL INSTALLATION



OPERATION

Operation of the drum series filters requires little more than periodic monitoring of the following:

Pressure reading at primary and secondary influent. A normal increase in the amount of pressure drop will occur throughout filter operation. In long term treatment systems it may become necessary to backflush the unit as the pressure nears design limitations.

Inspection of the drum series filters for leaking and stress. Since the drum series filter is primarily a disposable filter, at time the filter may be suspect to interior or exterior corrosion.

Inspect discharge stream for filter media. In the event of distributor failure filter media could escape into the discharge stream. Additional monitoring of accessories may be necessary, please refer to your operational manual.

[redacted]uct Information

BARNEBEY & SUTCLIFFE CORP.

ACTIVATED CARBON

TYPE 206A-8

COAL BASED CARBON

STANDARD SPECIFICATION

Iodine Number, ASTM D-4607	900
Moisture Content, ASTM D-2867	5% Maximum
Particle Size, ASTM D-2862	8x30 US mesh

TYPICAL PROPERTIES

Hardness, ASTM D-3802	90
Bulk Density, ASTM D-2854	0.50 g/cc (31 lb./ft^3)
Backwashed & Drained Density	0.44 g/cc (27 lbs./ft^3)
Ash Content, ASTM D-2866	15%
pH Aqueous Extract, ASTM D-3838	N/A
Surface Area, BET N_2	950 m^2/g

PACKAGING

50 pound bags
55 gallon drums
15 gallon drums
1,000 pound bulk sacks
Bulk tanker

NOTES

Unless otherwise specified, particle size distribution will be 15% maximum on the top screen and 5% maximum through the bottom screen.

An MSDS is available for all types of activated carbon.

In the event the moisture exceeds our 5% maximum, Barnebey & Sutcliffe will weight adjust to the 5% limit.

206A-8
(2-27-96)

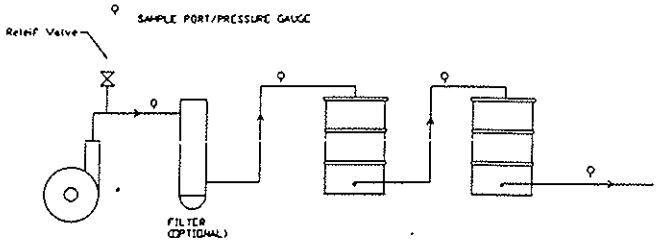
LIQUID FILTERS - STEEL DRUM SERIES
INSTALLATION & OPERATION INSTRUCTIONS

Drum Series Adsorbers are manufactures of carbon steel with vinyl ester lining (other systems available).

The specific drum series data sheet with drawing may be referred in these instructions.

SHIPMENT

Drum Series Adsorbers are shipped when possible upright with GAC pre-loaded. Certain special systems may be pre-plumbed and skid mounted and may require specific shipment methods. Contact your sales representative if you have any questions regarding shipment.



TYPICAL STEEL DRUM SERIES INSTALLATION

WETTING AND DEAERATION

Dry activated carbon must be wetted and deaerated prior to use. This procedure displaces air from the internal structure of the carbon granule, thus assuring that the liquid to be treated is in contact with the carbon surface.

Prior to operation, the adsorber must be filled with clean, uncontaminated liquid. The recommended method for filling the vessel is through the outlet line. Open the inlet line to purge air from the system. Feed water into the outlet line until water flows from the inlet line. The wet carbon should be allowed to set for a minimum of 24 hours, but preferably for 72 hours, to allow most of the carbon internal surface to be wetted. A guide is available to indicate how much of the internal surface becomes wetted over time.

After wetting, the carbon bed can be deaerated by draining the adsorber, and again filling the adsorber upflow with uncontaminated water. This procedure will eliminate any air pockets which may have formed between the carbon granules. The Adsorber is now ready for operation.

INSTALLATION

The Adsorber(s) should be set on a flat surface, capable of supporting the operating weight of the unit or system. Operating weights are listed on the specification sheet.

If the filter(s) is supplied individually the inlet and outlet piping should be connected to the unit using either flexible hose or hard piped. The outlet piping should be designed to allow flooded operation of the Adsorber at all times to assure effective operation. If the outlet line does not provide for back pressure on the Adsorber unit, then the discharge piping should include an elevated piping loop to assure flooded operation.

If the supply pump is capable of producing pressure greater than the design limitation of the filter it is recommended that a rupture disk or pressure relief valve be installed

Carbon filters can be manifolded in parallel operation for higher flowrates. Series operation is the preferred method of operation as it provides for the greatest degree of bed utilization.

If water conditions such as high suspended solids exist a filter should be installed prior to the Adsorber. A simple cartridge or screen filter helps prevent pressure buildup in the GAC bed. Many other water issues may effect Adsorber operation and we therefore recommend you discuss your specific installation with your sales representative.

OPERATION

With the Adsorber full of liquid, flow can be intro-

Big Mouth® Secondary Containment Pallets

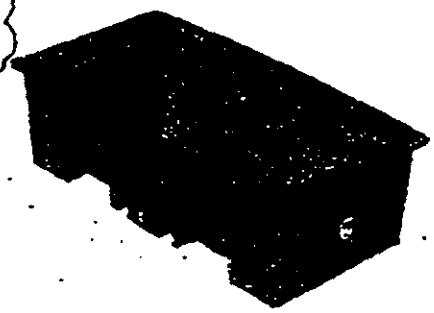
SUPERSHIPPER®

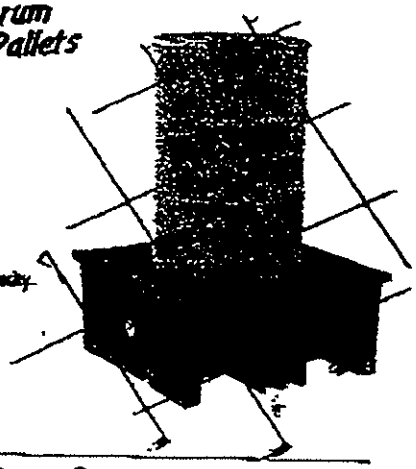
MODEL NO. BM-2-DP
Holds two 55 gallon drums
Length: 58"
Width: 24½"
Height: 16"
Weight: 40 lbs.
Capacity: 61 gallon sump capacity

Industrial strength molded polyethylene pallets with a unique patented grid pattern drainage deck captures container spills and leaks of expensive materials for reuse.

~~Single and~~ Double Drum Polyethylene Pallets

~~MODEL NO. BM-1-DP~~
~~Holds one 55 gallon drum~~
~~Length: 26"~~
~~Width: 26"~~
~~Height: 14"~~
~~Weight: 40 lbs.~~
~~Capacity: 61 gallon sump capacity~~





Best Price, Best Quality and Best Service

Basket Strainers

Haywood Duplex Basket Strainer

(325 mesh, 40 micron, stainless steel)

Duplex Basket Strainer

Haywood



Size: 1/2" - 4"

Material: PVC / CPVC

End Conn: Threaded / Socket / Flanged

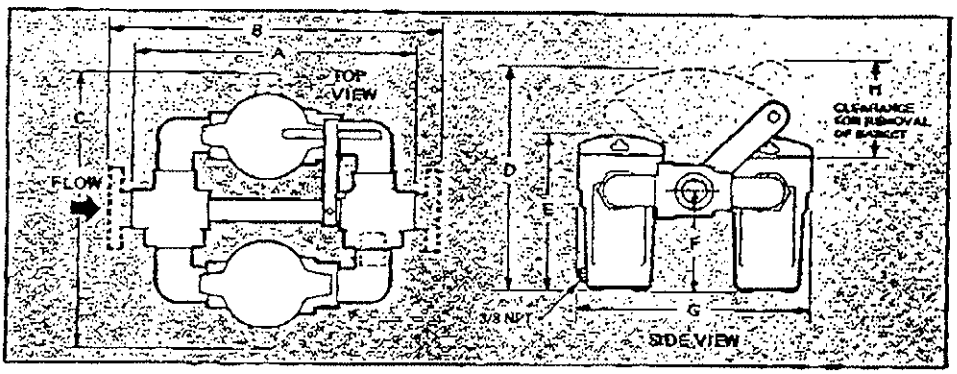
If uninterrupted flow is required, a Hayward Duplex Strainer is the answer. The line never has to be shut down for cleaning or servicing baskets.

When one basket is full, the flow is diverted to the other basket by a simple movement of a single lever. Plastic three-way valves, an integral part of the unit, provide tight shut-off. The full basket is then removed, cleaned and replaced - ready for use again. All this is done quickly without the use of any tools.

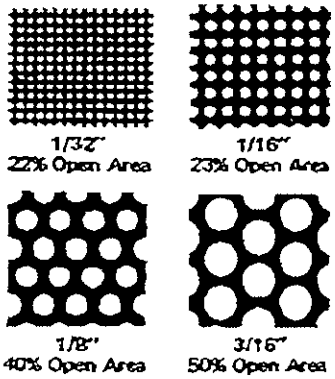
All sizes have a minimum 6:1 ratio of open area through the strainer basket to the corresponding cross-sectional pipe area. This allows maximum straining capacity with minimum pressure loss. In addition to plastic baskets, type 316 stainless steel baskets can also be supplied made of perforated sheet lined with 40 mesh screen.

Other features include:

- Viton O-ring cover seals.
- Rated at 150 PSI operating pressure at 75 °F.



Basket Perforations
(shown actual size)



1/32"
22% Open Area

1/16"
23% Open Area

1/8"
40% Open Area

3/16"
50% Open Area

DIMENSIONS — Dimensions are in inches - for reference only. For installation purposes, request certified drawings.

Size	A	B	C	D	E	F	G	H	Weight (LBS) Threaded	Weight (LBS) Flanged
1/2	16-1/4	17-1/8	15-1/8	12	8-3/8	5-1/4	12-3/4	7	10-3/4	11-3/4
3/4	15-1/4	17-5/8	15-1/8	12	8-3/8	5-1/4	12-3/4	7	10-3/4	11-3/4
1	16-1/4	17-5/8	15-1/8	12	8-3/8	5-1/4	12-3/4	7	10-3/4	11-3/4
1-1/2	22-1/2	25-5/8	22-1/2	16	12	8	19-1/8	10-1/8	33	34-1/2
2	22-1/2	25-7/8	22-1/2	16	12	8	19-1/8	10-1/8	33	35-1/2
3	32	36	32	23 3/4	16-1/2	10-1/2	25	12-1/8	93	98
4	35-1/2	40	35-1/4	28	21-1/8	14-7/8	28-1/2	16-3/8	99	107

CV FACTORS

Size	CV
1/2	5.0
3/4	6.0
1	7.0
1-1/2	28.0
2	35.0
3	80.0
4	100.0

Duplex Basket Strainer

ONTARIO SPECIALTY CONTRACTING INC.
333 GANSON ST. BUFFALO NY 14203
PHONE :(716) 856-3333
FAX :(716) 842-1630

JUNE 24, 1998

NYSDEC
50 WOLF RD.
ALBANY N.Y. 12233

Attn. Craig Lapinski

Re: Site No. 6-33-027
Primoshield Plating Site

Dear Mr. Lapinski,

In response to our telephone conversation today regarding the surge protection for the autodialer. As the autodialer is not available with an internal surge suppresor, we are proposing using an external suppresor. At this time we do not have a specific make and model for this unit, but we will forward the cut sheets and specific information as soon as possible. Also, the Hayward basket strainer will come equipped as specified with 325 mesh 40 micron stainless steel strainer. If I can be of any further help please contact me at (716) 856-3333.

Respectfully Yours,

Richard A. Cygan
Project Manager

HAYWARD INDUSTRIAL PRODUCTS
INSTALLATION OPERATION & MAINTENANCE
OF DUPLEX BASKET STRAINER

SOCKET CONNECTION INSTALLATION:

BOTH THE COVERS OF THE BASKET STRAINERS MUST BE REMOVED TO ALLOW THE CEMENT FUMES TO VENT.
Socket end connections are manufactured to ASTM D2467-87A. Solvent cementing of socket end connections to pipe should be performed per ASTM specifications D2855-87. Cut pipe square. Chamfer and deburr pipe. Surfaces must be cleaned and free of dirt, moisture, oil and other foreign material. Apply primer to inside socket surface of the valve on the Duplex strainer. Never allow primer or cement to contact valve ball, as leaking may result. Use a scrubbing motion. Repeat applications may be necessary to soften the surface of the socket. Next, liberally apply primer to the male end of the pipe to the length of the socket depth. Again apply to the socket, without delay apply cement to the pipe while the surface is still wet with primer. Next apply cement lightly, but uniformly to the inside of the socket. Apply a second coat of cement to the pipe, and assemble the pipe to the end socket of the Duplex, rotating the pipe 1/4 turn in one direction as it is slipped to full depth into the socket. The connection should be held in position for approx. 30 seconds to allow the connection to "set". After assembly wipe off excess cement. Full set time is a minimum of 30 minutes at 60 to 100 F. Full cure time should be based on the chart below.

JOINT CURE SCHEDULE:

The cure schedules are suggested as guides. They are based on laboratory test data, and should not be taken to be the recommendations of all cement manufacturers. Individual manufacturer's recommendations for their particular cement should be followed.

Temperature Range During Cure Period(B) °F(°C)	Test Pressures for Pipe Sizes 1/2 to 1-1/4 In.		Test Pressures for Pipe Sizes 1-1/2 to 3 In.		Test Pressures for Pipe Sizes 4 to 5 In.		Test Pressures for Pipe Sizes 6 to 8 In.	
	Up to 180 PSI (1240 kPa)	Above 180 to 370 PSI (1240 to 2550 kPa)	Up to 180 PSI (1240 kPa)	Above 180 to 315 PSI 1240) to 2170 kPa)	Up to 180 PSI (1240 kPa)	Above 180 to 315 PSI (1240 to 2170 kPa)	Up to 180 PSI (1240 kPa)	Above 180 to 315 PSI (1240 to 2170 kPa)
60 to 100 (15 to 40)	1 h	6 h	2 h	12 h	6 h	18 h	8 h	24 h
40 to 60 (5 to 15)	2 h	12 h	4 h	24 h	12 h	36 h	16 h	48 h
20 to 40 (-7 to 5)	6 h	36 h	12 h	72 h	36 h A	4 days A	3 days A	9 days A
10 to 20) (-15 to 7)	8 h	48 h	16 h	96 h	72 h A	8 days A	4 days A	12 days A
Colder than 10 (-15)	Extreme care should be exercised on all joints made where pipe, fittings or cement is below 10°F.							

A: It is important to note that at temperatures colder than 20°F on sizes that exceed 3 in., test results indicate that many variables exist in the actual cure rate of the joint. The data expressed in these categories represent only estimated averages. In some cases, cure will be achieved in less time, but isolated test results indicate that even longer periods of cure may be required.
B: These cure schedules are based on laboratory test data obtained on Net Fit Joints (NET FIT=in a dry fit the pipe bottoms snugly in the fitting socket without meeting interference).

THREADED CONNECTION INSTALLATION:

Threaded end connections are manufactured to ASTM specifications D2464-88. F437-88 and ANSI B2.1. Wrap threads of pipe with Teflon tape of 3 to 3-1/2 mil thickness. The tape should be wrapped in a clockwise direction starting at the first or second full thread. Overlap each wrap by, 1/2 the width of the tape. The wrap should be applied with sufficient tension to allow the threads of a single wrapped area to show through without cutting the tape. The wrap should continue for the full effective length of the thread. Pipe sizes 2" and greater will not benefit with more than a second wrap, due to the greater thread depth. To provide a leak proof joint, the pipe should be threaded into the end connection "hand tight". Using a strap wrench only. (Never use a stillson type wrench) tighten the joint an additional 1/2 to 1-1/2 turns past hand tight. Tightening beyond this point may induce excessive stress that could cause failure.

FLANGED CONNECTION INSTALLATION:

Flange bolts should be tight enough to slightly compress the gasket and make a good seal, without distorting or putting excessive stress on the flanges. Suitable washers should be used between the bolt head and flange and the nut and flange. Bolts should be tightened in alternating sequence.

RECOMMENDED FLANGE BOLT TORQUE

FLANGE SIZE	BOLT DIA.	TORQUE FT. LBS.	FLANGE SIZE	BOLT DIA.	TORQUE FT. LBS.
1/2	1/2	10-15	2	5/8	15-25
3/4	1./2	10-15	2-1/2	5/8	20-25
1	1/2	10-15	3	5/8	20-25
1-1/4	1/2	10-15	4	5/8	20-25
1-1/2	1/2	10-15	6	3/4	30-40

NOTE: USE WELL LUBRICATED METAL BOLTS AND NUTS. USE SOFT RUBBER GASKETS.

METAL PIPING INSTALLATION:

Due to different thermal expansion rates between metal and plastic, transmittal of pipe vibration, and pipe loading forces, direct installation of plastic duplex strainers into metal piping systems can potentially damage the duplex strainer.

IT IS RECOMMENDED THAT AT LEAST 10 PIPE DIAMETERS IN LENGTH OF PLASTIC PIPING BE INSTALLED UPSTREAM AND DOWNSTREAM OF THE DUPLEX STRAINER.

OPERATION and BASKET CLEANING:

CAUTION: Only the strainer that the lever is not touching is off line and must be depressurized before proceeding further.
Both covers must be installed per Step 5 below on the strainers before the lever is moved.

The maximum recommended fluid velocity is 8 feet per second. This velocity minimizes the effects of valve closure and pump start up or shut down.

Pressure gauges may be installed on the inlet and the outlet piping to indicate by pressure loss, in excess of 5 psi, when the active basket should be cleaned.

1. The lever position indicates which is the active strainer. By being positioned toward a given strainer, the opposite strainer should be serviced. When a basket is to be removed from a strainer the **LEVER** must be moved ***SLOWLY*** from one position to the other.

2. The drain plug, from the strainer that has been taken off line for servicing, should carefully be removed to depressurize and partially drain the strainer.

3. The off line strainer cover is removed by turning in a counter-clockwise direction. No tools are required. *Do not use wrenches or hammers.*

4. When the process fluid has been completely drained, remove the basket. Clean the basket by using a brush or soaking in an appropriate cleaning solution. **DO NOT USE SOLVENTS ON PLASTIC BASKETS.** Baskets should be cleaned as soon as possible after removal from the strainer, otherwise the contents may harden and become more difficult to remove. *Avoid striking baskets to loosen their contents as this may damage the basket.* To clean the basket strainer body wash the inside of the body with an appropriate cleaning solution. (NOT A SOLVENT)

5. Place a clean basket into the basket strainer body. The basket flange should rest squarely on the basket seat inside the body. Before replacing the cover, make sure that the "o"-ring for the cover is undamaged, clean, and lubricated. It is good practice to clean the body threads with a soft brush to remove all foreign material. **TIGHTEN THE COVER USING LIGHT HAND PRESSURE ONLY.** The cover holds the basket in place ensuring no material passes the basket. The cover does not have to be forced against the top surface of the body when tightening, as the seal is performed with a piston sealing action. A slight gap (approximately the thickness of a dime or a matchbook) between the cover and the top of the body will achieve a positive seal.

6. **Reinstall the drain plug.**

ADJUSTMENT OF VALVES:

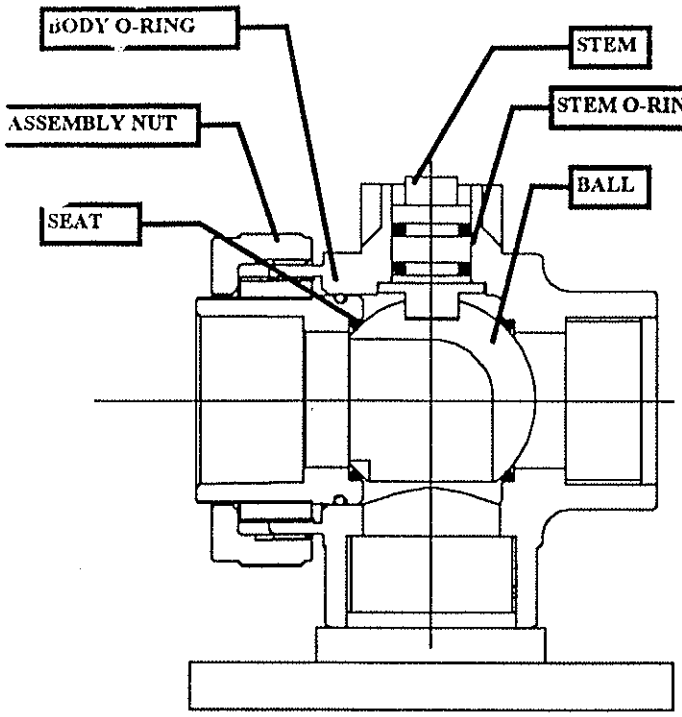
EXTREME CAUTION MUST BE TAKEN WHEN WORKING ON THE VALVES
THE PIPING SYSTEM MUST BE DEPRESSURIZED AND COMPLETELY DRAINED. PROPER CARE MUST BE TAKEN.
CONSULT M.S.D.S. (MATERIAL SAFETY DATA SHEETS) INFORMATION REGARDING YOUR SPECIFIC APPLICATION.

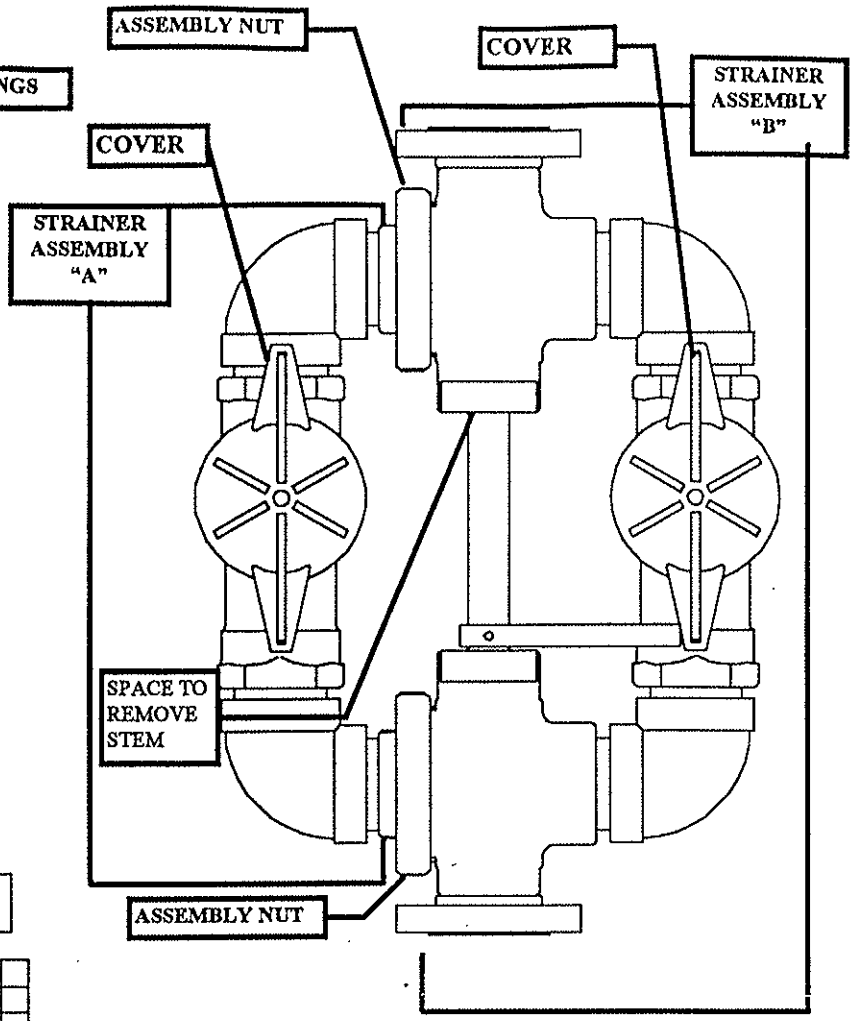
Rotation of the assembly nut clockwise will move the end connector toward the seats. This movement will tend to make a leaking valve stop leaking. The assembly nut adjustment must be made carefully as valve operating torque increases with increasing assembly nut torque. If the valve still leaks after adjustment, follow the "REPAIR OF VALVES" instructions. On 1/2" through 2" valves the seats can be reversed to provide a new seal surface.

REPAIR OF VALVES:

Rotate each of the assembly nuts completely in the counter clockwise direction and disengage them from valve bodies. The complete strainer assembly "A" section must be separated from strainer assembly "B" at the assembly nut portion of the valves. This can be achieved by lightly striking each elbow with a rubber or plastic mallet. Once the separation is completed, make a sketch of the ball orientations to assure proper positioning when reassembling. The o-rings and seals are now accessible for replacement using a "seal" repair kit. Carefully remove the o-rings from their respective locations taking care not to scratch their sealing surfaces. Use a non-petroleum base lubricant to lubricate the o rings, and re-assemble.

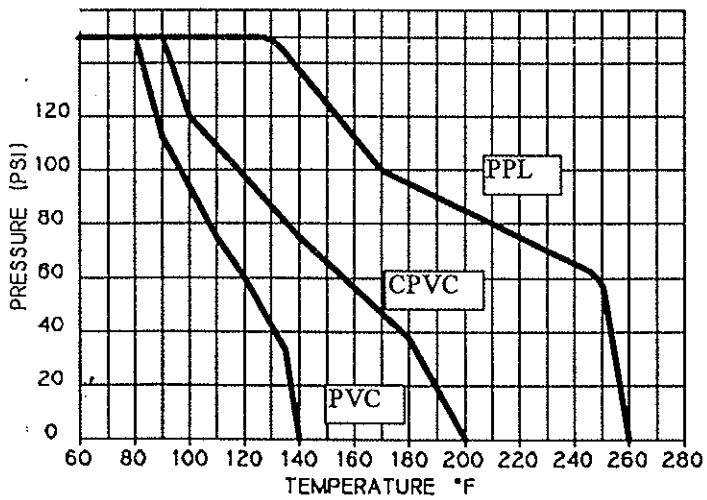
To replace the lever assembly, the stems must be removed from the valves.This will allow the lever to be removed. The stems can be pushed from the space between the lever and the valve bodies. The lever must be in place before the stems are installed in the valves.

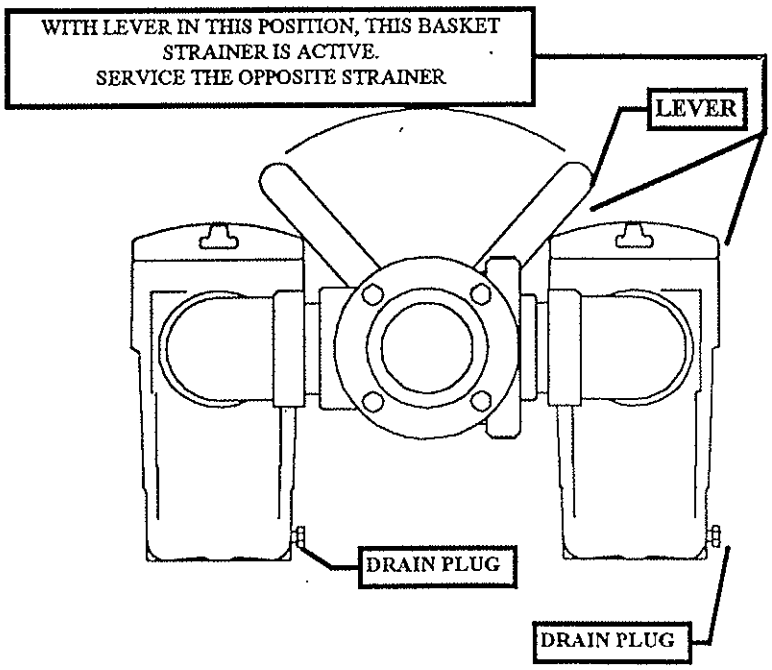




VALVE ILLUSTRATED

Operating Temperature vs. Pressure





Recommended valve stem torque to rotate the ball 360° when valve is reassembled.

VALVE SIZE	TORQUE IN*LB
1/2"	30
3/4"	40
1"	50
1 1/4"	60
1 1/2"	60
2"	80
3"	180
4" & 6"	220

HAYWARD INDUSTRIAL PRODUCTS
INSTALLATION OPERATION & MAINTENANCE
OF SIMPLEX BASKET STRAINER

SOCKET CONNECTION INSTALLATION:

THE COVER OF THE BASKET STRAINER MUST BE REMOVED TO ALLOW THE CEMENT FUMES TO VENT.
Socket end connections are manufactured to ASTM D2467-87A. Solvent cementing of socket end connections to pipe should be performed per ASTM specifications D2855-87. Cut pipe square. Chamfer and deburr pipe. Surfaces must be cleaned and free of dirt, moisture, oil and other foreign material. Apply primer to inside socket surface of the Simplex strainer. Use a scrubbing motion. Repeat applications may be necessary to soften the surface of the socket. Next, liberally apply primer to the male end of the pipe to the length of the socket depth. Again apply to the socket, without delay apply cement to the pipe while the surface is still wet with primer. Next apply cement lightly, but uniformly to the inside of the socket. Apply a second coat of cement to the pipe, and assemble the pipe to the end socket of the Simplex, rotating the pipe 1/4 turn in one direction as it is slipped to full depth into the socket. The connection should be held in position for approx. 30 seconds to allow the connection to "set". After assembly wipe off excess cement. Full set time is a minimum of 30 minutes at 60 to 100 F. Full cure time should be based on the chart below.

JOINT CURE SCHEDULE:

The cure schedules are suggested as guides. They are based on laboratory test data, and should not be taken to be the recommendations of all cement manufacturers. Individual manufacturer's recommendations for their particular cement should be followed.

Temperature Range During Cure Period(B) °F(°C)	Test Pressures for Pipe Sizes 1/2 to 1-1/4 In.		Test Pressures for Pipe Sizes 1-1/2 to 3 In.		Test Pressures for Pipe Sizes 4 to 5 In.		Test Pressures for Pipe Sizes 6 to 8 In.	
	Up to 180 PSI (1240 kPa)	Above 180 to 370 PSI (1240 to 2550 kPa)	Up to 180 PSI (1240 kPa)	Above 180 to 315 PSI 1240) to 2170 kPa)	Up to 180 PSI (1240 kPa)	Above 180 to 315 PSI (1240 to 2170 kPa)	Up to 180 PSI (1240 kPa)	Above 180 to 315 PSI (1240 to 2170 kPa)
60 to 100 (15 to 40)	1 h	6 h	2 h	12 h	6 h	18 h	8 h	24 h
40 to 60 (5 to 15)	2 h	12 h	4 h	24 h	12 h	36 h	16 h	48 h
20 to 40 (-7 to 5)	6 h	36 h	12 h	72 h	36 h A	4 days A	3 days A	9 days A
10 to 20) (-15 to 7)	8 h	48 h	16 h	96 h	72 h A	8 days A	4 days A	12 days A
Colder than 10 (-15)	Extreme care should be exercised on all joints made where pipe, fittings or cement is below 10°F.							

A: It is important to note that at temperatures colder than 20°F on sizes that exceed 3 in., test results indicate that many variables exist in the actual cure rate of the joint. The data expressed in these categories represent only estimated averages. In some cases, cure will be achieved in less time, but isolated test results indicate that even longer periods of cure may be required.
B: These cure schedules are based on laboratory test data obtained on Net Fit Joints (NET FIT=in a dry fit the pipe bottoms snugly in the fitting socket without meeting interference).

THREADED CONNECTION INSTALLATION:

Threaded end connections are manufactured to ASTM specifications D2464-88. F437-88 and ANSI B2.1. Wrap threads of pipe with Teflon tape of 3 to 3-1/2 mil thickness. The tape should be wrapped in a clockwise direction starting at the first or second full thread. Overlap each wrap by, 1/2 the width of the tape. The wrap should be applied with sufficient tension to allow the threads of a single wrapped area to show through without cutting the tape. The wrap should continue for the full effective length of the thread. Pipe sizes 2" and greater will not benefit with more than a second wrap, due to the greater thread depth. To provide a leak proof joint, the pipe should be threaded into the end connection "hand tight". Using a strap wrench only. (Never use a stillson type wrench) tighten the joint an additional 1/2 to 1-1/2 turns past hand tight. Tightening beyond this point may induce excessive stress that could cause failure.

FLANGED CONNECTION INSTALLATION:

Flange bolts should be tight enough to slightly compress the gasket and make a good seal, without distorting or putting excessive stress on the flanges. Suitable washers should be used between the bolt head and flange and the nut and flange. Bolts should be tightened in alternating sequence.

RECOMMENDED FLANGE BOLT TORQUE

FLANGE SIZE	BOLT DIA.	TORQUE FT. LBS.	FLANGE SIZE	BOLT DIA.	TORQUE FT. LBS.
1/2	1/2	10-15	2	5/8	15-25
3/4	1/2	10-15	2-1/2	5/8	20-25
1	1/2	10-15	3	5/8	20-25
1-1/4	1/2	10-15	4	5/8	20-25
1-1/2	1/2	10-15	6	3/4	30-40
			8	3/4	30-40

NOTE: USE WELL LUBRICATED METAL BOLTS AND NUTS. USE SOFT RUBBER GASKETS.

METAL PIPING INSTALLATION:

Due to different thermal expansion rates between metal and plastic, transmittal of pipe vibration, and pipe loading forces, direct installation of plastic Simplex strainers into metal piping systems can potentially damage the Simplex strainer.

IT IS RECOMMENDED THAT AT LEAST 10 PIPE DIAMETERS IN LENGTH OF PLASTIC PIPING BE INSTALLED UPSTREAM AND DOWNSTREAM OF THE SIMPLEX STRAINER.

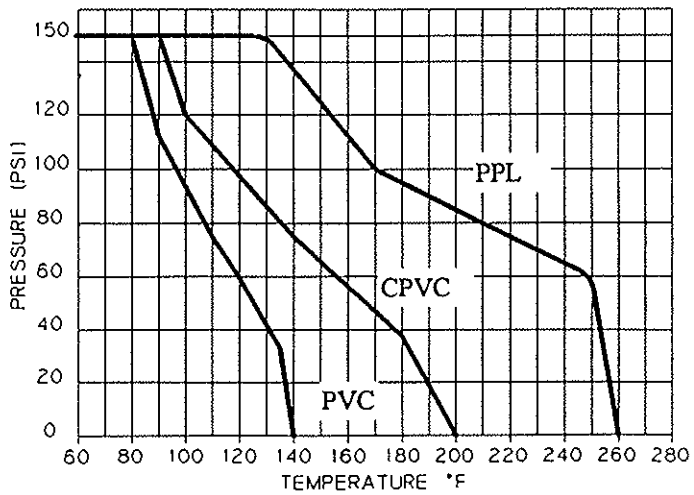
OPERATION and BASKET CLEANING:

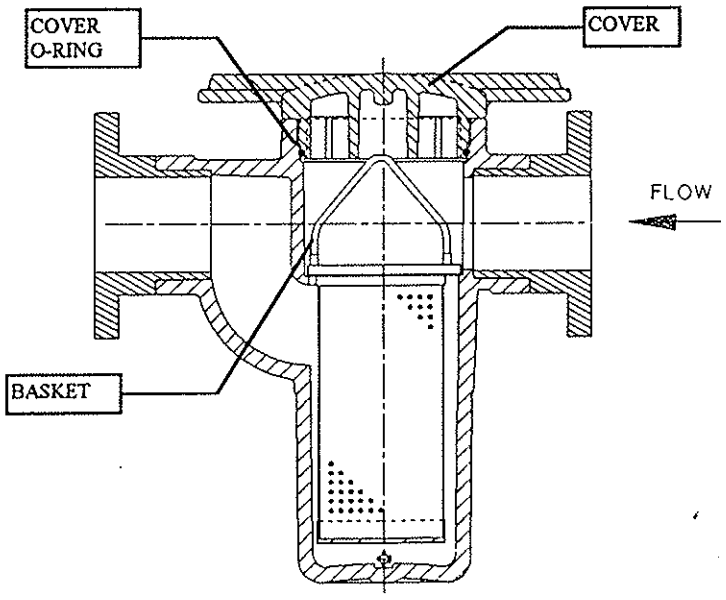
CAUTION: The Simplex basket strainer must be depressurized before proceeding further.
The cover must be installed per Step 5 below on the strainer before the system is pressurized.

The maximum recommended fluid velocity is 8 feet per second. This velocity minimizes the effects of valve closure and pump start up or shut down.

Pressure gauges may be installed on the inlet and the outlet piping to indicate by pressure loss, in excess of 5 psi, when the basket should be cleaned.

1. Valves should be installed just upstream and downstream of the Simplex Basket strainer. These valves must be closed and/or the system depressurized before proceeding.
2. The drain plug, from the strainer, should carefully be removed to depressurize and partially drain the strainer.
3. The strainer cover is removed by turning in a counter-clockwise direction. No tools are required. *Do not use wrenches or hammers.*
4. When the process fluid has been completely drained, remove the basket. Clean the basket by using a brush or soaking in an appropriate cleaning solution. **DO NOT USE SOLVENTS ON PLASTIC BASKETS.** Baskets should be cleaned as soon as possible after removal from the strainer, otherwise the contents may harden and become more difficult to remove. *Avoid striking baskets to loosen their contents as this may damage the basket.* To clean the basket strainer body wash the inside of the body with an appropriate cleaning solution. (NOT A SOLVENT)
5. Place a clean basket into the basket strainer body. The basket flange should rest squarely on the basket seat inside the body. Before replacing the cover, make sure that the "o"-ring for the cover is undamaged, clean, and lubricated. It is good practice to clean the body threads with a soft brush to remove all foreign material. **TIGHTEN THE COVER USING LIGHT HAND PRESSURE ONLY.** The cover holds the basket in place ensuring no material passes the basket. The cover does not have to be forced against the top surface of the body when tightening, as the seal is performed with a piston sealing action. A slight gap (approximately the thickness of a dime or a matchbook) between the cover and the top of the body will achieve a positive seal.
6. **Reinstall the drain plug.**
7. **Slowly open the upstream valve to pressurize the strainer.** It is good practice to provide a vent fitting so the air can be vented from the strainer.
8. **Slowly open the downstream valve.**





BALL VALVE

Hayward

- [redacted] Ball Valve

HAYWARD INDUSTRIAL PRODUCTS
INSTALLATION OPERATION & MAINTENANCE OF TRUE UNION BALL VALVES

SOCKET CONNECTION:

Socket end connections are manufactured to ASTM D2467-87A. Solvent cementing of socket end connections to pipe should be performed per ASTM specifications D2855-87. Cut pipe square. Chamfer and deburr pipe. Surfaces must be cleaned and free of dirt, moisture, oil and other foreign material. Remove assembly nuts and end connectors from valve body. Slide assembly nuts, with threads facing valve, onto pipe to which the end connector is to be cemented. Apply primer to inside socket surface of end connector. Never allow primer or cement to contact valve ball or end connector o-ring sealing surfaces, as leaking may result. Use a scrubbing motion. Repeat applications may be necessary to soften the surface of the socket. Next, liberally apply primer to the male end of the pipe to the length of the socket depth. Again apply to the socket, without delay apply cement to the pipe while the surface is still wet with primer. Next apply cement lightly, but uniformly to the inside of the socket. Apply a second coat of cement to the pipe, and assemble the end connector to the pipe, rotating the end connector 1/4 turn in one direction as it is slipped to full depth on to the pipe. The end connector should be held in position for approx. 30 seconds to allow the connection to "set". After assembly wipe off excess cement. Full set time is a minimum of 30 minutes at 60 to 100 F. Full cure time should be based on the chart below.

JOINT CURE SCHEDULE:

The cure schedules are suggested as guides. They are based on laboratory test data, and should not be taken to be the recommendations of all cement manufacturers. Individual manufacturer's recommendations for their particular cement should be followed.

Temperature Range During Cure Period(B) °F(°C)	Test Pressures for Pipe Sizes 1/2 to 1-1/4 In. Up to 180 PSI (1240 kPa)	Test Pressures for Pipe Sizes 1/2 to 1-1/4 In. Above 180 to 370 PSI (1240 to 2550 kPa)	Test Pressures for Pipe Sizes 1-1/2 to 3 In. Up to 180 PSI (1240 kPa)	Test Pressures for Pipe Sizes 1-1/2 to 3 In. Above 180 to 315 PSI 1240) to 2170 kPa)	Test Pressures for Pipe Sizes 4 to 5 In. Up to 180 PSI (1240 kPa)	Test Pressures for Pipe Sizes 4 to 5 In. Above 180 to 315 PSI (1240 to 2170 kPa)	Test Pressures for Pipe Sizes 6 to 8 In. Up to 180 PSI (1240 kPa)	Test Pressures for Pipe Sizes 6 to 8 In. Above 180 to 315 PSI (1240 to 2170 kPa)
60 to 100 (15 to 40)	1 h	6 h	2 h	12 h	6 h	18 h	8 h	24 h
40 to 60 (5 to 15)	2 h	12 h	4 h	24 h	12 h	36 h	16 h	48 h
20 to 40 (-7 to 5)	6 h	36 h	12 h	72 h	36 h A	4 days A	3 days A	9 days A
10 to 20) (-15 to 7)	8 h	48 h	16 h	96 h	72 h A	8 days A	4 days A	12 days A
Colder than 10 (-15)	Extreme care should be exercised on all joints made where pipe, fittings or cement is below 10°F.							

A: It is important to note that at temperatures colder than 20°F on sizes that exceed 3 in., test results indicate that many variables exist in the actual cure rate of the joint. The data expressed in these categories represent only estimated averages. In some cases, cure will be achieved in less time, but isolated test results indicate that even longer periods of cure may be required.
B: These cure schedules are based on laboratory test data obtained on Net Fit Joints (NET FIT=in a dry fit the pipe bottoms snugly in the fitting socket without meeting interference).

THREADED CONNECTION:

Threaded end connections are manufactured to ASTM specifications D2464-88. F437-88 and ANSI B2.1. Wrap threads of pipe with Teflon tape of 3 to 3-1/2 mil thickness. The tape should be wrapped in a clockwise direction starting at the first or second full thread. Overlap each wrap by, 1/2 the width of the tape. The wrap should be applied with sufficient tension to allow the threads of a single wrapped area to show through without cutting the tape. The wrap should continue for the full effective length of the thread. Pipe sizes 2" and greater will not benefit with more than a second wrap, due to the greater thread depth. To provide a leak proof joint, the pipe should be threaded into the end connection "hand tight". Using a strap wrench only. (Never use a stillson type wrench) tighten the joint an additional 1/2 to 1-1/2 turns past hand tight. Tightening beyond this point may induce excessive stress that could cause failure.

FLANGED CONNECTION:

Flange bolts should be tight enough to slightly compress the gasket and make a good seal, without distorting or putting excessive stress on the flanges. Suitable washers should be used between the bolt head and flange and the nut and flange. Bolts should be tightened in alternating sequence.

RECOMMENDED FLANGE BOLT TORQUE

FLANGE SIZE	BOLT DIA.	TORQUE FT. LBS.	FLANGE SIZE	BOLT DIA.	TORQUE FT. LBS.
1/2	1/2	10-15	2	5/8	15-25
3/4	1./2	10-15	2-1/2	5/8	20-25
1	1/2	10-15	3	5/8	20-25
1-1/4	1/2	10-15	4	5/8	20-25
1-1/2	1/2	10-15	6	3/4	30-40

NOTE: USE WELL LUBRICATED METAL BOLTS AND NUTS. USE SOFT RUBBER GASKETS.

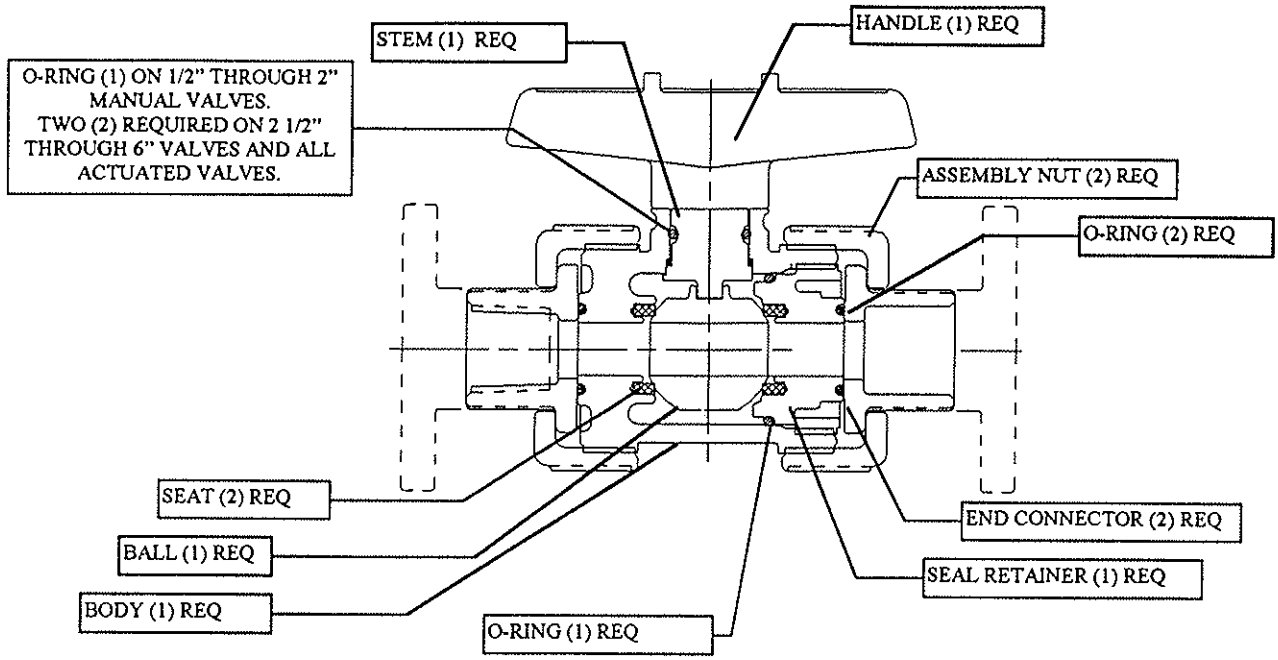
ADJUSTMENT:

EXTREME CAUTION MUST BE TAKEN WHEN WORKING ON THIS VALVE.
THE PIPING SYSTEM MUST BE DEPRESSURIZED AND DRAINED. PROPER CARE MUST BE TAKEN. CONSULT M.S.D.S. (MATERIAL SAFETY DATA SHEETS) INFORMATION REGARDING YOUR SPECIFIC APPLICATION.

Remove the assembly nut and end connector from the "adjust" end of the body, or the complete valve body from the piping system. The front face of the seal retainer indicates which direction of rotation tightens or loosens the seal retainer, with the word "tighten" and a directional arrow, and the word "loosen" and a directional arrow. Direction of rotation may vary depending on date of manufacture. The Assembly nut should be installed on the valve "hand tight". Using a strap wrench only the joint may be tightened 1/2 to 3/4 of a turn past hand tight.

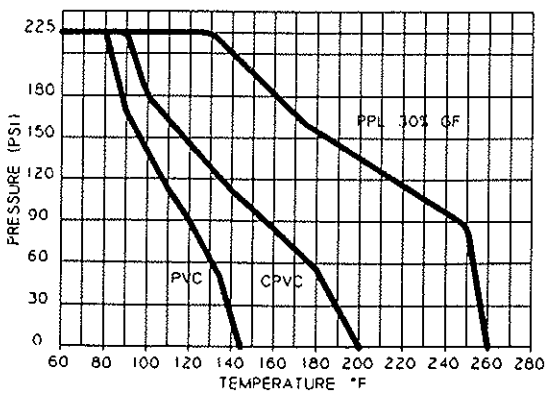
REPAIR:

Follow the adjustment sequence and information above, but rotating the seal retainer completely in the "loosen" direction and remove it from valve body. The o-rings and seals are now accessible for replacement using a "seal" repair kit. Carefully remove the o-rings from their respective locations taking care not to scratch their sealing surfaces. Use a non-petroleum base lubricant to lubricate the o-rings, and re-assemble the valve. See table below.



OPERATING PRESSURE TEMPERATURE

TRUE UNION, TRUE CHECK, & SINGLE ENTRY ONLY



Recommended valve stem torque to rotate the ball 360° when valve is reassembled.

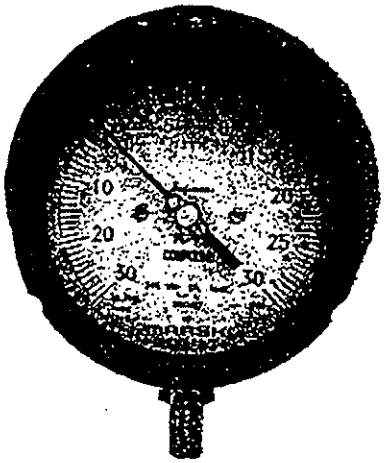
VALVE SIZE	TORQUE IN*LB
1/2"	30
3/4"	40
1"	50
1 1/4"	60
1 1/2"	60
2"	80
3" & 2 1/2"	140
4" & 6"	170

Pressure Guages / Seals

- Marsh Instruments guages + seals

MARSH INSTRUMENTS

Process Gauges



POLYPROPYLENE CASE

- 4½" ~~and 6"~~ Dials
- 5 Safecase Designs
- Pressure Ranges to 20,000 psi
- Dry or Liquid Filled
- Micrometer Pointer

Marsh Process Gauges are first in performance. With over 125 years of proven experience, Marsh offers the most complete line of process instrumentation in the industry. An extensive list of designs and options makes the Marsh line of Process Gauges the intelligent and practical choice in process instrumentation. All case styles feature Safecase solid-front construction.

SPECIFICATIONS

ACCURACY ASME Grade 2A = ±0.5% of full scale.

CASE SIZES 4 ½" ~~and 6 inches~~ diameter.

CASE MATERIAL Safecase polypropylene turret style only) ~~and Safecase aluminum.~~

CASE STYLE 4 ½": T = Turret (polypropylene), ~~G = Back flanged case (aluminum), or H = Front flange hinged ring (aluminum). 6": G = Back flanged case.~~

TUBE & SOCKET ~~Copper alloy or 316~~ stainless steel, ~~403 SST tube above 10,000 psi. Monel® option available (consult factory).~~

MOVEMENT All 316 Stainless Steel.

CONNECTION ~~¼" or~~ ½" NPT in LM = bottom mount ~~or LB = lower back.~~

RANGES 0 to 30" Hg VAC; Compound 30" Hg to 300 psi; 0 to 20,000 psi.

DIAL STANDARD Psi only standard.

DIAL COLOR Black markings on white.

POINTER Adjustable Micrometer.

WINDOW Acrylic standard.

FILL MEDIUM ~~Dry or~~ filled. Note: ALL 4 ½" bottom mount Process Gauges are field-fillable (fill kit factory installed), and have option factory filled glycerin or silicone.

SAFECASE Safecase construction featured as standard on all Process Gauges.

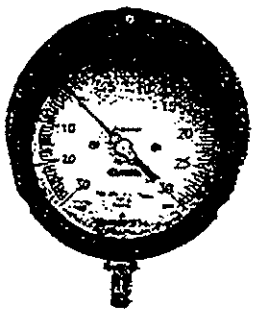
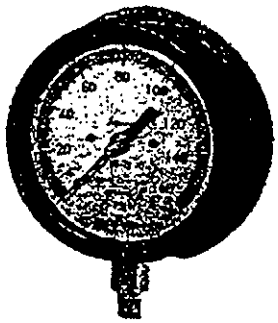
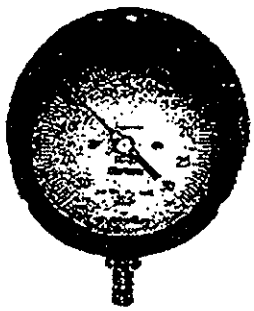
VENT Internal compensating diaphragm on filled and fillable gauges.

STANDARD RANGES AND PART NUMBERS

Type	Process Gauges					
Size	4 ½"					
Material	Polypropylene Case					
Internals	Copper Alloy			Stainless Steel		
Mounting	LM	LB	LM	LB	LM	LB
Connection (NPT)	1/4"	1/4"	1/2"	1/2"	1/4"	1/4"
Style	T	T	T	T	T	T
Scale Standard	psi					
0 to 30"Hg VAC	P0105	P0205	P0505	P0605	P5105	P5205
30"Hg VAC to 15p	P0110	P0210	P0510	P0610	P5110	P5210
30"Hg VAC to 30p	P0112	P0212	P0512	P0612	P5112	P5212
30"Hg VAC to 60p	P0114	P0214	P0514	P0614	P5114	P5214
30"Hg VAC to 100p	P0116	P0216	P0516	P0616		P5216
30"Hg VAC to 200p	P0120	P0220	P0520	P0620		P5220
30"Hg VAC to 300p	P0124	P0224	P0524	P0624	P5124	P5224
0 to 15p	P0140	P0240	P0540	P0640	P5140	P5240
0 to 30p	P0142	P0242	P0542	P0642	P5142	P5242
0 to 60p	P0146	P0246	P0546	P0646	P5146	P5246
0 to 100p	P0148	P0248	P0548	P0648	P5148	P5248
0 to 160p	P0152	P0252	P0552	P0652	P5152	P5252
0 to 200p	P0154	P0254	P0554	P0654	P5154	P5254
0 to 300p	P0158	P0258	P0558	P0658	P5158	P5258
0 to 400p	P0160	P0260	P0560	P0660	P5160	P5260
0 to 600p	P0164	P0264	P0564	P0664	P5164	P5264
0 to 800p	P0166	P0266	P0566	P0666	P5166	P5266
0 to 1,000p	P0168	P0268	P0568	P0668	P5168	P5268
0 to 1,500p					P5174	P5274
0 to 2,000p					P5176	P5276
0 to 3,000p					P5178	P5278
0 to 5,000p					P5180	P5280
0 to 10,000p					P5190	P5290
0 to 15,000p					P5192	P5292
0 to 20,000p					P5194	P5294

MARSH INSTRUMENTS

Process Gauges

STANDARD RANGES AND PART NUMBERS

Type	Process Gauges									
Case →	Polypropylene		Aluminum						Aluminum	
Internals →	Stainless Steel		Copper Alloy						Stainless Steel	
Size →	4 ½"		4 ½"						4 ½"	
Mounting →	LM	~~LB~~	LM	LM	LB	LB	LB	LB	LM	LM
Connection (NPT) →	1/2"	~~1/2"~~	1/4"	1/2"	1/4"	1/4"	1/4"	1/2"	1/4"	1/2"
Style →	T	~~T~~	G	G	G	G	H	H	G	G
Scale Standard	psi									
0 to 30"Hg VAC	P5605	P5705	P10005	P10505	P11005	P11505	P16005	P16505	P14005	P14505
30"Hg VAC to 15p	P5610	P5710	P10010	P10510	P11010	P11510	P16010	P16510	P14010	P14510
30"Hg VAC to 30p	P5612	P5712	P10012	P10512	P11012	P11512	P16012	P16512	P14012	P14512
30"Hg VAC to 60p	P5614	P5714	P10014	P10514	P11014	P11514	P16014	P16514	P14014	P14514
30"Hg VAC to 100p	P5616	P5716	P10016	P10516	P11016	P11516	P16016	P16516	P14016	P14516
30"Hg VAC to 200p	P5620	P5720	P10020				P16020	P16520		
30"Hg VAC to 300p	P5624	P5724	P10024				P16024	P16524		
0 to 15p	P5640	P5740	P10040	P10540	P11040	P11540	P16040	P16540	P14040	P14540
0 to 30p	P5642	P5742	P10042	P10542	P11042	P11542	P16042	P16542	P14042	P14542
0 to 60p	P5646	P5746	P10046	P10546	P11046	P11546	P16046	P16546	P14046	P14546
→ 0 to 100p →	P5648	P5748	P10048	P10548	P11048	P11548	P16048	P16548	P14048	P14548
0 to 160p	P5652	P5752	P10052	P10552	P11052	P11552	P16052	P16552	P14052	P14552
0 to 200p	P5654	P5754	P10054	P10554	P11054	P11554	P16054	P16554	P14054	P14554
0 to 300p	P5658	P5758	P10058	P10558	P11058	P11558	P16058	P16558	P14058	P14558
0 to 400p	P5660	P5760	P10060	P10560	P11060	P11560	P16060	P16560	P14060	P14560
0 to 600p	P5664	P5764	P10064	P10564	P11064	P11564	P16064	P16564	P14064	P14564
0 to 800p	P5666	P5766					P16066	P16566		
0 to 1,000p	P5668	P5768	P10068	P10568	P11068	P11568	P16068	P16568	P14068	P14568
0 to 1,500p	P5674	P5774								P14574
0 to 2,000p	P5676	P5776								P14576
0 to 3,000p	P5678	P5778								P14578
0 to 5,000p	P5682	P5782								P14582
0 to 10,000p	P5690	P5790								P14590
0 to 15,000p	P5692	P5792								P14592
0 to 20,000p	P5694	P5794								P14594

DIAPHRAGM SEALS

General Description

Mansfield & Green diaphragm seals are protective devices designed to isolate pressure gauges, pneumatic transmitters and other instruments from potentially damaging process media.

Operation

M&G diaphragm seals typically comprise a metal, Teflon* or elastomer diaphragm mounted between two flanges and sealed to prevent leakage of process gases or fluids. The space on the instrument side of the diaphragm, the connections, and the instrument sensing element are all completely filled with instrument oil, silicon or other suitable fluid.

When process line pressure is applied, the diaphragm exerts equal pressure on the instrument side of the seal producing a reading on the gauge or other instrument. Instruments may be attached directly to the diaphragm seal or connected remotely by means of a filled length of capillary tubing. M&G diaphragm seals can be used with pressure or vacuum instruments incorporating C-type, helical or spiral bourdon tubes, bellows, diaphragm, or electronic strain gauge sensing elements.

Continuous Duty Operation

M&G diaphragm seals are continuous duty type designs (excluding Models L, CS and ES). Continuous duty seals permit removal or replacement of an instrument, while a system is in operation, without damage to the diaphragm or leakage of the process media. This feature is especially important in hazardous applications such as with harmful or corrosive gases.

Diaphragm Seal Selection

All products shown in this catalog are identified by type and construction materials to help you select the right seal for your application.

M&G diaphragm seals come in a variety of designs ranging from low cost gauge protectors and welded metal diaphragm units, to seals having removable metal, Teflon or elastomer diaphragms designed for easy replacement. Available standard ranges are from 29" Hg. VAC to pressures of up to 2500 PSI; Type S, R, T and L seals are available in Thread-attached, In-line and Flow-Thru design configurations.

The following criteria should be noted in determining the proper seal for your application:

A) Type of seal mounting:

1. Thread attached—used where the seal may be easily installed on a threaded process pipe
2. Flange attached—required in piping systems with flanged connections per ANSI B16.5. These seals are limited to 2500 PSI maximum pressure.
3. In-line Flow-Thru—used in applications where process pressure measurement is required in a flowing pipeline. M&G offers several styles in this configuration.

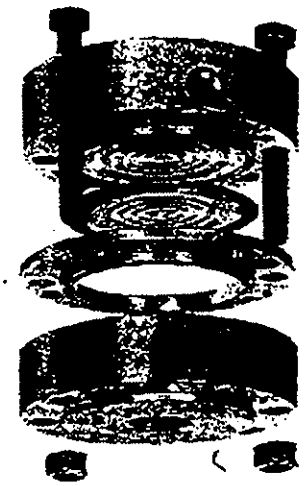
B) Diaphragm designs and materials

M&G Diaphragm Seals are constructed of materials suitable for all types of applications and process media. Utmost care should be exercised when specifying to insure material compatibility with your specific requirement.

1. **Type S welded metal diaphragm**—economical seal incorporates a diaphragm welded permanently to the top housing. Welded metal seals are used in general purpose applications covering ranges from 15 to 2500 PSI @ 100°F. (Optional ranges to 10,000 PSI). The diaphragm and housing are sealed by a non-asbestos Aramid fiber gasket. Glass filled Teflon and Teflon coated stainless steel gaskets are also available on request.
2. **Type R removable metal diaphragm**—for general purpose applications ranging from 15 to 2500 PSI @ 100°F. (Optional ranges to 5000 PSI). Features a diaphragm easily replaceable by the user. The fill fluid cavity is sealed by a Viton* O-ring.

   Welded and removable metal diaphragm seals (Type S&R) are available in a choice of diaphragm materials including: 304 and 316 ELC SS, Carpenter #20 stainless*, Nickel 200*, Monel 400*, Inconel 600*, Hastelloy B&C*, Tantalum and Titanium. Bronze, silver and gold diaphragms are available with Type R removable diaphragm seals only.
3. **Type T removable Teflon diaphragm**—for corrosive applications, compatible with a wide range of chemicals and process media. Ranges from 10 to 2500 PSI @ 100°F. Diaphragm is replaceable by user, molded TFE Teflon is the standard diaphragm material, with a temperature range of −40° to +400°F.
4. **Type L low pressure removable elastomer diaphragm**—for low pressure applications in standard ranges from 29" Hg. VAC to 1250 PSI @ 100°F. Diaphragm is replaceable by user. Molded VITON is standard; molded EPT, Buna N, Neoprene, Kalrez materials are also available. Type L diaphragm temperature ranges: Viton −20 to +400°F; EPT −60 to +200°F; Buna-N −40 to +200°F; Neoprene −40 to +225°F; Kalrez −20 to +550°F.
5. **Type CS sanitary seals**—quick couple one-piece units designed to meet 3-A standard requirements for sanitary piping in food, beverage, pharmaceuticals and other industries requiring high levels of cleanliness.
6. **Type SMJ & SNJ Flow-Thru seals**—for use in jacketed pipelines where heated processes are used. Type SMJ conforms to schedule 40 process pipe rating; Type SNJ meets ANSI flange pressure/temperature ratings.
7. **Type SCE extended seal**—for applications where piping or insulation requires extension of the diaphragm into the flowstream of the process media.
8. **Type SCW all-welded seal**—designed for applications requiring control of fugitive emissions, toxic and explosive media. Ranges from 10 psig to Class 300 material maximum limit.
9. **Type ES gauge protector**—one of our lowest cost M&G seal designs. These units are used on compressors, paint and agricultural sprayers and other installations, to isolate a gauge from media that may clog or corrode sensing elements.

VITON, TEFLON, TFE TEFLON - TM, DuPont, Inc.; Carpenter # Stainless - TM, Carpenter Steel Co.; INCONEL 600, MONEL 400 - TM, Huntington Alloys Inc.; HASTELLOY - TM, Cabot Corp.; NICKEL 200 - TM, International Nickel Co., Inc. † Patent #4108636



Flange Materials

M&G diaphragm seals are available in a wide range of construction materials to enable the specifier to select designs compatible with specific process requirements.

Upper Housing

~~Standard upper housing material is carbon steel, zinc plated.~~ Optional 316 stainless steel ~~and other materials are also available~~

Lower Housing

Selection of the correct lower housing material is especially important since that part of the seal is directly exposed to the process media. As a general rule, materials chosen are normally of the same type as used in the remainder of the piping system. Standard materials include ~~carbon steel, 304SS,~~ 316SS ~~Hastelloy B-2 and Hastelloy C-276, Titanium, Carpenter #20 stainless, Monel 400, Nickel 200, Inconel 600, PVC, polypropylene, TFE Teflon. Tantalum plated steel is available in flange attached seals only.~~ Low carbon 304 and 316 stainless steel is used in all units which are to be welded in the field. Other materials are available on request.

Gaskets

Type R removable metal diaphragms are self-gasketed by means of a Teflon coating. No separate gasket is required.

Standard Type S seals incorporate gasket material of non-asbestos aramid fiber. Glass-filled Teflon and Teflon coated stainless steel gaskets are also available for Type S seals; other materials are available on request.

Fasteners

M&G furnishes bolts and nuts with all thread-attached and inline Flow-Thru seals. Standard bolt material is high temperature alloy steel, Grade 41 BV 35 or equal, 105,000 PSI minimum yield strength at 650°F; 316SS and other materials are available on request. Nuts are supplied in Type 18-S stainless steel as standard material; other materials are available on request. M&G also supplies studs, where required.

Bolts and nuts for all flange-attached seals are supplied by user. The 5/16" bolts should be torqued to 20-25 ft. lbs. on Type S and R seals and 10 ft. lbs. on Type T thread attached seals. The ⅜" bolts used on Type SX thread attached seals require 40-45 ft. lbs. of torque. All bolts should be lubricated prior to installation.

Fill Fluids

Specifiers should exercise care in the selection of the proper fill fluid for specific applications since fill fluids may react chemically with process fluids and other materials. Compatibility of the selected fluid is the responsibility of the user.

Available fill fluids include:

- M&G Instrument Oil-stability range (+30° to 300°F)
- Silicone DC-704-stability range (+70° to 600°F)
- Silicone DC-550-stability range (-40° to +500°F)
- Silicone DC-200-stability range (-60° to +300°F)
- Fluorolube FS5-stability range (-50° to +400°F)
- Halocarbon 4.2-stability range (-90° to +400°F)

Food grade fluids for sanitary seals include:

- Silicone DC-360-stability range −50° to +450°F
- Mineral oil-stability range +30° to 300°F
- Vegetable oil-stability range +40° to 360°F

Pressure

Diaphragm seal pressure limitations vary according to seal design and construction materials.

Thread attached non-Flow-Thru seals having metal process (lower) flanges have a maximum working pressure rated at 2500 PSI @ 100°F. Teflon diaphragms are limited to 1000 PSI @ 400°F.

Inline Flow-Thru seal Types R, S and T are rated at 1500 PSI @ 100°F. Type L seals are rated at 1250 PSI @ 100°F.

All flange attached seals are sized according to ANSI B 16.5. ANSI standard flange attached and inline Flow-Thru seals are available with maximum working pressure ranges to 2500 PSI.

Seals using lower housings made of non-metallic materials should not be used for working pressures in excess of 100 PSI @ 140°F; Teflon threaded connections are limited to pressures of 50 PSI @ 100°F.

Special M&G diaphragm seal designs are available with maximum working pressure ranges of up to 20,000 PSI. Consult factory for specific requirements.

Vacuum

M&G L Series elastomer diaphragm seals are satisfactory for most vacuum instrument applications in ranges from 0" to 29" Hg. (excluding Types LB and LG).

Type S&R Series metal diaphragm seals are suitable for vacuum applications in the 0" to 20" Hg. range.

Type T Teflon diaphragm seals may be used in applications ranging from 0" to 25" Hg. vacuum.

CAUTION

All diaphragm seal assemblies and components must be selected with full consideration of process fluids, pressure and temperature compatibility to prevent misapplication. An improper selection may result in a system failure and possible property damage or injury to personnel.

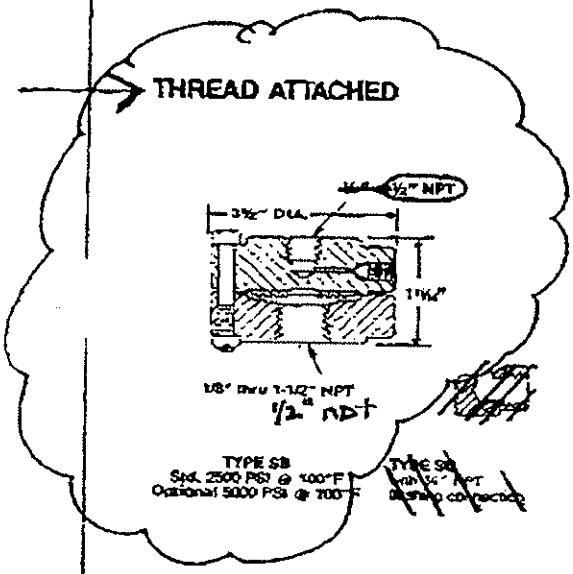
TYPE S-WELDED METAL DIAPHRAGMS

The M&G Type S seal incorporates a diaphragm which is welded directly onto the instrument (upper) flange or top. This design eliminates the diaphragm retaining ring reducing the risk of fill fluids leakage during disassembly of the seal. The interior of the upper housing is contoured to fit the movement of the diaphragm at maximum allowable flexing, minimizing distortion of the diaphragm in the event of instrument removal or failure.

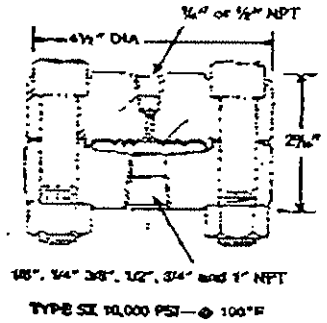
Type S seals have a volumetric displacement of .07 cubic inches. Filling screws are standard on all models except the Type SX.

Type S thread attached, non Flow-Thru seals with metal process (lower) housings are pressure rated at 2500 PSI at 100°F. Inline Flow-Thru seals are rated at 1500 PSI at 100°F. A ¼" NPT flushing connection is available on most thread & flange attached models.

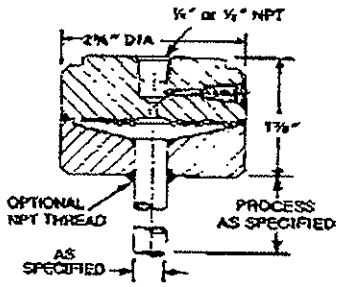
THREAD ATTACHED



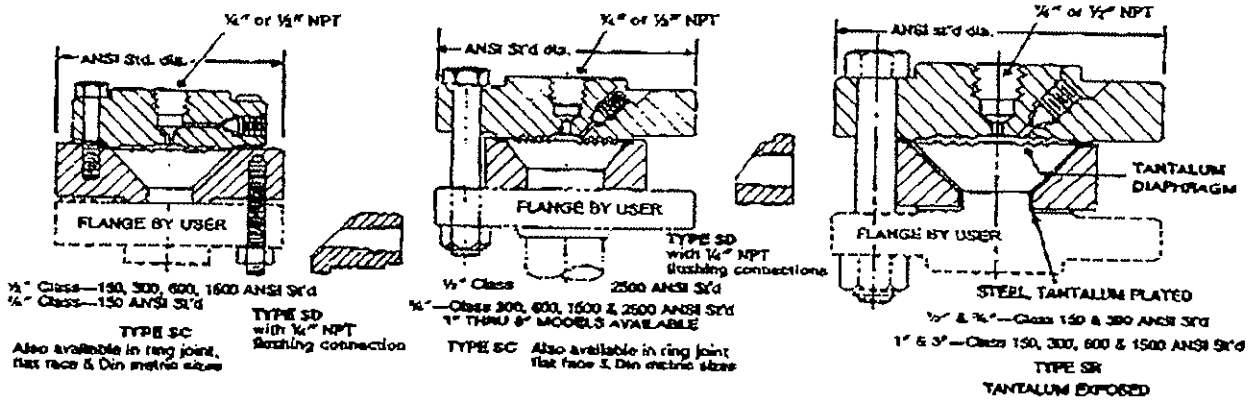
HIGH PRESSURE THREAD ATTACHED



ALL WELDED



FLANGE ATTACHED (STANDARD RAISED FACE)



CHEMICAL TRANSFER HOSE

- Mustang 45 HW

Industrial Site Services, Inc./
Ontario Specialty Contracting, Inc.
8215 Golden Oak Circle, Clarence, NY 14221
(716) 856-3333
Fax (716) 842-1630

SUBMITTAL INFORMATION SHEET

Name of The Project: **Primoshield Plating Site**
Utica, New York
NYSDEC Site No. 6-33-027

Date of Submittal: July 16, 1998

Submittal No: 001

Item No: M-1 / Item 10

scription of Item: Chemical Transfer Hose

Intended Use: Treatment System

Item Submitted is: As Specified / Approved Equal.

Manufacturer's/Supplier's Certification is Enclosed / To Follow

Signed: _____

(Contractor hereby certifies that all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog number and similar data with respect thereto have been reviewed or that Shop Drawing or sample has been coordinated with other Shop Drawings and samples and with the requirements of the Work and the Contract Documents)

Consultant's Comment: _____

ion: _____



39496-(XX)
January 2, 1998
Supersedes 39496-000
May 15, 19[illegible]

Acid-Chemical Hose

Mustang™ 45HW

(Specification 4695/4695G)

Black Cover (4695)

Part No.	Nom. I.D. (In.)	Nom. I.D. (mm)	Nom. O.D. (In.)	Nom. O.D. (mm)	Max. W.P. (psi)	Max. W.P. (MPa)	Suction (In. Hg)	Suction (mm Hg)	Min. Bend Radius (In.)	Min. Bend Radius (mm)	Wt. Per Ft. (Lbs.)	Wt. Per Ft. (Kg)	Standard Pack	Stock (X) or Minimum Order Qty.	Gates Item No.	List Price Per Ft.
305750	¾	19.0	1.25	31.8	200	1.38	30.0	762	3.0	76	.44	.20	100 ft.	X	4695-0002	$19.71
305751	1	25.4	1.50	38.1	200	1.38	30.0	762	3.5	88	.54	.25	100 ft.	X	4695-0003	20.75
305752	1¼	31.8	1.75	44.5	200	1.38	30.0	762	3.7	94	.64	.29	100 ft.	X	4695-0004	21.90
305753	1½	38.0	2.04	51.8	200	1.38	30.0	762	4.0	102	.84	.38	100 ft.	X	4695-0005	23.69
305754	2	51.0	2.54	64.5	200	1.38	30.0	762	4.5	114	1.06	.48	100 ft.	X	4695-0001	29.85
305755	2½	63.0	3.05	77.5	150	1.03	30.0	762	5.0	127	1.36	.62	100 ft.	X	4695-0006	35.40
305756	3	76.0	3.58	90.9	150	1.03	30.0	762	6.0	152	1.74	.79	100 ft.	X	4695-0007	42.49
305757	4	102.0	4.69	119.0	125	.86	30.0	762	8.0	203	2.66	1.21	100 ft.	X	4695-0008	52.30

Green Cover (4695G)

306610	1½	38.0	2.04	51.8	200	1.38	30.0	762	4.0	102	.85	.39	100 ft.	X	4695-0211	$23.69
306611	2	51.0	2.54	64.5	200	1.38	30.0	762	4.5	114	1.08	.49	100 ft.	X	4695-0216	29.85
306612	3	76.0	3.58	90.9	150	1.03	30.0	762	6.0	152	1.76	.80	100 ft.	X	4694-0229	42.49

RECOMMENDED FOR: Tank truck, barge, ship, or storage tank transfer of a variety of chemical products. Mustang 45HW contains a wire helix for full suction capability, as well as for routing hoses through tight bends. Its Modified Cross-linked Polyethylene tube stock is "best in class" for maintaining a tight seal with stainless steel fittings, and is designed for cleaning with 50 PSI steam or in a bath containing 10% (NaOH) @212°F (100°C). Applications include over 950 basic chemicals which are building blocks for numerous chemicals used in a variety of industries. Reference Gates Chemical Resistance Table on page 131 for proper hose selection.

TEMPERATURE: -40°F to +250°F (-40°C to +121°C) normal service. Mustang 45HW is designed to withstand fluid temperatures to 250°F (+121°C), however the rating is dependent on the specific chemical conveyed. Contact Denver Product Application (303) 744-5070 for any chemical above 125°F (+52°C).

CONSTRUCTION: **Tube:** Type K (Gatron® Modified Cross-linked Polyethylene). Tan. High chemical resistance.
Reinforcement: Synthetic, high tensile textile with steel wire helix.
Cover: Type P (EPDM). Black or green corrugated with orange spiral stripe. Blue, red, gray, tan and yellow covers available on special order.

COUPLINGS: Gates has tested hose assemblies at the maximum rated service temperature to assure your safety. Use 7, 8 or 49 **for fluid temperatures to 125°F (+52°C).** Use permanent fittings only 71 or 73 **for fluid temperatures above 125°F (+52°C) and up to 250°F (+121°C).** Reference pages 117-128.

PACKAGING: 100′ length coiled and wrapped in polyethylene.

BRANDING: Continuous spiral transfer label. Example: " Mustang™ 45HW Acid-Chemical Suction/Discharge 200 PSI (1.38MPa) WP Made In U.S.A. For Your Safety: Use Permanent Couplings above 125°F."

SPECIAL ORDER REQUIREMENTS: Special production runs require minimum order quantities of 400 feet per size. If a special transfer label is required, contact Denver Industrial Hose Marketing for minimum quantity.

Blue, red, gray, tan and yellow covers are made to order and require minimum production order quantities of 400 feet per size. For price, add 10% (x1.10) to above prices.

REMNANT LENGTHS: Remnant lengths are sometimes available in popular sizes at a discount. Contact Denver Industrial Hose Marketing for pricing, order requirements and availability.

Due to continual product improvements, Gates reserves the right to alter specs and prices without prior notice.

Quick Connect Kamlock Coupler + Adapt.

- Civacon (Various Models

Industrial Site Services, Inc./
Ontario Specialty Contracting, Inc.
8215 Golden Oak Circle, Clarence, NY 14221
(716) 856-3333
Fax (716) 842-1630

SUBMITTAL INFORMATION SHEET

Name of The Project: **Primoshield Plating Site**
Utica, New York
NYSDEC Site No. 6-33-027

Date of Submittal: July 16, 1998

Submittal No: 001

Item No: M-1 / Item 7

Description of Item: Quick Connect Kamlock Coupler + Adapter

Intended Use: TREATMENT System

Item Submitted is: As Specified / (Approved Equal)

Manufacturer's/Supplier's Certification is Enclosed / To Follow

Signed: [signature]

(Contractor hereby certifies that all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog number and similar data with respect thereto have been reviewed or that Shop Drawing or sample has been coordinated with other Shop Drawings and samples and with the requirements of the Work and the Contract Documents)

Consultant's Comment: _____

Action: _____

KAM-PL
Effective Feb. 1, 1995

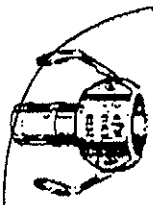
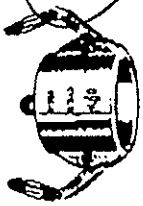
civacon™

Twin-Kam™ Kamlok® Price List

Standard Items

O.K. 7-20-95 TAW

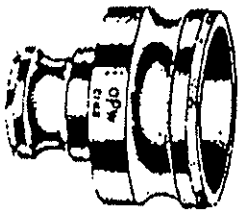
PRODUCT	SIZES	ALUMINUM SUFFIX	ALUMINUM PRICE	BRONZE SUFFIX	BRONZE PRICE	S. STEEL SUFFIX	S. STEEL PRICE
 633-A Adaptor Female N.P.T.	½"	0100	$2.80	0400	$4.10	0700	$25.50
	¾"	0110	3.00	0410	4.50	0710	25.50
	1"	0120	3.45	0420	4.85	0720	25.70
	1¼"	0130	4.90	0430	5.70	0730	42.15
	1½"	0140	4.85	0440	6.60	0740	27.60
	2"	0150	5.70	0450	9.20	0750	32.05
	2½"	0160	9.25	0460	18.40	0760	84.00
	3"	0170	11.25	0470	18.75	0770	83.85
	4"	0180	26.15	0480	45.05	0780	114.05
	5"	0185	42.75				
	6"	0190	52.65				
 633-F Adaptor Male N.P.T.	½"	0100	3.00	0400	5.65	0700	29.30
	¾"	0110	3.65	0410	5.65	0710	29.30
	1"	0120	4.35	0420	6.35	0720	32.60
	1¼"	0130	5.85	0430	9.35		
	1½"	0140	5.90	0440	10.30	0740	42.10
	2"	0150	7.35	0450	12.95	0750	45.60
	2½"	0160	13.70				
	3"	0170	15.20	0470	26.45	0770	92.60
	4"	0180	28.60	0480	48.15	0780	140.05
	6"	0190	63.45				
 633-E Adaptor Hose Shank	½"	0110	4.35	0410	7.00	0710	27.35
	1"	0120	4.55	0420	8.60	0720	28.15
	1¼"	0130	5.50	0430	11.85	0730	41.15
	1½"	0140	5.60	0440	11.45	0740	33.10
	2"	0150	6.95	0450	15.20	0750	35.70
	2½"	0160	11.85				
	3"	0170	13.50	0470	25.35	0770	71.35
	4"	0180	28.25	0480	53.80	0780	137.45
	5"	0185	45.35				
	6"	0190	54.95				
 634-A Dust Plug	½ & ¾"	0110	4.05	0410	6.05	0710	23.10
	1"	0120	4.55	0420	6.15	0720	23.95
	1¼"	0130	5.50			0730	37.10
	1½"	0140	5.75	0440	8.55	0740	27.20
	2"	0150	6.20	0450	10.15	0750	35.60
	2½"	0160	8.50			0760	71.45
	3"	0170	9.70	0470	15.60	0770	57.30
	4"	0180	14.75	0480	25.40	0780	90.80
	5"						
	6"	0190	30.85				

PRODUCT	SIZES	ALUMINUM SUFFIX	ALUMINUM PRICE	BRONZE SUFFIX	BRONZE PRICE	S. STEEL SUFFIX	S. STEEL PRICE
 633-D Coupler Female N.P.T.	½"	0100	$7.35	0400	$11.10	0700	$41.05
	¾"	0110	7.50	0410	11.10	0710	41.05
	1"	0120	7.90	0420	12.40	0720	44.25
	1¼"	0130	10.60	0430	16.40	0730	75.70
	1½"	0140	10.45	0440	16.90	0740	55.20
	2"	0150	11.65	0450	20.50	0750	63.40
	2½"	0160	17.90	0460	28.30	0760	125.40
	3"	0170	20.30	0470	36.35	0770	128.05
	4"	0180	31.25	0480	58.60	0780	166.25
	5"	0185	55.35				
	6"	0190	72.50				
 633-B Coupler Male N.P.T.	½"	0100	7.10	0400	8.90	0700	40.35
	¾"	0110	7.50	0410	10.95	0710	40.35
	1"	0120	8.05	0420	12.80	0720	44.95
	1¼"	0130	11.70				
	1½"	0140	10.25	0440	17.35	0740	54.2
	2"	0150	11.30	0450	20.85	0750	63.50
	2½"	0160	17.30				
	3"	0170	20.85	0470	38.20	0770	123.20
	4"	0180	32.20	0480	57.20	0780	164.75
	6"	0190	74.70				
 633-C Coupler Hose Shank	½"	0110	7.25	0410	11.90	0710	39.60
	1"	0120	7.65	0420	13.20	0720	41.05
	1¼"	0130	11.20	0430	17.45	0730	63.05
	1½"	0140	10.25	0440	17.60	0740	48.55
	2"	0150	11.65	0450	21.50	0750	50.75
	2½"	0160	17.65	0460	32.20	0760	104.70
	3"	0170	19.70	0470	35.40	0770	106.50
	4"	0180	29.55	0480	50.35	0780	151.10
	5"	0185	51.55				
	6"	0190	74.10				
 634-B Dust Cap	½ & ¾"	0110	7.20	0410	10.30	0710	33.20
	1"	0120	8.30	0420	13.10	0720	38.45
	1¼"	0130	10.55	0430	14.65	0730	53.80
	1½"	0140	9.90	0440	15.35	0740	46.40
	2"	0150	9.40	0450	17.25	0750	58.55
	2½"	0160	14.10			0760	80.25
	3"	0170	14.60	0470	25.20	0770	75.10
	4"	0180	21.30	0480	38.10	0780	96.5
	5"	0185	35.65				
	6"	0190	52.90				

Contact Customer Service at 800-626-5657 if you cannot find the product you require.

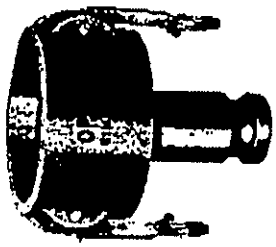
Reducing Couplers & Adaptors

When 2 sizes are listed, such as 4" x 2", the first dimension is the adaptor or coupler size, the second dimension is the fitting size.



633-AA
DOUBLE ADAPTOR
ALUMINUM

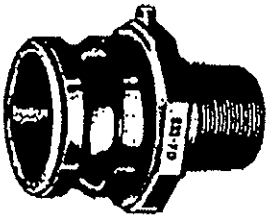
SIZE	SUFFIX	PRICE
1"hX2"	1360	$18.85
2X2"	1385	19.50
3X3"	1225	30.80
4X4	1386	44.35



COUPLER X ADAPTOR

633-BA COUPLER/ ADAPTOR ALUMINUM
(COUPLER X ADAPTOR)

SIZE	SUFFIX	PRICE
2x1"h"	0920	$27.00
2X2"	0950	31.90
3X3"	1040	34.10
3X4"	1060	44.35
4X2"	8353	54.50
4X3"	1080	53.35



ADAPTOR X MALE THD.

633-FD
REDUCING ADAPTOR
ALUMINUM X MALE N.P.T.

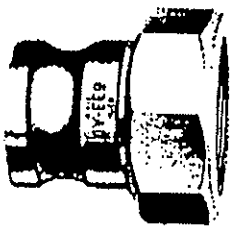
SIZE	SUFFIX	PRICE
3"X2"	8760	28.95
3"X4"	8850	37.85
4"X3"	8788	51.35



COUPLER X MALE THD.

633-BD
REDUCING COUPLER
ALUMINUM X MALE THREAD

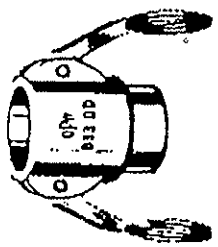
SIZE	SUFFIX	PRICE
4"X3"	1245	$51.40



ADAPTOR X FEMALE THD.

633-AD
REDUCING ADAPTOR
ALUMINUM X FEMALE N.P.T.

SIZE	SUFFIX	PRICE
4"X3"	6090	$67.90

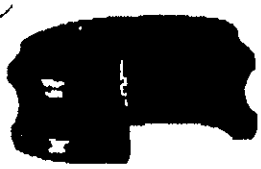


COUPLER X FEMALE THD.

633-DD
REDUCING COUPLER
ALUMINUM X FEMALE THREAD

SIZE	SUFFIX	PRICE
3"X2"	0800	$52.75

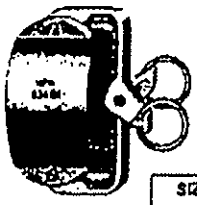
Miscellaneous Couplers & Adaptors



When ordering, size of bore (O.D. of tubing or pipe) must be specified.

633-AW ADAPTOR WITH SOCKET WELDING END

SIZES	ALUMINUM		S. STEEL	
	SUFFIX	PRICE	SUFFIX	PRICE
2"x2.015"	9120	$19.25		
2"x2.395"	9127	19.25	9126	$84.85
3"x3.015"	9130	28.40		
3"x3.530"	9131	28.40	9135	107.85
4"x4.015"	9170	41.95		
4"x4.530"	9171	41.95	9172	153.40
5"x5.020"	9180	68.55		



634-BK LOCKABLE CAP

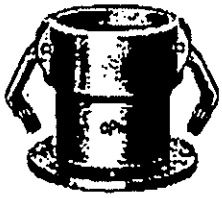
SIZES	ALUMINUM		S.STEEL	
	SUFFIX	PRICE	SUFFIX	PRICE
2"	0090	$29.80	0765	$114.70
3"	0100	36.40		
4"	0200	50.86	0785	191.70
6"	0210	95.75		



ALUM. FLAT FACE
S. ST. RAISED FACE.
4" SHOWN

633-LAS ADAPTOR 150 LB. ASA FLANGE

SIZES	ALUMINUM		S. STEEL	
	SUFFIX	PRICE	SUFFIX	PRICE
2"			3050	$221.45
3"	3192	$108.90	3070	280.40
4"	3181	174.15		



BRONZE FLANGES
ARE FLAT FACE.

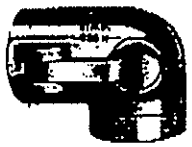
633-LBS COUPLER 150 LB. ASA FLANGE BRONZE

SIZES	SUFFIX	PRICE
4"	5085	$295.60



633-G ELBOW COUPLER W/CHECK VALVE ALUMINUM

SIZE	SUFFIX	PRICE
2"	0150	$74.15
3"	0170	125.25



633-H ELBOW COUPLER ALUMINUM

SIZE	SUFFIX	PRICE
1½"	0140	$32.30
2"	0150	34.25
3"	0170	58.25

Gaskets for CIVACON™ Kamlok® Couplers

COMPOUND	COMPOUND SYMBOL		½"-¾"	1"	1¼"	1½"	2"	2½"	3"	4"	5"	6"
BUNA-N (STANDARD)	GREEN OR WHITE STRIPES M	Part No.	H6585M .40	H6480M .45	H6477M .55	H6430M .55	H20544M .60	H20545M .90	H20546M .95	H20547M 1.45	H20548M 3.35	H20549M 3.45
E.P.T.	WHITE & YELLOW STRIPES N	Part No.	H5215M 1.80	H5216M 2.10	H20534M 3.05	H20535M 3.15	H20536M 3.15	H20537M 5.85	H20538M 5.95	H5225M 7.50		H20539M 11.55
NEOPRENE	BLUE STRIPES P	Part No.	H1881M 3.75	H1884M 3.75	H1887M 3.75	H1890M 3.75	H1893M 4.00	H1896M 4.20	H1899M 4.20	H1902M 4.20		H1251M 10.75
WHITE NEOPRENE	OPW ON O.D. WP	Part No.		H4196M 7.50		H4200M 7.50	H4201M 7.50	H1189M 11.50	H1190M 11.50	H4208M 11.75		H4209M 16.50
TEFLON*	NONE T	Part No.	H1979M 3.55	H1980M 3.80	H1981M 6.90	H1982M 6.90	H1983M 6.95	H2172M 19.25	H2173M 19.50	H2174M 35.15		H2175M 62.75
VITON-A	RED STRIPES V	Part No.	H966M 3.75	H967M 5.70	H968M 9.85	H972M 9.85	H973M 12.55	H974M 19.90	H975M 20.05	H976M 26.45		H977M 107.25
TEFLON ENVELOPE GASKET	BUNA-N FILLER	Part No.	H3304 7.35	H3307 7.40	H3310 7.50	H3317 8.90	H3325 8.90	H3330 22.90	H3333 22.90	H3336 35.80		
TEFLON ENVELOPE GASKET	VITON-A FILLER	Part No.	H3401 12.75	H3402 12.75	H3405 16.45	H3407 18.50	H3408 18.10	H3410 28.95	H3411 75.85	H3412 94.15		

*Solid Teflon® gasket recommended for use with viscous fluid only.
To compute price of CIVACON™ Kamlok® with special gasket: Add price of special gasket. Other gaskets such as Silicone and Compar are available. Consult CIVACON™.

TWIN-KAM™ KAMLOK® Coupler Parts Kits

with Guaranteed For Life Twin-Kam® Arms

CIVACON™ KAMLOK® Coupler Parts Kits are packaged in convenient plastic pouches, pre-punched for easy hanging in stock room or display area. Each Part Kit includes two genuine patented Guaranteed For Life Twin-Kam® Arms, groove type pins, and finger rings necessary to repair a Coupler or Dust Cap.



Parts Kit includes 2 Cam Arms, plus Pins, 2 Finger Rings instructions.

KITS FOR COUPLERS AND DUST CAPS				
SIZES	AL,BR,Φ	PRICE	S.ST.Φ	PRICE
½" & ¾"*	H-9832	3.50	H2164	$ 6.45
1"	H-9833	5.50	H-1836	6.45
1¼" thru 2½"	H-1829	7.85	H-1836	10.75
3", 4", & 5"	H-487	12.70	H-2167	18.80
**6"	H-2124	34.55		

H-20691 Zinc Plated Carbon Steel Arms for 3" and 5" Kamloks – $12.35.

Φ Coupler Material of Construction

* Note: Finger Rings are not included with ½" and ¾" Kit.

** Note: 6" Cam Arms are bronze and do not have Twin-Kam and GFL feature.

Our Strong Arm Guarantee: Should a Guaranteed For Life GFL™ Twin-Kam Arm ever break CIVACON™ will replace it Free of Charge – no questions asked.

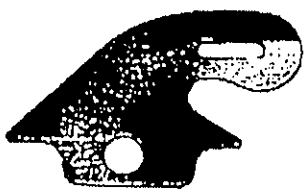
CAUTION: We do not recommend the use of TWIN-KAM arms on couplers not manufactured by CIVACON™ Dimensional differences do exist and proper performance cannot be assured.

Sur-Lok™ Clip Kit 634-LK

Cam Arm cannot be opened until spring is released.

The Kit contains:
1) One Stainless Steel Spring
2) One Wave Washer (Steel)
3) Two Flat Washers (Stainless Steel)
4) One Cam Arm Pin (Stainless Steel)
5) Complete Installation Instructions



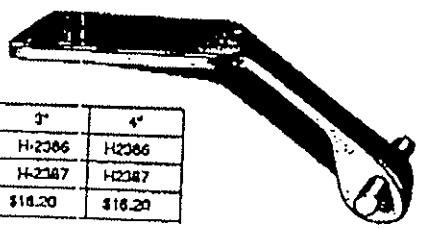


SIZE	SUFFIX	PRICE
1"	1020	$6.50
1¼"	1030	6.50
1½"	1040	6.50
2"	1050	6.50
2½"	1060	6.50
3"	1070	7.00
4"	1080	8.20

Accessories

BRASS SECURITY CHAIN (W/"S" HOOKS)	6" LONG	H06682M..... $ 2.95
	12" LONG	H06683M..... $ 4.15
ZINC PLATED SECURITY CHAIN (WITH FINGER RING)	12" LONG	H-1436..... $ 4.80
FINGER RING	1"-2½"	H6451M..... .20
	3" - 6"	H7592M..... .20
SPRING FINGER RING	1"-6"	H20550M..... .30

Bronze Paddle Cam Arm provides extra leverage



	3"	4"
COUPLER	H-2386	H2386
DUST CAP	H-2387	H2387
	$16.20	$16.20

Price for 1 Arm and 1 Pin

* Requests for special adaptations of this equipment should be addressed by contacting the factory.

civacon

P.O. Box 54907 • Cincinnati, Ohio 45254
Phone: (513) 528-2700 • FAX: (513) 528-7802
(800) 524-5657 (800) 634-1433

A DOVER RESOURCES COMPANY

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Project Submittal

Climate Control Heating Unit

Date: *May 27, 1998*

Project: *Primo Shield*

Location: *Utica, New York*

Engineer: *NYSDEC*

Contractor: *Ontario Specialty Contracting*

Manufacturer:

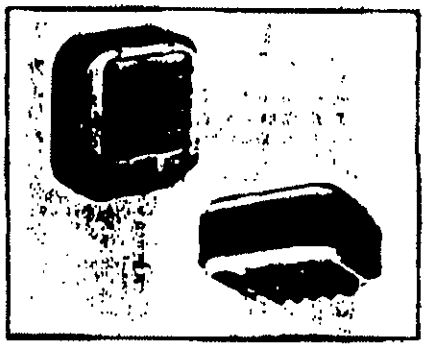
KISTNER CONCRETE PRODUCTS INC.

8713 Read Road
East Pembroke, New York 14056
Tel: 716-762-8216
Fax: 716-762-8315

Mark - 2 pages

TYPE MUH
UNIT HEATERS

- One unit mounts either horizontally or vertically. Totally versatile. For factories, warehouses, garages, stores, shipping rooms, power stations, aircraft hangars. Can be used for primary, supplementary, spot, or dual-system heating.
- Wide range of optional control kits are field installable, increasing the MUH adaptability to the specification market.
- Forced air unit heater with 10 power ratings: from 3 Kw to 50 Kw heating output; 208, 240, 277 and 480V. 10,220 to 170,600 BTU/hr.
- 25 compatible models (no need to try to assemble a heating system from 70 or 80 models!)
- Heavy gauge die-formed steel housing. Two-toned, smartly styled.
- Advanced pull-through air flow design draws air across heating element for more even air distribution and cooler element operation.
- Specially designed venturi outlet to meet throw as required in vertical position.
- Branch circuit fusing (when required).
- Completely enclosed fan motor.
- 1-or 3-phase wiring on 5 through 10 Kw 208/240V and 15 Kw 208V units (field interchangeable).
- Aluminum-finned, copper clad steel sheath heating element has longer useful life, because of cooler sheath temperature and faster heat dissipation.
- 24V control transformer standard on most models, providing a safer and more accurate means of temperature control. 3 Kw and 5 Kw, 208-277V, have the voltage controls as standard. (24V control available on made-to-order basis.)
- Automatic reset linear thermal cut-out, capillary type, provides protection over entire length of element area. (Manual reset protection available on made-to-order basis.)
- 2-speed fan selector switch (25 to 50 Kw models).
- Fan delay feature eliminates cold drafts. Element heats up before fan cuts in, then fan continues to distribute heat after element shuts off.
- Rugged-built, yet lighter weight for easier installation. No piping fluids, valves, or traps.
- Individually adjustable discharge louvers to control air flow.
- Choice of optional diffusers for variety of air patterns, maximizing heat concentration and coverage in the vertical position.
- Meets all UL, NEC, and OSHA requirements.



LISTED

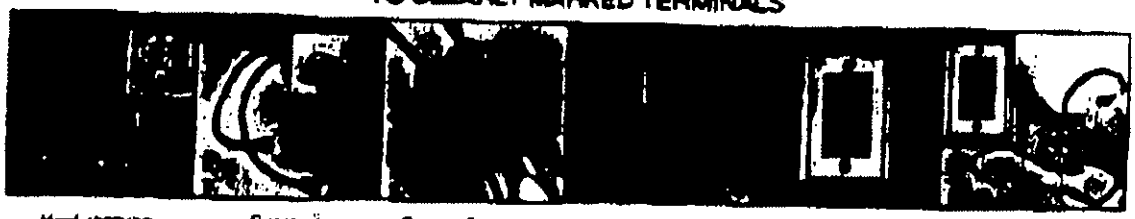
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SELECTION CHART 347V and 600V Models Available, Contact Sales Representative

Model No.	Nominal Input						Nominal Output	Air Handling Data			Fan Motor Data			Maximum Fuse Size		Shipping Wt.	Wire Size	Connection Size
	Watts	Phase	Amps				BTU/hr											
[illegible]	[illegible]																	

Notes:
1. [illegible]
2. [illegible]
3. On dual voltage units, [illegible]
4. [illegible]
5A. Standard
5B. Optional - made to order - amp load [illegible]
5C. Optional - made to order - amp load [illegible]

CONTROL KITS INSTALL EASILY IN THE FIELD TO CLEARLY MARKED TERMINALS



Heat recovery thermostat & low voltage relay | Summer fan switch | Power disconnect switch (25 or 63 amp) | One & two-stage thermostats | Remote manual fan switch (line voltage) | Remote manual fan switch (with relay) 24V

ACCESSORIES

CATALOG NO.	DESCRIPTION	ELECTRICAL RATINGS	FOR USE WITH HEATERS NO.
MT-1	Single Pole Universal Thermostat Temp. Range: 40°F - 86°F	25A, 1 HP, 240V, A.C. Res. 25A, 277V, A.C. Res.	All MUH Series Heaters (except MUH06-21 SB, and MUH08-61 3S, which use MT-2).
MT-2	Two Stage Universal Thermostat Temp. Range: 40°F - 86°F	25A, 1 HP, 240V, A.C. Res. 25A, 277V, A.C. Res. 12FLA, 72LRA, 240V, A. Pilot Duty	MUH06-21 3S, MUH08-61 3S, MUH-15-2, MUH-20-2, MUH-25-2, MUH-35-2, MUH-40-4, MUH-50-4, MUH-50-2.
MSFS	Universal Summer Fan Switch	5A, 600V, A.C. Res. 2 HP, 230, 460, 600V, A.C. 1, 2, or 3Ø	All MUH Series Heaters
MRFS-1	Remote Summer Fan Switch (Line Voltage)	3 HP, 230-240V, A.C.	All MUH Series Heaters
MRFS-3	Remote Summer Fan Switch with Relay (24V Coil-Single Pole Normally Open)	5 AR, 33 ALR, 240V, A.C. 60 HZ 3 AR, 18 ALR, 480V, A.C. 60 HZ	All MUH Series Heaters (except MUH06-21, MUH03-71, MUH06-61, MUH08-61, MUH03-71, MUH08-61 Units, unless optional control transformer is supplied)
MHRT	Heat Recovery Thermostat with relay (24V Coil-Single Pole Normally Open) Hi—120°F; Low—60°F	5 AR, 33 ALR, 240V, A.C. 60 HZ 3 AR, 18 ALR, 480V, A.C. 60 HZ	All MUH Series Heaters (except MUH03-21, MUH03-71, MUH03-61, MUH08-61, MUH05-71, MUH06-61 Units, unless optional control transformer is supplied)
MFDS-24	Power Disconnect Switch (2 Pole)	25A, 600V, A.C. Res.	MUH06-21, MUH08-41, MUH03-71, MUH06-61, MUH06-21, MUH08-41, MUH08-71, MUH06-61 MUH-07-4, MUH-15-4, MUH-20-4, MUH-25-4.
MFDS-48	Power Disconnect Switch (3 Pole)	63A, 600V, A.C. Res.	MUH-07-2, MUH-07-7, MUH-07-6, MUH-10-2, MUH-10-7, MUH-10-4, MUH-15-2, MUH-15-6 2S only, MUH-20-2, MUH-20-6, MUH-25-2, MUH-25-4, MUH-35-4, MUH-40-4, MUH-50-4.

NOTE: *Summer Fan Switch MSFS cannot be used with Remote Fan Switch/Relay MRFS-3 or with Heat Recovery Thermostat/Relay MHRT.
**MHRT cannot be used with MT-1 or MT-2.

ACCESSORIES

UNIVERSAL WALL & CEILING BRACKET

CATALOG NO.	DESCRIPTION
[illegible]-15	MUH-03, 05, 07 & 10
[illegible]-20	MUH-15 & 20
[illegible]-35	MUH-25 & 35
[illegible]-50	MUH-40 & 50

CEILING BRACKET

CATALOG NO.	DESCRIPTION
[illegible]-10	MUH-03, 05, 07 & 10
[illegible]-20	MUH-15 & 20
[illegible]-35	MUH-25 & 35
[illegible]-50	MUH-40 & 50

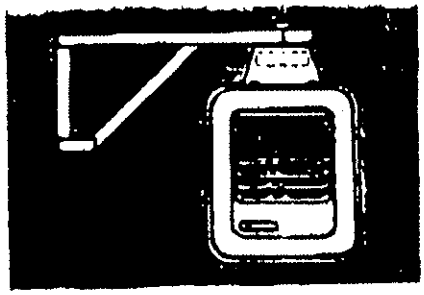
BRACKET SIZE

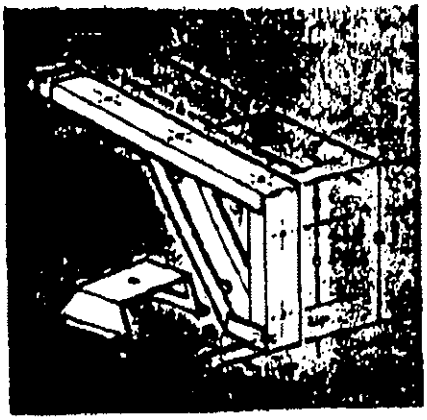
DIMENSION	1 - 20kW	25 - 50kW
A	7¼"	9⅞"
B	8⅛"	14⅜"
C	7½"	12⅞"
D	1⅝"	3⅛"
E	2⅛"	3"
L	20⅜"	28⅝"
M	9⅝"	16⅜"
N	3⅛"	4⅛"

OPTIONAL BUILT-IN CONTROLS AND ACCESSORIES ON MUH HEATERS

Factory Installed Only	
DESCRIPTION	
MUH-02 & 05 (208, 240V/10, 277V Supply) 24 or 120V Control Transformer 24 or 120V H.C. Power Contactor	
MUH-05 & 07 (480V Supply) & MUH-07 thru MUH-50 Optional 120V Control	
3-Stage Control of Elements (See Note 6).	
Manual Reset.	
Corded Mesh (Bird Screens) For all MUH Heaters.	

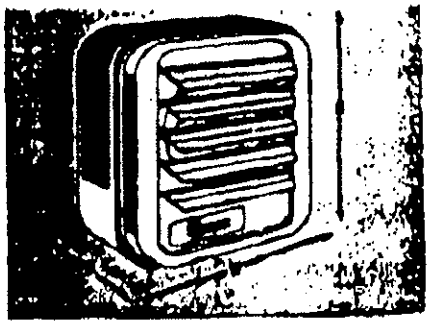
† Optional built-in controls and accessories factory installed only - Not to be field installed





DIMENSIONS

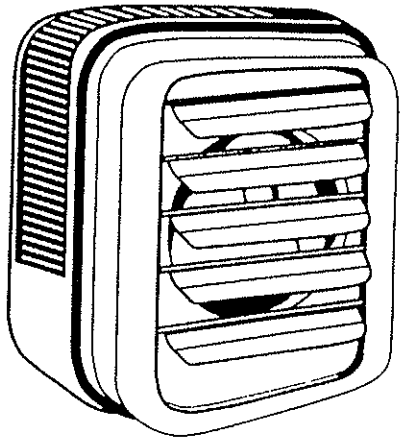
CATALOG NO.	HEIGHT	WIDTH	DEPTH
MUH-02 & 05	18"	14"	7⅛"
MUH-07 & 10	21⅛"	18"	9⅛"
MUH-15 & 20	21⅛"	18"	12⅛"
MUH-25 & 35	30"	23⅝"	11⅝"
MUH-40 & 50	30"	28⅝"	17⅛"



MOUNTING LIMITATIONS

Unit heaters should not be used in potentially explosive atmospheres. The finish is not intended for direct salt spray exposure in marine applications or the highly corrosive atmospheres at swimming pools, chemical storage bins, etc. Do not install unit heaters above recommended maximum mounting height. Obstructions must not block unit heater air inlet or discharge. Heaters must be mounted at least 7' above the floor to prevent accidental contact with the heating element or fan blade which could cause injury.

QMARK®
A Division of Marley Electric Heating



MUH Series
Modular Unit Heaters

LISTED c LISTED
FILE #E21609

Installation & Maintenance Instructions

Dear Owner,

Congratulations! Thank you for purchasing this new heater manufactured by a division of Marley Electric Heating. You have made a wise investment selecting the highest quality product in the heating industry. Please carefully read and follow the installation and maintenance directions shown in this manual. You should enjoy years of efficient heating comfort with this product from Marley Electric Heating... the industry's leader in design, manufacturing, quality and service.

... The Employees of
Marley Electric Heating

⚠ WARNING ⚠

Read Carefully - These instructions are written to help you prevent difficulties that might arise during installation of heaters. Studying the instructions first may save you considerable time and money later. Observe the following procedures, and cut your mounting time to a minimum.

To **reduce risk of fire** or **electric shock:**

1. To prevent electrical shock, disconnect all power coming to heater at main service panel before wiring or servicing.
2. All wiring must be in accordance with the National and Local Electrical Codes and the heater must be grounded as a precaution against possible electric shock.
3. Verify the power supply voltage coming to heater matches the ratings printed on the heater name plate before energizing.
4. This heater is hot when in use. To avoid burns, do not let bare skin touch hot surfaces.
5. Do not insert or allow foreign objects to enter any ventilation or exhaust opening as this may cause an electric shock, fire,or damage to the heater.
6. To prevent a possible fire, do not block air intakes or exhaust in any manner. Keep combustible materials, such as crates, drapes, etc., away from heater. Do not install behind door, furniture, towels, or boxes.
7. A heater has hot and arcing or sparking parts inside. Do not use it in areas where gasoline, paint or flammable liquids are stored.
8. Use this heater only as described in this manual. Any other use not recommended by the manufacturer may cause fire, electric shock, or injury to persons.
9. This heater is not approved for use in corrosive atmospheres such as marine, green house or chemical storage areas

SAVE THESE INSTRUCTIONS

IMPORTANT

CAUTION

THE HEATER MUST BE MOUNTED AT LEAST 7' (2134mm) ABOVE THE FLOOR TO PREVENT ACCIDENTAL CONTACT WITH THE FAN BLADE WHICH COULD CAUSE INJURY.

CAUTION

ALL BUILT-IN THERMOSTATS: IF THE HEATER IS USED TO PREVENT PIPING OR LIQUIDS FROM FREEZING, AND IF THE THERMOSTAT IS SET BELOW 45° F (7°C), THE FAN MUST RUN CONTINUOUSLY.

CAUTION

THE CEILING MOUNTING STRUCTURE AND THE ANCHORING PROVISIONS MUST BE OF SUFFICIENT STRENGTH TO SUPPORT THE COMBINED WEIGHT OF THE HEATER AND MOUNTING BRACKET. (SEE TABLE 4).

CAUTION

TO PREVENT POSSIBLE OVERHEATING OR DAMAGE DUE TO OVERHEATING, KEEP AT LEAST 5' (1524mm) CLEARANCE IN FRONT OF HEATER. REFER TO TABLE 1 FOR SIDE, TOP, AND BACK CLEARANCE REQUIREMENTS.

DO NOT MOUNT MERCURY TYPE THERMOSTAT DIRECTLY ON UNIT. VIBRATION COULD CAUSE HEATER TO MALFUNCTION.

MANUAL RESET LIMIT (FACTORY INSTALLED OPTION ONLY.) THE LIMIT SWITCH IS LOCATED INTERNALLY ON THE REAR OF THE HEATER. ON THE MUH03 AND MUH05 MODELS, THE ACCESS TO THE RESET BUTTON IS ON THE RIGHT SIDE (WHEN FACING REAR OF HEATER); ON ALL OTHER MODELS IT IS NEAR THE TOP REAR OF THE HEATER.

THE MANUAL RESET LIMIT IS IN SERIES WITH THE AUTOMATIC RECYCLING PROTECTOR (LIMIT). THE MANUAL RESET LIMIT WILL NOT RESET UNTIL THE HEATER HAS COOLED AND THE BUTTON IS PUSHED IN.

HEATER LOCATION INSTRUCTIONS

Arrange units so their discharge air streams:

a. are subjected to a minimum of interference from columns, machinery and partitions;
b. wipe exposed walls without blowing directly at them;
c. are directed away from room occupants in comfort heating;
d. are directed along the windward side when installed in a building exposed to a prevailing wind.

Locate thermostats approximately 5' (1524mm) above the floor on interior partition walls or post away from cold drafts, internal heat sources and away from heater discharge air streams.

Small rooms can be heated by one unit heater.

Large rooms require multi-unit installations. Number and capacity of units will be determined by volume of building and square feet of floor area to be heated. Arrange units to provide perimeter air circulation where each unit supports the air stream from another.

MOUNTING THE HEATER

GENERAL

The heater may be mounted to discharge the heated air either horizontally or vertically. When the heater is mounted for vertical discharge, it is recommended that the heater be positioned so that the access door will open away from the wall to provide greater access to the wiring and control compartment. If the heater is to be mounted with the access door facing a wall, the heater must be mounted far enough from that wall to allow full opening of the access door (a distance approximately equal to the width of the heater ... check clearance before installing). Refer to Table 1 for wall and ceiling clearances before mounting heater.

The heater may be mounted for either vertical or horizontal discharge by the use of threaded rods. (Refer to Table 2 for threaded rod sizes required.) Observe the detailed procedures in the following installation instructions.

The heater may also be suspended from the wall or ceiling by means of an optional mounting bracket (type MMB or MCMB) which permits horizontal pivoting of the heater.

After the heater is installed, the louvers may be positioned to

direct the heated air in the desired direction. When the heater is installed for horizontal discharge, the louvers should direct the air either straight ahead or downward. Directing the air upward may cause the heated air to remain in the ceiling area and waste energy.

HORIZONTAL DISCHARGE (Rod-mount from Ceiling)

1. Install four threaded mounting rods in the threaded holes and secure in place using lock nuts. (See Table 2).
2. Securely attach the four mounting rods to the ceiling. (Refer to Table 1 for wall and ceiling clearances, and Table 2 for mounting rod spacing).

Table 1. Wall and Ceiling Clearance, inches (mm)

Unit	Discharge	Ceiling	Side Wall	Back Wall
3 & 5 kW	Horiz.	2 (50.8)	6 (152.4)	9 (228.6)
	Vert.	6 (152.4)	18 (457.2)	18 (457.2)
7.5 to 10 kW	Horiz.	6 (152.4)	6 (152.4)	13 (330.2)
	Vert.	6 (152.4)	24 (609.6)	24 (609.6)
15 to 10 kW	Horiz.	6 (152.4)	9 (228.6)	12½ (317.5)
	Vert	6 (152.4)	24 (609.6)	24 (609.6)
25 to 50 kW	Horiz.	16 (406.4)	12 (304.8)	18½ (470.0)
	Vert.	12 (304.8)	39 (914.4)	39 (914.4)

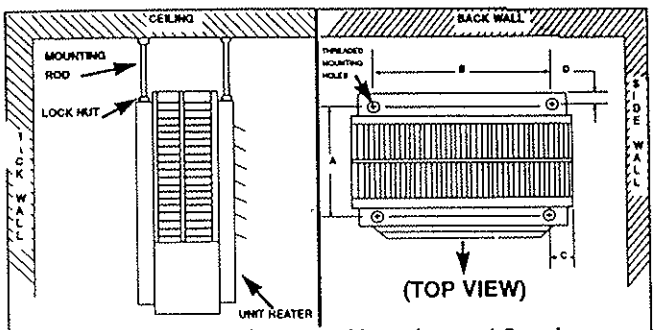


Figure 1. Horizontal Discharge Mounting and Spacing.

Table 2. Rod Thread and Spacing Dimensions, inches (mm) for Horizontal Discharge

Unit	Rod Thread Type	A	B	C	D
3 - 5 kW	5/16 - 18	6 1/16 (153.9)	6 (152.4)	4 1/16 (103.1)	3/4 (19.0)
7.5 - 10 kW			8 7/8 (225.6)	5 1/8 (130.3)	3/4 (19.0)
15 - 20 kW		11 3/8 (289.0)			
25 - 30 kW	3/8 - 16	10 9/16 (268.2)	14 - 12 (368.3)	6 3/16 (157.2)	5/8 (16.0)
40 - 50 kW		15 15/16 (404.9)	14 - 12 (368.3)	6 3/16 (157.2)	5/8 (16.0)

VERTICAL DISCHARGE (Rod-Mount from Ceiling)

1. Remove bolts from the threaded holes in the back of the heater.
2. Install four threaded mounting rods in the threaded holes and and secure in place using lock nuts.
3. Securely attach the four mounting rods to the ceiling. (Refer to Table 1 for wall and ceiling clearances, and Table 3 for mounting rod spacing dimensions.)

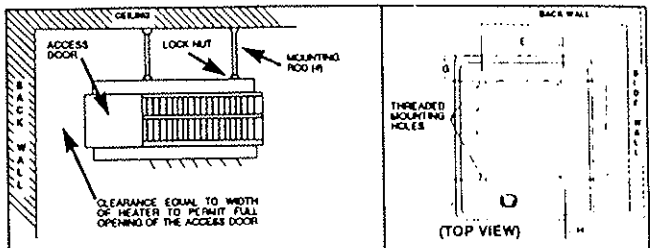


Figure 2. Vertical Discharge Mounting and Rod Spacing

Table 3. Rod Thread Type and Spacing Dimensions, inches (mm) for Vertical Discharge

Unit	Rod Thread Type	E	F	G	H
3 - 5 kW	5/16 - 18	6 (152.4)	9 3/4 247.7)	2 (50.8)	4 1/16 (103 1)
7.5 - 20 kW		8 7/8 (225.6)	14 5/8 (371.6)	2 (50.8)	5 1/8 (130.3)
25 - 30 kW	3/8 - 16	14 1/2 (368.3)	21 1/4 (539.8)	2 3/16 (56.0)	6 3/16 (157.2)

WIRING

BRANCH CIRCUIT (POWER)

1. Connect heater only to the voltage, amperage and frequency specified on the nameplate.
2. Field wiring must be properly sized to carry the amperage in accordance with the NEC.
3. The access door is hinged. There are either one or two screws accessible from the side that must be loosened to gain access. These screws are the captive type; do not try to remove them.
4. A knockout is provided in the back of the heater close to the power terminal block and the control terminal board. The control terminal board knockout is 1/2 inch (12.7 mm) conduit size. The power terminal block knockout is multiple diameter. Use the diameter that fits the required conduit size.
5. A ground terminal is provided near the power terminal board. The ground wire should be connected before other connections are made.
6. The power terminal board is equipped with box terminals sized to accept the correct size power supply wire. Wire rated at 600 V and 60° C is satisfactory for the heater branch circuit. Either aluminum or copper wire is satisfactory for connection to the heater power terminal board box terminal. Copper wire is recommended and must be used with built-in disconnect switch.

7. Each heater has a wiring diagram affixed to the inside of the access door. Consult this diagram before making any field connections.
8. Single or three-phase power connections may be used with heater models MUH0521, MUH07, MUH0581, MUH07, MUH078, MUH102, MUH108, and MUH158. These units are factory wired for single-phase operation. If these heaters are for use with three-phased power, reconnect the wires as indicated in the wiring diagram attached to the heater. Additional information can be found by looking at the wiring illustrations in Figures 3a and 3b and following the directions shown below.

On models MUH0521,MUH0581, MUH072, MUH078, MUH102, and MUH058 (Figure 3a), move only the two wires marked "A1" and marked "B1"; do not move or change any other wiring. The element lead wire marked "B1" which is factory connected to the power terminal block (terminal located closest to the elements) must be moved to terminal "B" on the three-phase terminal block. The relay (contactor) lead wire "A1" must be moved from the end terminal of the power terminal block (terminal closest to the contactor or control terminal board) to the "A" terminal of the lower terminal block (center terminal).

Model MUH158 (Figure 3b) has two three-phase terminal blocks located adjacent to the relays (contactors). Move only the two wires marked "C1" and "D1" on each of these two three-phase terminal blocks to terminal "B". Do not move or change any other wires.

9. Electrical Accessories, either kits or factory-installed options, are shown connected by a dash line on the heater wiring diagram.
10. **208/240 VOLT HEATER.** Interchange transformer red and black primary leads (see wiring diagram) when the heater is to be connected to 208 volts supply.

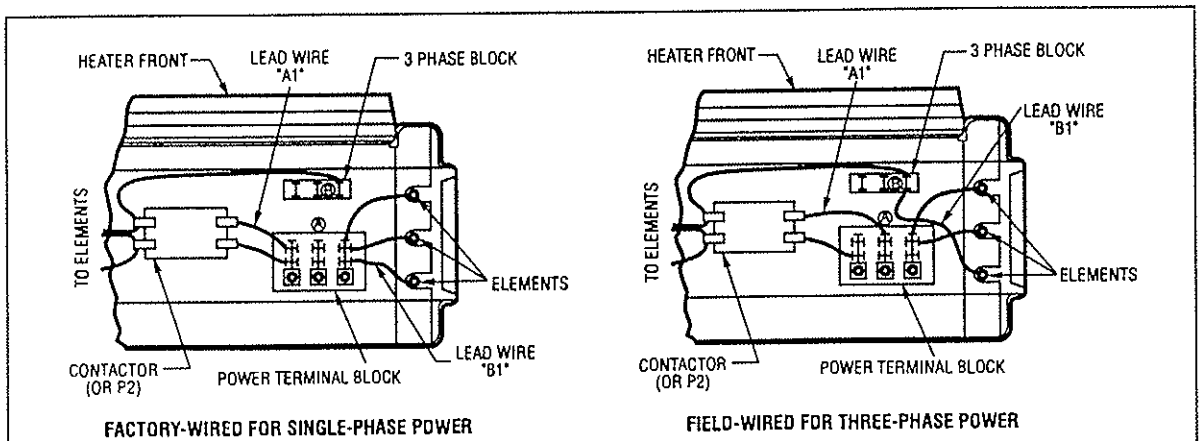


Figure 3a. Wiring Connections for Single-Phase and Three -Phase Power(MUH0521, MUH0581, MUH072, MUH078, MUH102 and MUH108)

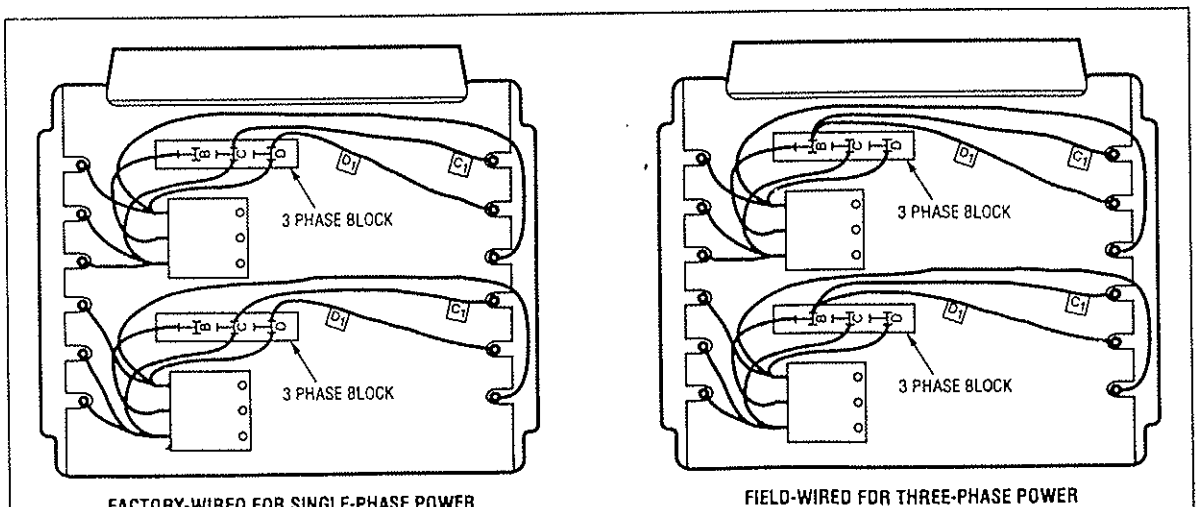


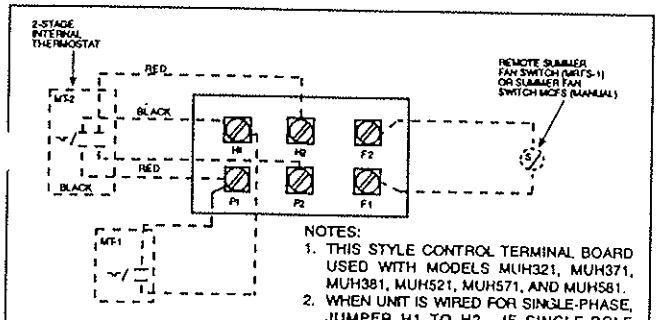
Figure 3b. Wiring Connections for Single-Phase and Three -Phase Power (MUH158)

CONTROL WIRING

⚠ WARNING ⚠

LINE VOLTAGE IS PRESENT ON SOME OF THE TERMINALS ON THE CONTROL TERMINAL BOARD. ALWAYS DISCONNECT THE POWER FROM THE HEATER BEFORE MAKING ANY CONNECTIONS TO THE CONTROL BOARD TO PREVENT ELECTRIC SHOCK HAZARD.

1. Use 600 volts, NEC Class 1 insulated wire with a minimum 18 gage for thermostats and a minimum 14 gage for line voltage motor switch (remote fan switch without relay).
2. Use a crimp-on type fork terminal on the wire end that attaches to the MUH control terminal board if more than one connection is to be made under the terminal screw.
3. Wire per Figure 4 for unit without contactors.
4. Wire per Figure 5 for unit with contactors.

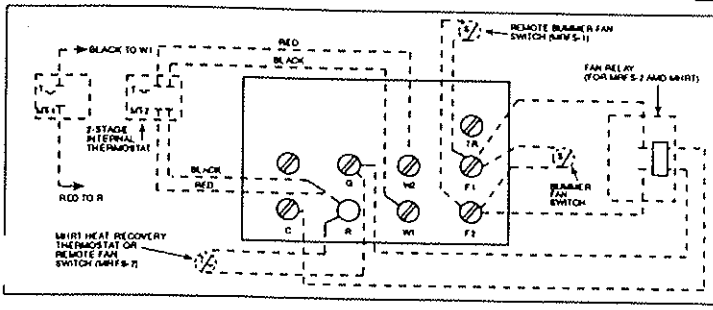


NOTES:
1. THIS STYLE CONTROL TERMINAL BOARD USED WITH MODELS MUH321, MUH371, MUH381, MUH521, MUH571, AND MUH581.
2. WHEN UNIT IS WIRED FOR SINGLE-PHASE, JUMPER H1 TO H2. IF SINGLE-POLE THERMOSTAT IS USED WITH SINGLE-PHASE UNIT, CONNECT THERMOSTAT LEADS TO P1 AND H1.
3. EXTERNAL LINE VOLTAGE THERMOSTATS SHOULD BE TREATED AS SINGLE STAGE ONLY.

Figure 4. Control Terminal Board (for Heaters Without Contactors)

Table 4. Specifications

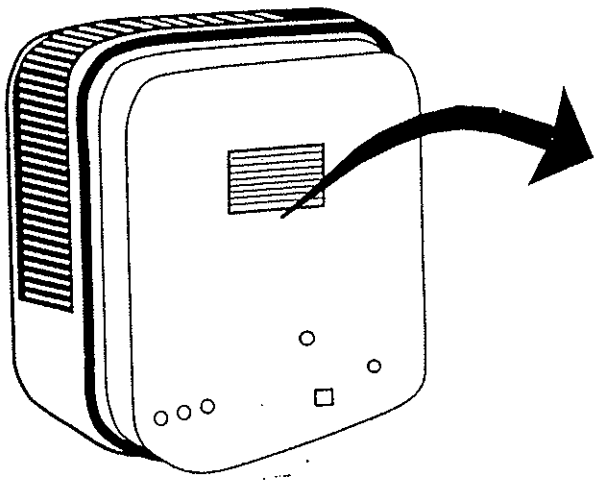
Basic Model No.	Height in (mm)	Width in. (mm)	Depth in. (mm)	Mounting Weight lbs. (kg)	Wiring Compartment Volume
MUH0381	16 (406.4)	14 (355.6)	7½ (190.5)	27 (12.2)	90 in³ (14.70 cm³)
MUH0321				27 (12.2)	
MUH0371				27 (12.2)	
MUH0341				30 (13.6)	
MUH0581				27 (12.2)	
MUH0521				27 (12.2)	
MUH0571				27 (12.2)	
MUH0541				30 (13.6)	
MUH0331				30 (13.6)	
MUH0361				30 (13.6)	
MUH0531				30 (13.6)	
MUH0561				30 (13.6)	
MUH078	21¾ (552.5)	19 (482.6)	7½ (190.5)	38 (17.2)	100 in³ (1639 cm³)
MUH072				38 (17.2)	
MUH077				38 (17.2)	
MUH074				38 (17.2)	
MUH108				38 (17.2)	
MUH102				38 (17.2)	
MUH107				38 (17.2)	
MUH104				38 (17.2)	
MUH073				38 (17.2)	
MUH076				38 (17.2)	
MUH103				38 (17.2)	
MUH106				38 (17.2)	
MUH158	21¾ (552.5)	19 (482.6)	12¾ (323.9)	54 (24.5)	140 in³ (2295 cm³)
MUH152				50 (22.7)	
MUH154				50 (22.7)	
MUH208				60 (27.2)	
MUH202				55 (24.9)	
MUH204				55 (24.9)	
MUH156				55 (24.9)	
MUH206				55 (24.9)	
MUH252	30 (76.2)	26⅝ 676.4)	11¾ (298.5)	89 (40 4)	504 in³ (8260 cm³)
MUH254				89 (40.4)	
MUH308				89 (40.4)	
MUH302				89 (40.4)	
MUH304				89 (40.4)	
MUH256				89 (40.4)	
MUH306				89 (40.4)	
MUH402	30 (76.2)	26⅝ 676.4)	17¼ (435.1)	119 (54.0)	648 in³ (10620 cm³)
MUH404				119 (54.0)	
MUH508				119 (54.0)	
MUH502				119 (54.0)	
MUH504				119 (54.0)	
MUH406				119 (54.0)	
MUH506				119 (54.0)	



NOTES:
1. THIS STYLE CONTROL TERMINAL BOARD USED WITH MODELS EXCEPT MUH321, MUH371, MUH381, MUH521, MUH571, AND MUH581
2. REMOVE JUMPER W1 TO W2 WHEN 2-STAGE THERMOSTAT IS USED.
3. *ONLY ONE OF THESE ACCESSORIES MAY BE INSTALLED IN A SINGLE HEATER.
4. EXTERNAL LINE VOLTAGE THERMOSTATS SHOULD BE TREATED AS SINGLE STAGE ONLY.

Figure 5. Control Terminal Board (for Heaters With Contactors)

IMPORTANT INFORMATION



NAMEPLATE

MODEL NO. MUH321
MFG. NO.

DATE CODE 0395

VOLTS AC 60 HZ	KILOWATTS	PHASE	MIN. SUPPLY CIR. AMPACITY
208 / 240	2.2 /3	1	
MAX. FUSE	MOTOR	CONTROLS	CUSTOMER NO
	VAC AMP	VAC	
	208/240 .25	208/240	

AIR FLOW	MINIMUM MOUNTING CLEARANCE SIDE	BACK	CEILING	FLOOR
HORIZ.	6"	9.5"	2"	7'
VERT.	18"	18"	6"	7'

WARNING: DO NOT TURN LOUVERS ABOVE LEVEL OF THE UNIT. DISCONNECT POWER BEFORE SERVICING. IF EXTERNAL CONTROL IS USED, ALSO DISCONNECT EXTERNAL POWER SUPPLY.

NE PAS RELEVER LES LAMES AU-DEL A DU NIVEAU PREVU DE L'APPAREIL. METTRE HORS TENSION AVANT DE PROCEDER A L'ENTRETIEN. SI UNE COMMANDE EXTERNE EST UTILISEE, COUPER AUSSE L'ALIMENTATION EXTERNE. ASSURER UN DEGAGEMENT D'AU MOINS 6 PI ENTRE L'APPAREIL DE CHAUFFAGE ET LEPLANCHER.

774G LISTED AIR HEATER

MARLEY ELCTRIC HEATING
BENNETTSVILLE, SC 29512

4104-0275-036

LIMITED WARRANTY

All products manufactured by Marley Electric Heating are warranted against defects in workmanship and materials for one year from date of installation, except heating elements which are warranted against defects in workmanship and materials for five years from date of installation. This warranty does not apply to damage from accident, misuse, or alteration; nor where the connected voltage is more than 5% above the nameplate voltage; nor to equipment improperly installed or wired or maintained in violation of the product's installation instructions. All claims for warranty work must be accompanied by proof of the date of installation.

The customer shall be responsible for all costs incurred in the removal or reinstallation of products, including labor costs, and shipping costs incurred to return products to Marley Electric Heating Service Center.Within the limitations of this warranty, inoperative units should be returned to the nearest Marley authorized service center or the Marley Electric Heating Service Center, and we will repair or replace, at our option, at no charge to you with return freight paid by Marley. It is agreed that such repair or replacement is the exclusive remedy available from Marley Electric Heating.

THE ABOVE WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WHICH EXCEED THE AFORESAID EXPRESSED WARRANTIES ARE HEREBY DISCLAIMED AND EXCLUDED FROM THIS AGREEMENT. MARLEY ELECTRIC HEATING SHALL NOT BE LIABLE FOR CONSEQUENTIAL DAMAGES ARISING WITH RESPECT TO THE PRODUCT, WHETHER BASED UPON NEGLIGENCE, TORT, STRICT LIABILITY, OR CONTRACT.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion or limitation may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

For the address of your nearest authorized service center, contact Marley Electric Heating in Bennettsville, SC, at 1-800-642-4328. Merchandise returned to the factory must be accompanied by a return authorization and service identification tag, both available from Marley Electric Heating. When requesting return authorization, include all catalog numbers shown on the products.

HOW TO ORDER REPAIR PARTS

In order to obtain any needed repair or replacement parts, warranty service or technical information, please contact Marley Electric Heating Service Center toll-free by calling 1-800-642-HEAT.

When ordering repair parts, always give the information listed as follows:

1. The Part Number
2. The Model Number
3. The Part Description
4. Date of Manufacture

Marley Electric Heating
A United Dominion Company
470 Beauty Spot Rd. East
Bennettsville, SC 29512 USA

Part No. 5200-0722-009

ECR 33386
2/97

MUH REPLACEMENT PARTS

MUH

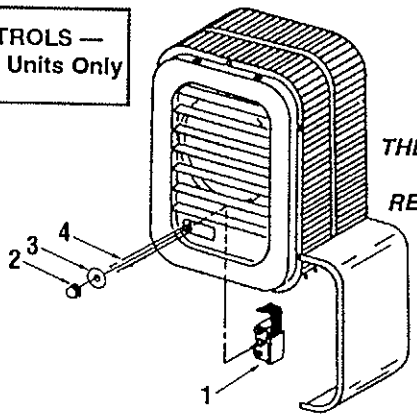
Built-in Controls

Key No.	Description	Part Number
1	Thermostat, One Pole (MT-1)	5813-0036-000
	Thermostat, Two Stage (MT-2)	5813-0035-000
2	Knob, Thermostat	3301-0060-000
3	Label, Thermostat	3502-1781-000
4	Screws, Fl. Hd., 6-32 x 1/4	5202-7009-021
5	Clip, Thermostat	1403-0041-000
6	Switch, 25A, OEM	5216-0132-000
	Switch, 25A, K & N	5216-0204-000
	Switch, 63A, OEM	5216-0131-000
	Switch, 63A, K & N	5216-0203-000
	Switch 25A, Electro	5216-0200-000
7	Screw, M4 x 10, Rd. Hd., (25A)	—
	Screw, 63A, M5 x 16, Rd. Hd.	—
8	Knob, 25A, OEM "T1"	OEM "T1"
	Knob, 25A, K & N	K & N S1B 6001
	Knob, 63A, OEM	OEM "S4"
	Knob, 63A, K & N	K & N S2B G001
	Knob, Electro	EI 141747
9	Switch, Toggle, 600V	5216-0130-000
10	Relay, Fan, 24V Coil	5018-0008-000
11	Switch Assembly	5216-0199-000
12	Manual Reset Limit	4520-0012-000

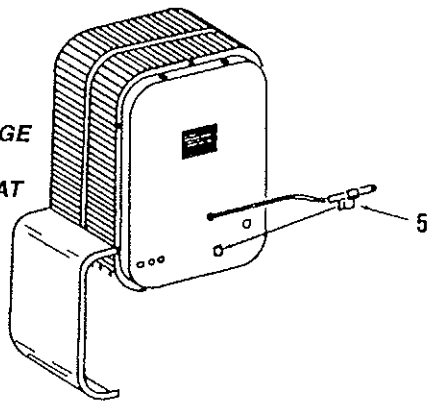
Heater Replacement Parts

Key No.	Description	Part Number
1	Spring, Element (used on MUH03 thru MUH-20 only)	5208-0073-000
	Spring, Element (used on MUH-25 thru MUH-50 only)	5208-0073-001
2	Spring, Capillary Tube	5208-0072-000
3	Spring, Element Retainer	5208-0074-000
4	Switch (used on MUH-25 thru MUH-50 only)	5216-7076-001
5	Insulator (used on MUH-25 thru MUH-50 only)	2900-0031-000
6	Bracket Extension (used on MUH-15, MUH-20, MUH-40 and MUH-50 only)	1215-0282-000
7	Switch Bracket	1215-0256-000
8	Fan Delay Protector	4520-0010-000
14	Speed Nut	4100-7036-026
15	Bracket, Captive Screw (used on MUH-03 thru MUH-20 only)	1215-0291-000
	Bracket, Captive Screw (used on MUH-25 thru MUH-50 only)	1215-0289-000
17	Protector, Linear Limit (used on MUH03 thru MUH05 only)	4520-0011-000
	Protector, Linear Limit (used on MUH-07 thru MUH-20 only)	4520-0011-001
	Protector, Linear Limit (used on MUH-25 thru MUH-50 only)	4520-0011-002
20	Clamp (used on MUH-20 thru MUH-50 only)	1417-5004-000
	Bracket, Mounting Capacitor (used on MUH-20-8 only)	1215-0314-000
22	Terminal Lug (used on MUH-07 thru MUH-50 only)	3504-7002-001
25	Bushing (used on MUH-20 thru MUH-50 only)	25221-60131
26	Washer, Ground (used on MUH03 thru MUH05 only)	6401-0034-000
27	Screw, Ground (used on MUH03 thru MUH05 only)	5202-0292-002
28	Louver (used on MUH03 thru MUH05 only)	3503-0036-000
	Louver (used on MUH-07 thru MUH-20 only)	3503-0036-001
	Louver (used on MUH-25 thru MUH-50 only)	3503-0036-002
29	Spring, Louver	5208-7005-001
32	Terminal Block, 3-Phase (used on MUH05-21, MUH-07-02, and MUH-10-2 only)	5823-0003-000
	Terminal Block, 3-Phase (used on MUH05-81, MUH-07-8, and MUH-15-8 only)	5823-0003-009
33	Terminal Doublers (used where required)	5819-7012-005

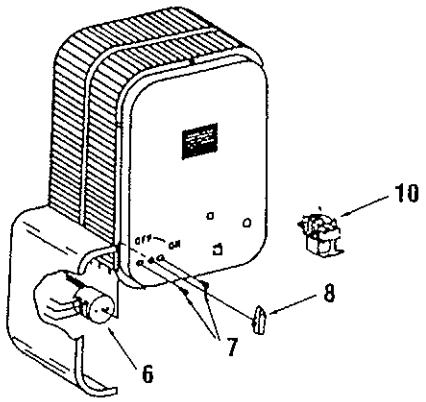
BUILT-IN CONTROLS — Made-to-Order Units Only



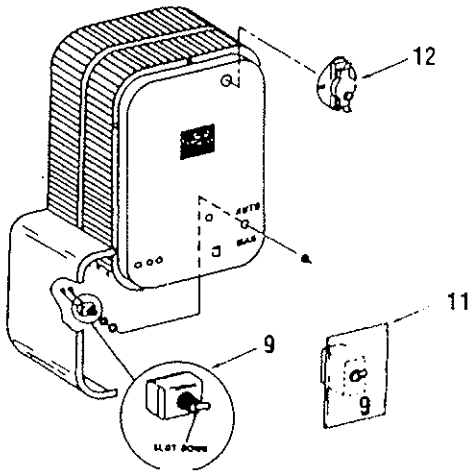
SINGLE-POLE THERMOSTAT, TWO-STAGE THERMOSTAT, HEAT RECOVERY THERMOSTAT



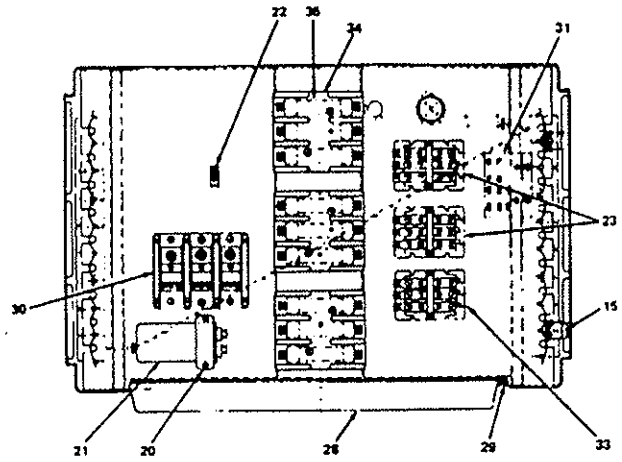
POWER DISCONNECT SWITCH



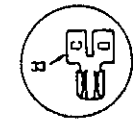
SUMMER FAN SWITCH



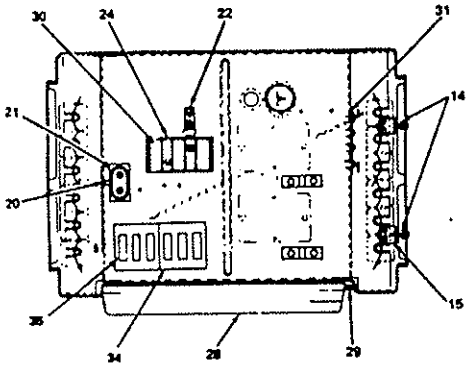
MUH (Con't.)



VIEW D-D
(MUH-26 THRU MUH-50 ONLY)



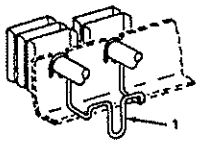
TERMINAL DOUBLER
(USED AS REQUIRED)



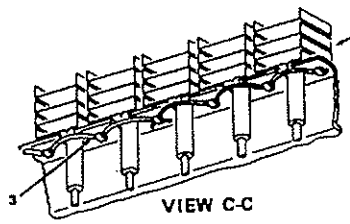
VIEW D-D
(MUH-07 THRU MUH-20 ONLY)



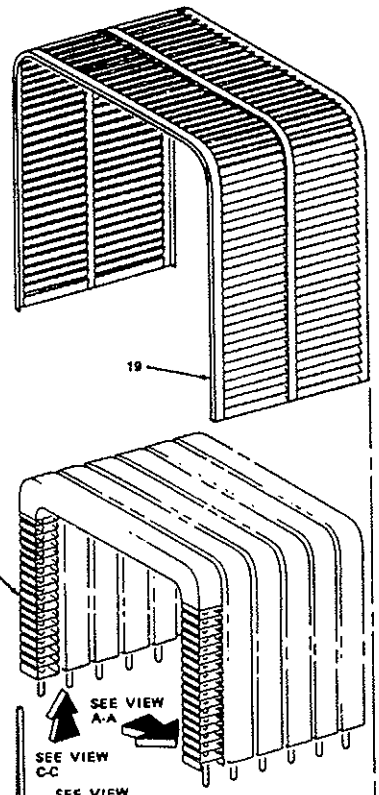
VIEW A-A

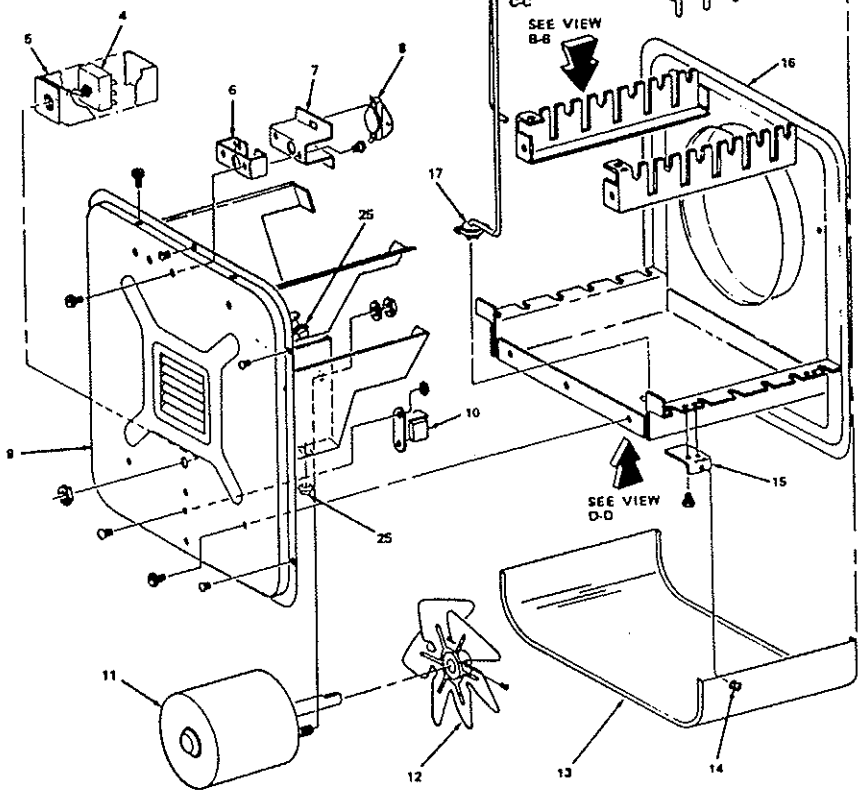


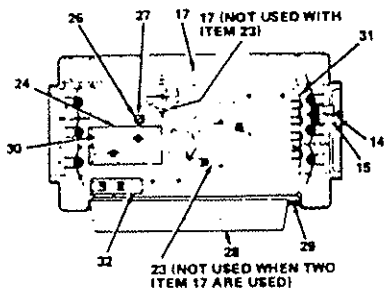
VIEW B-B



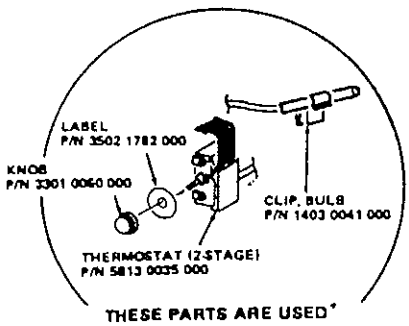
VIEW C-C







VIEW D-D
(MUH03 THRU MUH06 ONLY)



THESE PARTS ARE USED
ON MODEL MUH06-21T ONLY

MUH (Con't.)

Model No.	⑨ Back Case	⑩ Transformer**	⑪ Motor	⑫ Fan Blade	⑬ Cover	⑯ Front Case	⑱ Element Assy.	⑲ Element Guard	㉑ Capacitor
MUH03-21	1425-2004-000	–	3900-2002-006	1210-2000-000	1402-0336-001	1425-0009-005	1802-0087-000	2504-0011-000	–
MUH03-41	1425-2004-000	5814-0003-002	3900-2005-000	1210-2000-000	1402-0336-001	1425-0009-005	1802-0087-002	2504-0011-000	–
MUH03-71	1425-2004-000	–	3900-2002-007	1210-2000-000	1402-0336-001	1425-0009-005	1802-0087-001	2504-0011-000	–
MUH03-81	1425-2004-000	–	3900-2002-006	1210-2000-000	1402-0336-001	1425-0009-005	1802-0087-024	2504-0011-000	–
MUH05-21	1425-2004-000	–	3900-2002-006	1210-2000-000	1402-0336-001	1425-0009-005	1802-0087-003	2504-0011-000	–
MUH05-41	1425-2004-000	5814-0003-002	3900-2005-000	1210-2000-000	1402-0336-001	1425-0009-005	1802-0087-005	2504-0011-000	–
MUH05-71	1425-2004-000	–	3900-2002-007	1210-2000-000	1402-0336-001	1425-0009-005	1802-0087-004	2504-0011-000	–
MUH05-81	1425-2004-000	–	3900-2002-006	1210-2000-000	1402-0336-001	1425-0009-005	1802-0087-025	2504-0011-000	–
MUH-07-2	1425-0010-004	5814-0003-000	3900-2014-002	1210-0090-000	1402-0339-002	1425-0009-006	1802-0087-006	2504-0013-001	–
MUH-07-4	1425-0010-004	5814-0003-002	3900-0347-005	1210-0090-000	1402-0339-002	1425-0009-006	1802-0087-008	2504-0013-001	–
MUH-07-7	1425-0010-004	5814-0003-001	3900-2014-003	1210-0090-000	1402-0339-002	1425-0009-006	1802-0087-007	2504-0013-001	–
MUH-07-8	1425-0010-004	5814-0003-000	3900-2014-001	1210-0090-000	1402-0339-002	1425-0009-006	1802-0087-031	2504-0013-001	–
MUH-10-2	1425-0010-004	5814-0003-000	3900-2014-002	1210-0090-000	1402-0339-002	1425-0009-006	1802-0087-031	2504-0013-001	–
MUH-10-4	1425-0010-004	5814-0003-002	3900-0347-005	1210-0090-000	1402-0339-002	1425-0009-006	1802-0087-011	2504-0013-001	–
MUH-10-7	1425-0010-004	5814-0003-001	3900-2014-003	1210-0090-000	1402-0339-002	1425-0009-006	1802-0087-010	2504-0013-001	–
MUH-10-8	1425-0010-004	5814-0003-000	3900-2014-001	1210-0090-000	1402-0339-002	1425-0009-006	1802-0087-036	2504-0013-001	–
MUH-15-2	1425-0014-000	5814-0003-000	3900-0361-000	1210-0090-001	1402-0339-003	1425-0009-007	1802-0087-012	2504-0012-001	–
MUH-15-4	1425-0014-000	5814-0003-002	3900-0361-001	1210-0090-001	1402-0339-003	1425-0009-007	1802-0087-013	2504-0012-001	–
MUH-15-8	1425-0014-000	5814-0003-000	3900-0361-002	1210-0090-001	1402-0339-003	1425-0009-009	1802-0087-031	2504-0012-001	–
MUH-20-2	1425-0013-000	5814-0003-000	3900-0362-000	1210-0096-000	1402-0339-003	1425-0009-007	1802-0087-014	2504-0012-001	1432-0002-003
MUH-20-4	1425-0013-000	5814-0003-002	3900-0362-001	1210-0096-000	1402-0339-003	1425-0009-007	1802-0087-015	2504-0012-001	1432-0002-003
MUH-20-8	1425-0013-000	5814-0003-000	3900-0362-002	1210-0096-000	1402-0339-003	1425-0009-011	1802-0087-026	2504-0012-001	1432-0002-003
MUH-25-2	1425-0011-003	5814-0003-000	3900-0364-000	1210-0098-000	1402-0340-002	1425-0012-003	1802-0087-016	2504-0014-001	1432-0002-001
MUH-25-4	1425-0011-003	5814-0003-002	3900-0363-001	1210-0098-000	1402-0340-002	1425-0012-003	1802-0087-017	2504-0014-001	1432-0002-003
MUH-30-2	1425-0011-003	5814-0003-000	3900-0364-000	1210-0098-000	1402-0340-002	1425-0012-003	1802-0087-018	2504-0014-001	1432-0002-001
MUH-30-4	1425-0011-003	5814-0003-002	3900-0363-000	1210-0098-000	1402-0340-002	1425-0012-003	1802-0087-019	2504-0014-001	1432-0002-003
MUH-30-8	1425-0011-003	5814-0003-000	3900-0364-000	1210-0098-000	1402-0340-002	1425-0009-009	1802-0087-028	2504-0014-001	1432-0002-001
MUH-40-2	1425-0011-001	5814-0003-000	3900-0350-000	1210-0097-000	1402-0340-003	1425-0012-002	1802-0087-020	2504-0015-001	1432-0002-004
MUH-40-4	1425-0011-001	5814-0003-002	3900-0350-001	1210-0097-000	1402-0340-003	1425-0012-002	1802-0087-021	2504-0015-001	1432-0002-004
MUH-50-2	1425-0011-001	5814-0003-000	3900-0350-000	1210-0097-000	1402-0340-003	1425-0012-002	1802-0087-022	2504-0015-001	1432-0002-004
MUH-50-4	1425-0011-001	5814-0003-002	3900-0350-001	1210-0097-000	1402-0340-003	1425-0012-002	1802-0087-023	2504-0015-001	1432-0002-004
MUH-50-8	1425-0011-001	5814-0003-000	3900-0350-002	1210-0097-000	1402-0340-003	1425-0012-002	1802-0087-030	2504-0015-001	1432-0002-004

Model No.	㉓ Relay***	㉔ Insulator	㉚ Terminal Block, Power	㉛ Terminal Block, Control	㉞ Fuse Block	㉟ Fuse
MUH03-21	–	–	5823-0004-000	5823-0001-000	–	–
MUH03-41	5018-0004-100	2900-0030-000	5823-0004-000	5823-0002-000	–	–
MUH03-71	–	2900-0030-000	5823-0004-000	5823-0001-000	–	–
MUH03-81	–	–	5823-0004-000	5823-0001-000	–	–
MUH05-21	–	–	5823-0004-000	5823-0001-000	–	–
MUH05-41	5018-0004-100	2900-0030-000	5823-0004-000	5823-0002-000	–	–
MUH05-71	–	2900-0030-000	5823-0004-000	5823-0001-000	–	–
MUH05-81	–	–	5823-0004-000	5823-0001-000	–	–
MUH-07-2	5018-0003-000	–	5823-0004-000	5823-0002-000	–	–
MUH-07-4	5018-0004-100	2900-0030-000	5823-0004-000	5823-0002-000	–	–
MUH-07-7	5018-0004-100	2900-0030-000	5823-0004-000	5823-0002-000	–	–
MUH-07-8	5018-0003-000	–	5823-0004-000	5823-0002-000	–	–
MUH-10-2	5018-0003-000	–	5823-0004-000	5823-0002-000	–	–
MUH-10-4	5018-0004-100	2900-0030-000	5823-0004-000	5823-0002-000	–	–
MUH-10-7	5018-0003-000	2900-0030-000	5823-0004-000	5823-0002-000	–	–
MUH-10-8	5018-0004-100	–	5823-0004-000	5823-0002-000	–	–
MUH-15-2	5018-0005-004	–	5823-0004-001	5823-0002-000	–	–
MUH-15-4	5018-0004-100	2900-0030-000	5823-0004-000	5823-0002-000	–	–
MUH-15-8	5018-0005-008	–	5823-0004-003	5823-0002-000	2025-0002-000	2019-0007-010
MUH-20-2	5018-0006-000	–	5823-0004-002	5823-0002-000	–	–
MUH-20-4	5018-0004-100	2900-0030-000	5823-0004-000	5823-0002-000	–	–
MUH-20-8	5018-0005-000	–	5823-0004-002	5823-0002-000	2025-0002-000	2019-0007-008
MUH-25-2	5018-0005-004	–	5823-0004-002	5823-0002-000	2025-7002-000	2019-7008-077
MUH-25-4	5018-0005-004	2900-0030-000	5823-0004-001	5823-0002-000	–	–
MUH-30-2	5018-0005-004	–	5823-0004-003	5823-0002-000	2025-7002-000	2019-7008-079
MUH-30-4	5018-0005-004	2900-0030-000	5823-0004-001	5823-0002-000	–	–
MUH-30-8	5018-0006-000	–	5823-0005-000	5823-0002-000	2025-7002-000	2019-7008-080
MUH-40-2	5018-0005-004	–	5823-0005-000	5823-0002-000	2025-7002-000	2019-7008-079
MUH-40-4	*	2900-0030-000	5823-0004-002	5823-0002-000	2025-7002-000	2019-7008-079
MUH-50-2	5018-0005-004	–	5823-0005-000	5823-0002-000	2025-7002-000	2019 7008-080
MUH-50-4	*	2900-0030-000	5823-0004-002	5823-0002-000	–	–
MUH-50-8	5018-0006-000	–	5823-0005-000	5823-0002-000	2025-7002-000	2019 7008-078

* Two relays are used: 35A relay P/N 5018-0004-000 and 40A relay P/N 5018-0005-12.

24V secondary shown. For 120V secondary, increase last digit by 3. (i.e. for MUH03-41, 24V secondary use 5814-0003-002, for 120V secondary use 5814-0003-005.)

** 24V H.C. shown. For 120 H.C., increase last digit by 1. (i.e.: for MUH03-41, 24V H.C. use 5018-0004-000; for 120V H.C. use 5018-0004-001.)

QMARK®
A Division of Marley Electric Heating
470 Beauty Spot Rd. East
Bennettsville, SC 29512

Marley Electric Heating
A United Dominion Company

Mechanical Accessories

For MUH, HUHAA, Dayton 3UF75 - 3UF99 Series Unit Heaters

INSTALLATION OF VERTICAL SECTION
(Common Part for Radial and Anemostat Diffusers)

1. Remove louvers from front of heater by gripping louver close to spring and compressing spring until other end of the louver is free.
2. For Dayton Unit Heaters - Remove bird screen from venturi opening.
3. Position vertical section over venturi outlet and rotate vertical section until holes in mounting brackets align with matching hole in front of heater.
4. Secure vertical section with four No. 6-32 x 3/8" (9.5mm) mounting screws (supplied) as shown in Figure 1.

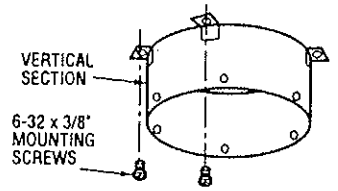


Figure 1. Installation of Vertical Section

INSTALLATION OF RADIAL DIFFUSER

1. Mount vertical section (supplied as part of radial diffuser). (Refer to INSTALLATION OF VERTICAL SECTION above.)
2. Loosen all six screws in radial diffuser hub until blades move freely (See Figure 2, View A).
3. Rotate the radial diffuser hub clockwise until the radial diffuser can be inserted into the vertical section.
4. Insert blade rods into matching holes in vertical section while rotating the radial diffuser hub counter-clockwise. (See Figure 2, View B).
5. Center all blades radially and tighten screws enough to allow each blade to rotate yet maintain a set position.
6. Rotate each blade to desired position and tighten screws to secure blades.

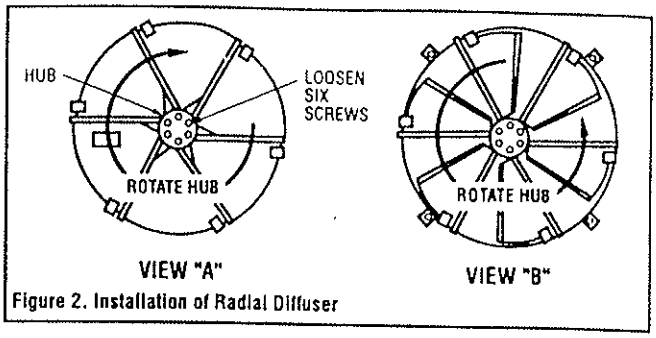


Figure 2. Installation of Radial Diffuser

INSTALLATION OF ANEMOSTAT DIFFUSER

1. Mount vertical section (supplied as part of anemostat diffuser) (Refer to INSTALLATION OF VERTICAL SECTION.)
2. For small (-S) and large (-L) diffusers, slide anemostat over vertical section and secure with three No. 10-32 x 3/8" (9.5mm) bolts and nuts. (See Figure 3, View A).
3. For medium (-M) diffuser, slide anemostat into vertical section and secure with three No. 10-32 x 3/4" (19mm) bolts, nuts and spacers (See Figure 2, View B).

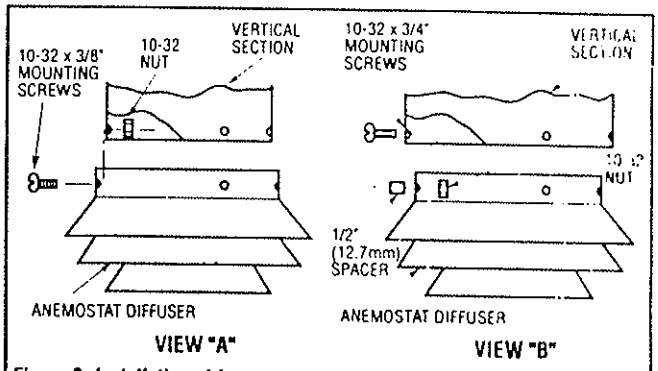
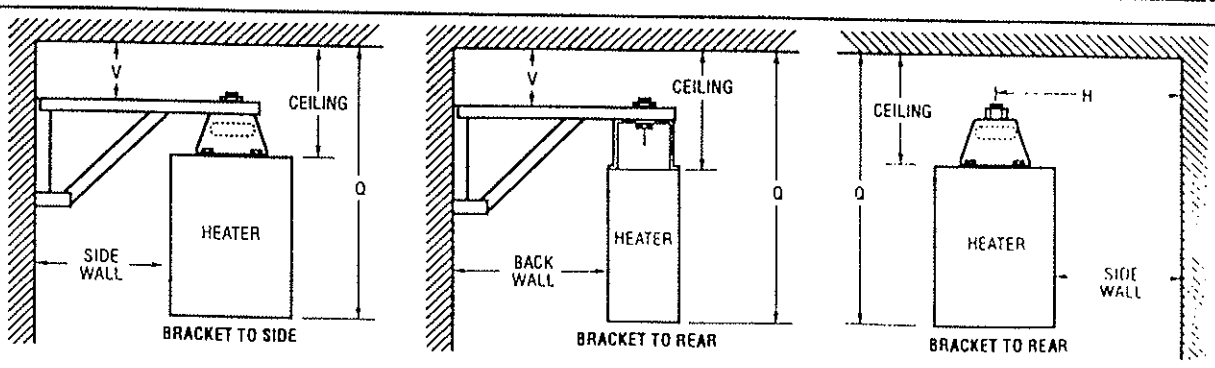


Figure 3. Installation of Anemostat Diffuser



Minimum Mounting Clearances

Heaters	Discharge	Ceiling	Side Wall	Back Wall	H (Min.)	V (Min.)	Q
3 KW - 5 KW	Horizontal	2" (50.8mm)	6" (152.4mm)	9" (228.6mm)	13" (330.2mm)	"0"	18 1/2" (462.0mm)
7.5 KW - 10 KW	Horizontal	6" (152.4mm)	6" (152.4mm)	13" (330.2mm)	15 1/2" (393.7mm)	2" (50.8mm)	27 3/4" (708.2mm)
15 KW - 20 KW	Horizontal	6" (152.4mm)	9" (228.6mm)	12 1/2" (317.5mm)	18 1/2" (470.0mm)	2" (50.8mm)	27 3/4" (708.2mm)
25 KW - 50 KW	Horizontal	16"	12"	18 1/2"	25 1/2"	10"	46 3/4"

Figure 4. Mounting Bracket Clearances

INSTALLATION OF LOUVERED DIFFUSER ON MUH HEATERS

1. Louvers may be left in place or removed from the heater. (Refer to Step 1, INSTALLATION OF VERTICAL SECTION on previous page).
2. Insert mounting springs into four 3/16" (4.8mm) holes in inside flange of front cover.
3. Place louvered diffuser against front of unit.

NOTE: **Position locating tabs toward the top and sides of heater flange.**

4. Secure louvered diffuser to heater by using long-nosed pliers to hook free ends of springs into four 3/16" (4.8mm) holes in inside flange of louvered diffuser.

INSTALLATION OF LOUVERED DIFFUSER ON HUHAA & DAYTON HEATERS

1. Louvers may be left in place or removed from the heater. (Refer to Step 1, INSTALLATION OF VERTICAL SECTION on previous page).
2. Place louvered diffuser against front of unit.

NOTE: **Position locating tabs toward the top and sides of heater flange.**

3. Secure louvered diffuser to heater with three (3) screws (provided) through the mounting tabs.

INSTALLATION OF B SERIES MOUNTING BRACKETS

WARNING

THE BUILDING STRUCTURE AND THE ANCHORING PROVISIONS MUST BE SUFFICIENT TO SUPPORT THE COMBINED WEIGHT OF THE HEATER AND MOUNTING BRACKET.

1. Locate the position of the heater wall mounting bracket. Refer to Figure 4 for minimum mounting clearances. Refer to Figure 5 for mounting bracket dimensions.

WARNING

MOUNTING BRACKET MUST BE INSTALLED WITH OPENING IN BRACKET TOWARD REAR OF HEATER.

2. The hole locations for the mounting bracket can be determined by holding the bracket in position and marking through the holes. Mounting bracket dimensions with hole locations are also given in Figure 5.
3. A minimum screw size of 3/8-inch (9.5mm) diameter should be used to mount the bracket to the wall or ceiling. A heavy washer should be used between the bolt head and the bracket. USE THE TYPE OF SCREW THAT IS BEST SUITED TO THE BUILDING STRUCTURE.
4. Remove four bolts and washers from top of heater and secure unit mounting bracket to top of heater using the four bolts and washers. (See Figure 6).
5. Bolt the unit mounting bracket to the wall mounting bracket using one 1/2-13 pivot bolt, two flat washers, one split lockwasher, and one 1/2-13 nut. (See Figure 7).

INSTALLATION OF CMB MOUNTING BRACKETS

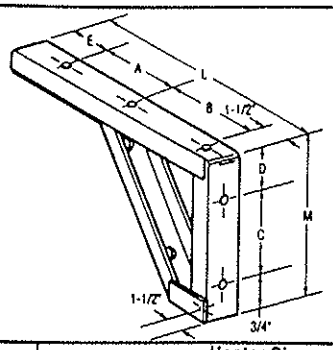
1. Mount bracket per step 4 above.
2. Hang heater from ceiling using center hole in unit mounting bracket, maintaining clearances shown in Figure 4.

INSTALLATION OF VDMB MOUNTING BRACKETS

WARNING

THE BUILDING STRUCTURE AND THE ANCHORING PROVISIONS MUST BE SUFFICIENT TO SUPPORT THE COMBINED WEIGHT OF THE HEATER AND MOUNTING BRACKET.

1. Locate the position of the vertical discharge mounting bracket. Refer to Figure 4 for minimum mounting clearances. Refer to Figure 8 for bracket dimensions.
2. A minimum screw size 3/8" diameter should be used to mount two of the brackets to the ceiling. A heavy washer should be used between the bolt head and the bracket. **Use the type of screw that is best suited to the building structure.**
3. Remove four bolts and washers from the back of the heater and secure the other two brackets to the back of the heater using the four bolts and washers.
4. Bolt the unit mounted brackets to the ceiling mounted brackets using the 5/16" bolts, split lockwashers and nuts provided. See Figure 8.



Dimensions	Heater Size	
	3-20 KW	25-50KW
A	7 1/4" (184.2mm)	9 7/16" (239.8mm)
B	9 1/2" (241.3mm)	14 3/8" (365.3mm)
C	7 1/4" (184.2mm)	12 1/8" (308.1mm)
D	1 15/16" (49.3mm)	2 1/16" (52.3mm)
E	2 1/4" (57.2mm)	3" (76.2mm)
L	20 1/2" (520.7mm)	28 5/16" (719.1mm)
M	9 15/16" (252.5mm)	14 15/16" (379.5mm)

Figure 5. Mounting Bracket Hole Dimensions

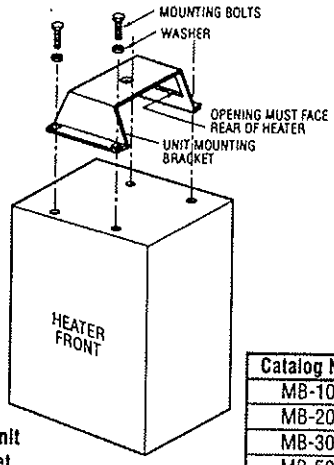


Figure 6. Installation of Unit Mounting Bracket

Catalog No.	Used on
MB-10	3 - 10 KW
MB-20	15 - 20 KW
MB-30	25 - 30 KW
MB-50	40 - 50 KW
CMB-10	3 - 10 KW
CMB-20	15 - 20 KW
CMB-30	25 - 30 KW
CMB-50	40 - 50 KW

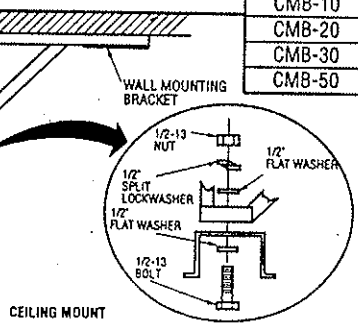
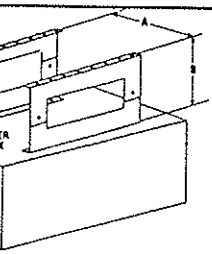


Figure 7. Installation of Heater on Mounting Bracket



Model No.	KW	A	B
VDMB5	3 - 5 KW	6"	6 1/8"
VDMB20	7.5 - 20 KW	8 7/8"	6 1/8"
VDMB50	25 - 50 KW	12 1/2"	12 1/8"

Figure 8. Installation of Heater on Mounting Bracket

Marley Electric Heating
A United Dominion Company

Electrical Accessories

For MUH, HUHAA & 3UF77-3UF98 Series Unit Heaters

INSTALLATION OF INTERNAL THERMOSTAT

1. Remove 5/16" (7.9mm) knockout from back of heater and route capillary tube through hole (Figure 1).
2. Install thermostat bulb clip in slot provided in the back panel of the heater. Secure capillary bulb in clip.
3. Press on left side of logo label on front of heater to locate shaft and screw holes. Punch holes through label.
4. Install thermostat as shown in Figure 2, coiling any excess capillary tubing inside the heater.

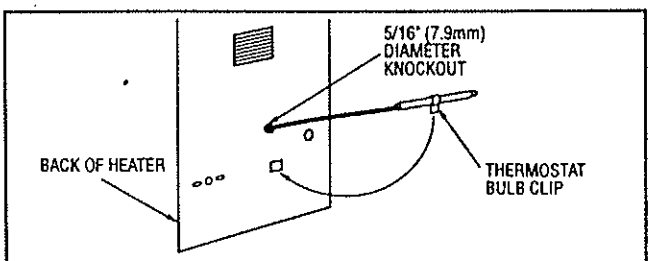


Figure 1. Installation of Internal Thermostat Capillary

WARNING

TO PREVENT POSSIBLE ELECTRICAL SHORT CIRCUIT OR FIRE, KEEP CAPILLARY TUBING AWAY FROM INTERNAL ELECTRICAL COMPONENTS.

5. Refer to wiring diagram, Figure 6, for wiring procedure on 3KW and 5KW (208V, 240V and 277V only). Refer to wiring diagram, Figure 7, for wiring procedure on all other heaters.
6. Remove backing from label (supplied) and install over thermostat shaft. Install knob by pushing onto the thermostat shaft.

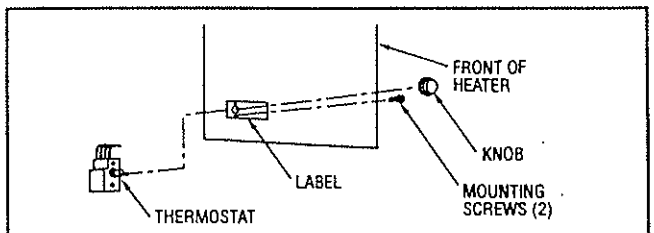


Figure 2. Installation of Internal Thermostat

INSTALLATION OF FAN SWITCH

1. Remove 1/2" (12.7mm) knockout (located between ON and AUTO) from back of heater (Figure 3).
2. Install manual fan switch as shown in Figure 3. (Note orientation of slot in switch nozzle. Locate slot in the switch nozzle towards the "AUTO" position.) Be sure to use lockwasher to prevent rotation of switch.

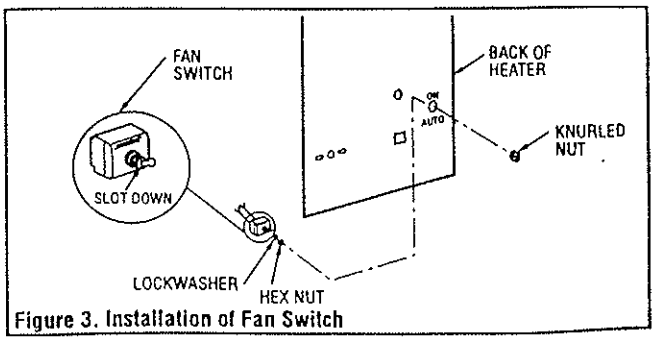


Figure 3. Installation of Fan Switch

3. Install leads to terminal block. Refer to wiring diagram, Figure 6, for wiring procedure on 3KW and 5KW units (208V, 240V, and 277V only). Refer to wiring diagram, Figure 7, for wiring procedure on all other heaters.

INSTALLATION OF REMOTE FAN SWITCH

The Remote Fan Switch is mounted external and remote from the unit heater. The voltage of the remote fan switch circuit is the same as the supply voltage to the heater.

1. Use 14 gauge copper, NEC Class 1, 600V rated insulated wire. Wiring must meet all local and NEC requirements.
2. Install the remote fan switch in a standard wall box in any convenient location that is protected from traffic or other accidental damage.
3. Connect the 14 gauge copper field wire to the switch lead wires with suitable connectors.
4. A 1/2-inch (12.7mm) knockout is provided in the back of the heater adjacent to the control terminal board. Use a crimp-on terminal suitable for No. 8 screw on the control terminal board. Connect one field wire terminated lead to terminal F1 and the other terminated lead to terminal F2. Refer to Figure 6 for connecting to heaters without built-in contactors. Refer to Figure 7 for connecting to heaters equipped with built-in contactors.

INSTALLATION OF REMOTE PILOT DUTY FAN SWITCH (Including Wall Switch and Relay)

The Remote Fan Switch is mounted external and remote from the unit heater.

1. Use 18 gauge (min.), NEC Class 1, 600V wiring that meets all local and NEC requirements.
2. Install the remote fan switch in a standard wall box in any convenient location that is protected from traffic or other accidental damage.
3. Connect the field wire to the switch lead wires with suitable connectors.
4. A 1/2-inch (12.7mm) knockout is provided in the back of the heater adjacent to the control terminal board. Use a crimp-on terminal suitable for No. 8 screw on the control terminal board. Connect one field wire terminated lead to terminal "R" and the other terminated field wire lead to terminal "G". Refer to Figure 7.
5. Install relay as indicated below.

INSTALLATION OF FAN RELAY

1. Mount relay in control compartment with two No. 8 mounting screws as shown in Figure 4.
2. Connect the lead wires from the relay to the control terminal board as shown in Figure 7. Each lead wire is marked for proper terminal location; connect the lead wires as indicated.

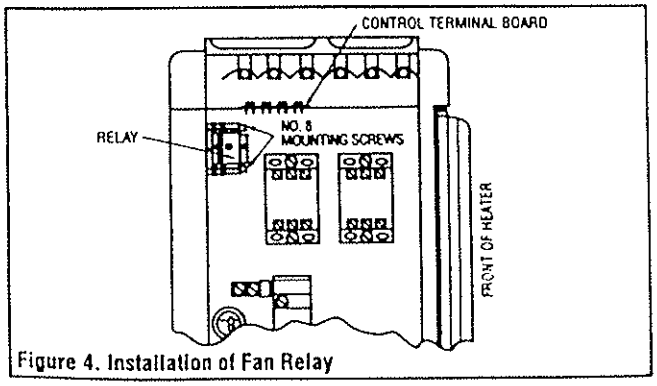


Figure 4. Installation of Fan Relay

INSTALLATION OF HEAT RECOVERY THERMOSTAT

NOTE: This accessory cannot be installed on heaters equipped with built-in single-pole or two-stage thermostats.

(For heaters with 24 Volt Control Circuit refer to Fig. 7 and proceed to step 1. For heaters with Line Voltage Control refer to Fig. 6 and proceed to step 3.)

1. Mount relay in baffle compartment with two No. 8 mounting screws as shown in Figure 4.
2. Connect the lead wires from the relay to the control terminal board as shown in Figure 7. Each lead wire is marked for proper terminal location; connect lead wires as indicated.
3. Remove 5/16" (7.9mm) knockout from back of heater and route capillary tube through hole (See Figure 1).
4. Install thermostat bulb clip in slot provided in the back panel of the heater. Secure capillary bulb in clip.
5. Press on left side of logo label on the front of heater to locate shaft and screw holes. Punch holes through label.
6. Install heat recovery thermostat as shown in Figure 2, coiling any excess capillary tubing inside the heater.
7. Use the wire tie to hold the thermostat leads to other wiring at approximately the midpoint of the leads between control terminal board and thermostat.

WARNING

TO PREVENT A POSSIBLE ELECTRICAL SHORT CIRCUIT OR FIRE, KEEP CAPILLARY TUBING AWAY FROM INTERNAL ELECTRICAL COMPONENTS.

8. Refer to wiring diagram, Figure 6 or Figure 7 for wiring procedure.
9. Remove backing from the label (supplied) and install over thermostat shaft as shown in Figure 2.
10. Install knob by pushing onto the thermostat shaft.
11. Set thermostat for desired turn-on temperature. Full counter-clockwise rotation of the knob is approximately 70°F (21° C). Full clockwise rotation of the knob is approximately 120°F (49° C).

INSTALLATION OF 25 AMP AND 60 AMP POWER DISCONNECT SWITCH

1. Use copper conductor supply wire only when using these switches.
2. Remove the 5/8" (16mm) knockout and the two knockout slots from back of heater, below OFF-ON markings.
3. Install power disconnect switch with two mounting screws as shown in Figure 5.
4. Install the knob with the pointer position at the "OFF" position marking when the switch is rotated to the full counterclockwise position.
5. Before connecting the wires of the switch, check the pointer index. Check to be sure the pointer end of the knob points to "OFF" when the switch is rotated full counterclockwise. It may be necessary to rotate the switch 180° to index the pointer knob.
6. Refer to wiring diagram, Figure 8, for wiring procedure.

(NOTE: For single-phase, remove and discard leads "L2" and "S2").

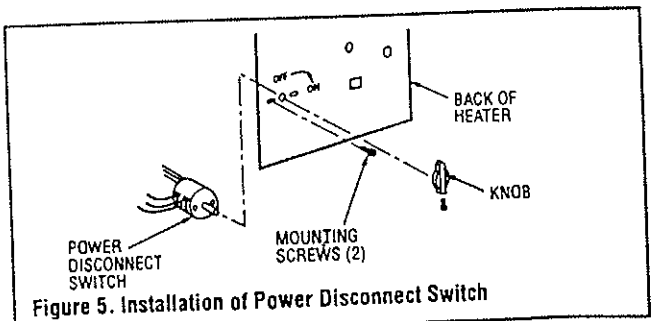
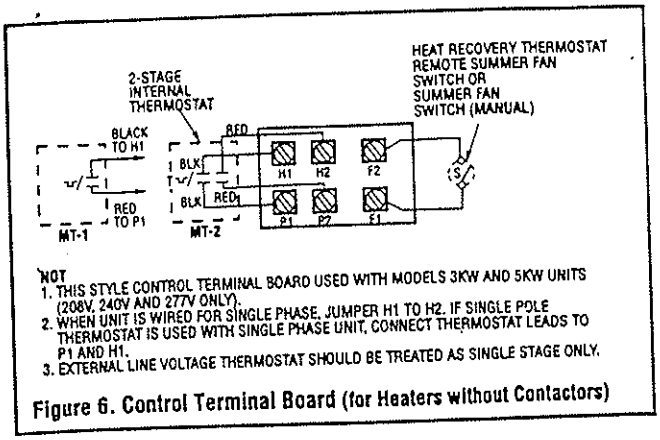
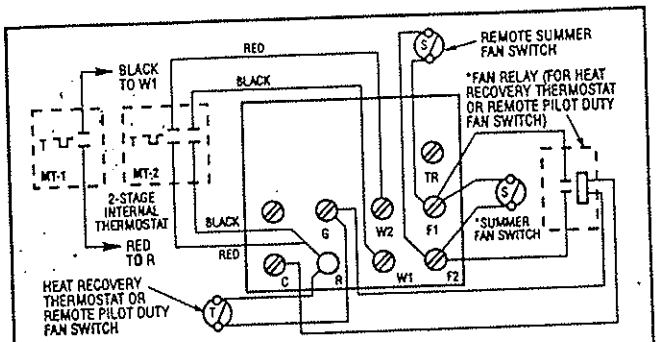


Figure 5. Installation of Power Disconnect Switch



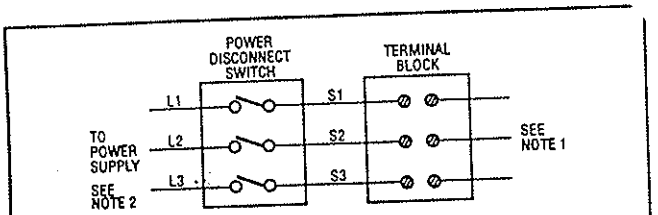
NOT
1. THIS STYLE CONTROL TERMINAL BOARD USED WITH MODELS 3KW AND 5KW UNITS (208V, 240V AND 277V ONLY).
2. WHEN UNIT IS WIRED FOR SINGLE PHASE, JUMPER H1 TO H2. IF SINGLE POLE THERMOSTAT IS USED WITH SINGLE PHASE UNIT, CONNECT THERMOSTAT LEADS TO P1 AND H1.
3. EXTERNAL LINE VOLTAGE THERMOSTAT SHOULD BE TREATED AS SINGLE STAGE ONLY.

Figure 6. Control Terminal Board (for Heaters without Contactors)



NOTES:
1. THIS STYLE CONTROL TERMINAL BOARD USED WITH ALL MODELS EXCEPT 3KW AND 5KW UNITS (208V, 240V AND 277V ONLY).
2. REMOVE JUMPER W1 TO W2 WHEN 2-STAGE THERMOSTAT IS USED.
3. *ONLY ONE OF THESE ACCESSORIES MAY BE INSTALLED IN A SINGLE HEATER.
4. EXTERNAL LINE VOLTAGE THERMOSTATS SHOULD BE TREATED AS SINGLE STAGE ONLY.

Figure 7. Control Terminal Board (for Heaters with Contactors)



NOTES:
1. THIS ILLUSTRATION SHOW WIRING HOOK UP FOR THREE PHASE SERVICE. REMOVE LEAD WIRES MARKED L2 AND S2 WHEN USING ONE PHASE POWER SERVICE.
2. USE COPPER SUPPLY WIRE ONLY WITH THIS SWITCH.

Figure 8. Power Disconnect Switch Wiring Diagram

Marley Electric Heating
A United Dominion Company
470 Beauty Spot Road East
Bennettsville, SC 29512 USA

WHITE-RODGERS

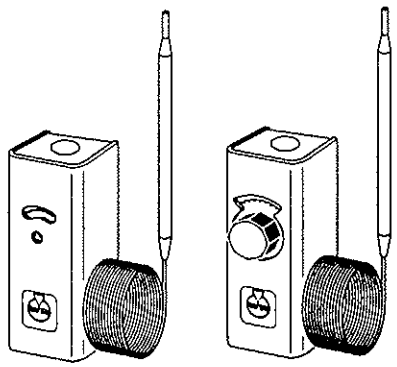
241-2 & 1609 Series
Refrigeration Temperature Controls
INSTALLATION INSTRUCTIONS

Operator: Save these instructions for future use!

FAILURE TO READ AND FOLLOW ALL INSTRUCTIONS CAREFULLY BEFORE INSTALLING OR OPERATING THIS CONTROL COULD CAUSE PERSONAL INJURY AND/OR PROPERTY DAMAGE.

DESCRIPTION

These hydraulic action temperature controls are applicable for all types of commercial or industrial refrigeration applications. These controls close contacts on rise in temperature and open them on a fall in temperature.



PRECAUTIONS

THESE CONTROLS MUST BE INSTALLED BY A QUALIFIED INSTALLER.

Do not exceed the specification ratings.

All wiring must conform to local and national electrical codes and ordinances.

This control is a precision instrument, and should be handled carefully. Rough handling or distorting components could cause the control to malfunction.

This control has been accurately calibrated at the factory. Any attempt to calibrate this control will void the White-Rodgers warranty.

⚠CAUTION

To prevent electrical shock and/or equipment damage, disconnect electric power to system, at main fuse or circuit breaker box, until installation is complete.

⚠WARNING

Do not use on circuits exceeding specified voltages. Higher voltages will damage control and could cause shock or fire hazard.

INSTALLATION

The switch mechanism of this control may be mounted in any location, provided that the temperature and humidity of the air in which it is located do not cause a condensation on the switch parts.

The sensitive element, or "bulb", should be located in the **average temperature** of the controlled area.

Capillary tubing should be led over a path that protects it from damage from blows, cuts, etc., and should be installed without kinking or twisting. The tubing should be attached to some surface at frequent intervals along its length, and should not hang loosely. Excess tubing should be coiled and secured at a convenient protected location close to the switch mechanism.

The bulb should be handled with reasonable care, as a dent or sharp bend may change the calibration and cause the control to cycle at a temperature different from the dial setting.

EMERSON

WHITE-RODGERS DIVISION
EMERSON ELECTRIC CO.
9797 REAVIS RD., ST. LOUIS, MO. 63123
(314) 577-1300, FAX (314) 577-1517
9999 HWY. 48, MARKHAM, ONT. L3P 3J3
(905) 475-4653, FAX (905) 475-4625

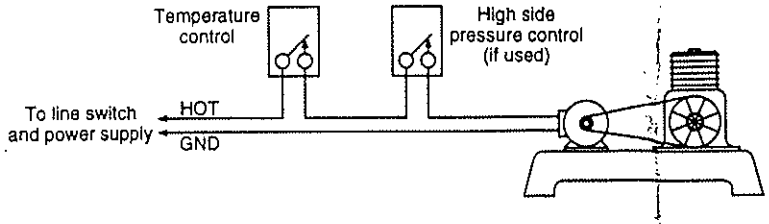
Printed in U.S.A.

PART NO. 37-1104D
Replaces 37-1104C & 37-9085
9545

WIRING

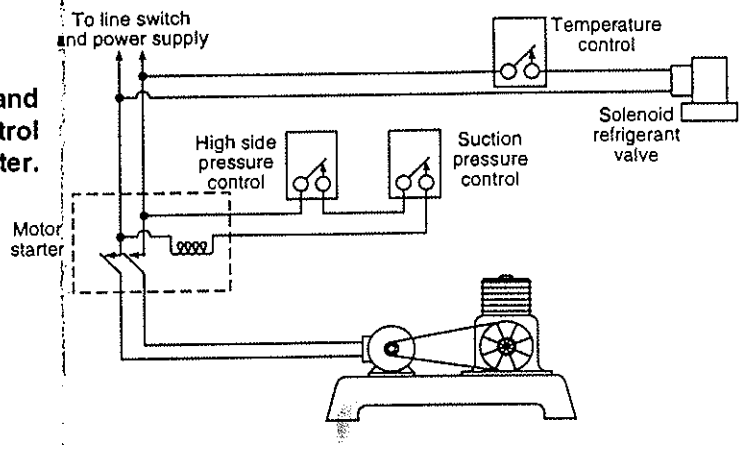
All wiring should be done in accordance with local and national electrical codes and ordinances.

If the manufacturer of the cooling equipment has supplied a wiring diagram, follow the manufacturer's recommendations. The following diagrams show the general use of these controls.



Circuit showing temperature control controlling compressor directly.

Circuit showing temperature control to open and close refrigerant valve. Suction pressure control starts and stops compressor through motor starter.



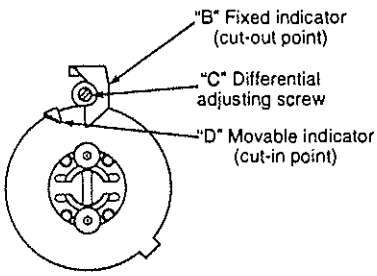
SETTING THE CONTROLS

CONTROLS WITH ADJUSTABLE DIFFERENTIAL

The movable indicator points to the temperature at which the compressor starts. The fixed indicator points to the temperature at which the compressor will stop. The difference between these two indicators is the differential.

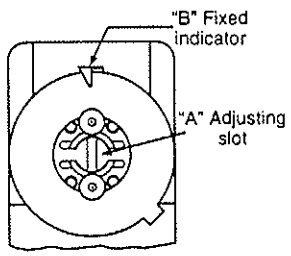
To set the control, do the following:

1. Use a screwdriver in the slot on the front of the control to turn the dial so that the fixed indicator (B) points to the temperature at which the compressor is to stop.
2. Turn the differential adjusting screw (C) until the movable indicator (D) points to the temperature at which the compressor is to start.



CONTROLS WITH FIXED DIFFERENTIAL

The indicator (B) points to the temperature at which the contacts open to stop the compressor. **To set the control,** use a screwdriver in the slot on the front of the control to rotate dial until the desired temperature at which the compressor is to stop is positioned directly under the indicator (B).



Project Submittal

Ventilation Components

Date: *April 9, 1998*

Project: *Primo Shield*

Location: *Utica, New York*

Engineer: *NYSDEC*

Contractor: *Ontario Specialty Contracting*

Manufacturer:

KISTNER CONCRETE PRODUCTS INC.

8713 Read Road
East Pembroke, New York 14056
Tel: 716-762-8216
Fax: 716-762-8315

GREENHECK
P.O. BOX 410 SCHOFIELD, WISCONSIN 54476-0410
PH. 715-359-6171

Wall Housing Assembly Instructions
for Sizes 8 - 48

8-20 Wall Housing Pkg. 817067

NOTE: Unit sizes 8-18 use spinlock fasteners in lieu of weldstuds as listed in these instructions.

Reference Number	Item	Qty.
1	Wall Housing Mounting Angle	4
2	Side Panel	2
3	Top Panel	1
4	Bottom Panel	2
--	Fasteners	1 Bag

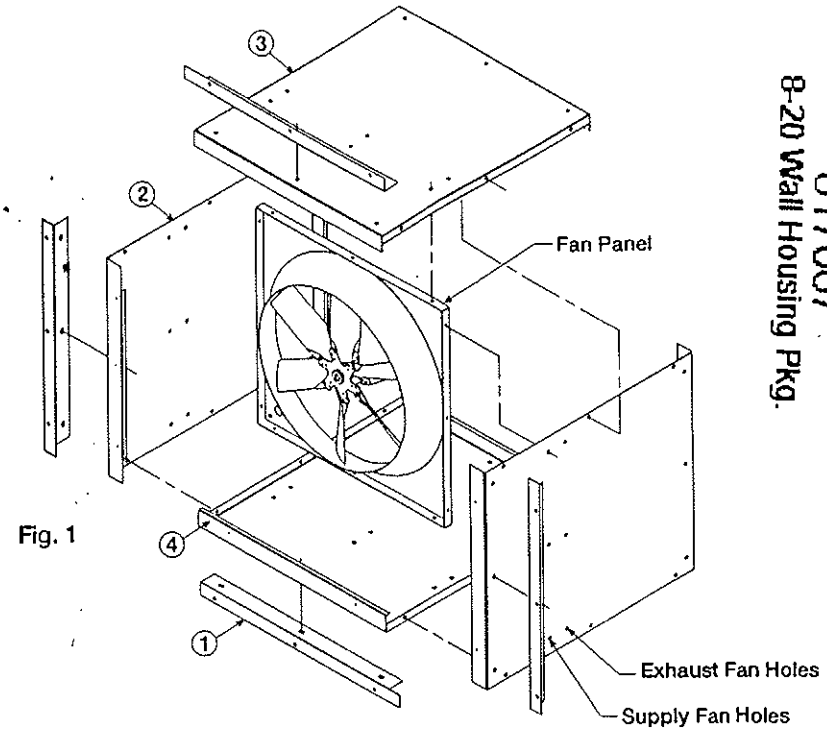


Fig. 1

1. Determine if a supply fan or exhaust fan is to be used in the wall housing. (Fig. 4) Two rows of holes are provided for attaching the wall housing panels to the fan panel. Note that exhaust fans are mounted farthest from and supply fans nearest to the damper end (NOTE: damper end 0.149 holes) (Fig. 1,2). The wall housing panels are attached to the fan panel before securing to each other.

2. Using weldstuds and neoprene washers, attach the wall housing bottom panel (4) to the bottom of the fan panel. With the weldstud heads and neoprene washers on the exterior of the housing, (Fig. 3) place hex nuts on the spinlock bolts and finger tighten.

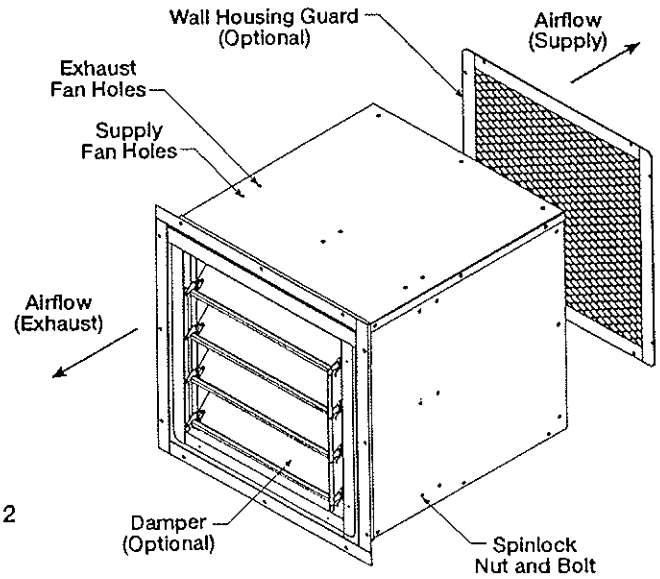


Fig. 2

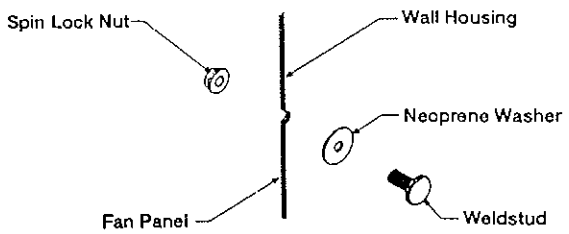


Fig. 3

3. Attach side panels to the fan panel, overlapping the bottom panel for weatherproofing. Install weldnuts, neoprene washers, and hex nuts. Finger tighten all fasteners.

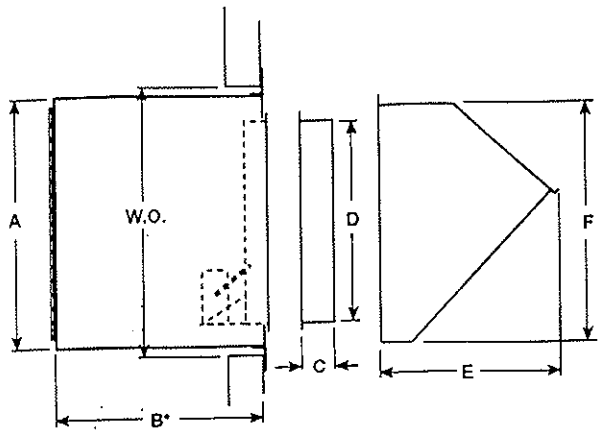
4. Attach the top panel to the fan panel, assuring the formed edges overlap the side panels for weatherproofing. Install weldstuds, neoprene washers, and hex nuts. Finger tighten all fasteners.

5. Attach both side panels to the top and bottom panels using 5/16-18 x 1 weldstuds, neoprene washers and hex nuts.

6. Install weldstuds with neoprene washers in the unused holes of the top and side panels to keep the wall housing weathertight. Unused holes in the bottom panel are used as drain holes. Tighten all fasteners securely.

7. A versatile feature of the Greenheck wall housing is a mounting flange which may be used in either a standard arrangement (Fig. 4) or moved any where along the housing. This permits the distance the wall housing protrudes outside or inside the wall to be varied. 5/16" holes must be drilled in the housing if the factory punched holes are not used.

8. Conduit holes are provided in each side of the housing.



Size	Wall Housing			Damper Guard		Weatherhood			Damper Size Sq.
	A	B*	W.O.	C	D	E	F	Width	
8	13 1/4	19	14 1/4	5 1/2	10 1/4	13 1/4	11 1/4	10 1/2	10
10	15 1/4	19	16 1/4	5 1/2	12 1/4	14 7/8	13 3/8	12 1/2	12
12	18 1/4	23	19 1/4	5 1/2	14 1/4	16 3/8	15 5/8	14 1/2	14
14	20 1/4	23	21 1/4	6 1/2	16 1/4	17 1/2	17 5/8	16 1/2	16
16	22 1/4	24	23 1/4	6 3/4	18 1/4	19 3/8	19 5/8	18 1/2	18
18	24 1/4	25	25 1/4	6 3/4	20 1/4	22	21 5/8	20 1/2	20
20	26 1/4	29	27 1/4	6 3/4	22 1/4	24 3/4	23 5/8	22 1/2	22
24	32 1/4	34	33 3/4	6 3/4	26 1/4	26 7/8	30 3/8	29 1/2	26
30	38 1/4	38	39 3/4	6 3/4	32 1/4	29 1/8	36 1/2	35 1/8	32
36	44 1/4	39	45 3/4	6 3/4	38 1/4	33	42 1/2	41 1/8	38
42	50 1/4	42	51 3/4	7 1/2	44 1/4	35 3/4	48 1/2	47 1/2	44
48	56 3/8	44	57 3/4	7 1/2	50 1/4	40 3/8	54 5/8	53 1/4	50
54	62 3/8	50	63 3/4	7 1/2	56 1/4	44 3/4	60 7/8	59 1/2	56
60	68 3/8	54	69 3/4	7 1/2	62 1/4	48 3/8	67	65 5/8	62
72	83 1/8	60	84 3/4	7 1/2	74 1/4	53 1/4	79 1/2	78 1/8	74

* B dimension will increase by 6" when a heavy duty motorized backdraft damper is specified.
For complete dimensional information refer to submittal.
All dimensions given in inches.

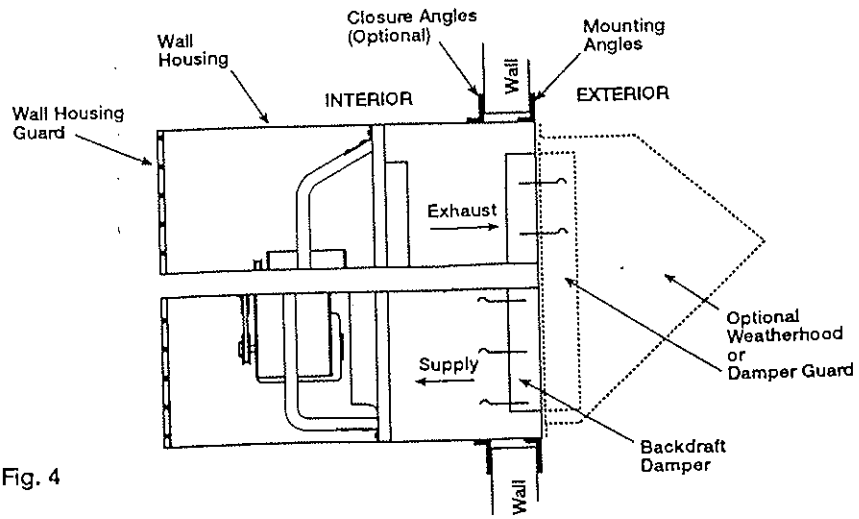


Fig. 4

Damper Installation

9. To install an optional damper see (Fig. 5). If an optional damper guard or weatherhood is to be installed, go to step 10. Using a pneumatic or electric drill, run the self drilling screws through the holes provided in the side and bottom damper flanges into the wall housing. Check damper for freedom of movement.

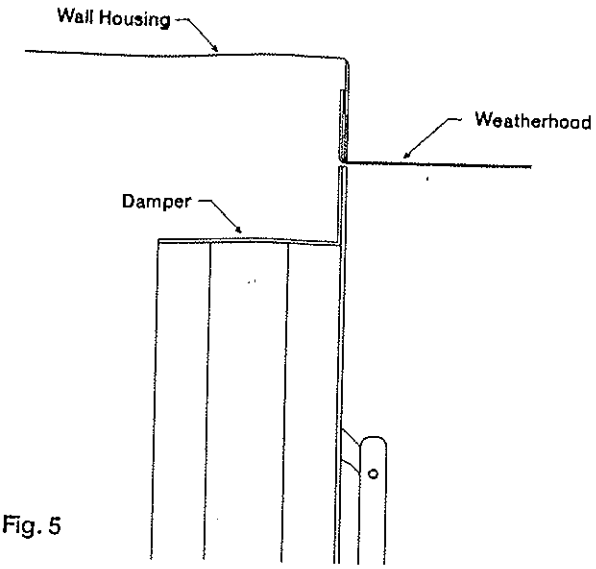
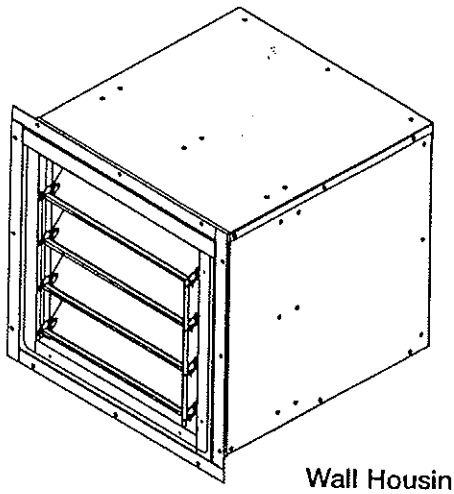


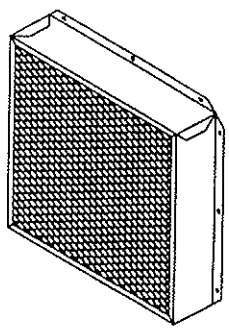
Fig. 5

Damper Guard or Weatherhood Installation

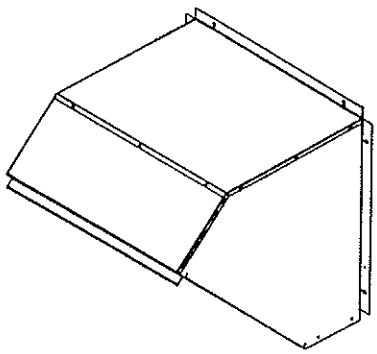
10. To install a damper guard or weatherhood over a damper, the weatherhood is slid under the damper lip. Using self drilling screws and a socket on the end of a pneumatic or electric drill, run the self drilling screws in holes provided on the damper guard and/or weatherhood flange sides. Check damper for freedom of movement.



Wall Housing



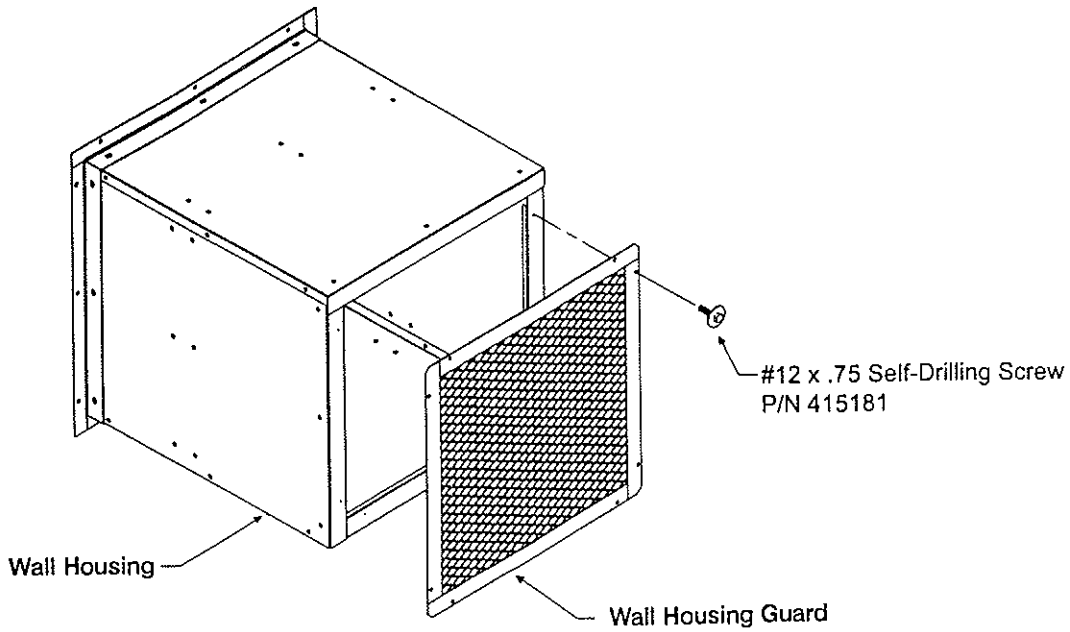
Damper Guard



Weatherhood

11. Attach wall housing guard to wall housing with a 5/16" socket on the end of a pneumatic or electric drill. Align (2) holes in top of guard with (2) holes on wall housing top and run #12 x .75 self-drilling screws with neoprene washer into wall housing top. Use remaining self-drilling screws to secure guard to wall housing sides and bottom.

NOTE: 48" units use a (2) piece guard design. 48" (2) piece guards will align with (4) h wall housing top when guard edges are butted together.



GREENHECK
P.O. BOX 410 SCHOFIELD, WISCONSIN 54476-0410
PH. 715-359-6171

Sidewall Propeller Fans Belt Drive and Direct Drive

Installation, Operating and Maintenance Manual

Upon receiving the unit, check for any damage and report it immediately to the shipper. Also assure all accessory items are accounted for.

Move fan to the desired location and determine the method by which the fan is to be mounted as shown below in figures 1, 2 and 3. Optional wall mount housings (Fig. 1) and wall mount collars (Fig. 2) provide a convenient means of mounting sidewall fans while maintaining the proper distance between propeller and damper.

Attach the fan by inserting a suitable fastener through each of the pre-punched mounting holes in the fan panel. Care should be taken not to bend or distort the fan panel or drive components during installation.

The motor voltage and amperage rating must be checked for compatibility with the electrical supply. Supply wiring to the fan must be properly fused and conform to local and national electrical codes.

TYPICAL INSTALLATIONS

Wall opening size and propeller-to-damper distance are two important dimensions for fan installation. Fans mounted to the wall require a different opening (W.O.) size than those mounted in collars or wall housings. Propeller-to-damper distance (M) is important to reduce turbulence and damper flutter which may lead to premature damper failure.

Figs. #1 and #2 , show the wall opening (W.O.) required for installations with either a wall housing or collar.

Fig. #3 shows the recommended wall opening (W.O.) and the minimum distance (M) suggested between the fan and damper for direct to wall installations.

Wall Opening Requirements

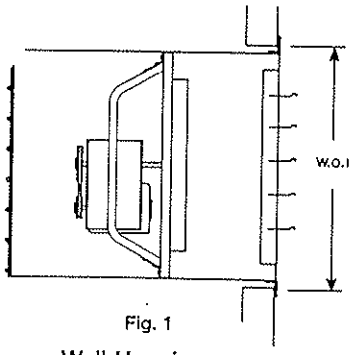


Fig. 1
Wall Housing Installation

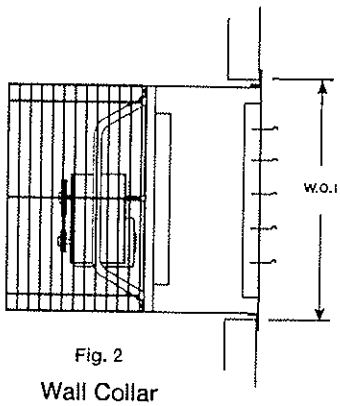


Fig. 2
Wall Collar Installation

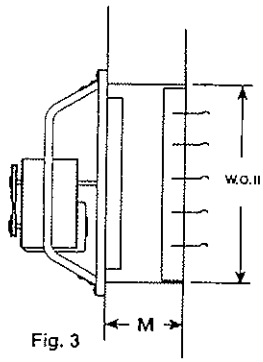


Fig. 3
Direct to Wall Installation

Fan Size	D Damper Size	WO-I Sq.	WO-II Sq.	M Min.
8	10x10	14 1/4	10 1/2	13
10	12x12	16 1/4	12 1/2	13
12	14x14	19 1/4	14 1/2	13
14	16x16	21 1/4	16 1/2	13
16	18x18	23 1/4	18 1/2	13
18	20x20	25 1/4	20 1/2	13
20	22x22	27 1/4	22 1/2	13
24	26x26	33 3/4	26 1/2	13
30	32x32	39 3/4	32 1/2	13
36	38x38	45 3/4	38 1/2	14
42	44x44	51 3/4	45 1/2	15
48	50x50	57 3/4	50 1/2	16
54	56x56	63 3/4	56 1/2	17
60	62x62	69 3/4	62 1/2	18
72	74x74	83 3/4	74 1/2	19

PRESTARTING CHECKS

Check all fasteners and set screws for tightness. This is especially important for bearing set screws.

The propeller should rotate freely and not rub on the fan panel venturi. Rotation direction of the propeller should be checked by momentarily turning the unit on. Rotation should be in the same direction as the rotation decal affixed to the unit or as shown in Fig. 4. For 3-phase installations, fan rotation can be reversed by simply interchanging any two of the three electrical leads. For single phase installations follow the wiring diagram located on the motor.

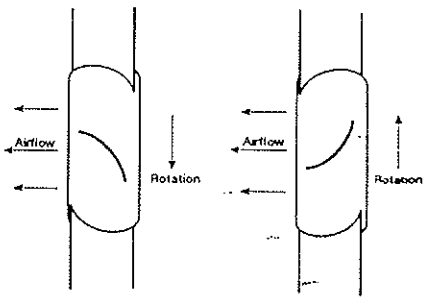


Fig. 4

FOR BELT DRIVE FANS

The adjustable motor pulley is preset at the factory for the specified fan RPM. Fan speed can be increased by closing or decreased by opening the adjustable pulley. Two or three groove variable pitch pulleys must be adjusted an equal number of turns open. Any increase in fan speed represents a substantial increase in horsepower required from the motor. Always check motor load amperage and compare to name plate rating when changing fan speed.

ROUTINE MAINTENANCE

WARNING

DISCONNECT AND SECURE TO THE "OFF" POSITION ALL ELECTRICAL POWER TO THE FAN PRIOR TO INSPECTION OR SERVICING. FAILURE TO COMPLY WITH THIS SAFETY PRECAUTION COULD RESULT IN SERIOUS INJURY OR DEATH.

Once the fan has been put into operation, a periodic maintenance program should be set up to preserve the reliability and performance of the fan. Items to be included in this program are:

- **BELTS**
- **BEARINGS**
- **FASTENERS**
- **SET SCREWS**
- **LUBRICATION**
- **REMOVAL OF DUST/DIRT**

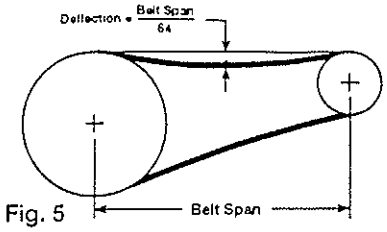


Fig. 5

BELTS

Premature belt failures are frequently caused by improper belt tension (either too tight or too loose) or misaligned pulleys. The proper tension for operating a V-belt is the lowest tension at which the belts will not slip at peak load conditions. For initial tensioning, the proper belt deflection half way between pulley centers is 1/64" for each inch of belt span. For example, if the belt span is 64 inches, the belt deflection should be one inch using moderate thumb pressure at midpoint of the drive (Fig. 5).

Check belt tension two times during the first 24 hours of operation and periodically thereafter. To adjust belt tension, simply loosen four fasteners (two on each side of the motor plate) and slide the motor plate away from the fan shaft until proper belt tension is attained. On some fans, fasteners attaching the motor to the motor plate must be loosened in order to adjust the belt.

It is very important that the drive pulleys remain in proper alignment after adjustments are made. Misalignment of pulleys will result in premature belt wear noise, vibration and power loss. See Fig. 6.

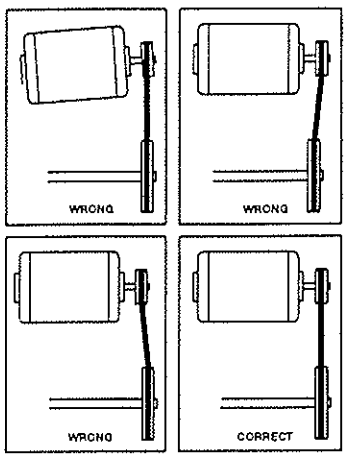


Fig. 6

BEARINGS (For belt drive fans only)

Bearings are the most critical moving part of the fan and should be inspected at periodic intervals. Locking collars and set screws, in addition to fasteners attaching the bearings to the bearing plate, must be checked for tightness. In a clean environment and temperatures above 32°F./below 200° F., fan shaft bearings with grease fittings should be lubricated semi-annually using a high quality lithium based grease. If unusual environmental conditions exist temperatures below 32°F./above 200°F., moisture or contaminants, more frequent lubrication is required.

With the unit running, add grease very slowly with a manual grease gun until a slight bead of grease forms at the seal. Be careful not to unseat the seal by over lubricating or using excessive pressure. Bearings without grease fittings are lubricated for life.

FASTENERS AND SET SCREWS

Any fan vibration has a tendency to loosen mechanical fasteners. A periodic inspection should include checking all fasteners and set screws for tightness. Particular attention should be paid to set screws attaching the propeller to the shaft and the shaft to the bearings. Loose bearing set screws will lead to premature failure of the fan shaft.

LUBRICATION

Refer to the paragraph on bearings for bearing lubrication. Many fractional horsepower motors installed on the smaller fans are lubricated for life and require no further attention. Motors equipped with oil holes should be oiled in accordance with the manufacturer's instructions printed on the motor. Use a high grade SAE 20 machine oil and use caution not to over lubricate. Motors supplied with grease fittings should be greased according to directions printed on the motor.

REMOVAL OF DUST AND DIRT

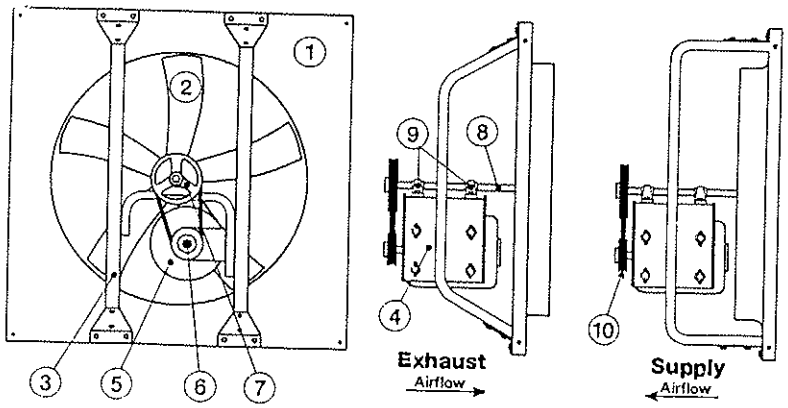
Dirt clogs cooling openings on the motor housing, contaminates bearing lubricant and collects on propeller blades causing severe imbalance if left unchecked. The exterior surface of the motor, fan panel and entire propeller should be thoroughly cleaned periodically. Use caution and do not allow water or solvents to enter the motor or bearings. Under no circumstances should motors or bearings be sprayed with steam or water.

TROUBLESHOOTING		
PROBLEM	**CAUSE**	**CORRECTIVE ACTION**
Reduced airflow	System resistance is too high.	Check backdraft dampers for proper operation. Remove obstructions in ductwork. Clean dirty filters. Check for adequate supply air for exhaust fans or exhaust air for supply fans.
	Fan too close to damper.	Increase distance between fan and damper.
	Unit running backwards.	See pre-starting checks.
	Fan speed too low.	Increase fan speed.
	Excessive dirt on propeller.	Clean propeller.
Excessive Noise	Bearings	Tighten bearing collars and set screws Lubricate bearings. Replace defective bearings.
	V-Belt drive	Tighten pulleys on motor and fan shaft. Adjust belt tension. Align pulleys. Replace worn belts or pulleys. See "Routine Maintenance".
	Excessive vibration	Clean dirt build-up from propeller. Check all set screws and fasteners for tightness. Check for worn bearing. Correct propeller imbalance. Check for loose dampers. guards or ductwork.
	Defective Motor	Replace motor.

Motor load amperage must be checked and compared to nameplate rating to avoid serious damage to motor when speed is increased.

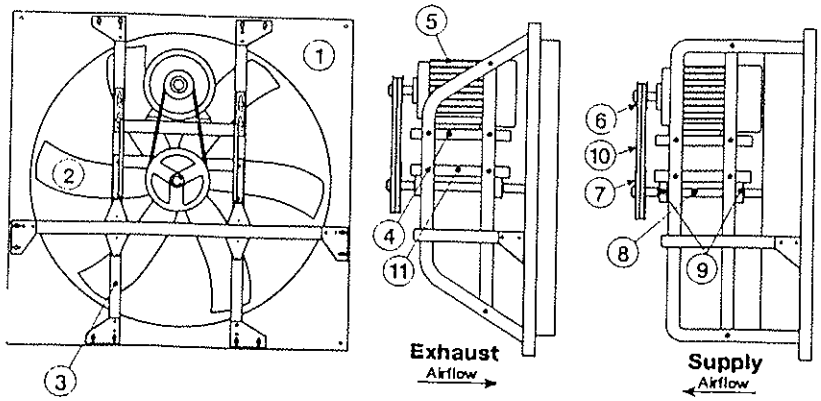
Belt Drive Fans Parts List

›r SB-1L/H and SBC-2L/H Fans



1. Fan Panel
2. Propeller
3. Drive Frame Channel (2)
4. Motor/Bearing Plate
5. Motor
6. Motor Pulley
7. Shaft Pulley
8. Fan Shaft
9. Bearings (2)
10. Belt

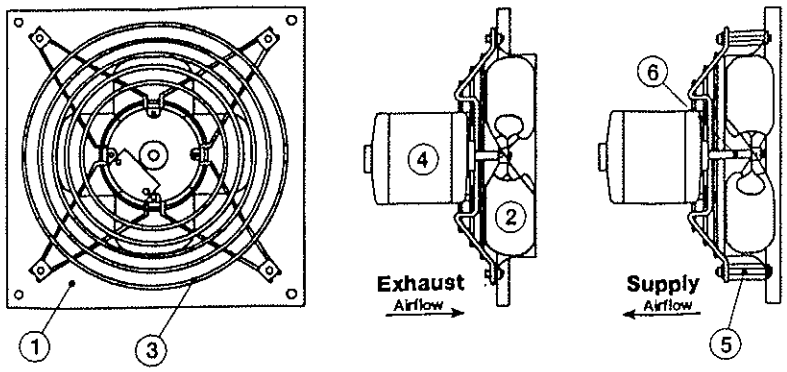
For SB-3L/H and SBC-3L/H Fans



1. Fan Panel
2. Propeller
3. Drive Frame Channel (2)
4. Motor Plate
5. Motor
6. Motor Pulley
7. Shaft Pulley
8. Fan Shaft
9. Bearings (2)
10. Belt
11. Bearing Plate

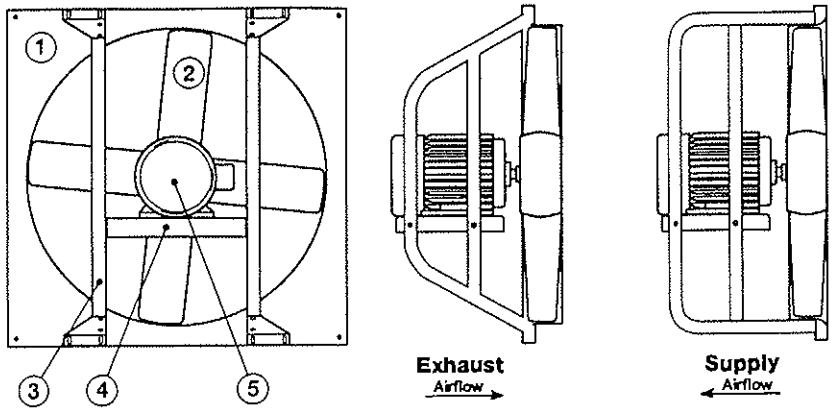
Direct Drive Fans Parts List

For S1 Fans



1. Fan Panel
2. Propeller
3. Drive Frame/Motor Support
4. Motor
5. Riser Blocks (4) - supply fan only
6. Shaft Extension- supply fan only

For S2 and SC3 Fans



1. Fan Panel
2. Propeller
3. Drive Frame Channels (2)
4. Motor Plate
5. Motor

Replacement Parts

Always provide the unit serial number when requesting parts or information.

JOB _____

MODEL _____ SERIAL NO. _____

GREENHECK PRODUCTION ORDER NO. _____

SALES OFFICE _____ CITY _____

SELECT ONE:

❑ BELT DRIVE ❑ DIRECT DRIVE

Part Description	Quantity	Remarks

Project Submittal

Interior Light Fixtures

Date: *April 9, 1998*

Project: *Primo Shield*

Location: *Utica, New York*

Engineer: *NYSDEC*

Contractor: *Ontario Specialty Contracting*

Manufacturer:

KISTNER CONCRETE PRODUCTS INC.

8713 Read Road
East Pembroke, New York 14056
Tel: 716-762-8216
Fax: 716-762-8315

crescent LIGHTING
a GENLYTE company
Barrington, New Jersey 08007
609-546-5500

Ordering Data

Catalog Number*	Lamps-Watts	Nominal Length
RH240	2-40RS	48
RH248	2-38SL	48
RH196	1-75SL	96
RH196-16	2-75SL	192
RH296	2-75SL	96
RH248HO	2-60HO	48
RH196HO	1-110HO	96
RH196-16HO	2-110HO	192
RH296-HO	2-110HO	96
RH248PGA	2-110VHO	48
RH296PGA	2-215VHO	96

*Standard reflectors have solid top. For 10% apertured reflectors add suffix "A" (Example: RH296A).

Lighting Calculation Guide

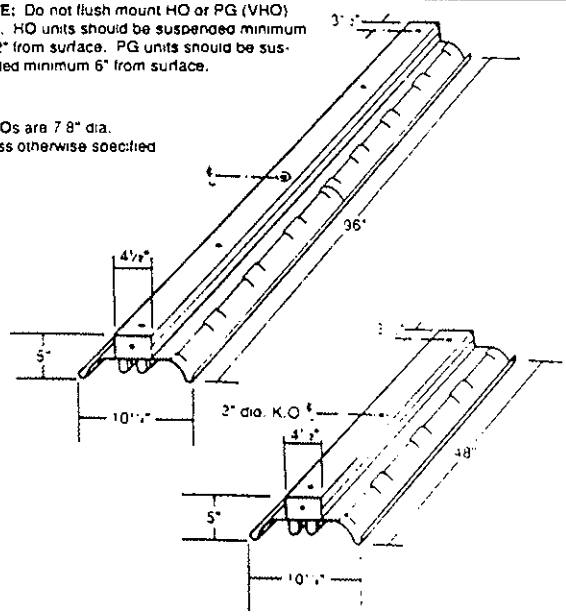
Crescent Fixture	Approximate Area of Room (Square Feet): 120	200	300	400	600	800	1000	2000	over 2000 per 1000	Maximum spacing-to-mtg. height ratio
	Number of fixtures required for 100 footcandles*									
RH240	6	8	10	13	18	22	27	49	23	1.5
RH196	5	7	10	12	17	22	26	48	23	1.5
RH296	3	4	5	6	9	11	13	25	12	1.5
RH296HO	2	3	4	5	6	8	9	17	8	1.5

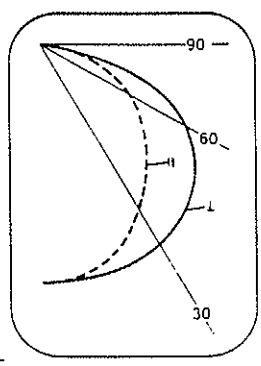
*If lower or higher footcandle levels are desired, add or subtract fixtures proportionately.

Two-Lamp Photometric Data

NOTE: Do not flush mount HO or PG (VHO) units. HO units should be suspended minimum 1-1/2" from surface. PG units should be suspended minimum 6" from surface.

All KOs are 7/8" dia. unless otherwise specified





Coefficients of Utilization

Floor Cavity Reflectance 0.20

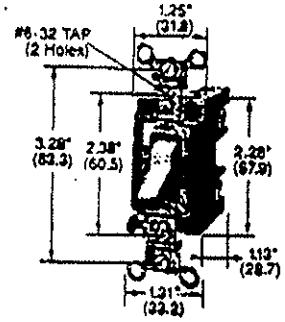
RC	80%			50%			10%		
RW	50	30	10	50	30	10	50	30	10
1	91	88	84	86	83	81	78	76	75
2	80	74	69	75	70	66	68	65	62
3	70	63	57	66	60	56	60	56	53
4	62	54	48	58	51	46	54	49	45
5	54	45	39	50	44	39	48	43	39
6	47	39	34	45	38	33	42	37	33
7	42	34	29	40	34	29	38	32	28
8	38	30	25	36	29	25	34	28	24
9	34	26	21	33	26	21	31	25	21
10	31	23	19	30	23	18	28	23	19

Room Cavity Ratio

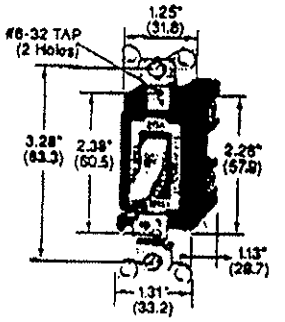
AC switches

15 and 20 Ampere, 120-277 Volt AC

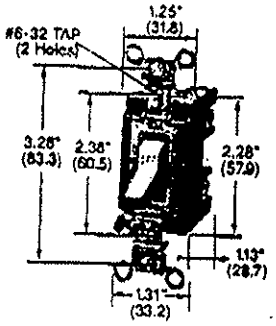
Commercial Specification Grade AC Toggle Switches with Ground Screw NEW



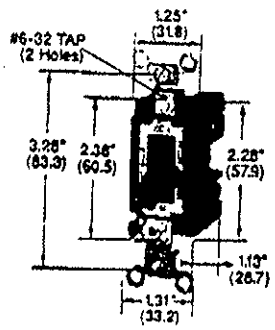
CSB115I



CSB120



CS115I



CS120

Commercial Specification Grade
AC Toggle Switches, Back and Side Wired

15A, 120-277V AC

Description	Catalog Numbers Single Pole	Double Pole	Three Way	Four Way
Brown toggle.	CSB115	–	CSB315	–
Ivory toggle.	CSB115I	–	CSB315I	–
Gray toggle.	CSB115GY	–	CSB315GY	–
White toggle.	CSB115W	–	CSB315W	–

20A, 120-277V AC

Description	Catalog Numbers Single Pole	Double Pole	Three Way	Four Way
Brown toggle.	CSB120	CSB220	CSB320	CSB420
Ivory toggle.	CSB120I	CSB220I	CSB320I	CSB420I
Gray toggle.	CSB120GY	CSB220GY	CSB320GY	CSB420GY
White toggle.	CSB120W	CSB220W	CSB320W	CSB420W

Commercial Specification Grade
AC Toggle Switches, Side Wired Only

15A, 120-277V AC

Description	Catalog Numbers Single Pole	Double Pole	Three Way	Four Way
Brown toggle.	CS115	–	CS315	–
Ivory toggle.	CS115I	–	CS315I	–
Gray toggle.	CS115GY	–	CS315GY	–
White toggle.	CS115W	–	CS315W	–

20A, 120-277V AC

Description	Catalog Numbers Single Pole	Double Pole	Three Way	Four Way
Brown toggle.	CS120	–	CS320	–
Ivory toggle.	CS120I	–	CS320I	–
Gray toggle.	CS120GY	–	CS320GY	–
White toggle.	CS120W	–	CS320W	–

Notes: See Section D for wall plates. See page C-26 for wiring diagrams.
For accessories see pages C-18 to C-20.
Dimensions of double pole 3-way and 4-way switches are the same as single pole switches, e.g. CSB120 and CS120.

HP Conversion Chart

	120V	240V
15A	1 HP	2HP
20A	1½ HP	2HP

Dimensions in inches (mm)

APR 07 '98 11:59 QUERMBACK ELECTRIC, INC.

Project Submittal

Exterior Light Fixture

Date: *April 9, 1998*

Project: *Primo Shield*

Location: *Utica, New York*

Engineer: *NYSDEC*

Contractor: *Ontario Specialty Contracting*

Manufacturer:

KISTNER CONCRETE PRODUCTS INC.

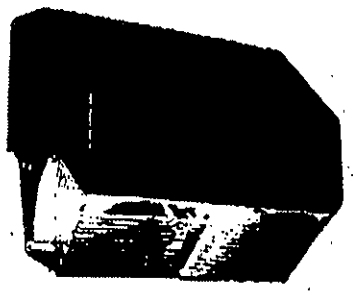
8713 Read Road
East Pembroke, New York 14056
Tel: 716-762-8216
Fax: 716-762-8315

PATENTED

Listed for Wet Locations E88021

LPM Series LytePro® Universal Wall Mounted Luminaire

100 watts thru 175 watts
High Pressure Sodium
Metal Halide



LPMR Series
LytePro with Refractor

PRODUCT SPECIFICATIONS

■ APPLICATIONS
Accent, security, area and perimeter lighting. Can also be used in parking garages, tunnels, underpasses, alleys and driveways.

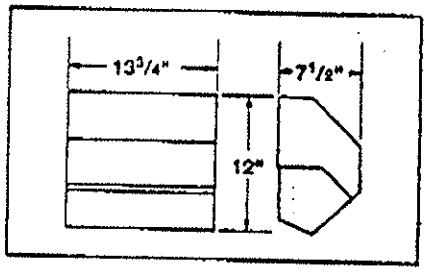
■ CONSTRUCTION
Modular design features precision die-cast aluminum mounting box. Mounting box contains four 1/2" NPS tapped holes for thru-wiring and/or installation of photocontrol (see Accessories). Electrical and optical components are mounted to die-cast aluminum tray for maximum heat dissipation and quick installation. Deep ribbing on back side of component tray permits airflow cooling which assures longer component life. Socket is pulse rated for 4KV. Component cover is injection molded, UV stabilized, impact resistant polycarbonate in dark bronze finish that won't peel, chip or fade. Refractor/lens is constructed of injection molded high impact acrylic. Reflector system is hydroformed anodized aluminum. Exterior hardware is stainless steel.

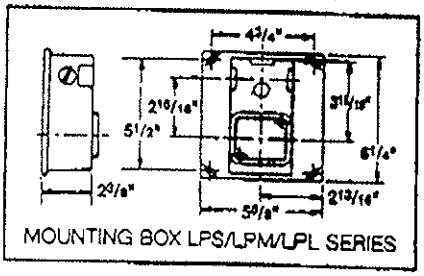
■ OPTICS
Patented bioptical lens allows for refractive distribution of light or glare free cut-off. Refractor units (LPMR series) yield Type II beam pattern. Units are shipped with prismatic refractor forward for uniform perimeter lighting. Glare-free cutoff units (LPMC series) are shipped with clear lens forward incorporating an internal front baffle to yield Type II beam pattern (with forward glare control). Spacing/mounting height ratio is 6.1 on all Type II units. Unique lamp/socket assembly allows for minor field adjustment of beam pattern. (Additional light patterns available-see Accessories.) *Refer to Section 12 for photometric data.*

■ BALLAST
Core and coil ballast as noted in ordering information. *Refer to Section 12 for electrical data.*

■ INSTALLATION
See page 18.

■ LAMP
Refer to Section 12 for lamp data.





MOUNTING BOX LPS/LPM/LPL SERIES

ORDERING INFORMATION

Catalog No.★ with Refractor	Catalog No.★ Cut-Off Optics	Watts	Lamp	Volts	Ballast
HIGH PRESSURE SODIUM					
LPMR100LXL	LPMC100LXL	100	E/B17	120-277	HX-HPF
LPMR100NLXL①	LPMC100LXL①	100	E/B17	120	Reactor (NPF)
■ LPMR150LXL	LPMC150LXL	150	E/B17	120-277	HX-HPF
■ LPMR150NLXL①	LPMC150NLXL①	150	E/B17	120	Reactor (NPF)
METAL HALIDE					
LPMR100MAL	LPMC100MAL	100	ED17	120-277	HX-HPF
LPMR150MAL	LPMC150MAL	150	ED17	120-277	CWA
■ LPMR175MAL	LPMC175MAL	175	ED17	120-277	CWA

★Medium base lamps included with all units. To order without lamp remove "L" from end of Cat. No.
①To order HPF (High Power Factor Reactor) ballast, change "N" to "H", i.e., LPMR100HLXL.

OPTIONS—For The LytePro LPS/LPM Series

To order the following factory installed options, add appropriate suffix to Cat. No.

	Suffix
FUSING: In-line protects HID circuitry:	
For 120V, 277V-Single Fusing	FS
For 208V, 240V, 480V-Double Fusing	FFS
POLYCARBONATE REFRACTOR:	
For vandal prone areas consult factory for wattages and availability.	PR

AUTOMATIC STAND-BY AUXILIARY LIGHT: Electronic relay energizes an auxiliary quartz lamp in the event of a momentary voltage drop or in cold start situations. Quartz lamp (included) remains illuminated until HID lamp (100, 150, 175 watt HID units only) reaches 70% of brightness. Consult factory for wattages and availability . . . **AMC**

ACCESSORIES

For The LytePro LPS/LPM Series

The following are field installed accessories. Order by Cat. No.

	Cat. No.
PHOTOCONTROL:	
BUTTON TYPE: (Installs easily to mounting box)	
120V	P105A
208V, 240V, 277V.	P105M
SWIVEL TYPE:: (Installs easily to 1/2" NPS hole on mounting box.)	
120V	P150A
120V	P110A
208V, 240V, 277V.	P150M
480V	P150E
TAMPERPROOF KIT: 2 allen screws to prevent access by intruders	LPTP

OPTICAL ACCESSORIES

See page 18

■ *Stock Item: Normally carried in factory stock and/or at local regional warehouses.*

07 '98 11:55 QUEENSBACK ELECTRIC, INC

TREATMENT SYSTEM ELECTRICAL

- Various

TABLE OF CONTENTS

Section a – Panel Ladder Logic Diagram

Section b – Auto-Dialer Instructions

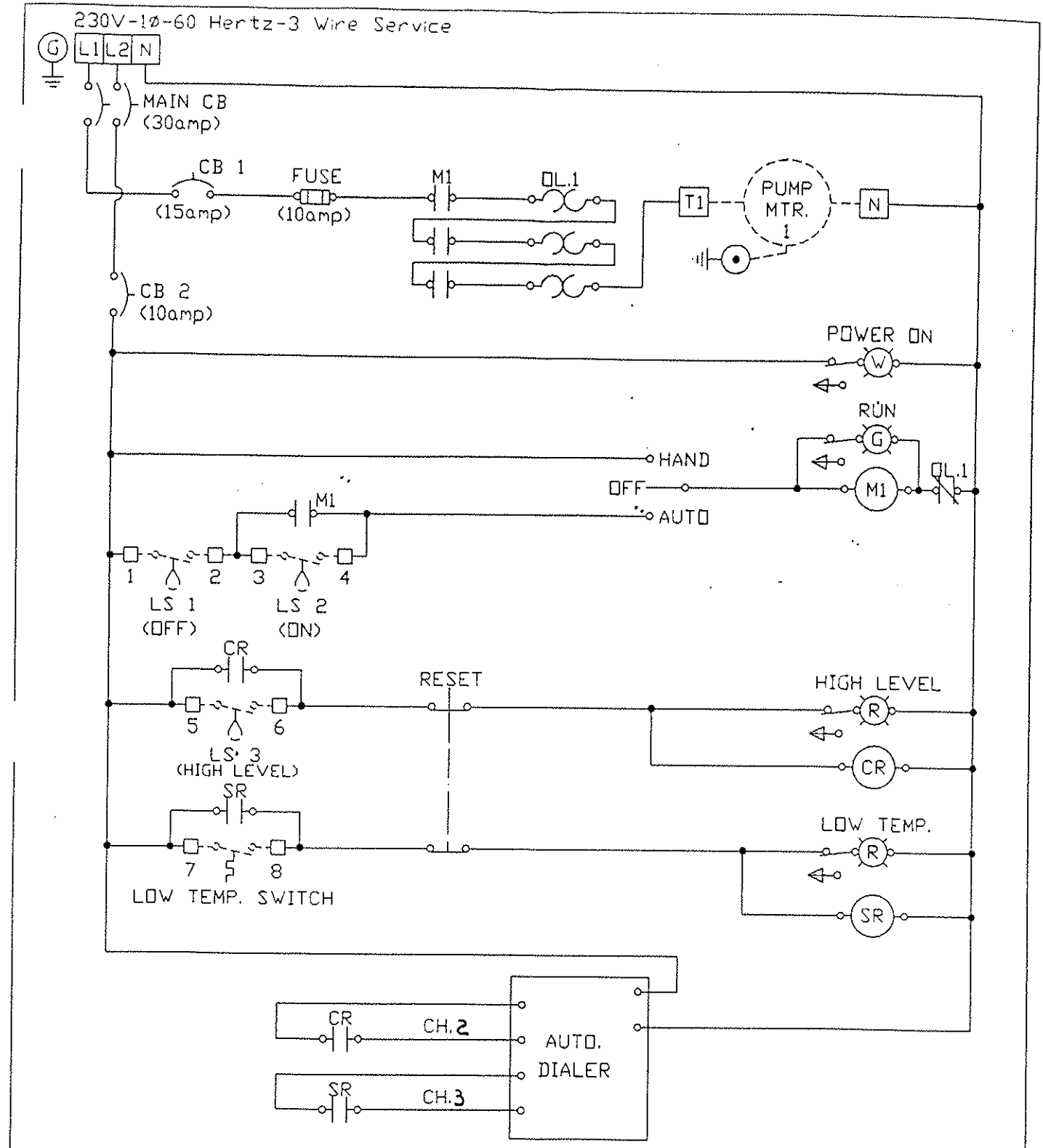
Section c - Panel Components:

1. Disconnect Switch
2. Circuit Breaker
3. Pump Motor Starter
4. Control Relay
5. Pushbutton Operators
6. Pilot Light Operators

Section d – Warranty

SECTION A

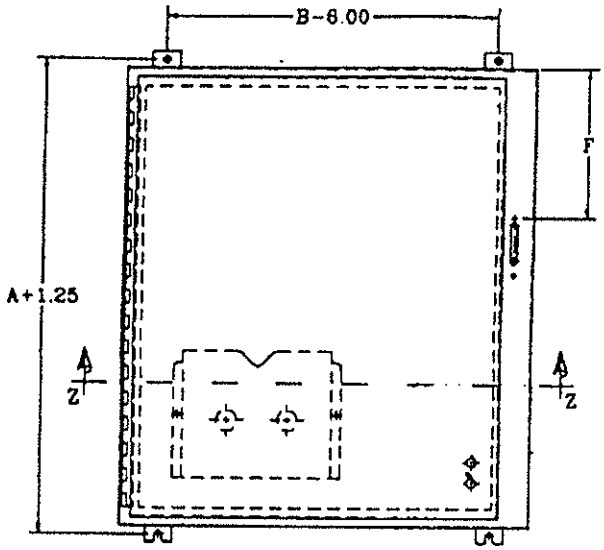
Electrical PANEL



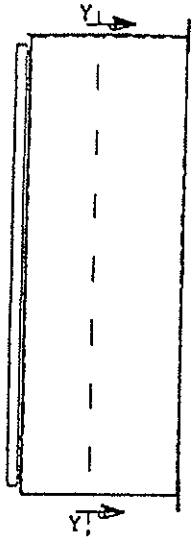
tes:
Level Switches Must Be Rated a Minimum of 2 Amps
it 120 Volts
Torque all white field wiring terminals to 8 In.Lbs.
3) Field Wiring Must Be 60°C Copper Wire Minimum.
4) – – – – – = Items Not Supplied In Control Panel.

DRWN.	DATE	BISCO Environmental 60 Stergis Way Dedham, MA 02026
SDK	3/31/98	
CHKD.	DATE	SCALE: NONE
		DRWG. NO. A-847509

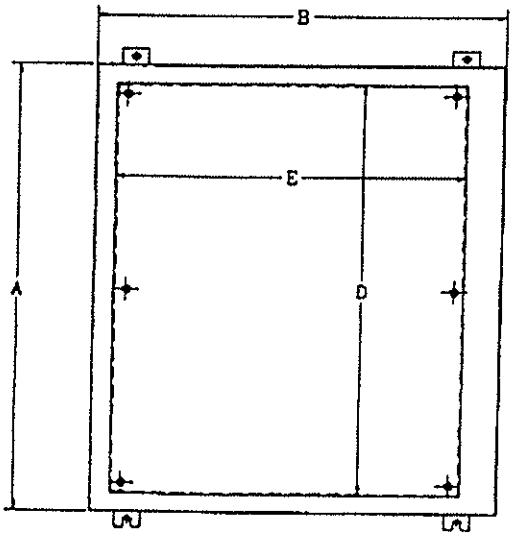
NEMA 12 SINGLE DOOR ENCLOSURES FOR FLANGE-MOUNTED DISCONNECTS
TECHNICAL DATA



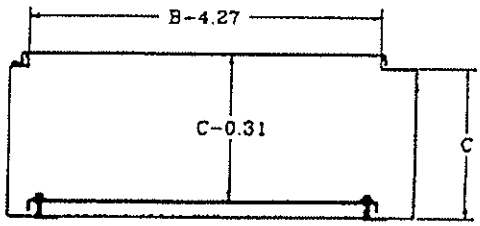
FRONT VIEW



SIDE VIEW



SECTION Y-Y



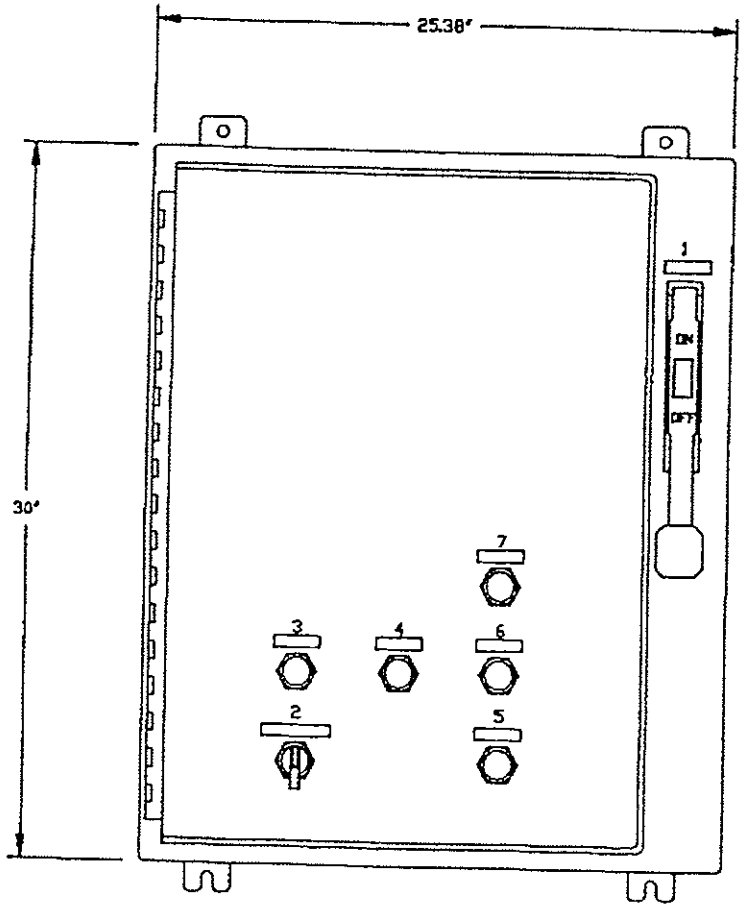
SECTION Z-Z

NOTES

F = 4.75 WHEN C = 8.00
F = 7.09 WHEN C = 10.00
F = 11.62 WHEN C = 12.00
F = 11.62 WHEN C = 16.00
F = 18.38 FOR SCE-60SA3612A24LP

ENCLOSURES WITH AN "A" DIMENSION UNDER 40.00 INCHES REQUIRE A 2-POINT DOOR CLOSING MECHANISM. ENCLOSURES WITH AN "A" DIMENSIONS OF 40.00 INCHES OR MORE REQUIRE A 3-POINT DOOR HARDWARE.

NEMA 12 ENCLOSURE
(8" DEPTH)



NAMEPLATE SCHEDULE

1) MAIN CB
2) HAND-OFF-AUTO
3) PUMP RUN
4) POWER ON
5) RESET
6) HIGH LEVEL
7) LOW TEMP.

LAYOUTS SHOW APPROXIMATE SIZE AND LOCATION OF COMPONENTS ONLY

PANEL WILL BE "UL"508A LISTED AND LABELED.

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Notes:
1) Level Switches Must Be Rated A Minimum Of 2 Amps @ 120 Volts
2) Torque All White Field Wiring Terminals To 20 In.Lbs.
3) Field Wiring Must Be 60°C Copper Wire Minimum.
4) ------- = Items Not Supplied In Panel

BISCO Environmental
60 Stergis Way
Dedham, MA 02026

PRIMESHIELD
CONTROL PANEL LAYOUT

DRWN.	DATE	SCALE
SDK	3/31/98	
		DRWG. NO. B-BISPRI

SECTION B

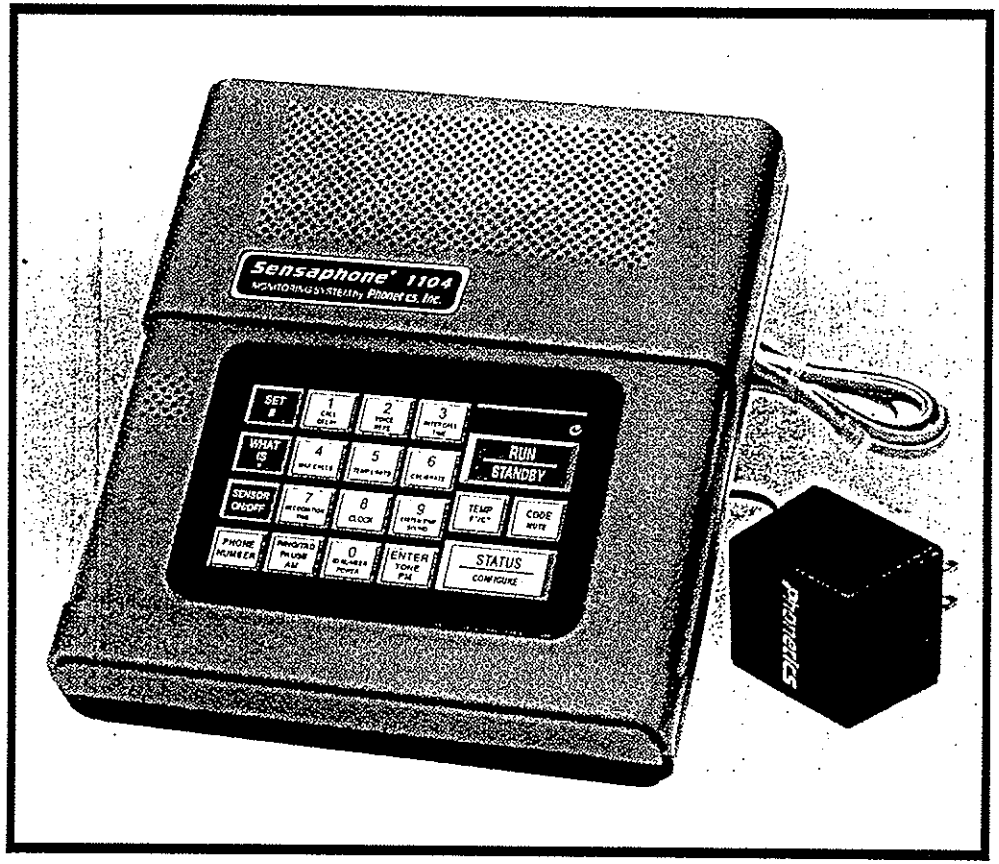
AUTO-DIALER INSTRUCTIONS

17/23/ Modl

Sensaphone®

Model 1104

User's Manual



Stay informed and in control of vital environmental conditions and processes with the fully-programmable Sensaphone® Model 1104.

Phonetics, Inc.

901 Tryens Road
Aston, PA 19014

Model 1104

User's Manual

Version 1.01

Phonetics, Inc.

Every effort has been made to ensure that the information in this document is complete, accurate and up-to-date. Phonetics, Inc. assumes no responsibility for the results of errors beyond its control. Phonetics, Inc. also cannot guarantee that changes in equipment made by other manufacturers, and referred to in this manual, will not affect the applicability of the information in this manual.

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Revised Edition, version 1.01, January 1998.

Written and produced by Phonetics, Inc. Please address all comments on this publication to:

Phonetics, Inc.
901 Tryens Road
Aston, PA 19014
www.sensaphone.com

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Touch-Tone™ is a registered trademark of AT&T.

IMPORTANT SAFETY INSTRUCTIONS

Your Model 1104 has been carefully designed to give you years of safe, reliable performance. As with all electrical equipment, however, there are a few basic precautions you should take to avoid hurting yourself or damaging the unit:

- Read the installation and operating instructions in this manual carefully. Be sure to save it for future reference.
- Read and follow all warning and instruction labels on the product itself.
- To protect the Model 1104 from overheating, make sure all openings on the unit are not blocked. Do not place on or near a heat source, such as a radiator or heat register.
- Do not use your Model 1104 near water, or spill liquid of any kind into it.
- Be certain that your power source matches the rating listed on the AC power transformer. If you're not sure of the type of power supply to your facility, consult your dealer or local power company.
- Do not allow anything to rest on the power cord. Do not locate this product where the cord will be abused by persons walking on it.
- Do not overload wall outlets and extension cords, as this can result in the risk of fire or electric shock.
- Never push objects of any kind into this product through ventilation holes as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electric shock.
- To reduce the risk of electric shock, do not disassemble this product, but return it to Phonetics Customer Service, or other approved repair facility, when any service or repair work is required. Opening or removing covers may expose you to dangerous voltages or other risks. Incorrect reassembly can cause electric shock when the unit is subsequently used.

- If anything happens that indicates that your Model 1104 is not working properly or has been damaged, unplug it immediately and follow the procedures in Appendix C for having it serviced. Return the unit for servicing under the following conditions:
  1. The power cord or plug is frayed or damaged.
  2. Liquid has been spilled into the product or it has been exposed to water.
  3. The unit has been dropped, or the cabinet is damaged.
  4. The unit doesn't function normally when you're following the operating instructions.
- Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.
- Do not use the telephone to report a gas leak in the vicinity of the leak.

CAUTION

To Reduce the Risk of Fire or Injury to Persons, Read and Follow these Instructions:

1. Use only the following type and size batteries: Alkaline, size D.
2. Do not dispose of the batteries in a fire. The cell may explode. Check with local codes for possible special disposal instructions.
3. Do not open or mutilate the batteries. Released electrolyte is corrosive and may cause damage to the eyes or skin. It may be toxic if swallowed.
4. Exercise care in handling batteries in order not to short the battery with conducting materials such as rings, bracelets, and keys. The battery or conductor may overheat and cause burns.
5. Do not mix old and new batteries in this product.

FCC Requirements

Part 68: The Sensaphone® Model 1104 complies with Part 68 of the FCC rules. On the back of the unit there is a label that contains, among other information, the FCC Registration Number and the Ringer Equivalence Number (REN) for this equipment. You must, upon request, provide this information to your local telephone company.

The REN is useful to determine the quantity of devices that you may connect to your telephone line and still have all of those devices ring when your telephone number is called. In most, but not all areas, the sum of the REN's of all devices connected to one line should not exceed five (5.0). To be certain of the number of devices that you may connect to your line, you may want to contact your local telephone company to determine the maximum REN for your calling area.

This equipment may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs.

Should the Model 1104 cause harm to the telephone network, the telephone company may discontinue your service temporarily. If possible, they will notify you in advance. But if advance notice isn't practical, the telephone company may temporarily discontinue service without notice and you will be notified as soon as possible. You will be informed of your right to file a complaint with the FCC. The telephone company may make changes in its facilities, equipment, operations, or procedures where such action is reasonably required in the operation of its business and is not inconsistent with the rules and regulations of the FCC that could affect the proper functioning of your equipment. If they do, you will be notified in advance to give you an opportunity to maintain uninterrupted telephone service.

If you experience trouble with this equipment, or you need information on obtaining service or repairs, please contact:

PHONETICS, INC.
901 Tryens Road, Aston, PA 19014
(610) 558-2700 Fax: (610) 558-0222

The telephone company may ask that you disconnect this equipment from the network until the problem has been corrected or until you are sure that the equipment is not malfunctioning.

Part 15: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/television

Canadian Department of Communications Statement

Notice: The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, where the company's inside wiring is associated with a single line, individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

CAUTION: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

The Load Number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device to prevent overloading. The termination on loop may consist of any combination of devices subject only to the requirement that the total of the Load Numbers of all the devices does not exceed 100. For the Sensaphone® Model 1104, the Load Number is 8.

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version 1.00v

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Chapter 1: Introduction

The Sensaphone® Model 1104 is a fully-programmable, environmental monitoring system that offers extensive on-site and remote monitoring capability to small businesses, private homes, farms, greenhouses, computer rooms, and remote facilities. Designed for desktop or wall mounting, the Model 1104 is simple to install, program and operate; no changes to standard electrical or telephone service are required. Connected to a telephone line, it will respond to an alarm by dialing up to four separate telephone numbers. When the call is answered, an *"Alert Condition"* message is delivered in digitized speech.

The Model 1104 features built-in sensors to monitor a variety of conditions:

- High sound level
- AC electric power failure
- Battery backup
- Temperature*

*Note: While technically not a "built-in" sensor, temperature is factory installed on input 1, and if left installed will limit your additional inputs as listed below to 3.

1104 is equipped with 4 alert inputs. Additional sensors* can be added to extend monitoring capabilities to include:

- Intrusion or unauthorized entry
- Water leaks and seepage
- Temperature
- Humidity
- Equipment operation
- Many other conditions that may require unique monitoring solutions

* Refer to Appendix B for information on additional sensors (available separately from Phonetics) best suited to your application.

The status of each monitored condition is readily obtained at the unit's installation site, or remotely by telephone. At the close of every Status Report, time is provided for listening to on-site sounds.

To ensure reliable operation, the Model 1104 features power backup capability; in the event of AC power failure, six D-cell batteries (not included) will continue to power the unit for approximately 24 hours.

This manual comprises the instructions and commands for installing and operating the Model 1104. The Quick Start chapter is included to speed understanding of programming and operation. Communication and Alarm Programming chapters demonstrate step-by-step methods for utilizing the full range of available features. The Troubleshooting chapter provides assistance in the event that problems are encountered.

Technical Support

If any questions arise upon installation or operation of the Model 1104, please contact Phonetics Customer Service Department, at the number shown below, and have the following information:

- Date of Purchase _____
- Serial number of your Model 1104 _____

Technical Support is available from 8:00 AM to 5:00 PM EST.

Phonetics, Inc.
901 Tryens Road
Aston, PA 19014
(610)558-2700
Fax: (610)558-0222
www.sensaphone.com

Chapter 2: Installation

Correctly installing the Model 1104 will ensure proper functioning of the unit. Please read the entire chapter before starting the installation process.

Within the packaging will be a Warranty Registration Card. Please take the time to fill this out and mail. The One Year Limited Warranty is explained in the back of this manual.

2.1 Operating Environment

The Model 1104 should be installed and operated in an area that provides space for wiring sensors to the screw terminals, near an AC power source and telephone line. Operating temperature ranges from 32° Fahrenheit (0° Celsius) to +120° Fahrenheit (+49° Celsius).

NOTE

The Model 1104 is a sensitive electronic device. Do not install the Model 1104 near strong electrostatic, electromagnetic or radioactive fields. Do not expose to fumes or corrosive vapors.

2.2 Mounting

Flat Mount: Place the Model 1104 on top of a desk or other horizontal surface. Wall Mount: Mount on a wall with two screws using the keyholes on the back panel of the unit. Place the screws or bolts 3 13/16" apart at the desired height from the floor. Hook the unit over the screws and toward the floor. Refer to Figure 2-1.

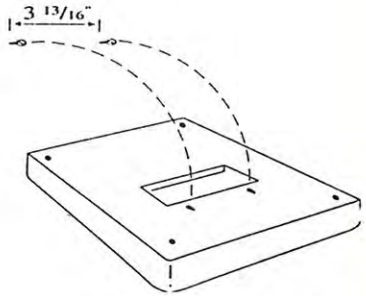


Figure 2-1. Wall Mount

2.3 Power Surge Protection

The Model 1104 can be damaged by power surges and lightning through the telephone line and the 120 VAC power supply. Although the Model 1104 has built-in surge protection, **we recommend that additional protection be obtained for the unit and for any electronic equipment that is attached to your power supply and telephone lines. Power surge protection is especially important if you live in a lightning-prone area.** The ISOTEL Surge Protector Model IB-4 is available through Phonetics. See Appendix B.

2.4 Power Supply and Battery Backup

The Model 1104 is provided with an AC power transformer that will plug into any standard 120 VAC outlet and a battery backup (batteries not included) that enables the unit to continue functioning if AC power is removed (due to electric power disruption or failure). The Model 1104 uses six, D-cell alkaline batteries. Do not use rechargeable nicad batteries.

NOTE

Be sure that the AC transformer is plugged into an outlet before installing batteries.

To install the batteries, open the battery compartment hatch located underneath the unit, align batteries according to the diagram shown in Figure 2-2, and replace the hatch.

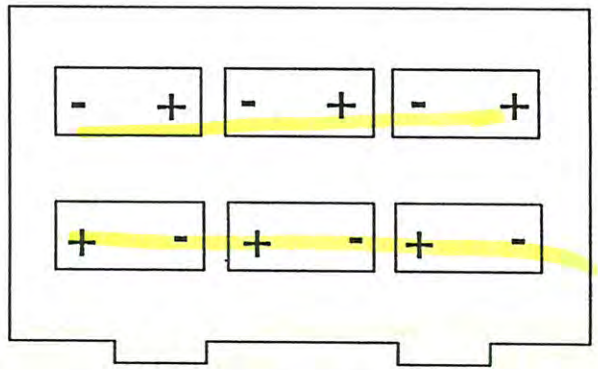


Figure 2-2. Battery Installation

2.5 Starting the Model 1104

When the AC power transformer is first plugged into the electrical outlet, the Model 1104 automatically starts in RUN mode. The red LED light will begin to glow. The unit will respond with, *"Hello, this is Sensaphone® 1104."*

2.6 Run Mode and Standby Mode

Pressing the RUN/STANDBY key on the Model 1104 keypad will alternately activate or deactivate the unit. If the unit is activated and in RUN mode, the red LED (small red light on the upper right of the unit's front panel) glows steadily. In STANDBY mode, the red LED goes out, but will blink every few seconds to indicate that power is still supplied to the unit.

In RUN mode, the Model 1104 is able to receive incoming calls and to automatically dial out in the event of an alarm on one of the monitored conditions. To enter STANDBY mode, press RUN/STANDBY.

As soon as the Model 1104 enters STANDBY mode, it responds with *"Have a good day."* The red light immediately goes out and then resumes with a blink every few seconds. While in STANDBY mode, all functions are disabled, but programmed memory is preserved. Upon exiting STANDBY mode, any currently existing alert conditions will be announced.

NOTE

STANDBY mode is not equivalent to "power off"—an electrical source, such as the 120 VAC, or the battery backup, continues to provide full power to the unit. If the unit is placed in STANDBY mode, unplugged from the 120 VAC outlet, and placed in storage, the batteries will continue to power the Model 1104, discharging until they fail. Consequently, batteries should always be removed from the unit following disconnection from any 120 VAC outlet, prior to storage.

Press the RUN/STANDBY key again to return to RUN mode.



Figure 2-3. The RUN/STANDBY Key

2.7 Telephone Line

The Model 1104 will operate with all standard telephone systems that accept pulse or tone dialing. The Model 1104 cannot be used on an extension line to dial its own telephone number. Also, it may not be installed on a party line or pay telephone line.

Certain private telephone systems and public switching equipment may not accept the Model 1104 dialing or may generate an unacceptable ring signal. In those cases, a dedicated line may be required. Consult the supplier of your telephone system if you encounter problems.

If you do not have a modular telephone extension at the Model 1104's location, you must contact your local telephone company to have one installed (there is a charge for this service). If you have four-pin jacks, adapters are available to convert them to the modular plugs. Contact your local telephone company or electronics parts store.

CAUTION

Never install telephone wiring during a lightning storm. Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations. Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface. Use caution when installing or modifying telephone lines.

To install the telephone line, plug the modular telephone jack provided into any standard RJ11 phone outlet. Refer to Figure 2-4.

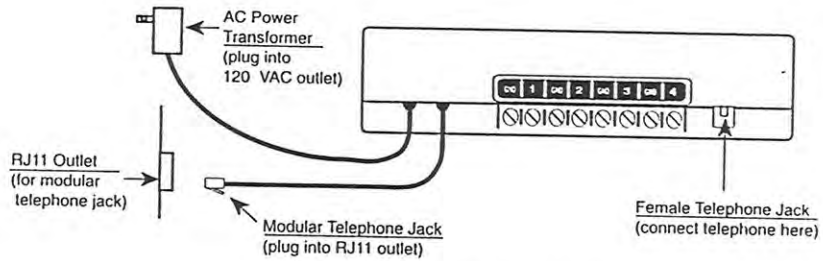


Figure 2-4. Installing the Telephone Line

On the back of the Model 1104 is a female telephone jack. This is provided so that a telephone or other answering device may be used on the same line as the unit. It is not necessary to hook up a telephone for the Model 1104 to operate.

2.8 The Microphone

The Model 1104 is provided with a built-in microphone which is used to monitor high sound levels produced near the installation site. The sensitivity of the microphone is configurable and will detect a continuous as well as a beeping alarm.

Other programming options that apply to the microphone include setting the length of time before a high sound causes an alarm.

If this sound level exists for 8 consecutive seconds (default) or for the programmed length of time, the Model 1104 will dial out with an alarm message.

NOTE

The proximity of the audible alarm to the microphone is extremely important. Normally, the Model 1104 and the audible alarm must be in the same room. The maximum distance can vary considerably depending on the alarm, the acoustics, and the size of the room.

During an alarm dial-out, the microphone allows four-second intervals to listen-in to sounds at the Model 1104's location.

When calling for a Status Report, the microphone permits listening to on-site sounds for a programmed time interval.

2.9 Alert Inputs

The Model 1104 can monitor up to 4 inputs (represented by the numbered terminal screws shown in Figure 2-5, below).

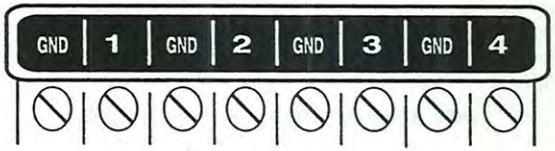


Figure 2-5. Alert Inputs

Inputs are configured as either dry contact or temperature. An input configured as dry contact can be used with any normally open (N.O.) or normally closed (N.C.) device. "Open" refers to an opened circuit path; if conditions cause the circuit to close, an alert condition occurs. "Closed" refers to a continuous circuit path; if a closed circuit is opened, an alert condition occurs. The Model 1104 determines the way inputs are configured by the type of sensor connected to each alert input (refer to Chapter 5, Section 5.1).

An input configured as "temperature" is designed to evaluate a range of settings. The Model 1104 will read the temperature at the sensor's location and compare that value to programmed high and low temperature limits. Temperature inputs *must* be used with Phonetics Remote Temperature Sensor.

NOTE

Before wiring, it is advisable to disable the inputs to prevent accidentally tripping an alarm. See Chapter 5, Section 5.2.

2.10 Installing the Sensor

After you have selected the sensor, loosen the screw of the alert input and its corresponding ground. Two wire leads are used to connect any monitoring sensor. Fasten one lead to the numbered screw and the other lead to GND. Tighten both screws. If the input was not disabled, the Model 1104 may recite its *"Alert Condition Exists"* message as you connect the sensor. If it does, just press any key to stop it. Re-enable the input after wiring. Refer to Figures 2-6 and 2-7 for connecting a sensor to an alert input.

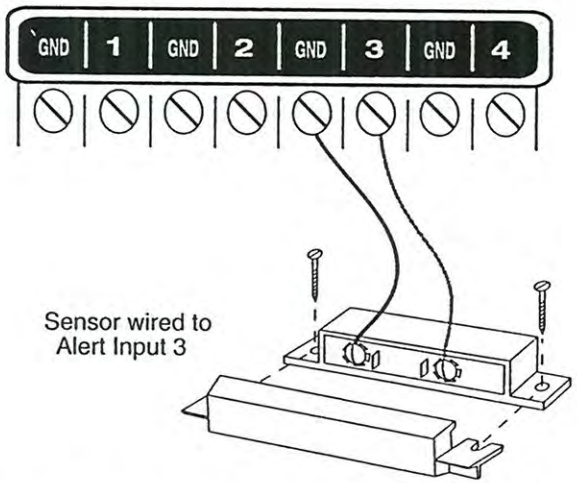


Figure 2-6. Sensor Connected to an Alert Input

Any sensor can be attached to the Model 1104 using 22-gauge wire. The sensor can be several hundred feet from the unit, as long as the total resistance of the circuit is not greater than 50 ohms. Use wire appropriate for the application.

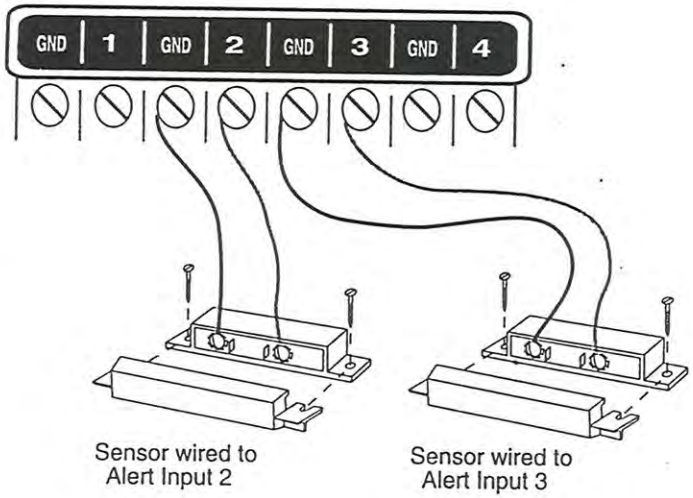


Figure 2-7. Two Sensors Wired to Adjacent Inputs

NOTE

Do not use sensors, switches, or relays that supply any voltage or current to the Model 1104. Be aware of proximity to other electrical wires or components when placing wires that lead from the sensors to the unit. Avoid running the wires near electrical devices that use high voltage or current, such as motors, heavy machinery, etc. This voltage may be inductively coupled into the sensor wiring and could result in damage to the the Model 1104's circuitry. Try to place wires at least 6 inches from other electrical wiring or devices.

2.11 Multiple Sensors

The Model 1104 may have more than one sensor connected to the same alert input, as long as the normal condition for each sensor on the same alert input is identical (either all N.O. or all N.C.). However, only one remote temperature sensor can be used on each input.

When wiring several normally closed sensors on one input, they must be connected in series. Connect one lead from the first sensor to the numbered screw of the alert input. Next, take the other lead from the first sensor and connect it to one lead from the next sensor. Continue connecting sensors end-to-end until you have connected all of your sensors. Take the second lead from the last sensor and connect it to the ground screw on the Model 1104. See Figure 2-8. Multiple N.C. sensors are typically magnetic reed switches to monitor the security of windows and doors.

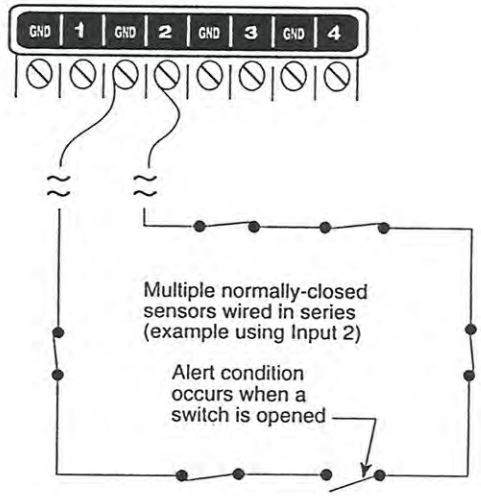


Figure 2-8. Multiple Normally Closed Sensors

To wire several normally open sensors to one alert input, connect them in parallel. To do this, take one lead from each sensor and attach it to the numbered terminal. Then, take the second lead from each sensor and attach each to the corresponding ground screw. Refer to Figure 2-9.

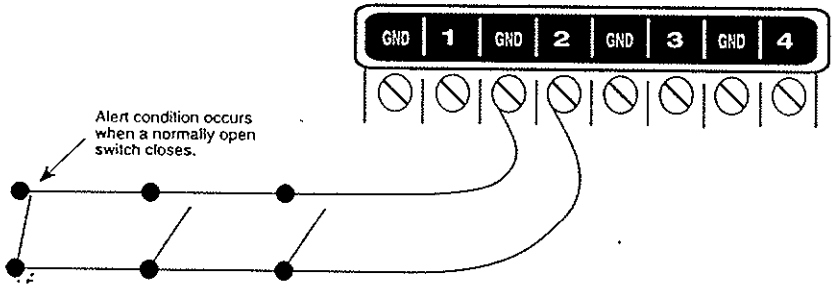


Figure 2-9. Multiple Normally Open Sensors

2.12 Outdoor Wiring

When wiring sensors outdoors, **DO NOT** allow exposed wires to run freely in open air; under such conditions, the Model 1104 is susceptible to serious damage during a lightning storm. Depending upon the distance outdoor wiring must travel, consideration should be given to use of shielded wire inside a metal conduit. Both shield and conduit should be connected to earth ground. This prevents stray voltage from entering the unit.

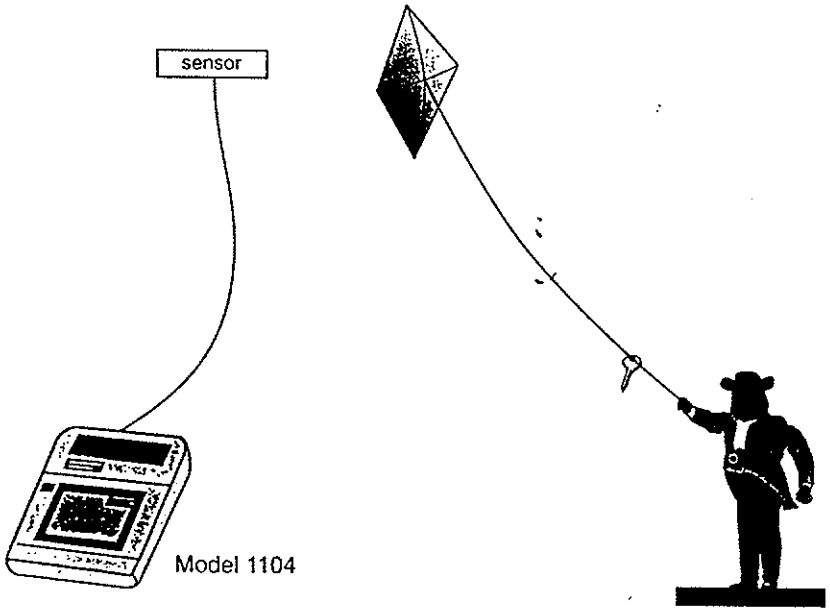


Figure 2-10. Potential Sensor Damage from Stray Electrical Noise

2.13 Disconnecting the Model 1104 for Storage or Seasonal Use.

If you plan to employ the Model 1104 as a seasonal "watchdog" for a few months during the year, **you must disconnect all wires from the unit completely to avoid damage to the circuitry when the unit is not in use.** If the unit is unplugged but left in place with all the sensors still connected, the wires act as antennae that draw in any stray "electrical noise" from such devices as fans, blowers, microwaves, etc.

Additionally, it is important to remove the batteries, or they will discharge until they fail.

Preserve your Model 1104 during the off-season, or when not in use:

- Remove the sensor wires at the screw terminals
- Remove the batteries
- Unplug the unit and store in a safe place

NOTES

Chapter 3: Quick Start

This section presents a useful guide for first-time programming of the Model 1104. Follow instructions for installation before attempting to program the Model 1104. Refer to Chapter 2: Installation.

3.1 The Local Keypad

Programming is accomplished using the local keypad (shown below, Figure 3-1). Notice that a single key has several functions assigned to it; ***programming results are determined by the order in which keys are pressed.***

Individual keystrokes are illustrated to show programming steps in the correct order. If you make a mistake by entering the wrong key, do not press another key until you hear the message, *"Error 1."* Then, start over with the first key in the programming sequence.

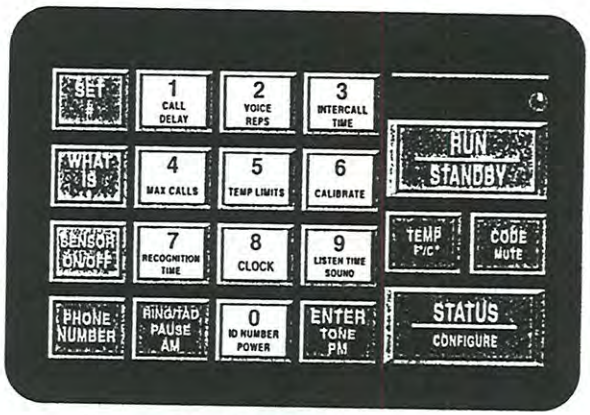


Figure 3-1. The Model 1104 Keypad

3.2 Preparation for Programming

Read complete instructions in Chapter 2: Installation, and make sure to follow these steps first:

1. Plug the AC adaptor into the 120 VAC outlet.
2. Install the batteries.
3. Connect the Model 1104 to a telephone line.

When these steps are completed, the Model 1104 is fully operational and able to monitor temperature, high sound, AC power failure and battery backup condition; it can also be called on the telephone for a Status Report or used for listening to on-site sounds from any remote location. Now, the unit is ready for programming.

3.3 Quick-Start Programming Steps

Step 1: Set Configuration of Inputs

The Model 1104 will scan the 4 external inputs and determine if they are N.O. (normally open), N.C. (normally closed), or Temperature. If external sensors are added, make sure they are in their ***normal*** positions before proceeding—refer to Chapter 5, Section 5.1.

1. Press STANDBY to place the Model 1104 in Standby mode.



2. If you have external sensors available, wire the sensors to the inputs on the back of the Model 1104 (see Chapter 2, Section 2.10). Otherwise, skip this step and move to step 3.
3. Press RUN. The red light glows when the Model 1104 returns to Run mode.



4. Press SET.



5. Press CONFIGURE.



6. The Model 1104 will audibly recite the new configuration for each of the four inputs, responding with *"OK,"* if it detects N.O. (normally open), *"beep-OK,"* if it detects N.C (normally closed) or *"Temperature,"* if it detects temperature (regardless of whether all the inputs have attached sensors or not). If an input is unused, it is treated as normally open.

Step 2: Set the ID Number

It is recommended that you set the ID number to reflect the telephone number on which the Model 1104 is installed.

1. Press SET.



2. Press ID NUMBER.



3. Using the number keys, enter the digits (up to 16 are permitted) for the ID number. The Model 1104 will recite the digits as they are pressed.



4. Press ENTER. The 1104 will respond: *"Enter."*



Step 3: Set Dial-Out Telephone Numbers

To program dial-out telephone numbers:

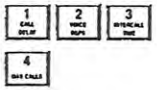
1. Press SET.



2. Press PHONE NUMBER.



3. Select which telephone number to program. Press any unassigned number key (from 1 to 4) to represent the new telephone number entry. Model 1104 will respond: *"Enter number."*



4. Enter the complete telephone number using the number keys. The Model 1104 will recite the digits as they are pressed.



5. Press ENTER. The unit will respond: *"Enter."*



6. Repeat above procedure to program up to four separate telephone numbers.

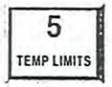
Step 4: Set Temperature Limits

High and low temperature limits can be separately programmed for each input that is configured as temperature. Limits can range from –20° to +150° Fahrenheit, or from –30° to 65° Celsius. Default settings are: 10° F for low temperature and 100° F for high temperature. Do not set temperature limits too close to normal room temperature, since minor fluctuations could result in frequent and unnecessary alarm dialouts.

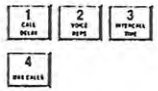
1. Press SET.



2. Press TEMP LIMITS.



3. From the number keys, press a number (from 1 to 4) that corresponds to the temperature input being programmed.



The Model 1104 responds: *"Enter low temperature limit."*

4. Using the number keys, enter a value for low temperature limit. The Model 1104 will recite the digits as they are pressed. If a negative number is required, first press PAUSE, then enter the number.



5. Press ENTER.



The Model 1104 responds: *"Enter high temperature limit."*

6. Using the number keys, enter the value for high temperature limit. The Model 1104 will recite the digits as they are pressed.



7. Press ENTER. The Model 1104 responds: *"Enter."*



This concludes minimum programming to achieve normal operation of the Model 1104. In additon to the programming just accomplished, default settings for many more features take effect when the unit is first powered. You will be able to reprogram most of these factory-set defaults to suit your application.

For a complete explanation of each feature (with illustrations of keystrokes), refer to Chapter 4: Communications Programming and Chapter 5: Alarm Programming.

To gain a basic understanding of how the alarm dial-out feature works, refer to this chapter, Section 3-4. For extended information regarding dial-out and related programmable parameters, refer to Chapter 7: Operation.

3.4 Summary of the Alarm Dial-Out Process

Action—Response	Programmable Feature
1. THE MODEL 1104 DETECTS AN ALERT CONDITION An alert condition is not the same as a valid alarm—the condition must continue for the programmed time period, or ***Recognition Time***, before it is recognized as a valid alarm.	• **Recognition Time** This is the programmed waiting period to determine if an alert condition has persisted long enough to be considered a valid alarm. If the sensor returns to normal within recognition time, then no alarm will occur.
2. A VALID ALARM IS CONFIRMED An audible, on-site alarm message begins and continues until the alarm is acknowledged. (If the Mute feature is turned on, there is no on-site message.) ***Call Delay*** is activated.	• **Call Delay** This is the programmed waiting period, before the first telephone number is called, to report an alarm.
3. DIAL-OUT BEGINS Dial-out begins by calling telephone number 1 to report an alarm. If there is no acknowledgment, the Model 1104 waits the programmed ***Intercall Time*** before dialing subsequent telephone numbers. Dial-out continues in this manner, cycling through the remaining telephone numbers, for the programmed ***Max Calls.***	• **Intercall Time** This is the programmed waiting period, in between sequential dialing of telephone numbers, to report an alarm. • **Max Calls** This is the total number of telephone calls that will be dialed in response to any valid alarm. Telephone numbers are dialed sequentially, and continue to cycle until the maximum number of calls is reached. If no acknowledgment occurs, then at the completion of Max Calls, all alarms are automatically acknowledged.
4. THE ALARM IS ACKNOWLEDGED When the alarm is acknowledged, the dial-out process is cancelled and the audible, on-site alarm message stops.	

NOTES

Chapter 4: Communications Programming

This chapter explains the keypad commands for communications programming of the Model 1104, including interrogation and resetting of the following:

- The Unit ID Number
- Dial-out Telephone Numbers
- Tone or Pulse Dialing
- Special Dialing with Pagers, Beepers and Access Numbers.
- Rings Until Answer and Telephone Answering Device Compatibility
- Listen-in Time
- Call Delay
- Local Voice Mute
- Voice Repetitions
- Intercall Time
- Maximum Number of Calls
- The Clock
- Security Code

4.1 The Unit ID Number

The Unit ID Number is the identification number of the Model 1104. This number may be the same as the telephone number where the unit is installed, or it may be designated using any number that best suits your application.

The purpose of the Unit ID Number is to immediately provide the source of any alarm, especially when using multiple Model 1104 units in a complex monitoring system. When the Model 1104 is called from a remote location, it always begins its message with the identification number: *"Hello, this is telephone number (Unit ID Number)."*

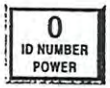
4.1.1 Programming the ID Number

To program the ID Number:

1. Press SET.



2. Press ID NUMBER.



3. Using the number keys, enter up to 16 digits for the ID number. The Model 1104 will recite the digits as they are pressed.



4. Press ENTER. The Model 1104 will respond: *"Enter."*



4.1.2 Interrogating the ID Number

To interrogate the ID numbers:

1. Press WHAT IS.



2. Press ID NUMBER. The Model 1104 will recite the Unit ID Number programmed.



4.2 Dial-out Telephone Numbers

The Model 1104 can store up to four 32-digit phone numbers. These are the numbers that will be called during dial-out. In the event of an alarm, the numbers are dialed sequentially, 1 through 4. Begin programming the first telephone number by assigning it to the key labeled with the number 1 on the keypad, and continue to assign any other telephone numbers in numerical order. ***A pause, pound or asterisk can be added*** to an individual phone number to access different phone and beeper systems. See Special Dialing, Section 4.4.

4.2.1 Programming Dial-out Telephone Numbers

To program dial-out telephone numbers:

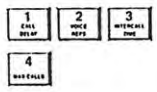
1. Press SET.



2. Press PHONE NUMBER.



3. Select which telephone number to program. Press any unassigned number key (from 1 to 4) to represent the new telephone number entry. The Model 1104 will respond: *"Enter number."*



4. Enter the complete telephone number using the number keys.



5. Press ENTER. The unit will respond with *"Enter."*



6. Repeat above procedure to program up to four separate telephone numbers.

4.2.2 Interrogating a Dial-out Telephone Number

To interrogate dial-out telephone numbers:

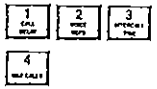
1. Press WHAT IS.



2. Press PHONE NUMBER.



3. Press a number key (from 1 to 4).



Model 1104 will recite the corresponding telephone number. If there is no number programmed for a particular key, the unit will respond: *"No number."*

4.2.3 Erasing a Telephone Number

To erase a telephone number:

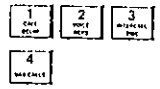
1. Press SET.



2. Press PHONE NUMBER.



3. Press the number key (from 1 to 4) representing the telephone number you want to erase.



4. Press ENTER. The Model 1104 will say *"Enter."*



4.3 Tone or Pulse Dialing

The Model 1104 can dial out in pulse or Touch Tone™. Select the type of dialing, in either pulse or tone, depending upon the type of service provided by your telephone company. The default is tone.

To program for either pulse or tone:

1. Press the SENSOR ON/OFF key.



2. Press TONE.



The Model 1104 will respond: *"Off"* to indicate that tone dialing is off and pulse is enabled, or *"On"* to indicate that tone dialing is on and pulse is disabled.

3. Repeat key sequence to switch between settings.

4.4 Special Dialing

The Model 1104 has provisions for special dialing sequences. Special dialing sequences allow:

- Dialing that requires an access number to connect with an outside line.

- Dialing that requires the pound (#) or asterisk (*).
- Dialing to a beeper or pager.

4.4.1 Special Dialing Keys

The following designated keys represent special functions when used with PHONE NUMBER entries:

1. ***Pause***



PAUSE represents a four second pause in dialing. It can be used when an access number is required before dialing to an outside line. (For example, in some cases a "9" or other number, must be dialed first, in order to get a dial tone for an outside line.) When interrogating telephone numbers, PAUSE is audibly represented by a *"beep."*

2. ***Pound (#)***



A pound may be required when calling some phone or beeper systems. When interrogating telephone numbers, pound (#) is audibly represented by the word "twelve."

3. ***Asterisk (*)***



An asterisk may be required when calling some phone or beeper systems. When interrogating telephone numbers, asterisk (*) is audibly represented by the word "eleven."

4. ***Code***



CODE instructs the Model 1104 to wait until the call is answered before continuing. When interrogating telephone numbers, CODE is audibly represented by the word "fourteen."

NOTE

Each time a pause, pound (#) or asterisk (*) is incorporated in a programming sequence, it is counted as one digit toward the total of 32 digits allowed.

4.4.2 Incorporating a Pause

Incorporate PAUSE to access an outside telephone line:

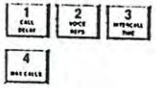
1. Press SET.



2. Press PHONE NUMBER.



3. Press any unassigned number key (from 1 to 4) to represent the new telephone number entry. Model 1104 will respond: *"Enter number."*



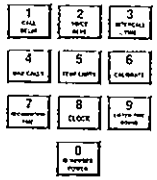
4. From the number keys, enter the access digit (i.e., 9). The Model 1104 will recite the digit.



5. Press PAUSE. The Model 1104 will *"beep."*



6. Enter the complete telephone number (1 + area code) using the number keys. The Model 1104 will recite the digits as they are pressed.



7. Press ENTER. The Model 1104 will say *"Enter."*



4.4.3 Incorporating a Pound (#) or Asterisk (*)

Incorporate a pound or asterisk if it is normally included in telephone number:

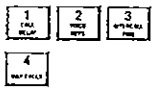
1. Press SET.



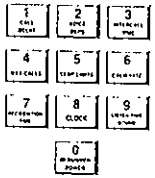
2. Press PHONE NUMBER.



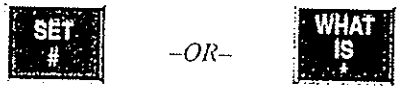
3. Press any unassigned number key (from 1 to 4) to represent the new telephone number entry. Model 1104 will respond: *"Enter number."*



4. Enter the telephone number using the number keys. The Model 1104 will recite the digits as they are pressed.



5. Position the pound (#) or asterisk (*) within the telephone number where required by pressing SET (where the pound is located) or WHAT IS (where the asterisk is located). The Model 1104 will *beep* each time pound or asterisk is pressed.



6. Enter any remaining digits of the telephone number.

7. Press ENTER. The Model 1104 will say *"Enter."*



4.4.4 Special Dialing to a Beeper or Pager

The following example demonstrates just one solution to programming the Model 1104 for dialing to a beeper or pager. Many other key sequences will also work. Start with steps 1–3 below; next, enter special dialing keys where required for your beeper or pager service.

To incorporate a pound or asterisk:

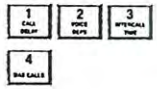
1. Press SET.



2. Press PHONE NUMBER.



3. Press any unassigned number key (from 1 to 4) to represent the new telephone number entry.



4. Enter the complete telephone number using the number keys. The Model 1104 will recite the digits as they are pressed.



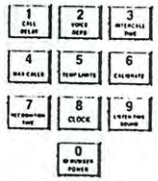
5. Press CODE. This instructs the Model 1104 to wait for the telephone call to be answered by the beeper or pager service. (A voice message will not occur—only digital tones are used.) Note that CODE may not work with beepers where there is no ring before the beeper connects. If that proves to be the case for your particular beeper, skip the CODE step and proceed from Step 4 to Step 6.



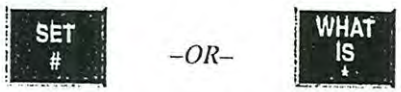
6. Now press PAUSE once to activate a four second delay. This assumes the call is answered by a beeper/pager service that immediately delivers a prerecorded voice message. PAUSE may be pressed more than once to program more time for the beeper/pager service to finish its message. Each press of PAUSE allocates four additional seconds. The Model 1104 will *"beep"* with each press.



7. Enter a telephone number or custom code number that will identify the Model 1104 as the caller to your beeper or pager. A code may consist of any number(s) you designate. Many users find it convenient to use the telephone number to which the Model 1104 is connected.



8. A pound or asterisk may be required in some dialing situations. If required, position the pound (#) or asterisk (*) within the telephone number where required by pressing SET (where the pound is located) or WHAT IS (where the asterisk is located). The Model 1104 will *"beep"* each time pound or asterisk is pressed. Enter any remaining digits of the telephone number.



9. Press ENTER. The Model 1104 will say *"Enter."*



4.5 Rings Until Answer

Rings Until Answer is the programmed number of times the telephone rings before the Model 1104 will answer an incoming call. This can be set from 1 to 15 rings. The default value is 4.

4.5.1 Programming Rings Until Answer

To program Rings Until Answer:

1. Press SET.



2. Press RING/TAD. The Model 1104 will respond: *"Enter number."*



3. Using the number keys, enter a value.



4. Press ENTER. The Model 1104 will respond: *"Enter."*



4.5.2 Interrogating Rings Until Answer

To interrogate Rings Until Answer:

1. Press WHAT IS.



2. Press RING/TAD.



4.6 TAD (Telephone Answering Device)

The TAD feature is especially useful because it integrates the operation of the Model 1104 with your telephone answering device in a way that retains the full flexibility of each system. This allows you to have on-demand telephone access to the Model 1104, for obtaining a Status Report, or for issuing call-in

commands, while your telephone answering device is set to receive outside calls. Programming for use with a telephone answering device (TAD) is always used in conjunction with Rings Until Answer, detailed in section 4.5.

NOTE

The TAD feature only applies to answering devices connected to the same telephone line as the Model 1104.

4.6.1 TAD Enable/Disable

To enable/disable the TAD feature:

1. Press SENSOR ON/OFF.



2. Press RING/TAD.



The Model 1104 will respond: *"On."* (If the Model 1104 says *"Off,"* repeat steps 1 and 2 to reactivate TAD.)

4.6.2 Using the TAD Feature

1. Make sure the TAD feature is ***enabled*** on the Model 1104. (The default setting is *disabled,* so you must enable it first.)
2. Determine the number of rings your telephone answering device uses to answer the telephone. (Most answering devices require 4 rings; others are selectable.)
3. On the Model 1104, program Rings Until Answer to a greater number than the number of rings set on your answering machine.

   Example:

   Telephone answering device, rings = 4

   Model 1104, Rings Until Answer = 6

Using the procedure just outlined, all incoming calls will be answered by the telephone answering device, allowing it to operate normally. With the programming just accomplished, the Model 1104 can be accessed remotely, by telephone, to obtain the Status Report.

1. Dial the telephone number of the Model 1104.
2. Let the telephone ring once and then hang up.
3. Wait approximately ten seconds
4. Call the Model 1104 back.
   It will answer the telephone on the first ring.

Explanation: The pattern of one ring, followed by a second call (within 30 seconds), signals the Model 1104 to answer your incoming call, excluding the telephone answering device.

NOTE

Special Case: If the Model 1104 shares the same line with a telephone answering device, and during certain time periods, frequent, incoming calls are expected on that line, then you may want to temporarily disable the TAD feature. If you leave the TAD enabled, it will not adversely affect normal operation, but if two outside telephone calls are received within the same 30-second time window, the Model 1104 will interpret this pattern as a signal to answer the telephone. If this occurs, press any key on the Model 1104 to hang up.

4.6.3 No TAD In Use

If a telephone answering device is not used on the same telephone line as the Model 1104, make sure that the TAD feature is disabled, or turned off. Only Rings Until Answer programming will determine how incoming calls are answered. For example, if you program Rings Until Answer to 3, incoming calls will be answered in 3 rings.

4.7 Listen-in Time

The Listen-in Time is the amount of time you can listen to sounds from the Model 1104's built-in microphone at its installation site. When you call in for a Status Report, the Model 1104 announces Listen-in Time at the end of its first round of status readings, saying, *"Listen to the sound level for (programmed time entered)."* The programmable range is from 0 to 255 seconds (or up to 4.17 minutes). The default value is 15 seconds.

NOTE

The microphone is also used to monitor high sound level. See Chapter 5, Section 5.10 through Section 5.11.1.

4.7.1 Programming the Listen-in Time

To program the Listen-in Time:

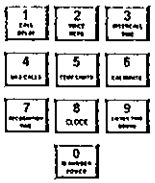
1. Press SET.



2. Press LISTEN TIME. The Model 1104 will respond: *"Enter seconds."*



3. Using the number keys, enter the seconds. The Model 1104 will recite the digits as they are pressed.



4. Press ENTER. The Model 1104 will respond: *"Enter."*



4.7.2 Interrogating the Listen-in Time

To interrogate the Listen-in Time:

1. Press WHAT IS.



2. Press LISTEN TIME. The Model 1104 will recite the listen time in seconds programmed.



4.8 Call Delay

Call Delay is the programmed length of time the Model 1104 waits, following detection of an alarm, before it begins the dial-out sequence. *This applies only to the first call.* (Delay time between calls is also programmable: refer to Intercall Time, Section 4-11.)

The purpose for Call Delay is to allow time for personnel at the Model 1104's installation site to respond to and cancel an alarm before dial-out begins. During this time, the Model 1104 will audibly repeat its "alert condition" message (unless the Local Voice Mute feature has been activated—refer to Section 4.9). The default for Call Delay is 30 seconds. Call Delay can be programmed from 0 seconds to 60 minutes (1 hour).

4.8.1 Programming the Call Delay

To program the Call Delay:

1. Press SET.

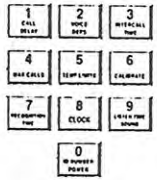


2. Press CALL DELAY.



The Model 1104 will respond: *"Enter minutes."*

3. Using the number keys, enter the minutes. The Model 1104 recites the digits as they are pressed.



4. Press ENTER. The Model 1104 responds: *"Enter seconds."*



5. Using the number keys, enter the seconds. The Model 1104 recites the digits as you press them.



6. Press ENTER. The Model 1104 responds: *"Enter."*



4.8.2 Interrogating Call Delay

To interrogate Call Delay:

1. Press WHAT IS.



2. Press CALL DELAY.



The Model 1104 will recite the programmed Call Delay.

4.9 Local Voice Mute

When the Model 1104 dials out to report an alarm, it also audibly recites the alarm message at its installation site. The Local Voice Mute command allows you to turn off the voice at the Model 1104's site during alarm dialouts and status call-ins. This feature is used to prevent intruders or unauthorized persons from hearing the alarm dial-out message or from hearing the Status Report during an off-site call.

4.9.1 Enable/Disable Local Voice Mute

To enable/disable Local Voice Mute:

1. Press SENSOR ON/OFF.



2. Press MUTE.



The Model 1104 will say *"On,"* to indicate that Local Voice Mute is enabled, or *"Off,"* to indicate that it is disabled.

3. Repeat key sequence to switch between enabled or disabled Local Voice Mute.

4.10 Voice Repetitions

The Voice Repetitions feature allows programming of the number of times the alarm message is delivered ***per phone call*** during alarm dial-out.

The maximum repetitions may be set to 10; the default is 3 repetitions.

4.10.1 Programming Voice Repetitions

To program Voice Repetitions:

1. Press SET.



2. Press VOICE REPS.



The Model 1104 will respond: *"Enter number."*

3. Using the number keys, enter a value from 0 to 10.



4. Press ENTER. The Model 1104 will respond: *"Enter."*



4.10.2 Interrogating Voice Repetitions

To interrogate Voice Repetitions:

1. Press WHAT IS.



2. Press VOICE REPS.



The Model 1104 will recite the number programmed.

4.11 Intercall Time

The Intercall Time is the programmable period of time the Model 1104 waits in calling subsequent telephone numbers. Intercall Time is activated ***only after alarm dial-out to the first telephone number fails to be acknowledged.*** This period can be programmed from 10 seconds to 60 minutes. The default intercall time is 1 minute.

If an incoming telephone call is made to the Model 1104 during Intercall Time (in between its dialing of subsequent telephone numbers to report an alarm), it will answer the incoming call and immediately report any existing alarms. The manner in which the incoming call is answered depends upon whether or not TAD is enabled or disabled:

- If TAD (Telephone Answering Device) is enabled, Rings Until Answer will be 1.
- If TAD is disabled, Rings Until Answer will be 10.

Refer to Section 4.5, Rings Until Answer, and Section 4.6, TAD (Telephone Answering Device).

4.11.1 Programming Intercall Time

To program Intercall Time:

1. Press SET.



2. Press INTERCALL TIME.



The Model 1104 will respond: *"Enter minutes."*

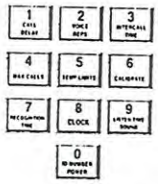
3. Using the number keys, enter the minutes. The Model 1104 recites the digits as you press them.



4. Press ENTER. The Model 1104 will respond: *"Enter seconds."*



6. Using the number keys, enter the seconds. The Model 1104 recites the digits as you press them.



7. Press ENTER. The Model 1104 responds: *"Enter."*



4.11.2 Interrogating Intercall Time

To interrogate Intercall Time:

1. Press WHAT IS.



2. Press INTERCALL TIME.



The Model 1104 will recite the programmed Intercall Time.

4.12 Maximum Number of Calls (Max Calls)

The Max Calls feature controls the total number of repeated calling attempts by the Model 1104 in the event of an alarm. When an alarm occurs, the dial-out process begins, and continues to cycle through your programmed telephone

numbers until a maximum number of calls is reached. The Max Calls setting regulates the number of calls that will be made as a result of any alarms; if more than one alarm is detected at once, or if a second alarm occurs during dial-out on the first alarm, the Max Calls setting will start the calling process from zero, until the programmed number of calling attempts are completed.

The default setting for Max Calls is 16, but it may be programmed from 0 to 255 calls. Max Calls is cancelled when an alarm is acknowledged. If the maximum number of calls is completed and no alarm acknowledgement has occurred, the Model 1104 will automatically acknowledge any alarm and stop the dial-out.

NOTE

If only one telephone number is programmed, the Model 1104 will dial out a maximum of 15 times to report an alarm.

4.12.1 Programming Max Calls

To program Max Calls:

1. Press SET.



2. Press MAX CALLS.



The Model 1104 will respond: *"Enter number."*

3. Using the number keys, enter a value. The Model 1104 will recite the digits as you press them.



5. Press ENTER. The Model 1104 responds: *"Enter."*



4.12.2 Interrogating Max Calls

To interrogate Max Calls programmed:

1. Press WHAT IS.



2. Press MAX CALLS.



The Model 1104 will recite the value set for Max Calls.

4.13 The Clock

The Model 1104 has a built-in clock. The power-up time is 12 AM. The clock will keep time from 12 AM until you program the current time. It will then keep time from your programmed time. If the AC power fails, the clock will continue to keep time until the battery back-up fails. It will then reset to 12 AM when power is restored. ***An incorrect time is a good indication that the power has failed and the batteries have been expended.***

4.13.1 Setting the Clock

To set the clock:

1. Press SET.



2. Press CLOCK.



3. Using the number keys, enter the correct time. The Model 1104 will recite the digits as they are pressed.



4. If the time is AM, press the AM key. The Model 1104 will *"beep."* (If the time is PM , there is no key to press—the clock will be automatically set to PM if AM is not set.)



5. Press ENTER. The Model 1104 will say *"Enter."*



Example: You want to set the clock to 12:45 AM. Press the following keys in the order shown:

SET...CLOCK...1...2...4...5...AM...ENTER.

4.13.2 Interrogating for the Current Time

To interrogate the Model 1104 for the current time:

1. Press WHAT IS.



2. Press CLOCK. The Model 1104 will recite the programmed time.



4.14 The Security Code

The Security Code is the last step after setting all other programming parameters for the Model 1104. The code consists of a 4-digit number you select and will effectively prevent unauthorized changes to the Model 1104's programming. When the Security Code is activated, all keyboard programming is inaccessible. The Model 1104 may be interrogated using the WHAT IS key, but the keyboard must be unlocked, via the Security Code, before any additional programming is possible.

4.14.1 Locking the Keypad

To program the Security Code:

1. Press SET.



2. Press CODE.



The Model 1104 will say *"Enter security code."*

3. Using the number keys, enter 4 digits. The Model 1104 says, *"OK."* The keyboard is now locked.



If unauthorized persons attempt to set a parameter, an error message, *"Error 2,"* is returned. Whenever any operation except WHAT IS takes place without entering the security code first, this error message occurs.

4.14.2 Unlocking the Keypad

To unlock the keyboard:

1. Press WHAT IS.



2. Press CODE.



The Model 1104 will say *"Enter Security Code."*

3. Using the number keys, enter the digits for the code.



If the correct code is entered, the Model 1104 will say "OK." If the wrong code is entered, the Model 1104 will *say "Error 2."*

Chapter 5: Alarm Programming

This chapter explains the alarm programming and monitoring capabilities of the Model 1104, with specific instructions for the following features:

- Configure inputs as dry contact or temperature
- Enable/disable inputs
- Program alarm Recognition Time for each input
- Program high and low temperature limits
- Disable alarm response to high or low temperature
- Program temperature in Fahrenheit or Celsius scale
- Calibrate temperature
- Obtain current temperature
- Program AC power-failure Recognition Time
- Enable/disable AC power monitoring
- Program sound level sensitivity
- Program high sound Recognition Time
- Disable alarm response to high sound
- Use Exit Delay via Status Report

5.1 Input Configuration

In preparing the Model 1104 to sense an alert condition, the inputs must be configured as dry contact (either open or closed) or as temperature inputs. The default setting for input 1 is temperature; for inputs 2-4, the default is dry contact and open. To configure input normality, sensors are first wired to the terminal strip at the back of the unit. (Refer to Chapter 2, Section 2.9–2.12, for an explanation on wiring inputs.)

The configuration process directs the Model 1104 to initialize the 4 inputs and establish normal settings. Any change in the status of an input (for example, from a normally open contact to a suddenly closed contact) is recognized as an ***alert condition.*** In the case of a temperature input, an alert condition is recognized when established temperature limits are [illegible]eeded.

NOTE

Before starting keyboard commands to configure input normality on the Model 1104, ***it is very important to check that the sensors you have wired to the unit are set in their normal, non-alarm positions.*** For example, if a magnetic reed switch (a normally-closed sensor used to detect unauthorized entry) has been wired to the Model 1104, make sure that the door or window to be monitored is shut before configuring the input. If a motion-detector is wired to the unit, it is advisable to block all sources of motion from the sensor before and during configuration.

5.1.1 Programming Input Configuration

1. Press STANDBY to place the Model 1104 in Standby mode.



2. Wire sensors to the inputs to the back of the Model 1104 (see Chapter 2, Section 2.10).
3. Press RUN. The red light glows when the Model 1104 returns to Run mode.



4. Press SET.



5. Press CONFIGURE.



6. The Model 1104 audibly recites the configuration for each of the four inputs:
   - If the input is normally open, the Model 1104 recites the number of the input and says *"OK."*
   - If the input is normally closed, the Model 1104 recites the number of the input, followed by a *"beep"* and *"OK."*
   - If the input is configured as temperature, the Model 1104 recites the number of the input, followed by *"Temperature."*

5.1.2 Verifying Input Configuration

Input configuration can be verified when interrogating the Model 1104 for a complete Status Report. Refer to Chapter 6 for a more detailed description of the Status Report.

5.2 Enable/Disable Inputs

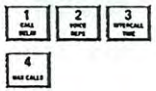
This function allows you to enable or disable an input's response to an alert condition. An enabled input will respond to an alert condition and allow dial-out. A disabled input will cause dial-out to be suppressed, but any existing alert conditions will be revealed during the Status Report. Enable/disable programming is useful during wiring of inputs (see Chapter 2) or when a condition needs to be monitored, but is not critical enough to be programmed for dial-out reporting. It is important to verify input status after performing any task that requires disabling. The default setting for all inputs is enabled (ON). If an alert condition exists when inputs are re-enabled, Recognition Time will restart—refer to Section 5.3.

5.2.1 Changing Enabled/Disabled Input Status

1. Press SENSOR ON/OFF.



2. Press the number (1 to 4) of the selected input to enable/disable. The Model 1104 says *"Off"* to indicate disabled or *"On"* to indicate enabled.



5.2.2 Verifying Enabled/Disabled Input Status

1. Press WHAT IS.



2. Press STATUS.



The Model 1104 audibly recites the current status of every input. In a Status Report, each input is first identified by its input number, followed by a report that specifies parameters currently affecting that input. ***If an input is disabled, the word "Off" immediately follows the number recited for that input.***

For example, input 3 is configured as a normally open, dry contact input. During the Status Report:

- ***If disabled,*** the Model 1104 recites: *"Number 3—Off—OK,"* for input 3.
- ***If enabled,*** the Model 1104 recites: *"Number 3—OK,"* for input 3.

In another example, input 2 is configured as a temperature input. The current temperature is 76 degrees. During a Status Report:

- ***If disabled,*** the Model 1104 recites *"Number 2—Off—76 degrees—OK".*
- ***If enabled,*** the Model 1104 recites *"Number 2—76 degrees—OK".*

5.3 Input Recognition Time

The Input Recognition Time is the length of time an alert condition must be present before a valid alarm exists and dial-out is activated. This time period is programmable, from 0 minutes, 0 seconds (for immediate response) up to a period of 272 minutes, 0 seconds. If an alert condition begins and then clears within the established Recognition Time, no dial-out will occur. When an alert condition continues beyond the programmed Recognition Time, the Model 1104 initiates dial-out. The default setting for Input Recognition Time is 0 minutes, 3 seconds.

5.3.1 Programming Input Recognition Time

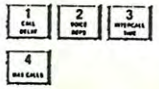
1. Press SET.



2. Press RECOGNITION TIME.



3. Press the number (1 to 4) of the selected input to be programmed.



The Model 1104 responds: *"Enter minutes."*

4. Using the number keys, enter the minutes. For example, to set a Recognition Time of five minutes, simply press "5" on the keypad. The Model 1104 recites the digits as they are pressed.



5. Press ENTER. The Model 1104 responds: *"Enter seconds."*



6. Using the number keys, enter the seconds. The Model 1104 recites the digits as they are pressed.



7. Press ENTER. The Model 1104 responds: *"Enter."*



5.3.2 Interrogating Input Recognition Time

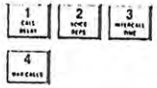
1. Press WHAT IS.



2. Press RECOGNITION TIME.



3. Press the corresponding input key (1 to 4).



The Model 1104 recites the programmed Recognition Time for that input.

5.4 Establishing High and Low Temperature Limits

High and low temperature limits can be separately programmed for each input configured as temperature. Limits can range from –20° to +150° Fahrenheit, or from –30° to 65° Celsius.

When temperature limits exceed high or low settings, the Model 1104 will dial out with an alarm message. Default settings are: 10° F for low temperature and 100° F for high temperature.

5.4.1 Programming Temperature Limits for a Selected Input

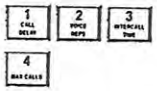
1. Press SET.



2. Press TEMP LIMITS.



3. From the number keys, press a number (from 1 to 4) that corresponds to the temperature input being programmed.



The Model 1104 responds: *"Enter low temperature limit."*

4. Using the number keys, enter a value for low temperature limit. The Model 1104 will recite the digits as they are pressed. If a negative number is required, first press PAUSE, then enter the number.



5. Press ENTER.



The Model 1104 responds: *"Enter high temperature limit."*

6. Using the number keys, enter the value for high temperature limit. The Model 1104 recites the digits as they are pressed.



7. Press ENTER. The Model 1104 responds: *"Enter."*



NOTE

Do not set temperature limits too close to normal room temperature. Minor temperature fluctuations could result in frequent and unnecessary alarm dialouts.

5.4.2 Disabling Alarm Response to High or Low Temperature

To disable alarm response to either high or low temperature settings exclusively, enter the maximum temperature limit when programming the selected input. (The Model 1104 will not

respond to temperatures encountered at maximum settings or beyond.) Begin by following the key sequence shown in Section 5.4.1, and when prompted to enter the high or low temperature value:

- Set high temperature to either +150° F or +65° C (high temperature limit) to prevent the Model 1104 from responding to a high temperature alarm.
- Set low temperature to either -20° F or -30° C to prevent the Model 1104 from responding to a low temperature alarm.

5.4.3 Interrogating High and Low Temperature Limits

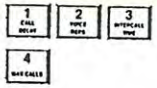
1. Press WHAT IS.



2. Press TEMP LIMITS.



3. Press the number key corresponding to the selected temperature input.



5.5 Temperature Scale

Temperature inputs may be set in either Fahrenheit or Celsius degrees. The default temperature scale is Fahrenheit. To change to Celsius:

1. Press SENSOR ON/OFF.



2. Press TEMP. The Model 1104 responds: *"Off,"* indicating Celsius scale has replaced Fahrenheit scale.



3. To return to Fahrenheit scale, repeat the key sequence. The Model 1104 responds: "On," indicating Fahrenheit scale is in effect.

NOTE

When switching from Fahrenheit to Celsius, or vice versa, the change applies to all inputs configured to read temperature. When switching temperature scales it is important to reset high and low temperature limits on all temperature inputs. Refer to Section 5.4.1 to reset temperature limits.

5.6 Temperature Calibration

To compensate for minor variances in sensor accuracy, an offset may be programmed for each temperature input. The amount of offset is measured in degrees Fahrenheit or degrees Celsius. Adjustments are possible within a range from -10 degrees to +10 degrees. For example, if input 3 is sensing temperature and is reading 1 degree too high, then the calibration for input 3 is set at -1 to obtain an accurate reading.

5.6.1 Programming Temperature Calibration

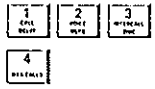
1. Press SET.



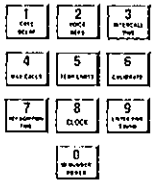
2. Press CALIBRATE.



3. Press the number (1 to 4) of the selected temperature input to be calibrated.



4. Enter the number required to offset the current temperature reading so a correct reading is obtained.



- To program a positive offset number (up to +10 degrees), enter the number on the keypad. The Model 1104 recites the digits as they are pressed.
- To program a negative offset number (up to –10 degrees), first press PAUSE. The unit responds with *a "beep."* Next, enter the number on the keypad. The unit recites the digits as they are pressed.

5. Press ENTER. The Model 1104 responds: *"Enter."*



NOTE

If you find that your calibration offset exceeds more than + 5 or – 5 degrees, other complicating factors could be affecting normal operation of the Model 1104. Call Phonetics for technical assistance.

5.6.2 Interrogating Temperature Calibration

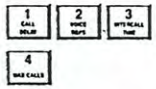
1. Press WHAT IS.



2. Press CALIBRATE.



3. Press the number key corresponding to the selected temperature input.



If a *"beep"* precedes the number as it is recited, then a **negative** offset is indicated.

5.7 Obtaining Current Temperature

Current temperature readings for each temperature input may be accessed at any time. The Model 1104 recites the input number, and the actual temperature detected by the attached sensor, for all inputs configured as temperature. To obtain current temperature:

1. Press WHAT IS.



2. Press TEMP.



5.8 AC Power Monitoring Enable/Disable

The Model 1104 monitors AC power failure. This command enables or disables the power failure detection feature. When enabled, the Model 1104 will monitor power and dial out when AC power failure exceeds a programmable span of time (refer to AC Power Failure Recognition Time, Section 5.9).
The default setting for AC power monitoring is enabled (on). When disabled, the Model 1104 will not dial-out to report power failure.

5.8.1 Enabling/Disabling the AC Power Alarm

1. Press SENSOR ON/OFF.



2. Press POWER.



- The Model 1104 will say *"Off"* to indicate that the power alarm is disabled, or
- The Model 1104 will say *"On"* to indicate that the power alarm is enabled.

3. Repeat key sequence to change settings.

5.9 AC Power Failure Recognition Time

The AC Power Failure Recognition Time is the length of time that AC electric power is off before a valid alarm is recognized and dial-out begins. The default setting is 5 minutes, 0 seconds, but is programmable from 0 seconds to a maximum of 272 minutes.

When AC power failure occurs, and throughout the programmed Recognition Time, the Model 1104 steadily repeats the message, *"the electricity is off,"* at the unit's installation site. There is no Call Delay programming available for AC power failure. Immediately following Recognition Time, the Model 1104 begins the dial-out process to report power failure.

To cancel the power-failure message locally at the keypad (during or after Recognition Time) press any key on the Model 1104 keypad. This action also cancels the dial-out process. The AC power failure alarm may also be cancelled remotely, by telephone acknowledgment (see Chapter 6, Section 6.1).

5.9.1 Programming Power Failure Recognition Time

1. Press SET.



2. Press RECOGNITION TIME.



3. Press POWER. The Model 1104 responds: *"Enter minutes."*



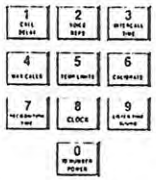
4. Using the number keys, enter the number of minutes. The Model 1104 will recite the digits as they are pressed.



5. Press ENTER. The Model 1104 responds: *"Enter seconds."*



6. Using the number keys, enter the number of seconds. The Model 1104 will recite the digits as they are pressed.



7. Press ENTER. The Model 1104 responds: *"OK."*



5.9.2 Interrogating Power Failure Recognition Time

1. Press WHAT IS.



2. Press RECOGNITION TIME.



3. Press POWER.
The Model 1104 will recite the power Recognition Time.



5.10 Sound Alarm Monitoring

This feature allows you to program the level and duration of sound that will cause the Model 1104 to respond to an alarm and dial-out. It may be useful to desensitize the Model 1104 to sound if it is installed in an area with a relatively high noise level, or where a loud noise occurs frequently but is not associated with an alarm. In some applications, it may be desirable to increase sound sensitivity to low sound levels.

5.10.1 Programming Sound Alarm Sensitivity

The sensitivity setting for sound alarm monitoring ranges from 1 to 255. A value of 1 makes the microphone the MOST sensitive to changes in sound. The value 255 makes the microphone the LEAST sensitive to sound. The default value is 32.

1. Press SET.



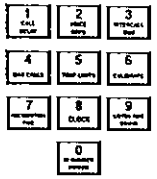
2. Press CALIBRATE.



3. Press SOUND. The Model 1104 responds: *"Enter number."*



4. Using the number keys, enter a value for sound sensitivity. The Model 1104 recites the digits as you press them.



5. Press ENTER. The Model 1104 responds: *"Enter."*



5.10.2 Interrogating Sound Sensitivity

1. Press WHAT IS.



2. Press CALIBRATE.



3. Press SOUND. The Model 1104 recites the programmed sound sensitivity level.



5.10.3 Programming High Sound Alarm Recognition Time

The Recognition Time for sound alarm monitoring ranges from 2 seconds to 59 seconds. The default value is 8 seconds.

1. Press SET.



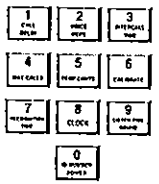
2. Press RECOGNITION TIME.



3. Press SOUND. The Model 1104 responds: *"Enter seconds."*



4. Using the number keys, enter the number of seconds. The Model 1104 will recite the digits as they are pressed.



5. Press ENTER. The Model 1104 responds: *"OK."*



5.11 High Sound Alarm Enable/Disable

The Model 1104 monitors sound through the built-in microphone. When the sound level suddenly exceeds the programmed high sound limit, the Model 1104 will respond to an alert condition. The increased sound level must continue throughout the programmed recognition time. The default for high sound alarm is enabled (on).

NOTE

The microphone is also used for listening to on-site sounds. Refer to Chapter 4, Section 4.7. Disabling the sound alarm does not affect listen-in capability.

5.11.1 Changing Enabled/Disabled High Sound Alarm

1. Press SENSOR ON/OFF.



2. Press SOUND. The Model 1104 will say *"Off"* to indicate disabled or *"On"* to indicate enabled.



3. Repeat key sequence to change settings.

5.12 Exit Delay

When tripping an alarm is unavoidable, yet a true alert condition has not actually occurred, the alarm response, including dial-out, can be temporarily suppressed.

The Model 1104 is able to suppress and then reset its dial-out function automatically through use of the Status Report. This is especially convenient when an alert condition is created upon exiting a monitored door, and there is no way to cancel from the local keypad.

Example: You are planning to exit through a monitored door. Prior to exiting, you initiate a Status Report recitation at the Model 1104 keypad by pressing WHAT IS, followed by STATUS, (key sequence shown below). This allows you approximately 30 seconds to exit without activating the Model 1104's programmed response to an alarm. At the conclusion of the status report, normal alarm response is reactivated.

To use exit delay, initiate the Status Report.

1. Press WHAT IS.



2. Press STATUS. The Model 1104 recites the full Status Report; during this time, you are able to exit the monitored area without tripping an alarm.



NOTES

Chapter 6: Acknowledgment, Status Report, and Remote Access

In addition to communication and alarm monitoring capabilities, the Model 1104 will also respond to your instructions and provide you with access to information on monitored conditions at all times.

By issuing commands to the unit, either at the installation site or over standard telephone lines, the following features may be activated:

- Acknowledgment of existing alarms
- The Status Report on all monitored conditions.

6.1 Alarm Acknowledgment

When the Model 1104 dials out with an alarm message, it will request acknowledgment before hanging up. Acknowledgment indicates to the unit that the alarm message has been received. Upon acknowledgment, the Model 1104 will cancel the dial-out sequence.

There are three ways* that an alarm is acknowledged directly:

- Local Acknowledgment
- Touch-Tone™ Acknowledgment
- Callback Acknowledgment

* A fourth method of alarm acknowledgment is indirect. Refer to Max Calls, Chapter 4, Section 4.12 for an example of automatic alarm acknowledgment.

6.1.1 Local Acknowledgment

To acknowledge an alarm locally (directly at the installation site of the Model 1104), press any key.

6.1.2 Touch-Tone™ Acknowledgment

This method of remote alarm acknowledgment works with a Touch-Tone™ telephone.

Example: You receive a call from the Model 1104, reporting that an alarm exists. The message concludes: "Indicate you have received warning message." Now, or at any time during this call, you may acknowledge the alarm with the code "555" if you are using a Touch-Tone™ telephone.

- To enter "555," press the number (5) key on the Touch-Tone™ phone keypad three times. The Model 1104 will respond: * ***"Warning message received by telephone number (last number dialed)."*** The Model 1104 will hang up and the dial-out sequence, including any further response to the alarm, will be cancelled.
- If you enter the wrong code or do not enter it within 10 seconds following the conclusion of the message, the Model 1104 will respond: ***"Dial telephone number (the programmed unit phone number) within (Intercall Time)."*** Then, the Model 1104 will hang up. The alarm is still not acknowledged until you call back. You have a period equal to the programmed Intercall Time to call the unit back in order to acknowledge the alarm. Refer to Callback Acknowledgment, Section 6.1.3, below.

6.1.3 Callback Acknowledgment

This method of remote alarm acknowledgment works with ***any telephone:*** pulse, rotary, or Touch-Tone™.

Example: The Model 1104 calls you with an alarm message. You answer the call with a rotary or pulse telephone, and do the following:

- You listen to the message and hang up.
- Then you call the Model 1104 back on any telephone. You must wait for 10 rings—this signals the Model 1104 to answer your telephone call. (Make sure to call back within the programmed setting for Intercall Time—refer to Chapter 4, Section 4.11.)

When the Model 1104 answers your return call, it gives a Status Report (refer to Section 6.2). Then it says: *"Warning message received by ..."* and recites the telephone number last dialed. This indicates that the alarm has been acknowledged.

NOTE

If you have the TAD feature (telephone answering device) enabled, the Model 1104 will answer the telephone on the first ring. If it is disabled, the telephone must be allowed to ring 10 times. This serves as a precaution against a random alarm acknowledgment. Refer to Chapter 4, Section 4.6, for complete information on using the TAD feature.

6.2 Status Report

The Status Report allows access to complete information on all monitored conditions either locally, from the keypad, or by telephone, from any location. The Model 1104 will answer an incoming telephone call following the programmed Rings Until Answer (refer to Chapter 4, Section 4.5). Included with the Status Report are messages related to alarm conditions, AC power, battery backup and sound level. It also provides an opportunity for listening to on-site sounds (refer to Listen-in Time, Chapter 4, Section 4.7).

To initiate the Status Report:

1. Press WHAT IS.



2. Press STATUS.



Sections 6.2.1, 6.2.2, and 6.2.3 demonstrate two different Status Report recitations. The Status Report starts with:

"Hello. This is telephone number 555-1234 (or the programmed ID)."

"The time is 12:15 PM (or the current time)."

The Model 1104 proceeds with a separate report for each input. Each input identifies itself by reciting the input number.

6.2.1 Example: Status Report, No Alarms

Inputs 2, 3, and 4 are configured as dry contact and input 1 is configured as temperature. No alarms exist. The Status Report begins by saying, *"Hello, this is telephone number 555-1234; the time is 12:15 PM."* Following this introduction, the report continues:

"Number 1, 74 degrees, OK."

"Number 2, OK."

"Number 3, OK."

"Number 4, OK."

"The electricity is ON." This refers to AC power.

"Battery condition, OK." Other responses: *"Battery condition low"* or *"Replace batteries."* (Refer to Section 6.2.4 for additional information regarding battery condition.)

"Sound level, OK."

"Listen to the sound level for 10 seconds." In this case, the programmed Listen-in Time is set at 10 seconds. (This feature is not available when obtaining the Status Report on-site, directly at the keypad.)

The Status Report repeats once more and the Model 1104 concludes the call, saying: *"Have a good day."* (The Status Report will not repeat if obtained at the keypad; *"Have a good day,"* is also not recited.)

The phrase *"no number"* at the end of a Status Report indicates that no dial-out phone numbers have been programmed.

6.2.2 Example: Status Report, Existing Alarms

Inputs 2, 3,and 4 are configured as dry contact and input 1 is configured as temperature. An emergency situation is at hand: a fire in a greenhouse has tripped a smoke alarm and electrical power has been disrupted. In addition to high sound and AC power alarms, separate alarms exist on inputs 1, 2, 3, and 4. You happen to call in for the Status Report, which begins with, *"Hello, this is telephone number 555-1234; the time is 12:15 PM."* Following this introduction, the report continues:

"Number 1, 110 degrees, HIGH."

"Number 2, EXISTS."

"Number 3, EXISTS."

"Number 4, EXISTS."

"The electricity is OFF."

"Battery condition, OK."

"Sound level, HIGH."

"Warning message received by ...(last telephone number dialed)."*

"Listen to the sound level for 10 seconds."

The Status Report repeats once more and the Model 1104 concludes the call, saying: *"Have a good day."*

* The "last telephone number dialed" refers to any one of the programmed, dial-out telephone numbers through which the Model 1104 was able to receive alarm acknowledgment, prior to your call for a Status Report; this could also refer to the Model 1104's I.D. Number (identification number), if the alarms are acknowledged at the keypad by someone present at the site.

6.2.3 Example: Status Report, Disabled Inputs

If an input is ***disabled,*** the dial-out feature for that input is deactivated, but all other programmed parameters remain in effect. In the example below, all 4 inputs are disabled, although inputs 1 and 3 are detecting alarms. AC power and Sound Level is also disabled for dial-out. (Note that to indicate disabled status, only AC power will return two audible *"beeps,"* rather than the word *"OFF.")* When you call the Model 1104 for a Status Report, you hear the following:

"Hello, this is telephone number 555-1234.

"The time is 12:15 PM."

"Number 1, OFF, 96 degrees, HIGH."

"Number 2, OFF, 74 degrees, OK."

"Number 3, OFF, EXISTS."

"Number 4, OFF, OK."

"The electricity is (beep, beep), ON." If the electricity is off, or the AC adaptor is disconnected, you will hear: *"The electricity is (beep, beep), OFF."*

"Battery condition, OK."

"Sound level, OFF, OK." If the sound level is high you will hear: *"Sound level, OFF, HIGH."*

"Listen to the sound level for 10 seconds."

The Status Report repeats once more and the Model 1104 concludes the call, saying: *"Have a good day."*

6.2.4 Battery Condition

During a Status Report, you may hear one of three possible messages regarding battery power. The Model 1104 determines the appropriate message by measuring battery voltage. Depending upon the remaining voltage, it may respond:

- *"Battery Condition, OK,"* if over 8.2 Volts.
- *"Battery Condition, low,"* if between 7.2 and 8.2 Volts.
- *"Replace batteries,"* if below 7.2 Volts.

6.2.5 Remote Access by Touch-Tone™ Telephone

Calling the Model 1104 for a Status Report provides the opportunity to access other functions, using Touch Tone™ push-button commands. Remote telephone commands include:

- Disabling/enabling any input.
- Disabling/enabling High Sound Alarm monitoring.
- Disabling/enabling AC Power monitoring.
- Activation of Listen-In Time.
- Activation of the Status Report.

To issue commands by telephone, first dial the number of the Model 1104 to access the Status Report. The Status Report will be followed by the programmed Listen-In Time. If you remain on the telephone, the Status Report will be repeated, followed by a 10 second waiting period and hang-up. During this 10 second waiting period, or ***at any time during the call, other commands may by accessed by pressing any push button on the telephone.***

If a Security Code is in effect, the Model 1104 will prompt you with: *"Enter Security Code."* If no Security Code is set, then it will say *"O.K."*

- Enter your Security Code (4 digits) with the telephone push buttons. If the code you enter is correct, the Model 1104 will respond: *"OK."*
- If you enter the wrong Security Code, the Model 1104 says, *"Error. Have a good day,"* and hangs up.

Disabling/enabling inputs – If an input is set to detect an alert condition, it can be disabled to prevent the Model 1104 from dialing out, or re-enabled at any time.

This feature allows the convenience of disabling an input, even if you are away from the site of the Model 1104. One such application may involve an input programmed to detect unauthorized entry. You are in another locale, but must allow someone else temporary access to the area monitored by the Model 1104. Using a Touch Tone™ telephone, you can disable the appropriate input (thereby disabling any alarm dial-out response). The input remains disabled until you issue the same command, which effectively returns it to its former, enabled state.

Press the following push-buttons on the Touch Tone™ telephone to execute the desired command:

*** (asterisk), 1**

...equal to Sensor On/Off, for input 1. To re-enable the input, repeat the same Touch-Tone™ button sequence used for disabling.

*** (asterisk), 2**

...equal to Sensor On/Off for input 2, and so on, for inputs up to 4. To re-enable the input, repeat the same Touch-Tone™ button sequence used for disabling.

Disabling/enabling High Sound Monitoring –

*** (asterisk), 9**

...equal to SENSOR ON/OFF for High Sound Alarm monitoring. To re-enable High Sound Alarm, repeat the command.

Disabling/enabling AC Power –

*** (asterisk), 0**

...equal to Sensor On/Off for AC Power monitoring. To re-enable AC Power monitoring , repeat the command.

Activating Listen-In Time –

 # (pound), 1

...initiates Listen-In Time for listening to on-site sounds for the programmed time available.

Activating Status Report –

 # (pound), 2

...initiates a full recitation of the Status Report.

Exiting –

 # (pound), # (pound)

...forces exit. The 1104 says, *"Have a good day,"* and hangs up.

NOTES

Chapter 7: Operation

After installation and programming is completed, the Model 1104 is fully operational. This chapter explains the sequence of events that occur during an alarm dialout to illustrate how the Model 1104 operates.

7.1 Alarm Detection, Dial-out and Acknowledgment

Generally, an alarm event is structured in the following manner:

I. The Model 1104 detects an alert condition due to a change at the sensor.

II. A valid alarm is recognized.

III. Dial-out begins.

IV. The alarm is acknowledged.

Often, an alarm does not proceed through all stages: either an alert condition does not persist long enough to be considered valid, or a valid alarm is cancelled.

The table on the following page explains the alarm detection, dial-out and acknowledgment features and lists important variable factors affecting their operation.

I. Model 1104 Detects a Change at the Sensor	Variable Factors
• Model 1104 detects a change in the monitored condition (from the sensor wired to one of the inputs). This is considered an *alert condition*, and does not qualify as a valid alarm at this point. • The condition continues throughout the programmed Recognition Time. If the condition (or sensor) reverts to its normal state before the Recognition Time is reached, no alarm will occur.	*Input Type: (1) An open circuit closes, (2) a closed circuit opens, or (3) temperature limits are exceeded.* *Recognition Time: Activated*

II. A Valid Alarm Is Recognized	Variable Factors
• The condition must persist long enough to meet or exceed the programmed Recognition Time. When Recognition Time has expired, but the alert condition continues, the Model 1104 will determine that a valid alarm exists. • When a valid alarm is determined, Call Delay is activated, forcing the Model 1104 to wait for a programmed period of time before starting the dial-out process. Call Delay applies to the period just prior to dial-out, before the first telephone call is made. • Call Delay provides the opportunity to cancel a valid alarm at the Model 1104's installation site, before dial-out occurs. An audible voice message indicates which of the inputs is in alarm. If on-site personnel acknowledge the alarm within the Call Delay time, the Model 1104 will not dial out. (Local Voice Mute is disabled, so that alarm messages can be heard at the site.)	*Recognition Time: Expired* *Valid Alarm: Exists* *Call Delay: Activated* *Alarm Message: Audible, On-site Activated* *Local Voice Mute: Disabled*

III. Dial-out Begins	Variable Factors
• The dial-out process is activated as soon as the Call Delay time expires (if the alarm has not been cancelled at the Model 1104's installation site.) The dial-out begins with telephone number 1 and proceeds sequentially, through the remaining telephone numbers. • If the alarm is not acknowledged with the first dial-out telephone call, the Model 1104 waits the duration of Intercall Time before dialing the next telephone number. Intercall Time is the programmed waiting period in between each dial-out telephone call. • When the telephone is answered, the programmed Voice Repetitions determine the number of times per call the Model 1104 recites the alarm message. • Call Progress, an automatic feature, enables the Model 1104 to detect whether or not the telephone call is answered. After 8 rings, or if a busy signal is encountered, the Model 1104 will hang up, wait the programmed Intercall Time, and proceed to dial the next telephone number. • If no telephone calls are answered, the Model 1104 dials out sequentially, through the remaining telephone numbers and continues to cycle until the programmed Maximum Number of Calls is reached. • When the telephone is answered, the Model 1104 will immediately begin reciting a message that indicates which of the inputs is in alarm. At the same time, the alarm message is repeating at the Model 1104's installation site. The Model 1104 will request acknowledgment, if it has not yet occurred.	*Call Delay: Expired* *Intercall Time: Activated* *Voice Repetitions: Activated* *Call Progress: Activated* *Max Calls: Activated* *Alarm Messages: By Telephone and On-site*

IV. The Alarm is Acknowledged	Variable Factors
• At any time after a valid alarm is determined, the alarm may be acknowledged at the Model 1104's installation site, by pressing any key.	*Local, On-site Acknowledgment*
• When the Model 1104 dials out and the call is answered via Touch-Tone telephone, any alarm may be instantly acknowledged by pressing "555."	
• If the alarm message repeats for the number of programmed Voice Repetitions, and "555" has not been entered, the Model 1104 will say:	*Touch-Tone Acknowledgment: Fast Code 555*
"Indicate that you have received warning message."	
The Model 1104 waits 10 seconds for the Touch-Tone code "555" to be entered. If the code is entered within 10 seconds, it responds:	*Touch-Tone Acknowledgment: Normal Code 555*
"Warning message received by telephone number...(the Unit ID Number)."	
The alarm is considered acknowledged and the dialout concludes.	
• If the Model 1104 does not receive the Touch-Tone code within 10 seconds, it recites the following and then hangs up:	*Tone or Pulse Callback Acknowledgment: Within Intercall Time*
"Dial telephone number (gives the Unit ID Number) within...(the programmed Intercall Time.)"	
The recipient of this message must call the Model 1104 back within the period programmed for Intercall Time, in order to acknowledge the alarm. If Local Voice Mute is off, the unit will beep at the installation site while waiting for this call.	
• Callback: The Model 1104 waits 10 rings before answering to guard against random acknowledgment. If an answering device is connected to the	

IV. The Alarm is Acknowledged	Variable Factors
same line as the Model 1104 (and TAD is enabled), the Model 1104 will answer on the first ring. First, it recites the Status Report, followed by:	*Tone or Pulse Callback Acknowledgment: TAD Enabled*
"Warning message received by telephone number...(the number of your present location)." *"Have a good day."*	
When the Model 1104 hangs up, the alarm is acknowledged and dial-out stops.	
• If calls remain unanswered, or if they are received by an answering machine or FAX, the Model 1104 continues the dialout sequence; it waits the Intercall Time and proceeds to dial the next telephone number. Telephone numbers are dialed sequentially, and this cycle continues for the number of Max Calls programmed. If no acknowledgment occurs, then at the completion of Max Calls, the alarm is automatically acknowledged and the dial-out process is terminated.	*Max Calls Acknowledgment*

NOTE

Acknowledging the alarm does not correct the situation! The alarm condition will still exist until the sensor is restored to its normal state.

Other Monitoring:

Problem	Cause	Solution
1. The batteries drain prematurely.	The unit's AC transformer is unplugged or for some other reason, full AC power is not available to the unit.	The batteries will take over powering the unit when the AC transformer is unplugged from the 120 VAC outlet. When storing the unit, be sure to remove the batteries. Refer to Chapter 2, Section 2.4. Be sure to use alkaline batteries—do not use rechargeable nicad batteries.

If the solutions offered above do not appear to correct the problem, apply the following steps, in the order shown.

- Remove the batteries.
- Unplug the unit.
- Wait one minute for the Model 1104 to completely power down.
- Plug in the unit's AC adaptor into a standard 120 VAC outlet.
- Replace the batteries.
- Reconfigure the inputs. Refer to Chapter 5, Section 5.1.

Refer to Chapter 2, Installation, for additional information on batteries and installation procedures.

Appendix B

Accessories

The sensors listed below are available from Phonetics, and represent the most commonly used input devices. Other dry contact sensors, designed for more specialized applications, may also be used. Commercial or industrial electrical supply houses can provide devices to monitor virtually any condition. For further information, contact Phonetics Customer Service at (610) 558-2700.

MODEL NUMBER	SENSOR / SWITCH
FGD-0005	Remote Temperature Sensor
FGD-0006	Magnetic Reed Switch
FGD-0007	Passive Infra-Red Detector
FGD-0013	Water Detection Sensor
FGD-0022	Temp° Alert
FGD-0023	ISOTEL Surge Protector
FGD-0027	Humidistat

NOTES

Appendix C: Returning the Unit for Repair

In the event that the Model 1104 does not function properly, we suggest that you do the following:

1. Record your observations regarding the Model 1104's malfunction.
2. We recommend that you call the Customer Service Department at (610) 558-2700 prior to sending the unit to Phonetics for repair.

If the unit must be sent to Phonetics for servicing, please do the following:

1. Unplug the AC power supply from the wall outlet, remove the batteries, and disconnect all sensors from the alert inputs.
2. Carefully pack the unit to avoid damage in transit. Use the original container (if available) or a sturdy shipping box.
3. **You must include the following information to avoid processing delays:**
   a) **Your name, address, and telephone number.**
   b) **A note explaining the problem.**
4. Ship your package to the address below:

   SERVICE DEPARTMENT
   PHONETICS, INC.
   901 TRYENS ROAD
   ASTON, PA 19014

5. Ship prepaid and insured via UPS or US Mail to ensure a traceable shipment with recourse for damage or replacement.

1 YEAR LIMITED WARRANTY

1. **WARRANTOR:** Dealer, Distributor, Manufacturer

2. **ELEMENTS OF WARRANTY:** This Product is warranted to be free from defects in materials and craftsmanship with only the limitations and exclusions set out below.

3. **WARRANTY AND REMEDY:**

One-Year Warranty — In the event that the Product does not conform to this warranty at any time during the time of one year from original purchase, warrantor will repair the defect and return it to you at no charge

This warranty shall terminate and be of no further effect at the time the Product is (1) damaged by extraneous cause such as fire, water, lightning, etc. or not maintained as reasonable and necessary; (2) modified; (3) improperly installed; (4) repaired by someone other than warrantor; (5) used in a manner or purpose for which the Product was not intended; or (6) sold by original purchaser.

WARRANTORS' OBLIGATION UNDER THIS WARRANTY IS LIMITED TO REPAIR OR REPLACEMENT OF THE PRODUCT. THIS WARRANTY DOES NOT COVER PAYMENT OR PROVIDE FOR THE REIMBURSEMENT OF PAYMENT OF INCIDENTAL OR CONSEQUENTIAL DAMAGES.

It must be clear that the warrantors are not insuring your premises or guaranteeing that there will not be damage to your person or property if you use this Product. The warrantors shall not be liable under any circumstances for damage to your person or property or some other person or that person's property by reason of the sale of this product or its failure to operate in the menner in which it is designed. The warrantors' liability, if any, shall be limited to the original cost of the Product. The warrantors assume no liability for installation of the Product and/or interruptions of the service due to strikes, riots, floods, fire, and/or any cause beyond Seller's control.

4. **PROCEDURE FOR OBTAINING PERFORMANCE OF WARRANTY:** In the event that the Product does not conform to this warranty, the Product should be shipped or delivered freight prepaid to a warrantor with evidence of original purchase.

5. **LEGAL REMEDIES:** This warranty gives you specific legal rights, and you may also have other rights which vary from state to state to the extent allowed by law expressly in lieu of any other express or implied warranty, condition, or guarantee.

Effective date 7/01/90

PHONETICS, INC.
901 Tryens Road
Aston, PA 19014
(610) 558-2700
Fax (610) 558-0222

SECTION C

PANEL COMPONENTS

DISCONNECT SWITCH

CLASS 9422
BRACKET MOUNTED OPERATING MECHANISMS

GENERAL

These Class 9422 Mechanisms are 30, 60 and 100 Amp Disconnect Switches and FA, KA, and LA Circuit Breakers with flange mounted operators. (See Table 1.)

ENCLOSURE CONSTRUCTION

Construct enclosure maintaining minimum dimensions shown in Figure 1.

INSTALLATION DISCONNECT SWITCH

1. Mounting
   Weld or rivet Interlock Blade Mounting Bracket to enclosure door. (See Figure 1). Attach Blade to Bracket with (2) 8-32x5/16 screws.
   Drill four holes in flange necessary to mount device. Cut out operator handle opening in enclosure flange. Mount Class 9422 Disconnect Switch to flange with (2) 1/4-20 x ½ screws from outside of flange. Place Trimplate over operator handle and attach to flange with (2) 8-32 x 1/2 screws from inside of flange.
2. Adjustment
   30, 60, 100 Amp Disconnect Switch Operating Mechanisms require no adjustment for proper operation.

CIRCUIT BREAKER

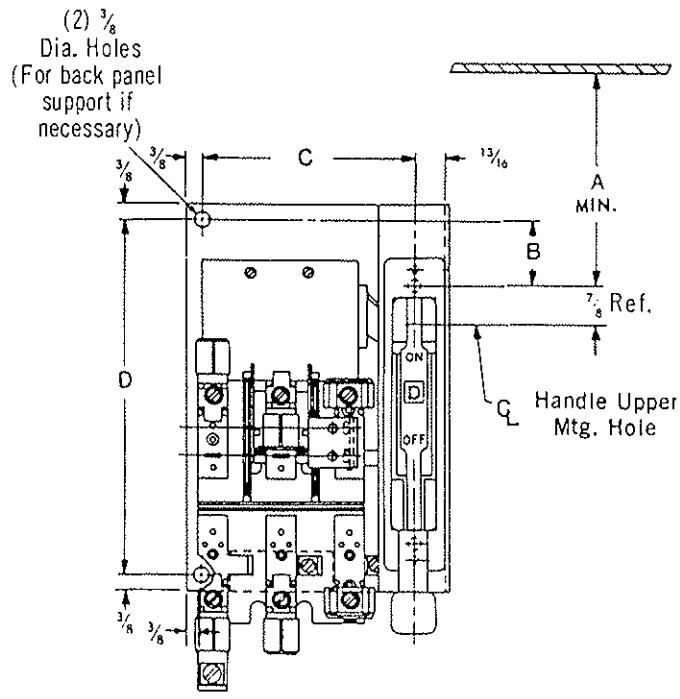
Assemble and adjust Circuit Breakers as shown on reverse side. Install Circuit Breakers using the same procedure as used for Disconnect Switches.

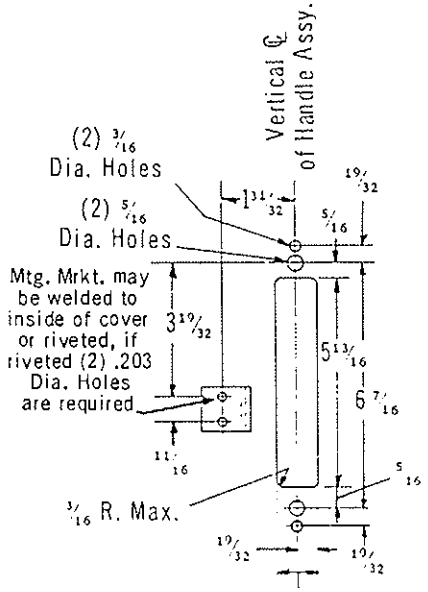
TABLE 1

CLASS 9422 TYPE Right Hand Mounted	DESCRIPTION
BC-1	30A. Disc. Sw. Non-Fusible
BD-1	60A. Disc. Sw. Non-Fusible
BE-1	100A. Disc. Sw. Non-Fusible
BN-1	FA (100A.) Circuit Breaker
BP-1	KA (225A.) Circuit Breaker
BR-1	LA (400A.) Circuit Breaker
CC-2	30A. Disc. Sw. w/30A. 250V. Fuse Clips
CC-3	30A. Disc. Sw. w/60A. 250V. Fuse Clips
CC-4	30A. Disc. Sw. w/60A. 600V. Fuse Clips
CC-6	30A. Disc. Sw. w/30A. 600V. Fuse Clips
CD-2	60A. Disc. Sw. w/60A. 250V. Fuse Clips
CD-3	60A. Disc. Sw. w/60A. 600V. Fuse Clips
CD-4	60A. Disc. Sw. w/100A. 250V. Fuse Clips
CD-6	60A. Disc. Sw. w/30A. 600V. Fuse Clips
CD-7	60A. Disc. Sw. w/100A. 600V. Fuse Clips
CE-2	100A. Disc. Sw. w/100A. 250V. Fuse Clips
CE-5	100A. Disc. Sw. w/100A. 600V. Fuse Clips

TABLE 2

DISCONNECT MEANS	DIMENSION A	B	C	D	MIN. ENCLOSURE DEPTH
30, 60, 100A Non-fusible	2 1/8	1 1/2	5 3/32	8 3/4	8
30, 60, 100A Fusible	2 1/8	1 1/2	5 3/32	8 3/4	10
FA	2 25/32	3/4	5 27/32	8	8
KA	3 17/32	3/4	6 3/32	8 3/8	8
LA	8 1/2	2 3/8	8 27/32	10 1/2	10





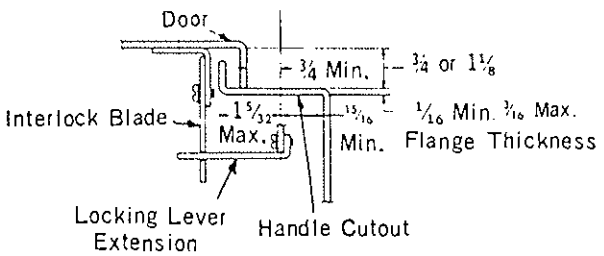


Figure 1

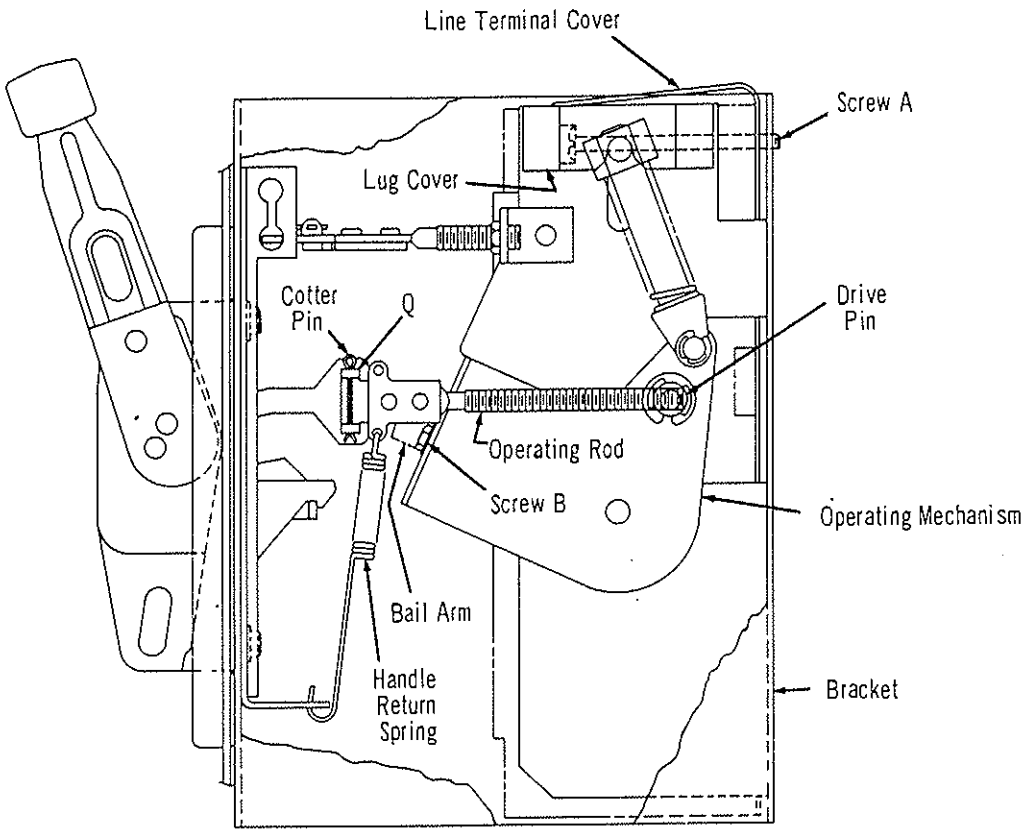


Figure 2

1. FA and KA Circuit Breaker Assembly
   Remove operating mechanism from bracket.
   Thread operating rod into drive pin:
   8 full turns for FA Circuit Breaker,
   10 full turns for KA Circuit Breaker.

   Mount line terminal cover, circuit breaker, and operating mechanism to bracket with (4) screws (A) as shown in Figure 2.

2. Adjustment FA and KA
   Place operating handle in ON position and connect operating rod to handle linkage with cotter pin, at point Q. Do not bend cotter pin.

   Push insulated recessed Push-To-Trip button on front of circuit breaker with a pencil or other small tool. This will cause breaker to trip.

   Attempt to reset breaker by moving operating handle to OFF position. When reset, breaker will turn ON and OFF with an audible snap. NOTE: If breaker does not reset, place handle in OFF position, disconnect linkage at Q, thread operating rod into drive pin one additional turn, reconnect linkage at Q and reset. Repeat this procedure until breaker resets. Bend cotter pin and attach handle return spring as shown in Figure 2.

3. For Class 9422–Type BR-1 and BRL-1 LA Circuit Breaker Mechanism Adjustment. (See Instruction Sheet 30072-303-50.)

   Install Circuit Breakers using the same procedure as used for Disconnect Switches.

SQUARE D
Instruction Bulletin

Bulletin No. 50006-354-01
November, 1992
Raleigh, NC, U.S.A.
Replaces 30072-303-02F dated 8/90

Variable Depth Operating Mechanism Class 9422 Type RN1 Series B

For use with Type FAL, FHL100 Ampere Frame Circuit Breaker

INTRODUCTION

This instruction bulletin contains installation instructions for the variable depth operating mechanism, Class 9422 Type RN1 Series B used with FAL, FHL 100 Ampere Frame Circuit Breakers.

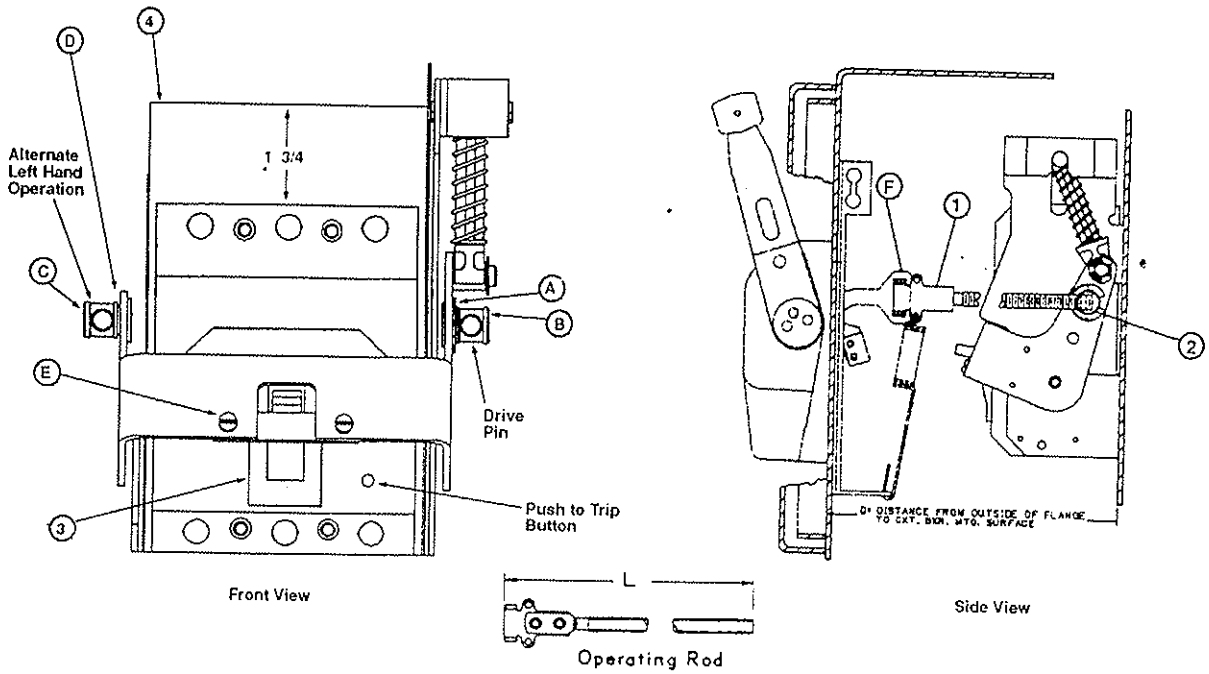


Figure 1 Variable Depth Operating Mechanism

CONTENTS OF KIT

Each variable depth operating mechanism kit contains the following:

Description	Quantity
Operating Mechanism Assembly	1
Screw Assembly (8-32 x 3 1/4")	4
Cotter Pin	1
Adhesive Backed Vinyl Mask	1
Operating Rod	1
Liner	1

⚠ DANGER

HAZARDOUS VOLTAGE.

Disconnect all power before working on equipment.

Electrical shock will cause severe injury or death.

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INSTALLATION

To install the operating mechanism (refer to Figure 1 for item locations):

1. Operating mechanism is assembled for right hand operation. For left hand flange mounting continue with the following conversion:
   - ❑ Remove E Ring at point A.
   - ❑ Move drive pin from position B to position C.
   - ❑ Reassemble E Ring at point D.
2. Location and drilling of panel mounting holes are shown in Figure 2.
3. Cut operating rod (item 1) to length (L = D-2 1/4).
4. Thread operating rod into drive pin (item 2) TEN full turns.
5. Attach adhesive backed vinyl mask (item 3) over "ON-OFF" markings on circuit breaker.
6. Slide liner (item 4) into the operating mechanism so it aligns with the mounting holes. **Check to see if the liner overhangs the top of the operating mechanism 1 3/4", if not, the liner is upside down and must be repositioned.** The liner is designed to wrap around the circuit breaker.
7. Before mounting the breaker, make sure the circuit breaker toggle and the operating mechanism are both in the ON position. Loosen both adjustment plate screws (item E), removing one so that the adjustment plate can be moved aside for breaker placement.
8. Slide the circuit breaker into the operating mechanism so it fits down over the two bottom extruded mounting holes.
9. Push the adjustment plate back into place.
10. Replace the adjustment plate screws (item E), secure and tighten.
11. After securing the adjustment plate screws, secure breaker and operating mechanism to the mounting surface with four screw assemblies (8- 32 x 3 1/4")
12. Install handle per handle instruction sheet.

⚠ CAUTION

HAZARD OF SPRING LOADED MOVING PARTS

- **Keep hands free of mechanism during operation of device.**

Failure to observe this precaution could result in personal injury.

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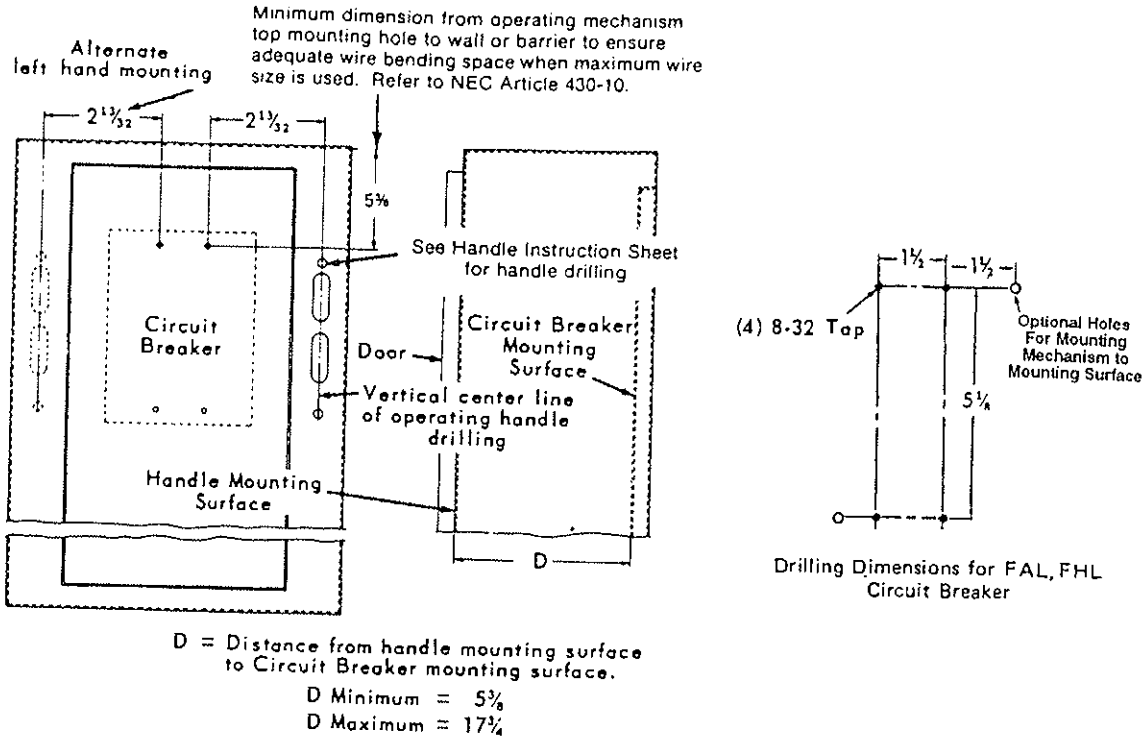


Figure 2 **Location and Drilling of panel mounting holes**

ADJUSTMENT

1. Place operating handle in ON position and connect operating rod to handle linkage with cotter pin at point F. Do not bend cotter pin.
2. Push the Push-To-Trip button on front of the circuit breaker with a small tool. This will cause the circuit breaker to trip.
3. Reset the circuit breaker by moving operating handle to the OFF position. When reset properly, the circuit breaker will turn ON and OFF with an audible snap.

NOTE

If the circuit breaker does not reset, place handle in the ON position, disconnect linkage at point F, thread the operating rod into the drive pin one additional turn, reconnect linkage at F and reset. Repeat this procedure until the circuit breaker resets.

4. When adjustment is attained, bend the cotter pin and attach handle return spring from operating handle kit.

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Replacement Parts List

Description	Part Number	Qty
Parts Kit	S31004-579-62	
Screw Assembly (8-32 x 3 1/4)		4
Cotter Pin (1/8 x 1 1/4)		1
Adhesive Backed Vinyl Mask		1
Operating Rod	Class 9422 Type R1	1
Liner	30002-032-01	1

PLEASE NOTE:

Electrical equipment should be serviced only by qualified electrical maintenance personnel, and this document should not be viewed as sufficient instruction for those who are not otherwise qualified to operate, service or maintain the equipment discussed. Although reasonable care has been taken to provide accurate and authoritative information in this document, no responsibility is assumed by Square D for any consequences arising out of the use of this material.

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CIRCUIT BREAKER

SQUARE D
Instruction Bulletin

Bulletin No. 48940-158-03
June 1996
Cedar Rapids, IA, USA
ECN H591

FA, FC, FH, AND SFH CIRCUIT BREAKERS

I-LINE® CIRCUIT BREAKER INSTALLATION

NOTE: Install main circuit breaker adjacent to main lugs.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN OR EXPLOSION

- This equipment must be installed and serviced only by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors, and covers before turning on power to this equipment.

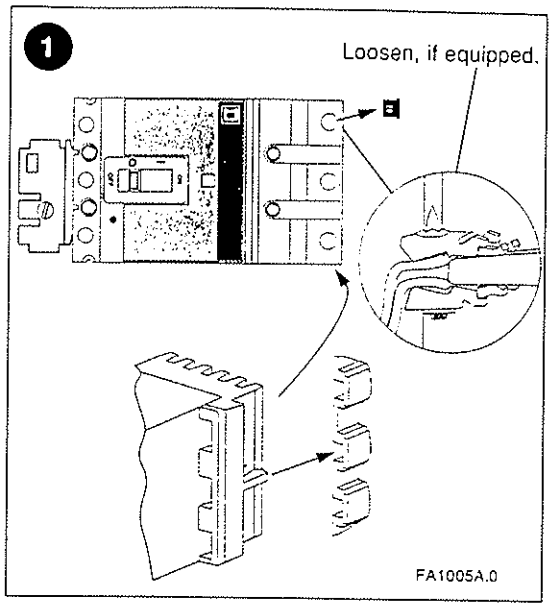
Failure to follow these instructions will result in death or serious injury.

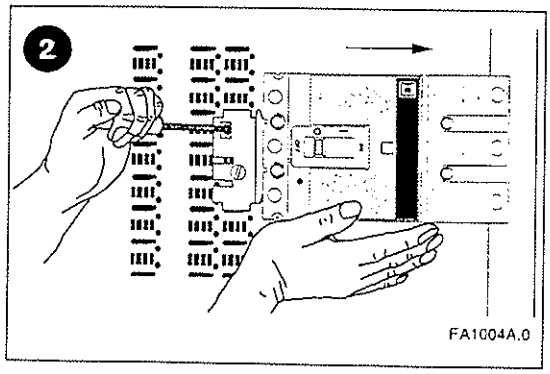
⚠ CAUTION

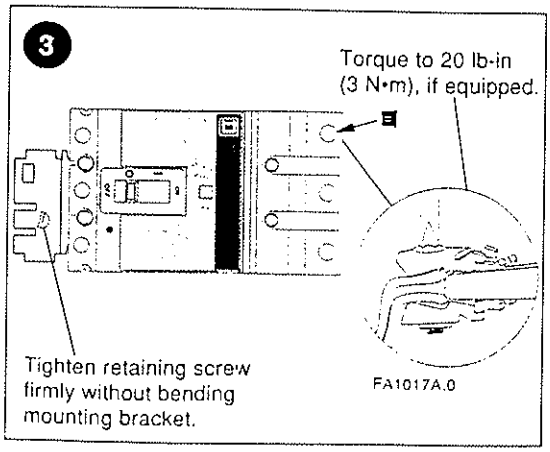
HAZARD OF OVERHEATING.

- Do not adjust plug-on jaws or remove joint compound from them.
- If necessary to replace lubricant, use Square D joint compound PJC7201.

Failure to follow these instructions can result in equipment damage.







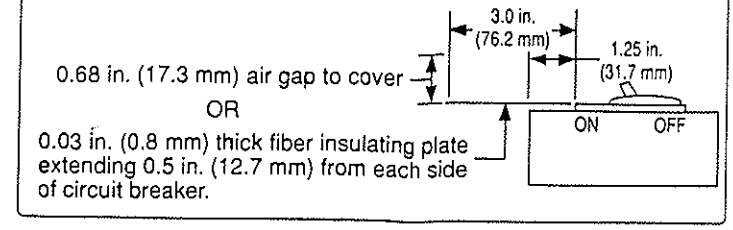
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INDIVIDUALLY-MOUNTED CIRCUIT BREAKER INSTALLATION

See last page for mounting dimensions.

⚠ CAUTION

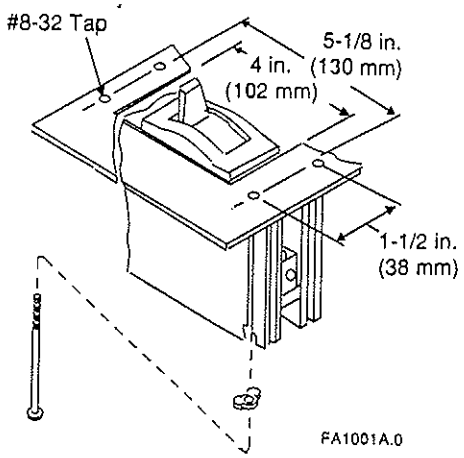
Hazard of equipment damage.
When mounted in metal box, cover must be insulated as shown.



FA1008A.1

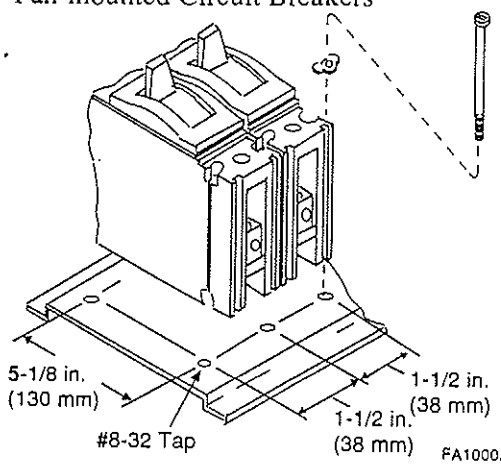
One-pole FA and FH Circuit Breakers

Front-mounted Circuit Breakers



FA1001A.0

Pan-mounted Circuit Breakers



FA1000A.0

FC, FH and SFH Circuit Breakers

⚠ DANGER

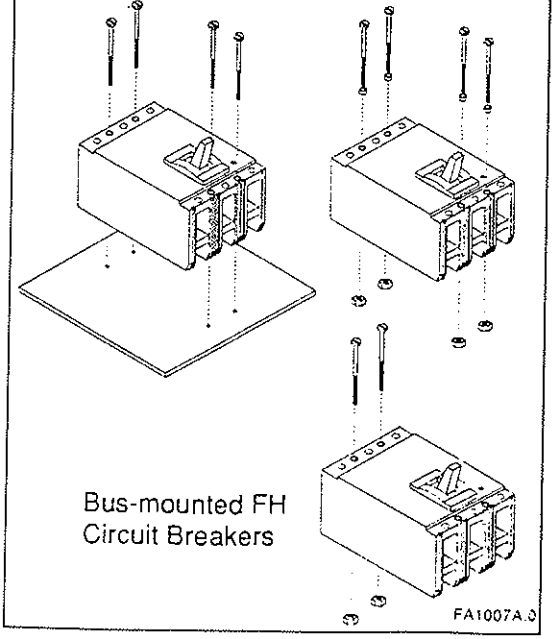
HAZARD OF ELECTRIC SHOCK OR BURN.

Mount circuit breaker as shown in these instructions to prevent cover separation under short-circuit conditions.

Failure to follow these instructions will result in death or serious injury.

Pan-mounted FC, FH and SFH Circuit Breakers

Bus-mounted FC and SFH Circuit Breakers



Bus-mounted FH Circuit Breakers

FA1007A.0

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WIRE INSTALLATION – ALL CIRCUIT BREAKERS

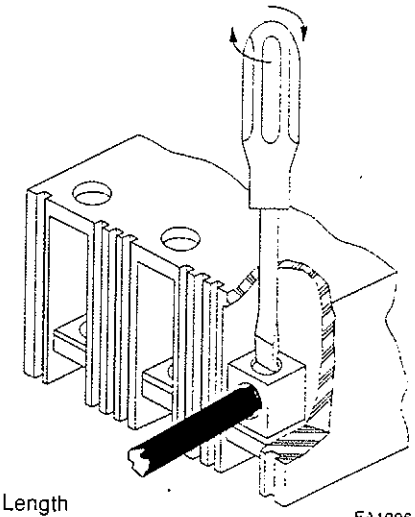
⚠ CAUTION

HAZARD OF FALSE TORQUE INDICATION.

Do not allow wire strands to interfere with threads of wire binding screw.

Failure to follow these instructions can result in equipment damage.

See circuit breaker faceplate label or optional lug instructions for wire size and torque.



Strip Length

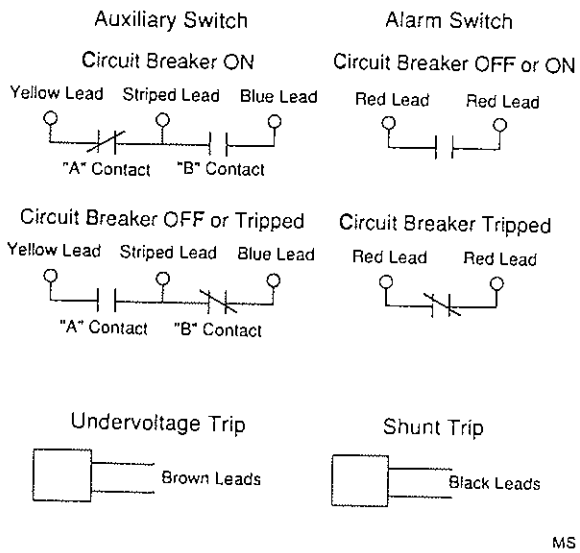


FA1006A.0

5/8 in. (16 mm)
3/4 in. (19 mm) for top feed lugs

FACTORY-INSTALLED ACCESSORIES

If circuit breaker has factory-installed accessories, refer to label on circuit breaker for electrical specifications and lead colors.



MS1172A.3

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PADLOCK CESSORY

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN OR EXPLOSION

When circuit breaker handle is padlocked OFF, always use a properly rated voltage sensing device to confirm power is off before working on equipment.

Failure to follow these instructions will result in death or serious injury.

With padlock accessory installed, circuit breaker does not comply with IEC 947 positive contact indication requirement for isolation.

CIRCUIT BREAKER REMOVAL

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN OR EXPLOSION

- This equipment must be installed and serviced only by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors, and covers before turning on power to this equipment.

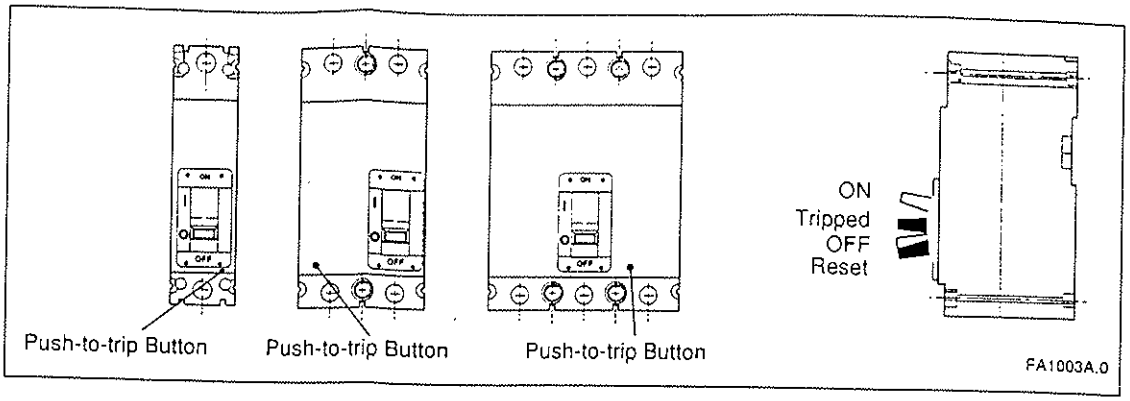
Failure to follow these instructions will result in death or serious injury.

Remove circuit breaker in reverse order of installation.

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CIRCUIT BREAKER OPERATION

Press push-to-trip button once a year to exercise circuit breaker.



TROUBLE-SHOOTING

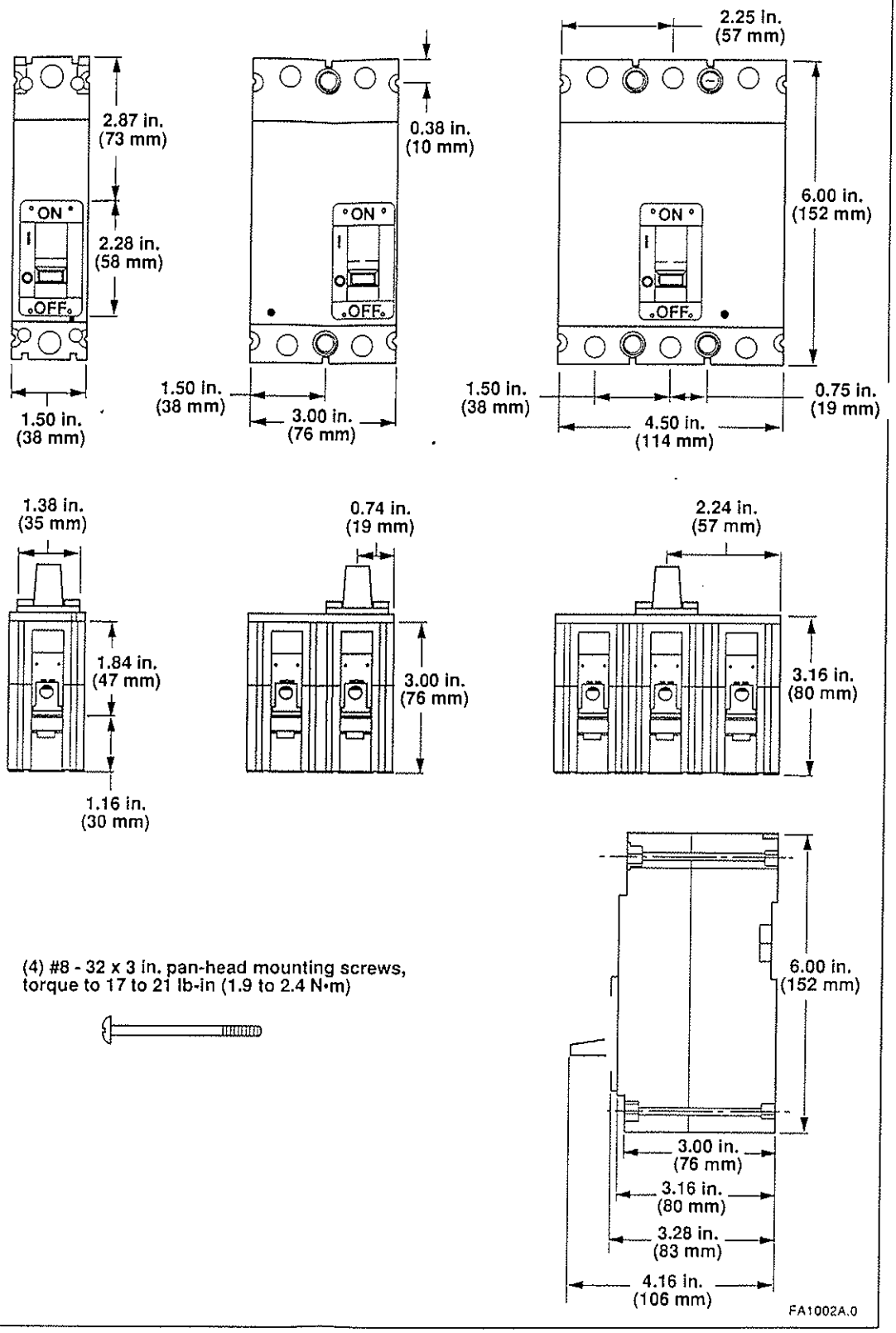
If problems occur during installation, refer to the following guide. If trouble persists, contact the local Square D Field Office.

CONDITION	POSSIBLE CAUSES	SOLUTION
Circuit breaker fails to stay closed.	1. Undervoltage trip not energized. 2. Shunt trip energized. 3. Short circuit or overload on system.	1. Energize undervoltage trip. 2. De-energize shunt trip. 3. Check system for short circuit or overload.
Circuit breaker trips, but no short circuit or overload is evident.	1. System voltage below under-voltage trip setting.	1. Check system for low voltage.
Push-to-trip button will not trip circuit breaker.	1. Circuit breaker already tripped or in the OFF position.	1. Move circuit breaker handle to reset then to ON position. Press push-to-trip button.

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DIMENSIONS

NOTE: Two-pole FC circuit breakers have the same dimensions as three-pole FC circuit breakers.



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PO Box 3069, 3700 Sixth St SW
Cedar Rapids IA 52406-3069 USA
Technical Services: 1-800-634-2003

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PUMP MOTOR STARTER

SQUARE D

Instruction Bulletin | Directives d'utilisation | Boletín de instrucciones

Ref. / réf. 278AS
30072-013-10C
Raleigh, NC, USA 12/95

AC Magnetic Contactors and Starters
Contacteurs et démarreurs magnétiques CA
Contactores y arrancadores magnéticos de ca

Class Classe Clase	Type Tipo	Series Série Serie	Sizes Tailles Tamaños	Poles Pôles Polos
8502 / 8536	SC	A / B	1 & 1P	2 & 3

INTRODUCTION

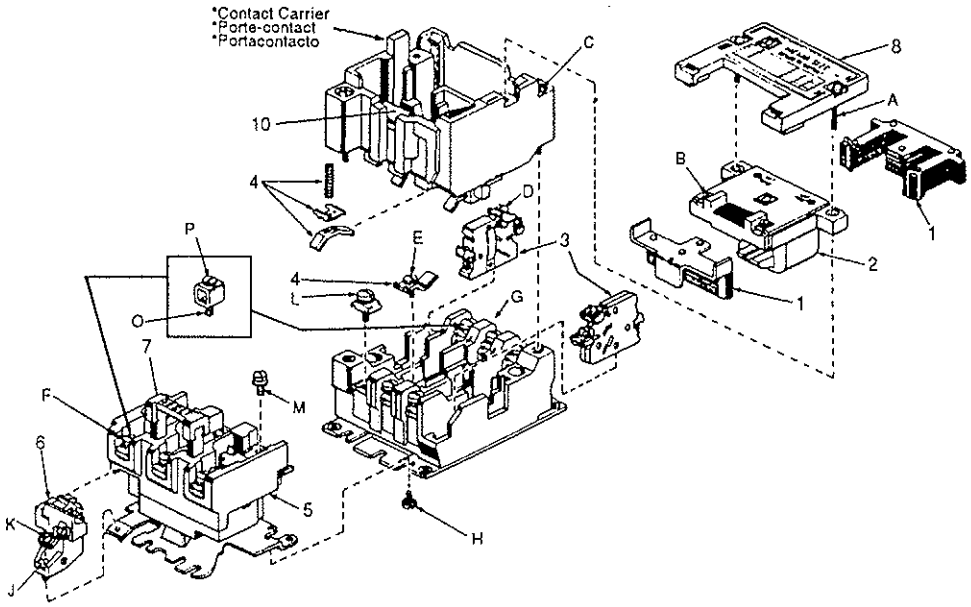
This bulletin provides assembly, modification and parts ordering instructions.

INTRODUCTION

Ce bulletin contient les directives pour assembler, modifier et commander des pièces.

INTRODUCCION

Este boletín incluye instrucciones de montaje, modificación y solicitud de piezas.



*Note: To ensure contacts are in the open position when the device is deenergized, the white portion of contact carrier must be flush with device cover (item 8).

*Remarque : Pour assurer que les contacts sont en position ouverte lorsque le dispositif est hors tension, la partie blanche du porte-contact doit être contre le couvercle du dispositif (article 8).

*Nota: Para asegurar que los contactos se encuentren en la posición abierta cuando el dispositivo está desenergizado, la parte blanca del portacontacto debe estar alineada con la cubierta del dispositivo (artículo 8).

Figure / Figura 1 Contactor and Starter Assembly / Assemblage de contacteur et de démarreur / Montaje de contactores y arrancadores

⚠ DANGER / PELIGRO

HAZARDOUS VOLTAGE.

Disconnect all power before working on equipment.

Electrical shock will cause death or severe injury.

TENSION DANGEREUSE.

Coupez l'alimentation avant de travailler sur cet appareil.

Une électrocution entraînera la mort ou des blessures graves.

TENSION PELIGROSA.

Desconecte toda la alimentación antes de efectuar cualquier trabajo en el equipo.

Las descargas eléctricas podrán causar la muerte o lesiones personales serias.

SERIES

Series B applies only to the Type S Starter Form B (3 ambient-compensated overloads). All parts of Form B Series A and B starters are interchangeable; only the overload relay block differs. If replacing the overload relay block of a Form B Series A starter with a Series B block, the overload relay thermal units must be selected from the Series B tables for proper motor protection.

SÉRIE

La série B n'est destinée qu'aux démarreurs type S, forme B (3 surcharges stabilisées en température). Toutes les pièces des démarreurs de forme B sont interchangeables pour les séries A et B ; seul le bloc-relais de surcharge est différent. Si on remplace le bloc-relais de surcharge d'un démarreur de forme B série A par un bloc-relais de série B, les unités thermiques du relais de surcharge doivent être sélectionnées dans les tableaux de sélection des unités

SERIE

La serie B se aplica solamente a los arrancadores tipo S, forma B (3 sobrecargas compensadas por temperatura). Todas las piezas de los arrancadores forma B series A y B son intercambiables; solamente el bloque del relevador de sobrecarga es diferente. Si reemplaza el bloque del relevador de sobrecarga de un arrancador forma B serie A con un bloque de la serie B, deberá seleccionar los elementos térmicos del relevador de sobrecarga de

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Replaces/Remplace/Reemplaza
30072-013-10B (2/94)

AUXILIARY CONTACTS

All contactors and starters feature a normally-open (N.O.) holding circuit contact. N.O. or normally-closed (N.C.) auxiliary contacts can be added in the field. Table 5 lists Class and Type. Bulletin 9999-287 and the Square D Digest contain application information.

COVER-MOUNTED CONTROL UNITS

NEMA Type 1 general purpose enclosures with slip-on or hinged covers contain knockouts for field addition of the kits listed in Table 1.

CONTACTS AUXILIAIRES

Tous les contacteurs et démarreurs sont dotés d'un contact de circuit de retenue normalement ouvert (N.O.). Des contacts auxiliaires N.O. ou des contacts normalement fermés (N.F.) peuvent être ajoutés sur place. Le tableau 5 dresse la liste des classes et des types autorisés. Le bulletin 9999-287 et l'aide-mémoire de Square D Digest contiennent des renseignements relatifs aux applications.

UNITÉS DE COMMANDE MONTÉES SUR COUVERCLE

Les armoires à usage général NEMA type 1 avec des couvercles à glissières ou à charnières contiennent des débouchures permettant l'ajout sur place des kits figurant au tableau 1.

CONTACTOS AUXILIARES

Todos los contactores y arrancadores contienen un contacto de circuito de sostén normalmente abierto (N.A.). Los contactos auxiliares normalmente cerrados (N.C.) o N.A. se pueden instalar en el local del cliente. La tabla 5 enumera su clase y tipo. El boletín 9999-287 y el Digest de Square D contienen información sobre su aplicación.

UNIDADES DE CONTROL PARA MONTAJE EN LA CUBIERTA

Los gabinetes NEMA tipo 1 para uso general con cubiertas deslizantes o abisagradas contienen agujeros ciegos para la adición de los accesorios enumerados en la tabla 1 los cuales pueden ser instalados en el local del cliente.

Table / Tableau / Tabla 1 Field Modification Kits, Class 9999 / Kits de modification sur place, classe 9999 / Accesorios para la modificación en el local del cliente, clase 9999

Kit / Kits / Accesorio	Slip-On Cover Couvercle à glissières Cubierta deslizante	Hinged Cover Couvercle à charnières Cubierta abisagrada	Form (Factory Mod.) Forme (mod. d'usine) Forma (modelo de fábrica)
Push button, Start-Stop / Bouton-poussoir, Démarrage-Arrêt Botón pulsador, arranque-parada	SA2	SA3	A
Push button, On-Off / Bouton-poussoir, Marche-Arrêt Botón pulsador, encendido-apagado	SA10	SA3	A3
Selector switch, Hand-Off-Auto / Interrupteur de sélection, Manuel-Arrêt-Auto / Interuptor selector, manual-apagado-auto	SC2	SC8	C
Selector switch, On-Off / Interrupteur de sélection, Marche-Arrêt / Interruptor selector, encendido-apagado	SC22	...	C6
Red pilot light / Lumière témoin rouge / Lámpara piloto roja	SP15R	SP28R [1]	P1

[1] For 120 V only. For other voltages, use Class 9001 Type KP units.
[1] Pour 120 V seulement. Autres tensions : utiliser les unités de classe 9001 type KP.
[1] Para 120 V solamente. Para otras tensiones, utilice las unidades clase 9001 tipo KP.

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OVERLOAD RELAYS

Standard: Melting alloy overload relay: incorporates one or three thermal units. Its contact unit (item 6 in Figure 1) is available with a N.O. or N.C. isolated alarm contact, in addition to the standard N.C. contact. The contact unit with alarm circuit contacts is field-installable (see Table 5).

Optional: Non-temperature compensated bimetallic overload relay: Form B1 incorporates two thermal units; Form B2 incorporates three thermal units.

Ambient-temperature compensated bimetallic overload relay (Form B): incorporates three thermal units.

SPDT contact (all Type S bimetallic overload relays): The N.O. contact can be used in an alarm circuit, and its wiring polarity must match that of the N.C. contact. Contacts are not replaceable. Use Table 5 to order replacement bimetallic overload relays.

Overload relays are not field-repairable. Do not disassemble.

TERMINALS

Use only copper wire on device power and control terminals. Pressure wire power terminals are suitable for wire sizes 14-8 AWG (2.5-6 mm^2), solid or stranded. Pressure wire control terminals are suitable for wire sizes 16-12 AWG (1.5-4 mm^2), solid or stranded.

CONTACT INSPECTION AND REPLACEMENT

Discoloration and slight pitting do not harm contacts. **Do not file contacts;** this wastes contact material. Replace contacts (item 4 in Table 5) only when worn thin.

To inspect or replace contacts, disconnect all power. Do not remove any wiring. Loosen the two captive screws (C) holding the contact actuator to the ontact block. Lift the contact actuator to expose the contacts.

RELAIS DE SURCHARGE

Standard : Relais de surcharge à fusion d'alliage : incorpore une ou trois unités thermiques. Son unité de contact (article 6, Figure 1) est disponible avec un contact d'alarme isolé N.O. ou N.F. en plus du contact N.F. standard. L'unité de contact avec les contacts de circuit d'alarme peut être installée sur place (voir le tableau 5).

En option : Relais de surcharge bimétallique non stabilisé en température : La forme B1 incorpore deux unités thermiques, la forme B2 incorpore trois unités thermiques.

Relais de surcharge bimétallique stabilisé en température (forme B) : incorpore trois unités thermiques.

Contact UPBD (tous les relais de surcharge bimétalliques de type S) : Le contact N.O. peut être utilisé dans un circuit d'alarme et la polarité de son câblage doit correspondre à celle du contact N.F. Les contacts ne peuvent pas être remplacés. Utiliser le tableau 5 pour commander des relais de surcharge bimétalliques de rechange.

Les relais de surcharge ne peuvent pas être réparés sur place. Ne pas les démonter.

BORNES

Utiliser uniquement des fils de cuivre sur les bornes d'alimentation et de commande du dispositif. Les bornes d'alimentation des fils à pression conviennent pour des fils conducteurs de calibre 14-8 AWG (2,5 - 6 mm^2), à un ou plusieurs brins. Les bornes de commande des fils à pression conviennent pour des fils conducteurs de calibre 16-12 AWG (1,5 - 4 mm^2), à un ou plusieurs brins.

INSPECTION ET REMPLACEMENT DES CONTACTS

La décoloration ou de légères piqûres de surface n'altèrent en rien les contacts. **Ne pas limer les contacts;** ceci abîme le matériau du contact. Ne remplacer les contacts que lorsqu'ils sont usés (article 4, tableau 5).

Pour inspecter ou remplacer les contacts, mettre l'ensemble hors tension. Ne pas retirer le câblage. Desserrer les deux vis prisonnières (C) en maintenant l'actionneur de contact contre le bloc à

RELEVADORES DE SOBRECARGA

Estándar: Relevador de sobrecarga de aleación fusible: incorpora uno o tres elementos térmicos. Su unidad de contacto (artículo 6 en la figura 1) se encuentra disponible con un contacto de alarma aislado N.A. o N.C., además del contacto estándar N.C. La unidad de contacto con los contactos de circuito de alarma se puede instalar en el local del cliente (vea la tabla 5).

Opcional: Relevador de sobrecarga bimetálico no compensado por temperatura: La forma B1 incorpora dos elementos térmicos; la forma B2 incorpora tres elementos térmicos.

Relevador de sobrecarga compensado por la temperatura ambiente (forma B): incorpora tres elementos térmicos.

Contacto 1P2T (todos los relevadores de sobrecarga bimetálicos tipo S): El contacto N.A. puede ser usado en un circuito de alarma y su polaridad de cableado debe corresponder con la polaridad del contacto N.C. Los contactos no se pueden reemplazar. Utilice la tabla 5 para solicitar repuestos de los relevadores de sobrecarga bimetálicos.

Los relevadores de sobrecarga no se pueden reparar en el local del cliente. No los desmonte.

TERMINALES

Utilice sólo conductores de cobre en las terminales de alimentación y control del dispositivo. Las terminales de alimentación de los conductores a presión son adecuadas para tamaños de cable calibre 14 - 8 (2.5 - 6 mm^2), sencillo o múltiple. Las terminales de control de los conductores a presión son adecuadas para tamaños de cable calibre 16 - 12 (1.5 - 4 mm^2), sencillo o múltiple.

INSPECCION Y REEMPLAZO DE CONTACTOS

La descoloración y picadura liviana no dañan los contactos. **No lime los contactos;** esto desperdicia el material del contacto. Reemplace los contactos (artículo 4 en la tabla 5) sólo cuando estén desgastados.

Para inspeccionar o reemplazar los contactos, desconecte toda la alimentación. No retire el cableado. Desatornille los dos tornillos imperdibles (C) sosteniendo el actuador de contacto

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'e Class 9998 Type SL22 kit contains placement contacts and springs for power pole kits only. Each N.O. or N.C. contact requires one kit.

MANUAL OPERATION

contacts. Soulever l'actionneur des contacts pour faire apparaître ces derniers.

Le kit de classe 9998 type SL22 contient des contacts et des ressorts de rechange uniquement pour des kits de pôles d'alimentation. Chaque contact N.O. ou N.F requiert un kit.

FONCTIONNEMENT MANUEL

al bloque de contactos. Levante el actuador de contacto para exponer los contactos.

El accesorio clase 9998 tipo SL22 contiene contactos y resortes de repuesto solamente para los accesorios de los polos de potencia. Cada contacto N.A. o N.C. requiere un accesorio.

FUNCIONAMIENTO MANUAL

⚠ WARNING/AVERTISSEMENT/ADVERTENCIA

HAZARDOUS VOLTAGE.
Disconnect all power before manually operating equipment.
Manual operation with power on can cause contact arcing and unexpected load energization, resulting in personal injury or equipment damage.

TENSION DANGEREUSE.
Coupez l'alimentation avant d'actionner manuellement cet appareil.
Le fonctionnement manuel de l'appareil sous tension peut provoquer un arc électrique de contact ou une alimentation inattendue de la charge, entraînant des blessures ou des dommages matériels.

TENSION PELIGROSA.
Desconecte toda la alimentación antes de hacer funcionar manualmente el equipo.
El funcionamiento manual con la alimentación conectada puede causar la formación de arcos y la energización inesperada de carga, lo cual puede resultar en lesiones personales serias o daño al equipo.

Manually operate the contactor/starter with a screwdriver by pushing down the contact carrier. The coil cover has a slot r this use.

COIL REPLACEMENT

To remove the coil, loosen the two captive cover screws (item A, Figure 1). Disconnect the wires from the coil terminals and remove the cover. Remove and disassemble the magnet, coil and armature.

To replace the coil, first assemble the magnet, replacement coil and armature. Manually operate the contact carrier (described in "Manual Operation") and insert the complete unit. Before installing the cover, manually operate the device to ensure that all parts function properly. Use the tightening torques listed in Table 2 when reassembling the device.

ASSEMBLY

Figure 1 illustrates the contactor and starter assembly. Table 2 and the device instructions list factory recommended torques for mechanical, electrical and essure wire connections. Use these rques to ensure proper device operation.

Actionner manuellement le contacteur et le démarreur en poussant le porte-contact vers le bas avec un tournevis. Le couvercle de la bobine possède une fente réservée à cet usage.

REMPLACEMENT DE LA BOBINE

Pour retirer la bobine, desserrer les deux vis prisonnières du couvercle (article A, figure 1). Débrancher les fils des bornes de la bobine et ôter le couvercle. Enlever et démonter l'aimant, la bobine et l'armature.

Pour remplacer la bobine, assembler l'aimant, la bobine de rechange et l'armature. Actionner manuellement le porte-contact (comme décrit dans «Fonctionnement manuel») et insérer l'unité complète. Avant d'installer le couvercle, actionner manuellement le dispositif pour s'assurer que toutes les pièces fonctionnent correctement. Pour remonter le dispositif, utiliser les couples de serrage figurant au tableau 2.

ASSEMBLAGE

La figure 1 représente l'assemblage contacteur-démarreur. Le tableau 2 et les directives du dispositif donnent la liste des couples de serrage recommandés par l'usine pour des connexions mécaniques, électriques et des fils à pression. Utiliser ces couples pour assurer un fonctionnement correct du dispositif.

Haga funcionar manualmente el contactor/arrancador con un desarmador oprimiendo el portacontacto hacia abajo. La cubierta de la bobina tiene una ranura para este uso.

REEMPLAZO DE LA BOBINA

Para retirar la bobina, desatornille los dos tornillos imperdibles de la cubierta (artículo A en la figura 1). Desconecte los cables de las terminales de la bobina y quite la cubierta. Retire y desmonte la bobina, el imán y la armadura.

Para reemplazar la bobina, ensamble el imán, la bobina de repuesto y la armadura. Haga funcionar manualmente el portacontacto (descrito en "Funcionamiento manual") y coloque la unidad completa. Antes de instalar la cubierta, haga funcionar manualmente el dispositivo y asegúrese de que todos sus componentes estén funcionando adecuadamente. Utilice los pares de apriete enumerados en la tabla 2 cuando vuelva a montar el dispositivo.

MONTAJE

La figura 1 ilustra el montaje del arrancador y contactor. La tabla 2 y las instrucciones del dispositivo proporcionan los pares de apriete recomendados por el fabricante para las conexiones mecánicas, eléctricas y de los conductores a presión. Utilice estos pares de apriete para asegurar el funcionamiento correcto del dispositivo.

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Table / Tableau / Tabla 2 Factory Recommended Tightening Torques / Couples de serrage recommandés par l'usine / Pares de apriete recomendados de fábrica

Item Art.	Description / Descripción	Tightening Torque Couple de serrage Par de apriete	
		lb-in / lb-po lb-pulg	N•m
A	Cover screw (2 per cover) / Vis de couvercle (2 par couvercle) / Tornillo de la cubierta (2 por cubierta)	18 - 21	2.0 - 2.3 2,0 - 2,3
B	Coil terminal pressure wire connector (2 per coil) / Connecteur des fils à pression aux bornes de la bobine (2 par bobine) / Conector de los conductores a presión de la terminal de la bobina (2 por bobina)	9 - 12	1.0 - 1.3 1,0 - 1,3
C	Power plant screws (4 per device) / Vis du groupe électrogène (4 par dispositif) / Tornillo de la planta de alimentación (4 por dispositivo)	18 - 21	2.0 - 2.3 2,0 - 2,3
D	Internal auxiliary contact pressure wire connector (2 per contact) / Connecteur des fils à pression du contact auxiliaire interne (2 par contact) / Conector de los conductores a presión del contacto auxiliar interno (2 por contacto)	9 - 12	1.0 - 1.3 1,0 - 1,3
E	Stationary contact fastener (2 per pole) / Attache du contact stationnaire(2 par pôle) / Sujetador del contacto estacionario (2 por polo)	6 - 9	0.68 - 1.0 0,68 - 1,0
F	Lug screw (2 per pole) / Vis de cosse (2 par pôle) / Tornillo de la zapata (2 por polo)	[1]	[1]
G	Auxiliary wire binding screw / Vis de fixation du fil auxiliaire / Tornillo de sujeción de los conductores auxiliar	18 - 21	2.0 - 2.3 2,0 - 2,3
H	Overload relay fastening screw (2 per overload block) / Vis de fixation du relais de surcharge (2 par bloc de surcharge) / Tornillo sujetador del relevador de sobrecarga (2 por bloque de sobrecarga)	18 - 21	2.0 - 2.3 2,0 - 2,3
J	Overload switch module fastening screw (1 per module) / Vis de fixation du module d'interrupteur de surcharge (1 par module) / Tornillo sujetador del módulo del interruptor de sobrecarga (1 por módulo)	9 - 12	1.0 - 1.3 1,0 - 1,3
K	Switch module pressure wire connector (2 per module standard; 4 per module w/ alarm circuit contact) Connecteur des fils à pression du module d'interrupteur (2 par module en standard ; 4 par module avec contact de circuit d'alarme) / Conector de los conductores a presión del módulo del interruptor (2 por módulo estándar; 4 por módulo con contacto de circuito de alarma)	9 - 12	1.0 - 1.3 1,0 - 1,3
L	Overload-to-contactor fastener (1 per pole) / Dispositif de fixation unité de surcharge-contacteur (1 par pôle) / Sujetador de sobrecarga a contactor (1 por polo)	18 - 21 [2]	2.0 - 2.3[2] 2,0 - 2,3[2]
M	Overload thermal unit fastening screw (2 per pole) / Vis de fixation de l'unité thermique de surcharge (2 par pôle) / Tornillo sujetador del elemento térmico de sobrecarga (2 por polo)	18 - 21	2.0 - 2.3 2,0 - 2,3[2]
O	Lug retaining screw - Size 1P only (1 per pole) / Vis de retenue de cosse - Taille 1P seulement (1 par pôle) / Tornillo sostenedor de la zapata- Tamaño 1P solamente (1 por polo)	18 - 21	2.0 - 2.3 2,0 - 2,3[2]

[1] See instructions supplied with the device.
[1] Voir les directives accompagnant le dispositif.
[1] Siga las instrucciones que vienen incluidas con el dispositivo.

[2] For contactor, see instructions supplied with the device.
[2] Pour le contacteur, voir les directives accompagnant le dispositif.
[2] Para el contactor, siga las instrucciones que vienen incluidas con el dispositivo.

SHORT-CIRCUIT PROTECTION

Provide branch-circuit overcurrent protection for starters, referring to instructions supplied with the thermal unit selection table. Provide branch-circuit overcurrent protection for contactors (Class 8502 or 8702) in accordance with the National Electrical Code. Do not exceed the maximum protective device ratings listed in Table 3.

PROTECTION CONTRE LES COURTS-CIRCUITS

Fournir un dispositif de protection d'artère pour démarreurs, conformément aux directives figurant dans le tableau de sélection de l'unité thermique. Fournir un dispositif de protection d'artère pour contacteurs (classe 8502 ou 8702) conformément au Code national de l'électricité (National Electrical Code). Ne pas dépasser l'intensité nominale maximale du dispositif de protection figurant au tableau 3.

PROTECCION CONTRA CORTOCIRCUITO

Proporcione protección contra sobrecorriente de circuito de derivación a los arrancadores, consultando las instrucciones incluidas con la tabla de selección del elemento térmico. Proporcione protección contra sobrecorriente de circuito de derivación a los contactores (clase 8502 ó 8702) de acuerdo con los reglamentos de instalaciones eléctricas nacionales. No exceda las capacidades máximas del dispositivo protector que se enumeran en la tabla 3.

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Table / Tableau / Tabla 3 Maximum Ampere Ratings / Intensités de courant nominales maximales / Capacidades máximas en amperes

Maximum Voltage Tension maximal Tensión máxima (V)	Class K5, RK5 or RK1 Fuse Fusible de classe K5, RK5 ou RK1 Fusible clase K5, RK5 o RK1 (A)	Class J or T Fuse Fusible de classe J ou T Fusible clase J o T (A)	Inverse-Time Circuit Breaker Disjoncteur à retardement Interruptor automático de retardo dependiente (A)
600	30	60	40
250	40	60	60

DISTANT CONTROL

Depending upon the voltage, wire size and number of control wires used, series impedance or shunt capacitance may limit the maximum distance of the wire run for remotely-operated contactors and starters. If distances to start or stop stations exceed those listed in Table 4, analyze the wire-run configuration and materials. For further information, request Product Data Bulletin M379 from your local Square D sales office.

COMMANDE À DISTANCE

Selon la tension, le calibre du fil et le nombre de fils de commande utilisés, l'impédance de série ou la capacité shunt peut limiter la longeur maximale du câblage des contacteurs et des démarreurs commandés à distance. Si les distances aux postes de départ ou d'arrêt dépassent celles figurant dans le tableau 4, analyser la configuration et les matériaux du câblage des conducteurs. Pour de plus amples informations, consulter le bulletin M379 sur les données des produits, auprès du bureau local de ventes de Square D.

CONTROL A DISTANCIA

Dependiendo de la tensión, del calibre del conductor y de la cantidad de conductores de control que se usan, la impedancia en serie o la capacitancia en derivación puede limitar la distancia máxima del tendido de cables de contactores y arrancadores que se hacen funcionar remotamente. Si las distancias a las estaciones de arranque o parada exceden aquéllas enumeradas en la tabla 4, analice la configuración del tendido de cables y los materiales. Para obtener más información, solicite el boletín de datos del producto M379 de su oficina local de ventas de Square D.

Table / Tableau / Tabla 4 Maximum Control Distance for Copper Wire / Distance de commande maximale pour fil de cuivre / Distancia máxima de control del conductor de cobre

Coil Voltage @ 60 Hz Tension de bobine à 60 Hz Tensión de la bobina @ 60 Hz (V)	Maximum Control Distance / Distance maximale de commande / Distancia máxima de control			
	14 AWG (2.5 mm²) / 14 AWG (2,5 mm²) Calibre 14 (2.5 mm²)		12 AWG (4 mm²) / 12 AWG (4 mm²) Calibre 12 (4 mm²)	
	ft / pieds / pies	m	ft / pieds / pies	m
120	845	258	1300	396
240	595	181	495	151
480	145	44	120	36

PARTS ORDERING

Specify quantity, part number or Class and Type and part description, giving complete nameplate data of the device (e.g., one armature and magnet kit 31041-605-50 for a Class 8536 Type SCO3 Series A starter).

COMMANDE DE PIÈCES

Spécifier la quantité, le numéro de pièce ou la classe et le type, ainsi que la description de la pièce, en donnant tous les renseignements figurant sur la plaque signalétique du dispositif (par ex., kit d'armature et d'aimant 31041-605-50 pour un démarreur de classe 8536 type SCO3 série A).

SOLICITUD DE PIEZAS

Especifique la cantidad, el número de pieza o clase y tipo, y descripción de la pieza, proporcionando los datos completos de la placa de identificación del dispositivo (p.ej., un accesorio de imán y armadura 31041-605-50 para un arrancador serie A, clase 8536 tipo SCO3).

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Table / Tableau / Tabla 5 Parts List / Liste de pièces / Lista de piezas

Item Art.	Description / Descripción	Part Number Nº de pièce Número de pieza	Quantity / Quantité / Contenido 1-Pole 1 pôle 1 polo	2-Pole 2 pôles 2 polos	3-Pole 3 pôles 3 polos	4-Pole 4 pôles 4 polos	5-Pole 5 pôles 5 polos
1	Armature and magnet kit / Kit d'armature et d'aimant / Accesorio de imán y armadura	31041-605-50	1	1	1	1	1
2	Coil / Bobine / Bobina	See Table 6 Voir le tableau 6 Vea la tabla 6	1	1	1	1	1
3	Internal auxiliary contact / Contact auxiliaire interne / Contacto auxiliar interno N.O. N.O. N.A. N.C. N.F. N.C.	Class / Classe / Clase 9999: Type / tipo SX11 Type / tipo SX12	[3] ...	[3] ...	1 ...	1 ...	1 ...
4	Contact kit / Kit de contact / Accesorio de contacto	Class / Classe / Clase 9998: Type / tipo SL3 Type / tipo SL13 Type / tipo SL13 & SL22	1	1	1	... 1 ...	 1
5	Melting alloy overload relay assembly / Assemblage de relais de surcharge à fusion d'alliage / Ensamblaje del relevador de sobrecarga de aleación fusible 1 Element / 1 élément / 1 elemento 2 or 3 Element / 2 ou 3 éléments / 2 ó 3 elementos	Class / Classe / Clase 9065: Type / tipo SDO4 Type / tipo SDO5	1 ...	1 ...	... 1	... 1	... 1
[1] 5	Bimetallic overload relay / Relais de surcharge bimétallique / Relevador de sobrecarga bimetálico Non-compensated / Non stabilisé en température / No compensado 2 Element (Form B1) / 2 éléments (forme B1) / 2 elementos (forma B1) 3 Element (Form B2) / 3 éléments (forme B2) / 3 elementos (forma B2) Compensated / Stabilisé en température / Compensado 3 Element (Form B) / 3 éléments (forme B) / 3 elementos (forma B)	Class / Classe / Clase 9065: Type / tipo SDO5B1 Type / tipo SDO6B2 Class / Classe / Clase 9065: Type / tipo SDO6B	... ...	... ...	... ...	... ...	... ...
6	Melting alloy overload contact unit / Unité de contact de surcharge à fusion d'alliage Unidad de contacto de sobrecarga de aleación fusible	Class / Classe / Clase 9998: Type / tipo SO1	1	1	1	1	1
[1] 6	Melting alloy overload contact unit w/ alarm circuit / Unité de contact de surcharge à fusion d'alliage avec circuit d'alarme / Unidad de contacto de sobrecarga de aleación fusible con circuito de alarma N.O. alarm contact / Contact d'alarme N.O. / Contacto de alarma N.A. N.C. alarm contact / Contact d'alarme N.F. / Contacto de alarma N.C.	Class / Classe / Clase 9999: Type / tipo SO4 Type / tipo SO5	... ...	... ...	... ...	... ...	... ...
7	Reset bar / Barre de réarmement / Barra de restablecimiento	31034-042-01	1	1	1	1	1
8	Cover only (nameplate not included) / Couvercle seulement (plaque signalétique non incluse) / Cubierta solamente (placa de identificación no incluida)	31127-013-01	1	1	1	1	1
[1]	External auxiliary contact / Contact auxiliaire externe / Contacto auxiliar externo 1 N.O. / 1 N.A. 1 N.C. / 1 N.F. / 1 N.C. 1 N.O. and 1 N.C. / 1 N.O. et 1 N.F. / 1 N.A. y 1 N.C. 1 N.O., overlapping / 1 N.O., chevauchement / 1 N.A., con recubrimiento 1 N.C., overlapping / 1 N.F., chevauchement / 1 N.C., con recubrimiento	Class / Classe / Clase 9999: Type / tipo SX6 Type / tipo SX7 Type / tipo SX8 Type / tipo SX9 Type / tipo SX10	... ...	... ...	... ...	... ...	... ...
[1]	Power pole kit / Kit de pôle d'alimentation / Accesorio del polo de potencia 1 N.O. / 1 N.A. 2 N.O. / 2 N.A.	Class / Classe / Clase 9999: Type / tipo SB6 Type / tipo SB9	... ...	... ...	... ...	1 ...	... 1
[2] 10	Lever bearing / Galet du levier / Cojinete de la palanca	31041-032-01	1	1	1	1	1
A	Cover screw / Vis de couvercle / Tornillo de la cubierta	21937-14341	2	2	2	2	2
B	Coil terminal pressure wire connector / Connecteur des fils à pression aux bornes de la bobine / Conector de los conductores a presión de la terminal de la bobina	31051-007-50	2	2	2	2	2
C	Power plant screw / Vis du groupe électrogène / Tornillo de la planta de alimentación	21916-14501	2	2	2	2	2
F	Wire clamp and screw / Vis de fixation et serre-fil / Pinza y tornillo del conductor Size 1 contactor / contacteur de taille 1 / contactor tamaño 1 Size 1 starter / démarreur de taille 1 / arrancador de tamaño 1	30018-018-50 30018-018-50	... ...	... 2	... 3	2 5	4 7
G	Auxiliary wire binding screw / Vis de fixation du fil auxiliaire / Tornillo de sujeción del conductor auxiliar	21819-25081	2	2	2	2	2
L	Wire clamp and screw / Vis de fixation et serre-fil / Pinza y tornillo del conductor Size 1 contactor / contacteur de taille 1 / contactor de tamaño 1 Size 1 starter / démarreur de taille 1 / arrancador de tamaño 1	30018-070-50 30018-070-50	2 ...	4 4	6 6	6 6	6 6
M	Overload thermal unit fastening screw / Vis de fixation de l'unité thermique de surcharge Tornillo sujetador del elemento térmico de sobrecarga	21920-16160	...	4	6	6	6
O	Screw assembly (Size 1P only) / Assemblage des vis (Taille 1P seulement) Ensamble del tornillo (Tamaño 1P solamente)	30018-066-50	...	4	...	...	...
P	Lug screw (Size 1P only) / Vis de cosse (Taille 1P seulement) Tornillo de la zapata (Tamaño 1P solamente)	25054-13600	...	4	...	...	...

[1] Not shown.
[2] To ensure proper device operation: when installing the lever bearing onto the lever, the oval concavity on the inside surface of one leg of the bearing must mate with the corresponding oval convexity on the bottom of the lever.
[3] Furnished on 2-pole starters; however 1- and 2-pole contactors are furnished with a holding circuit contact rated the same as a power pole.

[1] Non montré.
[2] Pour assurer un fonctionnement correct du dispositif : lors de l'installation du galet du levier sur ce dernier, veiller à faire correspondre la cavité ovale située sur la surface interne d'un pied du galet avec la forme convexe située au bas du levier.
[3] Fourni sur les démarreurs à 2 pôles ; toutefois, les contacteurs à 1 et 2 pôles sont fournis avec un contact de circuit de retenue de la même valeur nominale qu'un pôle d'alimentation.

[1] No se muestra.
Para asegurarse de que el dispositivo está funcionando adecuadamente al instalar el cojinete de la palanca en la misma; la concavidad ovalada en la superficie interior de uno de los pies del cojinete debe corresponder con la convexidad ovalada correspondiente en la parte inferior de la palanca.
[3] Incluida con los arrancadores de 2 polos; sin embargo, los contactores de 1 y 2 polos incluyen un contacto de circuito de sostén con la misma capacidad de un polo de potencia.

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Table / Tableau / Tabla 6 Magnet Coil Part Numbers [1] / Numéros de pièces des bobines d'excitation [1] / Números de piezas de la bobina de electroimán [1]

Coil Prefix Préfixe de bobine Prefijo de la bobina	Hz	Coil Suffix / Suffixe de bobine / Sufijo de la bobina													
		24 V	110 V	120 V	120/240 V	208 V	220 V	240 V	240/480 V	277 V	380 V	440 V	480 V	550 V	600 V
31041-400	60	20	Use 120 V Utiliser 120 V Utilice 120V	42	[2]	48	Use 240 V Utiliser 240 V Utilice 240V	51	[2]	52	56	Use 480 V Utiliser 480 V Utilice 480V	60	Use 600 V Utiliser 600 V Utilice 600V	62
	50	22	42	43	...	...	51	53	...	...	57	60	...	62	64

[1] Complete coil part number contains a prefix and a suffix (e.g., for 120 V 60 Hz coil, select 31041-400-42). When ordering replacement coils, give part number, voltage and frequency of coil being replaced.

[2] Dual voltage coil. Order 120/240 V 60 Hz as 31041-402-02. Order 240/480 V 60 Hz as 31041-402-04.

[1] Le numéro complet de la pièce de la bobine contient un préfixe et un suffixe (par ex., pour une bobine 120 V 60 Hz, sélectionner 31041-400-42). Pour commander des bobines de rechange, indiquer le numéro de pièce, la tension et la fréquence de la bobine à remplacer.

[2] Bobine à deux tensions. Commander 31041-402-02 pour les modèles à 120/240 V, 60 Hz. Commander 31041-402-04 pour les modèles à 240/480 V, 60 Hz.

[1] El número de pieza completo de la bobina contiene un prefijo y un sufijo (es decir, una bobina de 120 V 60 Hz, el número de pieza es 31041-400-42). Cuando solicite las bobinas de repuesto, proporcione el número de pieza, la tensión y la frecuencia de la bobina que se está reemplazando.

[2] Bobina de tensión doble. Solicite 31041-402-02 para los modelos de 120/240 V, 60 Hz. Solicite 31041-402-04 para los modelos de 240/480 V 60 Hz.

[1] El número de pieza completo de la bobina contiene un prefijo y un sufijo (es decir, una bobina de 120 V 60 Hz, el número de pieza es 31041-400-42). Cuando solicite las bobinas de repuesto, proporcione el número de pieza, la tensión y la frecuencia de la bobina que se está reemplazando.

[2] Bobina de tensión doble. Solicite 31041-402-02 para los modelos de 120/240 V 60 Hz. Solicite 31041-402-04 para los modelos de 240/480 V 60 Hz.

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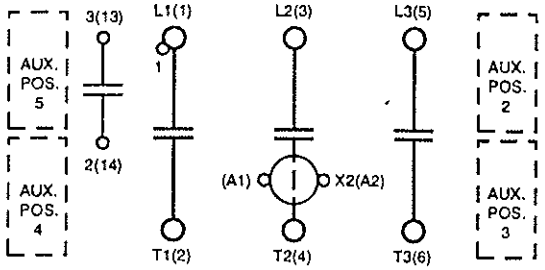
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Instruction Bulletin

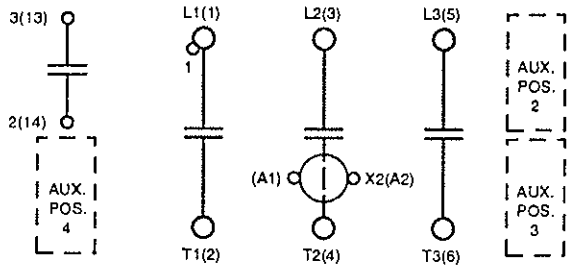
Device Terminal Identification
for Contactors and Starters

CONTACTORS

Size 00 to 2 Contactors



Size 3 to 5 Contactors

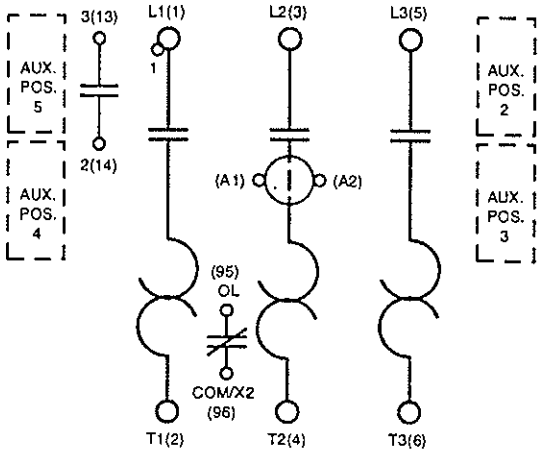


OPTIONAL AUXILIARY CONTACT TERMINAL IDENTIFICATION

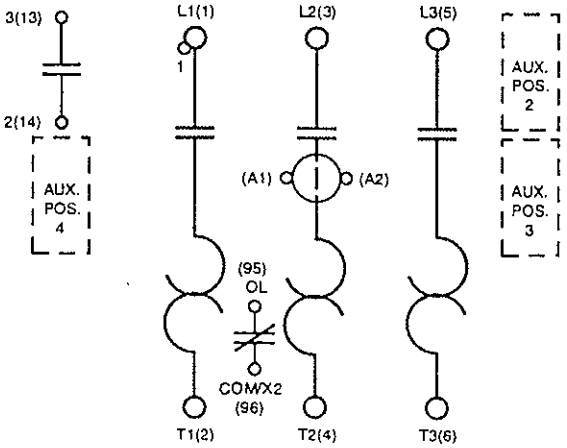
AUXILIARY POSITION	AUX. POS. 2	AUX. POS. 3	AUX. POS. 4	AUX. POS. 5
N/O AUXILIARY	23 / 24	33 / 34	43 / 44	53 / 54
N/C AUXILIARY	21 / 22	31 / 32	41 / 42	51 / 52

STARTERS with MELTING ALLOY OVERLOAD RELAY (MAOLR)

Size 00 to 2 Starters with MAOLR



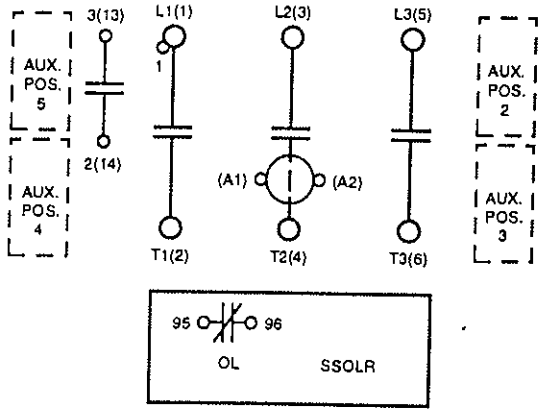
Size 3 to 5 Starters with MAOLR



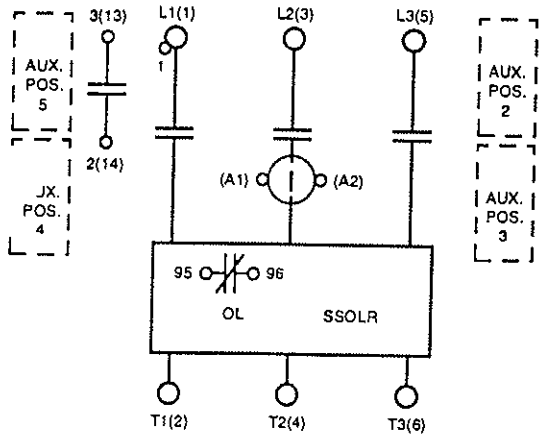
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STARTERS with SOLID-STATE OVERLOAD RELAY (SSOLR)

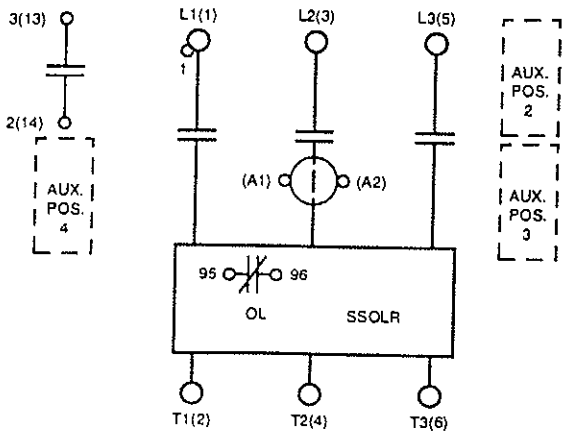
Size 00 to 1 Starters with SSOLR



Size 2 Starters with SSOLR



Size 3 to 5 Starters with SSOLR



OPTIONAL AUXILIARY CONTACT TERMINAL IDENTIFICATION

AUXILIARY POSITION	AUX. POS. 2	AUX. POS. 3	AUX. POS. 4	AUX. POS. 5
N/O AUXILIARY	23 / 24	33 / 34	43 / 44	53 / 54
N/C AUXILIARY	21 / 22	31 / 32	41 / 42	51 / 52

are D
1 Hwy 64 East
Knightdale, NC 27545 USA
(919) 266-3671

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CONTROL RELAY

531 AS
SERVICE BULLETIN

Class 8501 Type X Control Relay

GENERAL

The Class 8501 Type X relay is a 600 volt ac, 300 volt dc, industrial control relay. It is available in 2 to 12 poles (ac operated), with a maximum of 8 of those N.C., and 2-8 poles (dc operated). All contacts are easily convertible.

The Type X relay with standard cartridges (black cases) is designed to have a significant degree of non-overlap between the N.O. and N.C. contacts during normal operation. In addition, all cartridges are linked togther by a common mechanical tie.

The Type X relay family includes a number of accessory kits (Table 1). See catalog for further description of accessory kits.

TABLE 1 — ACCESSORY KITS

Kit Description	Class 8501 Type
Mechanical Latch Attachment (ac)	XL
Mechanical Latch Attachment (dc)	XDL
• Pneumatic Timer Attachment (On Delay, 0.2 to 60 sec.)	XTE1
• Pneumatic Timer Attachment (Off Delay, 0.2 to 60 sec.)	XTD1
Pneumatic Timer Attachment (On Delay, 5 to 180 sec.)	XTE2
Pneumatic Timer Attachment (Off Delay, 5 to 180 sec.)	XTD2
Standard Contact Cartridge	XC-1
Overlapping Contact Cartridge	XC-2
Master Contact Cartridge*	XC-4
Manual Test Tool	XA-1
Transient Suppressor	XS-1
Mounting Track (for 4 relays)	XM-4
Mounting Track (for 8 relays)	XM-8
Mounting Track (for 12 relays)	XM-12
Mounting Track (for 16 relays)	XM-16
Mounting Track (for 32 relays)	XM-32
Universal Adder Deck (with 2 N.O. convertible contacts)	XB-20
Universal Adder Deck (with 4 N.O. convertible contacts)	XB-40
Logic Reed Adder Deck (with 2 N.O. fixed logic reed contacts)	XBR-20
Logic Reed Adder Deck (with 1 N.O. and 1 N.C. fixed logic reed contacts)	XBR-11
Logic Reed Adder Deck (with 1 N.O. fixed logic reed contact)	XBR-10
Logic Reed Adder Deck (with 1 N.C. fixed logic reed contact)	XBR-01
Logic Reed Adder Deck (with 2 N.C. fixed logic reed contacts)	XBR-02

CONTACTS

All contacts are color coded. When the conventional symbol ⊣⊢ for N.O. contacts on a green background is visible between the cover and the terminal, the contact is in the N.O. mode. When the conventional symbol ⊣/⊢ for N.C. on a yellow background is visible, it is in the N.C. mode.

Three types of contact cartridges are available for use with the Type X relay: standard, overlapping, and master. Each is color coded to indicate the type of cartridge (Table 2). In addition, the N.O. or N.C. contact symbol appearing through the green or yellow background will be the same color as the contact cartridge.

TABLE 2 — CONTACT CARTRIDGES

Description	Class 8501 Type	Cartridge Color
Standard	XC-1	Black
Overlapping	XC-2	Red
Master*	XC-4	Blue

• INSTALLATION AND WIRING OF RELAY

Type X relays are designed for two-point mounting on a vertical panel with coil terminals upward. However, the relay can be mounted with the coil terminals down if required.

Mounting track, which simplifies installation, is available as an accessory kit (Table 1). These tracks are designed to accommodate 4, 8, 12, 16 or 32 relays. They can easily be cut to any length. Mount each track horizontally using #8 screws with 2 screws at each end position and with screws at spacings of 4½" in alternate upper and lower horizontal slots. Torque relay mounting screws to 18-21 in-lbs.

Wiring on the Type X relay is straight through. The terminals are self-lifting pressure wire connectors.

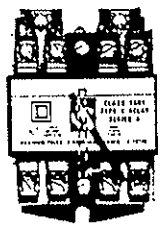
A minimum of 7 in-lbs tightening torque should be used on all control circuit terminals.

MANUAL OPERATION

WARNING: Manual operation should be performed only by *QUALIFIED* personnel. Manual operation with the power turned on is dangerous because of possible electric arcing, burn or shock — REMAIN ALERT!

Type X relays can be manually operated by depressing the red T-bar actuator visible in the center of the nameplate with an insulated tool. This red T-bar actuator also gives a visual indication of relay operation. It is flush with the nameplate when the relay is de-energized and recessed when the relay is energized. A manual test tool is available (Table 1) that simplifies the checking of control circuits without power on the coil. To use manual test tool, insert end marked "RELAY" diagonally on the red T-bar actuator, push down and rotate 1/8 turn (Figure 1).

Manual test tool must be removed before normal operation of the relay.



• Figure 1

APPLICATION DATA
MAXIMUM ELECTRICAL CONTACT RATINGS

Type of Cartridge	AC Ratings								DC Ratings			
		Inductive 35% Power Factor						Resistive 75% Power Factor		Inductive		
	Volts	NEMA Rating	Make		Break		Continuous Amperes	Make, Break and Continuous Amperes	Volts	NEMA Rating	Make and Break Amperes 138VA Max.	Continuous Amperes
			Amps.	VA	Amps.	VA						
Standard	120	A600	60	7200	6	720	10	10	125	P300	1.1	5
	240		30	7200	3	720	10	10	250		0.55	5
Overlapping	480		15	7200	1.5	720	10	10	125	P150	1.1	5
	600		12	7200	1.2	720	10	10				
Master*	—	A600	Same as standard cartridge above except substitute 20 ampere for the continuous ampere rating						125	P300	1.1	5
									250		0.55	5
Logic Reed**	—	—	150 VAC, 150 MA, 8 VA Maximum Resistive Only						—	—	30 VDC, 60 MA Resistive Only	

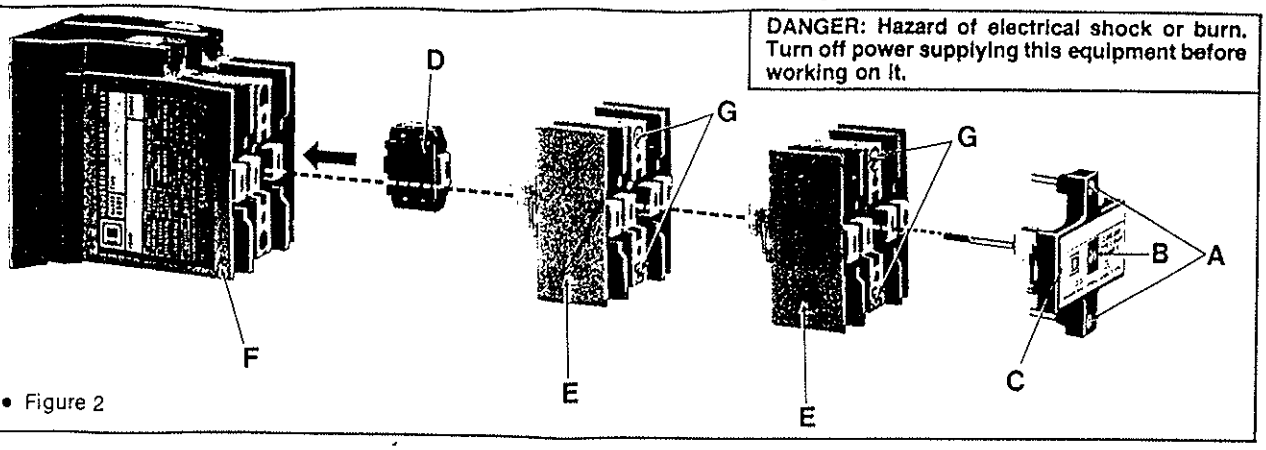
* Maximum of 6 Class 8501 Type XC-4 Master Contact Cartridges may be used on any 7 or 8 pole ac-operated devices. Do not use any master cartridges on 9-12 pole ac or any dc-operated relays.

** The operation of the reed switch may be affected by the presence of magnetic fields. Provide series resistance to protect the contacts against inrush currents exceeding 350 MA, such as those caused by the distributed capacitance of long wire runs and by incandescent lamp continuity checkers.

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SERVICE BULLETIN

Class 8501 Type X — AC Control Relay — Series A
Class 8501 Type XM — AC Master Relay — Series A

DANGER: Hazard of electrical shock or burn. Turn off power supplying this equipment before working on it.



• Figure 2

ADDER DECK INSTALLATION

The standard Type X 4 pole relay can be easily converted to an 8 pole or 12 pole standard relay (Figure 2) by installing one or two standard adder decks (Table 1). Logic reed adder decks (Table 1) can also be installed to standard 0-8 pole relays. The same Type XB standard adder deck and Type XBR logic reed adder deck is used for both the middle and upper decks. See Table 3 for factory recommended tightening torques.

Adding A Deck To A Basic 4 Pole Relay

To convert a 4 pole relay into a 6-8 pole relay:

1. Loosen and remove T-bar actuator screw (B) from cover assembly (C) and discard.
2. Loosen 2 captive cover screws (A) and remove cover assembly (C).
3. Place the adder deck (E) on the basic 4 pole relay (F). The adder deck is keyed for proper orientation. Tighten 2 deck mounting screws (G).
4. Place the cover assembly on the adder deck. Tighten 2 cover screws (A).
5. Thread shorter screw (2.50 inches) from adder deck kit through the red T-bar actuator in the cover assembly and tighten. Longer screw (3.75 inches) is not used.

Adding A Deck To An 8 Pole Relay

To convert an 8 pole relay into a 10-12 pole relay:

1. Loosen and remove T-bar actuator screw (B) from cover assembly (C) and discard.
2. Loosen 2 captive cover screws (A) and remove cover assembly (C).
3. Place the adder deck (E) on the 8 pole relay. The adder deck is keyed for proper orientation. Tighten 2 deck mounting screws (G).
4. Place the cover assembly on the adder deck. Tighten 2 cover screws (A).
5. Thread longer screw (3.75 inches) from adder deck kit through the red T-bar actuator in the cover assembly and tighten. Shorter screw (2.50 inches) is not used.

Adding Two Decks to Basic 4 Pole Relay

To convert a 4 pole relay into a 10-12 pole relay:

1. Loosen and remove T-bar actuator screw (B) from cover assembly (C) and discard.
2. Loosen 2 captive cover screws (A) and remove cover assembly (C).
3. Place the first adder deck (E) on the 4 pole relay. The adder deck is keyed for proper orientation. Tighten 2 deck mounting screws (G).
4. Place the second adder deck (E) on the first adder deck. The adder deck is keyed for proper orientation. Tighten 2 deck mounting screws (G).
5. Place the cover assembly on the upper deck. Tighten 2 cover screws (A).
6. Thread longer screw (3.75 inches) from either adder deck kit through the red T-bar actuator in the cover assembly and tighten. Shorter screw (2.50 inches) is not used.

CONTACT CONVERSION/REPLACEMENT

Contact conversion from N.O. to N.C. or vice versa, can be done without removing any wires or terminal screws (Figure 2). **A maximum of 8 N.C. contacts are allowed on 9-12 pole relays. Gray logic reed cartridges are non-convertible.** See Table 3 for factory recommended tightening torques.

Basic 4 Pole Relay Or Upper Deck Of An 8 Or 12 Pole Relay

1. Loosen 2 captive cover screws (A) and captive T-bar actuator screw (B), and remove cover assembly (C).
2. Remove cartridge (D), invert to opposite color and re-insert.
3. Replace cover assembly (C) and tighten 2 cover screws (A) and T-bar actuator screw (B).

Lower Deck Of An 8 Pole Relay Or Middle Deck Of A 12 Pole Relay

1. Loosen 2 captive cover screws (A) and captive T-bar actuator screw (B), and remove cover assembly (C).
2. Loosen 2 captive deck mounting screws (G) and lift off upper deck (E).
3. Remove cartridge (D), invert to opposite color and re-insert.
4. Replace upper deck (E) and tighten 2 deck mounting screws (G).
5. Replace cover assembly (C) and tighten 2 cover screws (A) and T-bar actuator screw (B).

Lower Deck of a 12 Pole Relay

1. Loosen 2 captive cover screws (A) and captive T-bar actuator screw (B), and remove cover assembly (C).
2. Loosen 2 deck captive mounting screws (G) and lift off upper deck (E). Remove middle deck (E) in similar manner.
3. Remove cartridge (D), invert to opposite color and re-insert.
4. Replace middle deck (E) and tighten 2 deck mounting screws (G). Replace upper deck (E) in similar manner.
5. Replace cover assembly (C) and tighten 2 cover screws (A) and T-bar actuator screw (B).

To replace a contact, follow the procedure for conversion except remove the cartridge and insert replacement. **Gray logic reed cartridges are non-replaceable. The logic reed adder deck (Table 1) must be replaced. Note: Maximum of 6 master contact cartridges may be used on 7 or 8 pole relays. Do not use any master cartridges on 9-12 pole relays.**

• TABLE 3 —
FACTORY RECOMMENDED TIGHTENING TORQUES

Item	Description	Driving Torque (in-lb)
A	Cover screw	9-12
B	T-bar actuator screw	6-10
G	Deck mounting screws	9-12
H	Baseplate screws	12-15
—	Relay mounting screws	18-21

531 AS
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Class 8501 Type X — AC Control Relay — Series A
Class 8501 Type XM — AC Master Relay — Series A

COIL REPLACEMENT

DANGER: Hazard of electrical shock or burn. Turn off power supplying this equipment before working on it.

The coil on the Type X relay is easy to replace from the back of the device without having to remove the contact block assembly from the basic relay (Figure 3). To replace the coil:

1. Loosen 4 captive baseplate screws (H).
2. Lift off baseplate (J) and lower housing assembly (K).
3. Lift out coil (L) and slide out magnet (M). Re-install magnet (M) (note orientation in Figure 3) in new coil and replace coil in relay.
4. When replacing baseplate and lower housing assembly, make sure the coil terminals (N) slide into the lower housing slots before the assembly is re-installed on the relay (Figure 3).
5. Tighten the 4 baseplate screws (H). See Table 3 for factory recommended tightening torques.

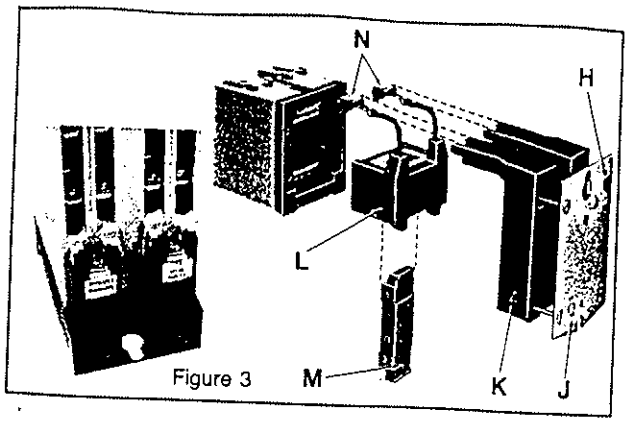


Figure 3

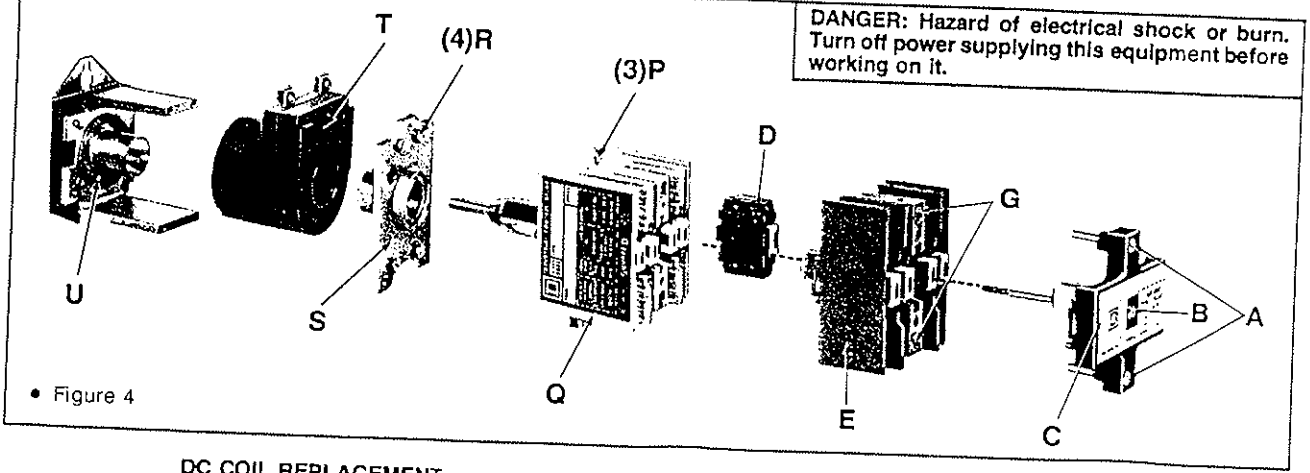
TABLE 4 — AC MAGNET COILS

Heavy-duty, molded coils are used. These coils are designed to operate on line-voltage fluctuations as much as 15% below and 10% above nominal voltage.

Coil Prefix	Hertz	SUFFIX NUMBERS (Coil part numbers consist of coil prefix followed by suffix number)												Coil Volt-Amperes	
		12 Volts	24 Volts	48 Volts	110 Volts	120 Volts	208 Volts	220 Volts	240 Volts	277 Volts	440 Volts	480 Volts	550 Volts	600 Volts	Inrush	Sealed
Class 9998 Type X	60	14	23	32	...	44	51	...	53	55	...	62	...	65	148	30
	50	15	24	33	44	...	...	53	...	...	62	...	65	...	143	32

Class 8501 Type XD — DC Control Relay — Series A
Class 8501 Type XUD — Utility Auxiliary Relay — Series A

DANGER: Hazard of electrical shock or burn. Turn off power supplying this equipment before working on it.



• Figure 4

DC COIL REPLACEMENT

The coil on a dc-operated Type XD or XUD relay is easy to replace from the front of the device (Figure 4). See Table 6 for factory recommended tightening torques. To replace the dc coil:

1. Loosen three captive housing screws (P). Lift off housing assembly (Q).
2. Remove four magnet plate screws (R) and lift off magnet plate (S).
3. Lift out coil (T) and replace with new coil. See Figure 4 for proper orientation. Be sure not to remove spring washer (U).
4. Replace magnet plate (S) and tighten four screws (R).
5. Replace housing assembly (Q) and tighten three housing screws (P).

NOTE: Do not use Class 9998 Type XD coils (Table 5) on Class 8501 Type XUD Utility Auxiliary Relays. Class 9998 Type XUD coils (Table 5) are designed specifically for the Utility Auxiliary Relay and must be used to assure proper operation.

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Class 8501 Type XD — DC Control Relay — Series A
Class 8501 Type XUD — Utility Auxiliary Relay — Series A

TABLE 5 — DC Control Relay and Utility Auxiliary Relay Coils

Heavy-duty, molded coils are used. When ordering replacement magnet coil give Class and Type Number and voltage of coil being replaced.

Coil Prefix	SUFFIX NUMBERS (Coil part numbers consist of coil prefix followed by suffix number)											• Coil Watts
	6 Volts	12 Volts	18 Volts	24 Volts	32 Volts	48 Volts	64 Volts	72 Volts	90 Volts	115/125 Volts	230/250 Volts	
Class 9998 Type XD	19	28	34	37	40	46	49	52	55	58	67	11
Class 9998 Type XUD	19	28	—	37	—	46	—	—	—	58	67	11

CONTACT CONVERSION/REPLACEMENT

Contact conversion from N.O. to N.C., or vice versa, can be done without removing any wires or terminal screws (Figure 4). **Gray logic reed cartridges are non-convertible.** See Table 6 for factory recommended tightening torques.

4 Pole Relay or Upper Deck of an 8 Pole Relay

1. Loosen 2 captive cover screws (A) and captive T-bar actuator screw (B), and remove cover assembly (C).
2. Remove cartridge (D), invert to opposite color and re-insert.
3. Replace cover assembly (C) and tighten two cover screws (A) and T-bar actuator screw (B).

Lower Deck Of An 8 Pole Relay or Middle Deck Of A 12 Pole Type XUD Relay

1. Loosen 2 captive cover screws (A) and captive T-bar actuator screw (B), and remove cover assembly (C).
2. Loosen 2 captive deck mounting screws (G) and lift off upper deck (E).
3. Remove cartridge (D), invert to opposite color and re-insert.
4. Replace upper deck (E) and tighten two deck mounting screws (G).
5. Replace cover assembly (C) and tighten two cover screws (A) and T-bar actuator screw (B).

Lower Deck of A 12 Pole Type XUD Relay

1. Loosen 2 captive cover screws (A) and captive T-bar actuator screw (B), and remove cover assembly (C).
2. Loosen 2 captive deck mounting screws (G) and life off upper deck (E). Remove middle deck (E) in similar manner.
3. Remove cartridge (D), invert to opposite color and re-insert.
4. Replace middle deck (E) and tighten 2 deck-mounting screws (G). Replace upper deck (E) in similar manner.
5. Replace cover assembly (C) and tighten 2 cover screws (A) and T-bar actuator screw (B).

To replace a contact, follow the procedure for conversion except remove the cartridge and insert replacement. **Gray logic reed cartridges are non-replaceable. The logic reed adder deck (Table 1) must be replaced. Note: Do not use any master contact cartridges on dc-operated relays.**

• TABLE 6 — FACTORY-RECOMMENDED TIGHTENING TORQUES

Item	Description	Driving Torque (in-lb)
A	Cover screw	9-12
B	T-bar actuator screw	6-10
G	Deck mounting screws	9-12
P	Housing screws	9-12
R	Magnet plate screws	9-12

ADDER DECK INSTALLATION — Figure 4

The basic dc-operated Type XD 4-pole relay can be easily converted to a 6 or 8 pole relay by installing one adder deck kit (Table 1). **Do not add a second deck — dc-operated Type XD relay restricted to 8 poles.** Type XUD 4-pole relays can be easily converted to an 8 pole or 12 pole relay by installing one or two adder deck kits (Table 1). Logic reed adder decks (Table 1) can also be installed on standard 0-4 pole dc-operated Type XD relays and 4-8 pole dc-operated Type XUD relays. See Table 6 for factory recommended tightening torques.

Adding A Deck To A Basic 4 Pole Relay

To convert a 4 pole relay into a 6-8 pole relay:

1. Loosen and remove T-bar actuator screw (B) from cover assembly (C) and discard.
2. Loosen 2 captive cover screws (A) and remove cover assembly (C).
3. Place the adder deck (E) on the basic 4 pole relay (F). The adder deck is keyed for proper orientation. Tighten 2 deck mounting screws (G).
4. Place the cover assembly on the adder deck. Tighten 2 cover screws (A).
5. Thread shorter screw (2.50 inches) from adder deck kit through the red T-bar actuator in the cover assembly and tighten. Longer screw (3.75 inches) is not used.

Adding A Deck To An 8 Pole Type XUD Relay

To convert an 8 pole Type XUD relay into a 10-12 pole relay:

1. Loosen and remove T-bar actuator screw (B) from cover assembly (C) and discard.
2. Loosen 2 captive cover screws (A) and remove cover assembly (C).
3. Place the adder deck (E) on the 8 pole relay. The adder deck is keyed for proper orientation. Tighten 2 deck mounting screws (G).
4. Place the cover assembly on the adder deck. Tighten 2 cover screws (A).
5. Thread longer screw (3.75 inches) from adder deck kit through the red T-bar actuator in the cover assembly and tighten. Shorter screw (2.50 inches) is not used.

Adding Two Decks To Basic 4 Pole Type XUD Relay

To convert a 4 pole Type XUD relay into a 10-12 pole relay:

1. Loosen and remove T-bar actuator screw (B) from cover assembly (C) and discard.
2. Loosen 2 captive cover screws (A) and remove cover assembly (C).
3. Place the first adder deck (E) on the 4 pole relay. The adder deck is keyed for proper orientation. Tighten 2 deck mounting screws (G).
4. Place the second adder deck (E) on the first adder deck. The adder deck is keyed for proper orientation. Tighten 2 deck mounting screws (G).
5. Place the cover assembly on the upper deck. Tighten 2 cover screws (A).
6. Thread longer screw (3.75 inches) from either adder deck kit through the red T-bar actuator in the cover assembly and tighten. Shorter screw (2.50 inches) is not used.

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Class 8501 Types XTE and XTD — Pneumatic Timer Attachments — Series A

DANGER: Hazard of electrical shock or burn. Turn off power supplying this equipment before working on it.

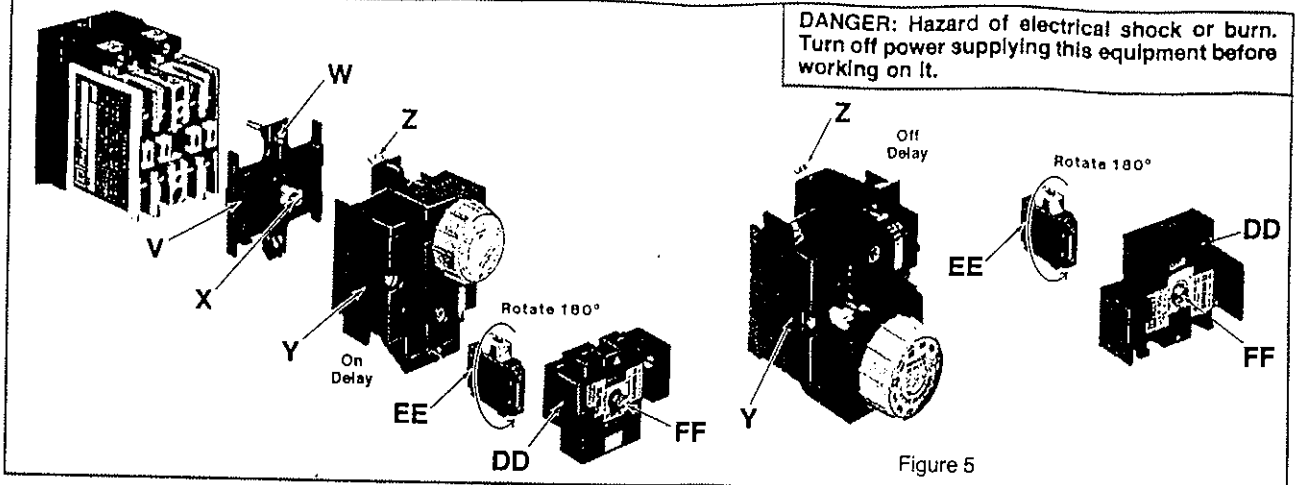


Figure 5

INSTALLATION

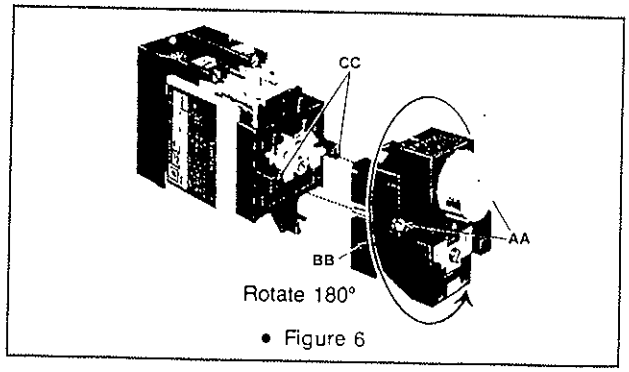
To add a timer attachment to a 0-4 pole relay:

1. Loosen 2 captive cover screws (A) and captive T-bar actuator screw (B) (Figure 2). Remove cover assembly (C) and discard.
2. Install adapter assembly (V) on relay (Figure 5). Adapter assembly is keyed for proper orientation. Tighten 2 captive screws (W) and T-bar actuator screw (X). Refer to Table 7 for factory-recommended tightening torques.
3. Orient timer attachment (Y) with "LIFT" tab (Z) on top as shown in Figure 5. Place timer attachment on relay and slide down. Timer attachment will lock in place.

To remove timer attachment, lift up on "LIFT" tab (Z), slide attachment up and lift off.

TIMING-MODE CONVERSION (Figure 6)

1. Loosen 2 captive screws (AA).
2. Remove timing head (BB) and rotate 180°.
3. Carefully replace timing head (BB). Make sure that the 2 screws (AA) are lined up with D-shaped posts (CC). Tighten 2 screws (AA).
4. Check timing-mode (On Delay or Off Delay) visible through a window in the cover (DD Figure 5) to insure that the desired timing-mode is indicated.
5. With timer attachment installed on relay, check contact symbols which are visible through windows in the cover (DD Figure 5) to insure that the desired function is indicated.



• Figure 6

• TABLE 7 — FACTORY RECOMMENDED TIGHTENING TORQUES

Item	Description	Driving Torque (in-lb)
W	Adapter assembly screw	9-12
X	T-bar actuator screw	6-10
AA	Timing head screw	6-9
FF	Contact cover screw	9-12

TIMED-CONTACT CONVERSION (Figure 5)

1. Loosen captive cover screw (FF) and remove cover (DD).
2. Remove cartridge (EE), rotate so that the contact symbols and colors are reversed from their original positions, and reinsert.
3. Replace cover (DD) and tighten cover screw (FF). Refer to Table 7 for factory-recommended tightening torques.
4. With the timer attachment installed on relay, check contact symbols which are visible through windows in the cover (DD) to insure that the desired function is indicated.
5. Must have 2 cartridges in any combination of N.O. or N.C. installed in timer attachment for proper operation.

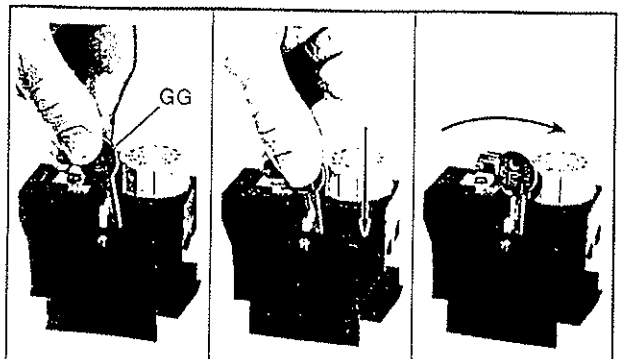
MANUAL OPERATION (Figure 7)

WARNING: Manual operation should be performed only by *QUALIFIED* personnel. Manual operation with the power turned on is dangerous because of possible electric arcing, burn or shock — REMAIN ALERT!

Type XT timing relays can be manually operated by depressing the red manual operator (GG) with an insulated tool. A manual test tool is available (Table 1) that simplifies the checking of control circuits without power on the coil. To use, follow steps shown in Figure 7.

Note — when used with the Type XT timing relay, the manual test tool is **not** twisted like a key.

Manual test tool must be removed before normal operation of the timing relay.



Engage test tool on manual operator (GG). Figure 7a

Push down on manual operator. Figure 7b

Rotate test tool to hook in place. Figure 7c

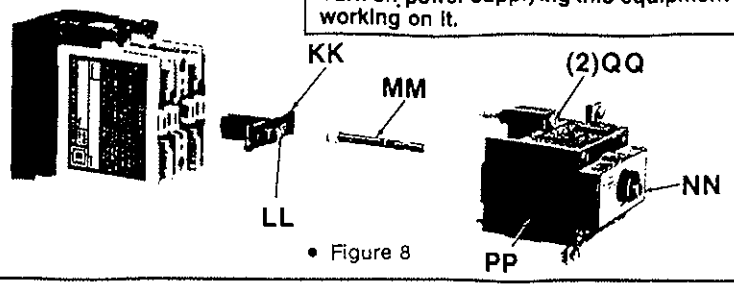
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531 AS
SERVICE BULLETIN

• Class 8501 Type XL — AC Latch Attachment — Series B
• Class 8501 Type XDL — DC Latch Attachment — Series B

DANGER: Hazard of electrical shock or burn. Turn off power supplying this equipment before working on it.



• Figure 8

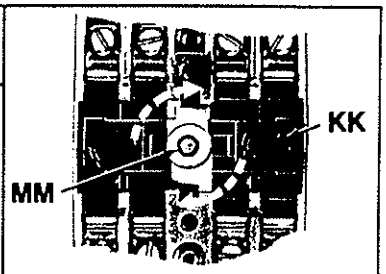


Figure 9

INSTALLATION

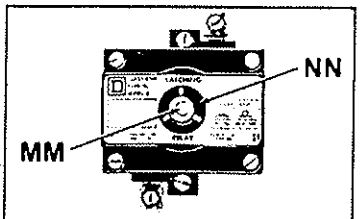
To add a latch attachment to any 2-8 pole Type X or XD relay:

1. See Figure 2. Loosen 2 captive cover screws (A) and captive T-bar actuator screw (B). Remove cover assembly (C) and discard.
2. **If adding latch attachment to 2-4 pole relay, proceed to Step 3. If adding latch attachment to a 6-8 pole relay,** remove short screw (1.25 inches) from black T-bar actuator (KK Figure 8), discard and replace with longer screw (2.50 inches) supplied separately with latch attachment.
3. Install black T-bar actuator (KK) from latch attachment on relay (Figure 8). T-bar actuator is keyed for proper orientation. Tighten T-bar actuator screw (LL). Refer to Table 8 for factory recommended tightening torques.
4. Place latch rod assembly (MM) on T-bar actuator (Figure 9) and rotate 90° clockwise to lock under mounting feet on T-bar actuator.
5. Push down on latch armature ring (NN) and hold (Figure 8). Slide latch attachment (PP) on to latch rod assembly (MM) and relay. Latch attachment is keyed for proper orientation. Release latch armature ring (NN).
6. Tighten 2 mounting screws (QQ).
7. Manually operate (see below) to check operation.

WARNING: Manual operation should be performed only by *QUALIFIED* personnel. Manual operation with the power turned on is dangerous because of possible electric arcing, burn or shock — REMAIN ALERT!

MANUAL OPERATION OF LATCHING RELAY (FIGURE 10)

1. To manually latch relay, depress latch rod (MM) with small insulated tool.
2. To manually unlatch relay, depress latch armature ring (NN) with small insulated tool.

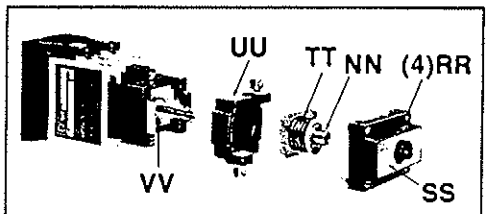


• Figure 10

NOTE: Do not use ac unlatch coils on dc latch attachments or dc unlatch coils on ac latch attachments. Class 8501 Type XL and XDL latch attachments cannot be converted from ac to dc operation or vice versa.

UNLATCH COIL REPLACEMENT

1. Remove latch attachment by loosening 2 mounting screws (QQ, Figure 8), and lifting off attachment.
2. Loosen 4 captive screws (RR) and remove cover (SS) (Figure 11).
3. Remove latch mechanism (TT).
4. Lift out unlatch coil (UU) and replace. **Do not** remove magnet frame (VV).
5. Push down and hold latch armature ring (NN) and replace latch mechanism (TT). Release latch armature ring.
6. Replace cover and tighten 4 screws (RR).
7. Manually operate (see left) to check operation.
8. Replace latch attachment (see steps 5-7 "Installation" at left).



• Figure 11

TABLE 8 — FACTORY-RECOMMENDED TIGHTENING TORQUES

Item	Description	Driving Torque (in-lb)
LL	T-bar Actuator Screw	6-9
• QQ	Latch Attachment Mounting Screws	9-12
RR	Cover Screws	6-9

• TABLE 9 — AC UNLATCH COILS — SERIES B*

Coil Prefix	Hertz	SUFFIX NUMBERS (Coil part numbers consist of coil prefix followed by suffix number)												Coil Volt-Amperes	
		12 Volts	24 Volts	48 Volts	110 Volts	120 Volts	208 Volts	220 Volts	240 Volts	277 Volts	440 Volts	480 Volts	550 Volts	600 Volts	Inrush	Sealed
Class 9998 Type XL	60	14B	23B	32B	...	44B	51B	...	53B	55B	...	62B	...	65B	25	12
	50	15B	24B	33B	44B	...	...	53B	...	...	62B	...	65B	...	24	11

• TABLE 10 — DC UNLATCH COILS — SERIES B*

Coil Prefix	SUFFIX NUMBERS (Coil part numbers consist of coil prefix followed by suffix number)											Coil Watts
	6 Volts	12 Volts	18 Volts	24 Volts	32 Volts	48 Volts	64 Volts	72 Volts	90 Volts	115/125 Volts	230/250 Volts	
Class 9998 Type XDL	19B	28B	34B	37B	40B	46B	49B	52B	55B	58B	67B	36

Heavy-duty, molded coils are used. These coils are designed to operate on line voltage fluctuations as much as 15% (20% for dc) below and 10% above nominal voltage.

When ordering replacement magnet coil give Class and Type Number, voltage and frequency of coil being replaced.

Series B unlatch coils are not interchangeable with Series A unlatch coils which are no longer available. If a Series A unlatch coil is desired, it will be necessary to replace the entire Series A latch with a Series B latch.

• REVISED

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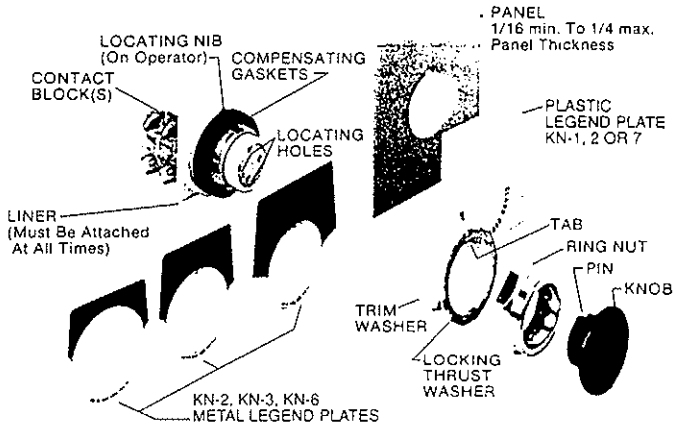
PUSHBUTTON OPERATORS

INSTRUCTION SHEET

JUNE, 1995

CLASS 9001
TYPE KR MOMENTARY NON-ILLUMINATED PUSH BUTTON OPERATORS**
TYPES KR4* AND KR5* MOMENTARY NON-ILLUMINATED PUSH BUTTON OPERATORS WITH MUSHROOM BUTTONS
UNDERWRITERS LABORATORIES LISTED FOR USE ON A FLAT SURFACE OF TYPES 1, 2, 3, 3R, 4, 6, 12 AND 13 ENCLOSURES

TYPES SKR MOMENTARY NON-ILLUMINATED PUSH BUTTON OPERATORS**
TYPE SKR4* AND SKR5* MOMENTARY NON-ILLUMINATED PUSH BUTTON OPERATORS WITH MUSHROOM BUTTONS
UNDERWRITERS LABORATORIES LISTED FOR USE ON A FLAT SURFACE OF TYPES 1; 2, 3, 3R, 4, 4X, 6, 12 AND 13 ENCLOSURES



A. Installation of Operator to Panel Using Class 9001 Type KN-2, KN-3 or KN-6 Legend Plates.
   1. Mount only Class 9001 Type KA Contact Block (maximum of 3 Contact Blocks mounted in tandem, total of 6) to the operator. Tighten Mounting Screws to 5-8 lb.-in.
   2. Remove the ring nut, locking thrust washer and trim washer from the operator.
   3. Discard the locking thrust washer and trim washer.
   4. Retain the required number of compensating gaskets (determined from Figure 2) on the operator.
   5. Insert the operator into the panel from the rear with the locating nib at the top.
   6. Install the required Legend Plate on the operator by aligning the tab with the slots in the operator and panel.
   7. Install the ring nut on the operator and tighten with a Class 9001 Type K-95 ring nut wrench. Recommended tightening torque: 6-8 lb.-ft.

   FOR KR4, KR5, SKR4 AND SKR5:
   8. Install the mushroom button on the operator by aligning the pin on the mushroom button with the locating hole provided in the operator stem.
   9. Snap the button into the stem using palm of your hand.

   NOTE: Do not attempt to install the mushroom button with a sharp blow. To do so may cause serious damage to the operator and mushroom button.

B. Installation of Operator to Panel Using Class 9001 Type KN-1, KN-2 and KN-7 Legend Plates. Follow steps A1, A2, A4 and A5 above.
   6. Install the Legend Plate on the operator.

30072-100-06K

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30072-100-06K

7. Install the locking thrust washer on the operator by aligning the tab with the slots in the operator, Legend Plate and panel.
8. Install the ring nut on the operator and tighten with a Class 9001 Type K-95 ring nut wrench. Recommended tightening torque: 6-8 lb.-ft.
9. Then follow steps A8 and A9 above.

C. Installation of Operator to Panel Without Legend Plate.
Follow steps A1, A2, A4 and A5 above.
6. Install the trim washer on the operator.
7. Install the locking thrust washer on the operator by aligning the tab with the slots in the operator, trim washer and panel, then follow step A7.
8. Follow steps A8 and A9..

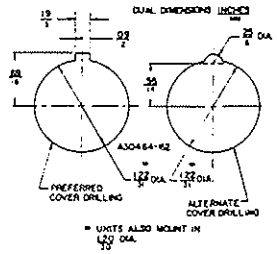
D. Installation of Class 9001 Type K16— and K17— Mushroom Button Kits.
1. Remove the color insert from the operator stem with a knife blade or other sharp instrument.
2. Remove the ring nut supplied with the operator.
3. Install the operator in the panel following the instructions listed above.
4. Install the ring nut supplied with the mushroom button kit on the operator and tighten using a Class 9001 Type K-95 ring nut wrench.
Recommended tightening torque: 6-8 lb.-ft.
5. Then follow steps A8 and A9 above.

E. Installation of the Color Insert to the Operator.
1. Select the required color insert and place in the insert recess provided in the operator stem.
2. Push the insert until the insert lip is securely held under the insert recess.

If it becomes necessary to replace an existing color insert, use a knife or thin blade screwdriver to pry out the existing insert from the insert recess.

Replace the new insert following steps C1 and C2 above.

Mounting Hole for All Type SK Control Units



HOLE PUNCH

The 1.22" diameter hole required to mount Type SK operators may be cut with Greenlee knockout punch No. 730-S. The notch may be cut with Greenlee punch No. 730-K. Both punches are available through electrical wholesalers.

Figure 1

GASKET SELECTION CHART	
Panel Thk.	No. of Gaskets
1/16	4
1/8	3
3/16	2
1/4	1

Figure 2



CLASS 9001 TYPE K-95 RING NUT WRENCH

Figure 3

MINIMUM CENTERLINE SPACINGS

	Vertical	Horizontal
Without Legend Plate	1.56	2.25
With Type SKN-700 Legend Plate	2.25	2.25

30072-100-06K

PILOT LIGHT OPERATORS

Instruction Bulletin | Boletín de instrucciones | Directives d'utilisation

65013-002-51L
12/97
Raleigh, NC, USA

Replaces / Reemplaza / Remplace 65013-002-51K (2/97)

Pilot Light Operators

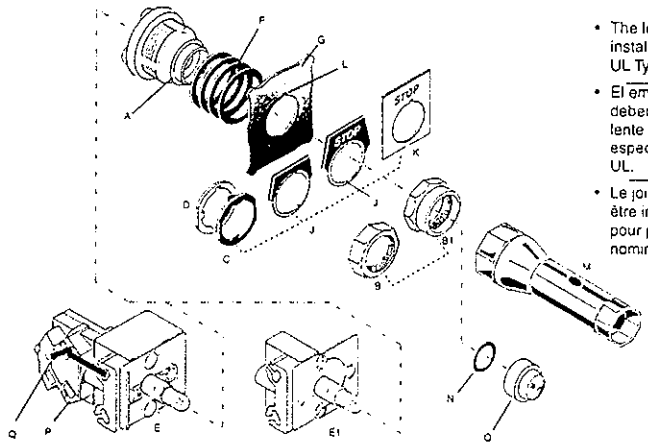
Operadores con lámpara piloto

Opérateurs à lampe témoin

Applications / Aplicaciones / Applications

9001 Class/Type Clase/Tipo/ Classe/Type	Application Aplicación Application	Operators / Operadores / Opérateurs: Standard pilot light Lámpara piloto estándar Lampe témoin standard	Push to test pilot light Lámpara piloto de prueba Lampe témoin d'essai	Remote test Prueba a distancia Essai à distance	UL listed for use on a flat surface of enclosure types: Registrado por UL para utilizar sobre una superficie plana de gabinetes tipo: Homologué par UL pour utilisation sur une surface plate d'une armoire de type :
KP	Heavy Duty Uso pesado Fort calibre	X			1, 2, 3, 3R, 4, 6, 12 & 13
KT			X		
KTR				X	
SKP	Corrosion Resistant Resistente a la corrosión Résistant à la corrosion	X			1, 2, 3, 3R, 4, 4X, 6, 12 & 13
SKT			X		
SKTR				X	

Full View / Vista completa / Vue complète



- The lens gasket (N) must be installed in the lens to retain UL Type 4 & 6 ratings.
- El empaque del lente (N) deberá ser instalado en el lente para conservar las especificaciones tipo 4 y 6 de UL.
- Le joint de la lentille (N) doit être installé dans la lentille pour préserver les valeurs nominales UL de type 4 et 6.

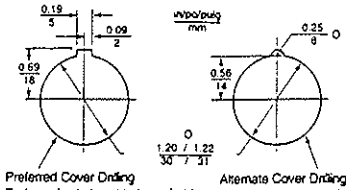
Legend	Leyenda	Légende
A. - operator	A. - operador	A. - operateur
B. - ring nut (KP, SKP, KTR, SKTR)	B. - tuerca arillo (KP, SKP, KTR, SKTR)	B. - ecrou de blocage (KP, SKP, KTR, SKTR)
B1. - ring nut (KT, SKT)	B1. - tuerca arillo (KT, SKT)	B1. - ecrou de blocage (KT, SKT)
C. - locking thrust washer	C. - roldana de seguridad de bloqueo	C. - rondelle de butée de verouillage
D. - trim washer	D. - roldana collarin	D. - rondelle de garniture
E. - standard light module	E. - módulo de luz estándar	E. - module lumineux standard
E1. - shallow depth light module (KP, SKP)	E1. - módulo de luz de poca profundidad (KP, SKP)	E1. - module lumineux de faible profondeur (KP, SKP)
F. - compensating gaskets	F. - empaques de compensación	F. - joints de compensation
G. - panel	G. - panel	G. - panneau
J. - metal legend plate	J. - placa leyenda metálica	J. - plaque de légende en metal
K. - plastic legend plate	K. - placa leyenda de plástico	K. - plaque de légende en plastique
L. - alignment tab	L. - lengüeta de alineamiento	L. - languette d'alignement
M. - ring nut wrench (K-95)	M. - llave para tuercas (K-95)	M. - clé pour ecrou de blocage (K-95)
N. - lens gasket	N. - empaque del lente	N. - joint de la lentille
O. - lens	O. - lente	O. - lentille
P. - contact block (KT, SKT, KTR,SKTR)	P. - bloque de contactos (KT, SKT, KTR, SKTR)	P. - bloc de contacts (KT, SKT, KTR,SKTR)
Q. - jumpers (KT, SKT, KTR,SKTR)	Q. - puentes (KT, SKT, KTR,SKTR)	Q. - cavaliers (KT, SKT, KTR,SKTR)

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SQUARE D

Mounting / Montaje / Montage



Preferred Cover Drilling
Perforación de la cubierta preferida
Perçage du couvercle préféré

Alternate Cover Drilling
Perforación de la cubierta alterna
Perçage du couvercle alternatif

(Dim.: in/pulg/po (mm))

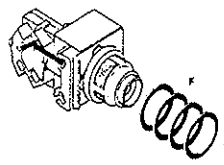
Hole Punch	Punzonado	Poinçon
Ø 31mm: Greenlee knockout punch 730-S	Ø 31mm: Punzonado de discos removibles Greenlee 730-S	Ø 31 mm : Emporte-pièce Greenlee 730-S
Notch: Greenlee punch 730-K	Muesca: Punzonado Greenlee 730-K	Encoche : poinçon Greenlee 730-K
Push buttons also mount in 1.20 (30.5) hole	Estos operadores también se pueden montar en un agujero de 1,20 (30,5)	Ces opérateurs se montent aussi dans un trou.

Min. Centerline Spacing / Espacio mín. al eje / Espacement mín. à l'axe

	Vertical	Horizontal
Without legend plate	1.56 (40)	2.25 (57)
Sin placa	1,56 (40)	2,25 (57)
Sans plaque de légende	1,56 (40)	2,25 (57)
With legend plate	*Consult Square D Digest*	
Con placa	*Consultar el Compendiado Square D*	
Avec plaque de légende	*Consulter le Digest Square D*	

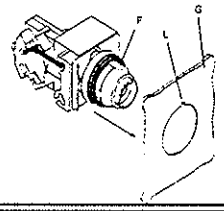
Installation / Instalación / Installation

① - Select number of gaskets (F) per table
- Seleccionar el número de empaques (F) según la tabla
- Choisir le nombre de joints (F) suivant le tableau

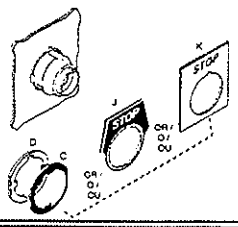


Panel thickness in. (mm) Espesor del panel pulg (mm) Épaisseur du panneau po (mm)	No. of gaskets No. de empaques N° de joints
1/16 (1.6)	4
1/8 (3,2)	3
3/16 (4.8)	2
1/4 (6,4)	1

② - Mount onto panel (G)
- Montar sobre el panel (G)
- Monter sur le panneau (G)

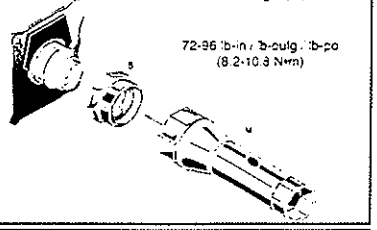


③ - Install legend plate (J or K) and/or washer (C,D)
- Instalar la placa (J o K) y/o roldana (C,D)
- Installer la plaque de légende (J ou K) et/ou rondelle (C,D)

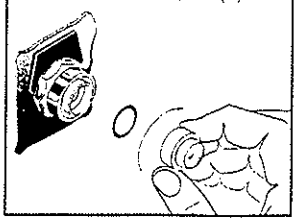


Legend Plate	Washer
Metal (J) Plastic (K) None	no D or C C only D and C
Placa	Roldana
De metal (J) De plástico (K) Ninguna	ni D ni C C solamente D y C
Plaque de légende	Rondelle
En metal (J) En plastique (K) Aucune	ni D ni C C seulement D et C

④ - Install ring nut (B)
- Instalar la tuerca arillo (B)
- Installer l'écrou de blocage (B)



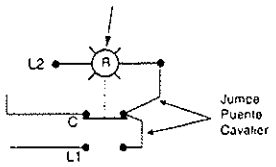
⑤ - Install lens (O)
- Instalar el lente (O)
- Installer la lentille (O)



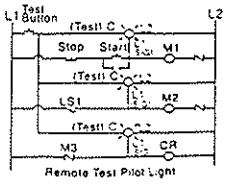
- Pressing lens moves contact from C to L1 to test bulb. (KT, SKT)
- Al oprimir el lente, el contacto móvil cambia de C a L1 para probar el bulbo (KT, SKT)
- Si on pousse sur la lentille, le contact mobile passe de C à L1 pour vérifier l'ampoule. (KT, SKT)

Typical Wiring Diagrams

Type KT, SKT / tipo KT, SKT



Type/Tipo KTR, SKTR



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&
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APPENDIX H

SITE SPECIFIC HEALTH & SAFETY/ CONTINGENCY PLAN

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APPENDICES

Appendix A Material Safety Data Sheets

Appendix B Health & Safety Field Forms

To Include:
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- Site Safety Meeting Form (or Document in Field Log Book)
- Instruction Calibration Form (or Document in Field Log Book)
- Atmospheric Monitoring Form (or Document in Field Log Book)

Appendix C Public Employee Safety and Health Act

1.0 INTRODUCTION

This site-specific Health and Safety Plan (HASP) has been prepared by the New York State DEPARTMENT OF ENVIRONMENTAL CONSERVATION (DEC). The purpose of this HASP is to summarize the project organization and responsibilities; establish Standard Operating Procedures (SOPs) for preventing accidents, injuries, and illnesses; identify hazards, discuss the personal protective equipment that may be used at the site; identify personnel health and safety training requirements; summarize the monitoring techniques to be used; establish emergency procedures; describe the medical surveillance program; identify that appropriate first aid equipment is available; provide for accident reporting; and establish a schedule for safety inspections.

The HASP will be implemented by the site Safety Officer (SSO) during site work. Compliance with this HASP is required of all personnel who enter this site. Assistance in implementing this plan can be obtained from the DEC project manager.

The content of this HASP may change using the HASP Modification Form presented in Appendix B, or undergo revision based upon additional information made available to health and safety personnel, monitoring results, or changes in the technical scope of work.

1.1 Scope of Work

The operation and maintenance activities to be performed under this HASP consists of the following work items:

- Monitoring Well Sampling and sampling inside the building.
- Clean duplex basket strainers.
- Service electrical equipment.
- Change/install new carbon drum.

1.2 Project Personnel

NAME/FIRM	TITLE	WORK PHONE
Terry Hughes, NYSDEC	Project Manager	518/457-0927

2.0 ASSIGNMENT OF HASP RESPONSIBILITY

The following describes the health and safety designations and general responsibilities which will be implemented for the Primoshield Plating Site activities. The DEC drafted this HASP, but those on site are responsible for its implementation and its applicability to differing site activities performed not currently addressed in this HASP.

2.1 Project Manager

The Project manager (PM) is responsible for having a project-specific HASP prepared, reviewed and approved prior to the start of on-site activities. In addition, the PM is responsible for assigning a qualified Site Safety Officer (SSO) and project team members. Before personnel may work on site, a current medical examination and acceptable health and safety training must be approved by the project manager.

2.2 Site Safety Officer

The site health and safety efforts will be directed through a Site Safety Officer (SSO) as needed. The SSO will be responsible for implementing the HASP. The SSO may direct or participate in on-site activities as appropriate when this does not interfere with primary SSO responsibilities. The SSO has stop-work authorization which he/she will execute upon determination of an imminent safety hazard, emergency situation, or other potentially dangerous situations.

2.3 DEC Field Personnel

DEC field personnel are responsible for conducting work in accordance with this HASP and reporting any problems or emergencies to the SSO and the project manager.

2.4 Subcontractors

Subcontracts may be issued. Subcontractors shall comply with the requirements outlined in this HASP and comply with OSHA 29 CFR 1910 and 29 CFR 1926; but, in all cases, subcontractors shall be responsible for site safety related to or affected by their own field operations.

3.0 SITE LOCATION, DESCRIPTION AND HISTORY

3.1 Location

Primoshield Inc. is a former Metal Electroplating facility located at 1212 St. Vincent Street; Utica, New York 13501. The site is located in a mixed commercial/residential area within the City of Utica, Oneida County, New York. The site is bordered by Conkling Avenue on the northwest and St. Vincent Street to the south and east. The site, as defined in the registry, consists of the Primoshield Plating property and the adjacent DePaul Building cinder and gravel parking lot which together total approximately 1.5 acres.

3.2 Site Description and History

Primoshield Inc. was a metal electroplating facility that operated from the early 1970s until August 1985. The Primoshield property consisted of a factory or production building, a small office building, a small laboratory and a small storage trailer, all of which were in an advanced state of disrepair.

A large number of drums and open vats (some containing acids, cyanide solutions and spent plating solutions) were left behind when the facility was abandoned by its owners following a fire which occurred during August of 1985.

Local citizen concerns regarding health and safety issues associated with this site were transmitted to the NYSDEC. Following an initial site reconnaissance and sampling effort by NYSDEC in December of 1985, laboratory sample results obtained indicated a very high risk to the public from the site at that time. Consequently, on March 12, 1986 the NYSDEC formally petitioned the U.S. EPA Region II Office requesting that the USEPA perform an Emergency Response and Removal Action at the Primoshield Site, including but not limited to the cleanup and removal of all the surficial and containerized hazardous wastes and the installation of a fence and gate system to resecure the site.

During 1986 and 1987 the USEPA conducted an emergency response and removal action at the Primoshield Site. All of the containerized waste and most of the accessible surficial waste materials were removed from the site during this initial cleanup and taken to approved off-site disposal facilities. Site security was also established by the installation of a chain link fence and gate system. In November 1987 USEPA emergency response and cleanup funds for the Primoshield Site were exhausted an jurisdiction for further remedial action at the site was returned to NYSDEC.

Following the fire which occurred in August 1985, the Primoshield facility was abandoned by its owners and the City of Utica subsequently assumed ownership of the property due to non-payment of taxes. In December of 1989 the NYSDEC signed a negotiated Order on Consent with the City of Utica which agreed to perform a Remedial Investigation/Feasibility Study (RI/FS) to further investigate and remediate residual hazardous waste contamination remaining at the site.

The RI was conducted in basically a single phase beginning with a site baseline survey which was initiated during September/October 1992 and ending with a second round of ground water sample collection and analyses during September 1993. Some additional sample collection and analyses (primarily for metals in surface soils and TCLP testing of building materials) was conducted after April 1993 to fill in gaps in the data base. A one day on-site air quality sampling and monitoring program conducted on August 29, 1994 was the final field data collection for the Primoshield Site Remedial Investigation.

Site related contaminants of concern in surface soil were identified (based on the results of the RI) as cadmium, chromium, nickel and cyanide. Site-related contaminants in ground water above class GA ground water standards included trichloroethene, 1,1,1-trichloroethane, 1,1 dichloroethane and chromium. Water and Sediment Samples collected from the sumps in the basement of the 1208 St. Vincent Street residence indicated elevated concentration levels for both VOCs (1,1-dichloroethane; 1,1,1 trichloroethane; and trichloroethene) and heavy metals/inorganics (cadmium, chromium, lead, nickel, and cyanide). These elevated concentration levels of both VOCs and heavy metals/inorganics in both the ground water and the sediment in the basement of the 1208 St. Vincent Street residence indicate the need to address these two areas during site remediation.

The Record of Decision (ROD) for the site was signed on March 30, 1995. The site was re-assigned as a State Superfund (SSF) project in November 1996 because the City of Utica had inadequate funds to perform construction.

Remedial construction began in the Spring of 1998.

The major tasks completed during the remediation includes:

Removal of all hazardous materials inside the former production and laboratory buildings; the demolition of the former production, laboratory and office buildings; excavation of non-hazardous soils and hazardous soils, and the off-site disposal of all the above.

Pumping the liquids from two underground storage tanks (USTs) into a vacuum truck, cleaning both USTs, disposing the liquid waste and tanks at the proper disposal facility and removing and disposing the petroleum contaminated soil under the two tanks.

Cleaning of the sump, pressure washing and applying a sealant to the basement walls of the home located at 1208 St. Vincent Street.

Construction of a building to house the groundwater treatment system (GWTS), construction of three (3) groundwater (GW) cutoff trenches, a central collection manhole and installation of a submersible pump to intercept and collect the plume of contaminated GW. Construction of the GWTS to remove the Volatile Organic Compounds from the GW. The GWTS uses Granular Activated Carbon drums to accomplish this. The treated GW is discharged to the Oneida County Sewer System. Operation of the GWTS began August 26, 1998. Final completion of the Remediation was issued on December 15, 1998.

4.0 HAZARD ASSESSMENT

4.1 Exposure Limits

The following chemical information is presented in order to identify the types of materials that may be encountered at the PRIMOSHIELD PLATING SITE. Detailed information on these materials was obtained from:

- ACGIH, Threshold Limit Values and Biological Exposure Indices for 1995-96.
- Material Safety Data Sheets.
- NIOSH Pocket Guide to Chemical Hazards - 1997.

Exposure limits for the chemicals of potential concern are presented in Table 4-1 and the tasks, hazards, and control measures are shown in Table 4-2.

Table 4-1
Exposure Limits

COMPOUND	TLV-TWO ppm	TLV-STEL ppm	PEL-TWA ppm	IONIZATION POTENTIAL	IDLH ppm
1,1,1-Trichloroethane	350	450	350	11.00	700
1.1 - Dichloroethane	100	NE	100	11.06	
Trichloroethene			100	11.99	1000
Chromium	0.5 mg/m^3		1 mg/m^3	NA	250 mg/m^3

References: American Conference of Governmental Hygienists (ACGIH) Threshold Limit Values (TLV) for 1995-96.

TLV -Threshold Limit Value
STEL - Short-Term Exposure Limit
PEL - Permissible Exposure Limit
IP - Ionization Potential
IDLH - Immediately Dangerous to Life & Health
TWA - Time Weighted Average
NE - Not Established
NA - Not Applicable

Table 4-2
Task Specific Hazard Assessment

TASK	HAZARD	CONTROL MEASURES
Monitoring Well Sampling and sampling inside the building	Dermal Contact Inhalation	General Awareness, Access Controls, PPE, Respiratory Protection, Work/Rest Cycles, Fluids, Continuous Monitoring
Clean Stainless Steel Strainers	Dermal Contact Inhalation	PPE, Respiratory Protection, Work/Rest Cycles, General Awareness, pinch point hazards
Service Electrical Equipment	Electrical Hazards	Inspections on all electrical equipment. De-energize source Lockout/tagout procedures must be utilized.
Removal of submersible well pump from collection man hole.	Dermal Contact Inhalation	General Awareness, Access Controls, PPE, Respiratory Protection, Work/Rest Cycles, Fluids, Continuous Monitoring

4.2 Degree of Hazard

On-site hazards include physical and chemical hazards. No radiological, biological, or laboratory wastes are suspected on-site.

4.2.1 Chemical Hazards

The contaminants of concern at the sites can affect the body if they are inhaled, come in contact with the eyes or skin, or are ingested. These compounds may be released during monitoring well and other sampling or service activities. The primary concern is for skin exposure to contaminated groundwater and potential inhalation of organic vapors. Elevated exposure to these substances by inhalation (in the Breathing Zone (BZ)) is not anticipated.

Atmospheric monitoring, however, may be conducted during all phases of on-site field activities to determine the need for upgrading to appropriate levels of respiratory protection, as found in Section 9.2. Exposure by skin absorption is a low to moderate possibility, but can be prevented by use of proper protective equipment and good hygiene practices. Table 4-1 presents exposure levels for contaminants of concern.

4.2.2 Physical Hazards

Hazards that could be encountered include falls and trips injury from lifting heavy objects, falling objects, eye injuries, head injuries, and pinched or crushed hands and feet. Fire hazards may also be present and the potential for explosive concentrations of vapors may be present but are unlikely. Depending on seasonal weather conditions, there is potential for workers on-site to be affected by heat stress or cold exposure.

Noise related to operations and maintenance activities is expected to be minimal; however, as a precaution, hearing protection will be worn.

Water sampling activities present the potential for slips and falls associated with wet surfaces.

4.2.3 Natural Hazards

Natural hazards such as weather, poisonous plants, bites from poisonous or disease-carrying animals and insects (i.e., snakes, ticks), cannot always be avoided. Refer to Section 12.0 for emergency phone numbers and procedures.

4.2.4 Confined Space Entry

Confined space entry may be necessary during some non-routine activities. The DEC Confined Space Entry Program shall be followed in the event a confined space entry is required.

4.2.5 Spill Containment

In the event that on-site work results in the accidental spill or release of soil or hazardous materials, containment to the extent possible will be required by on-site personnel (in proper PPE). Containment should include the use of absorbent pads or materials, diking with soils, covering and/or diverting spills. For spills that cannot be controlled by on-site personnel or are above the reportable quantities, the SSO or designee will secure the area and notify the project manager.

5.0 TRAINING REQUIREMENTS

5.1 Basic Training Required

Personnel who are required to work in areas where the potential for toxic exposure exists shall complete an initial site safety training orientation training and have site experience conforming to the requirements of 29 CFR 1910.120(e). In keeping with 29 CFR 1910.20, medical records and exposure records will be available to workers on his/her designated representative upon request.

Training includes a 40-hour course which describes procedures for working at hazardous waste sites. The procedures include a safety and health program, medical surveillance, decontamination, site characterization and analysis, protective clothing and monitoring equipment, site control work documentation, emergency response, engineering and administrative control to reduce exposure, and site safety evacuation procedures.

Contractors/subcontractors shall provide written documentation that these training/experience requirements have been met. Personnel shall also be trained in the contents of the DEC "Respiratory Protection Program," if respirator use is deemed necessary.

5.2 Site-Specific Training

Initial site-specific training will be conducted by the SSO for on-site personnel and visitors to minimize exposure to potential of on-site hazards. Site-specific training will address the activities, procedures, monitoring, and equipment for the field operations.

This training at a minimum will include the following:

10. Site description and history.
11. O&M activities, including coordination with other contractors.
12. Hazard evaluation.
13. On-site safety responsibilities.
14. Site control and work zones.
15. Personnel training.
16. Medical monitoring.
17. Atmospheric monitoring.
18. Personal protection, clothing, and equipment.
19. Decontamination procedures.
20. Emergency procedures.
21. Review of site-specific material safety data sheets (MSDSs).
22. Safe work practices.
23. Other elements covered in this site-specific HASP.

This training will also allow field workers to clarify anything they do not understand and to reinforce their responsibilities regarding safe operations.

5.3 Safety Briefings

Project personnel will be given briefings by the SSO on a daily or as-needed basis to further assist site personnel in conducting their activities safely. Briefings will be provided when new activities are to be conducted, changes in work practices must be implemented due to new information made available, or if site or environmental conditions change. Briefings will also be given to facilitate conformance with prescribed safety practices when performance deficiencies are identified during routine daily activities or as a result of safety audits.

5.4 Safety Audits

The project manager, SSO or designee, as necessary, may conduct safety audits of field operations and subcontractor performance to review for compliance with health and safety policies and procedures. Health and safety audit findings will be documented and corrective action taken.

5.5 First Aid and CPR

It is recommended that at least one individual be trained and qualified to administer first aid and cardiopulmonary resuscitation (CPR) in the event of an emergency.

The SSO will identify the individuals possessing this training in order to ensure that emergency treatment is available during every work shift from a person qualified in first aid and CPR. These courses will be consistent with requirements of the American Red Cross and/or American Heart Association.

6.0 MEDICAL SURVEILLANCE PROGRAM

All personnel performing field work at the PRIMOSHIELD PLATING SITE will be required to have passed a pre-assignment and/or periodic medical examination that is consistent with 29 CFR 1910.120(f). Medical examinations shall be performed by or under the supervision of a licensed physician, preferably one knowledgeable in occupational medicine.

Additional medical testing may be required in consultation with the medical surveillance physician and project manager if an overt exposure or accident occurs, or if other site conditions warrant further medical surveillance.

Contractors/subcontractors will maintain the medical records for their own employees, but shall also provide the project manager with written documentation certifying that each employee at the site has met the requirements of the Medical Surveillance Program. This documentation will be provided before the first day of work for each employee assigned to the site. The pre-assignment and annual examinations are essentially the same in content and are the examining physician's discretion but generally include:

- An updated medical and occupational history
- A screening physical examination
- Blood and urine laboratory tests
- Chest X-ray

- Electrocardiogram
- Pulmonary function tests
- Audiometry
- Visual acuity test

7.0 SITE CONTROL MEASURES

The purpose of the site control measures discussed in this section are to maintain order at the sites and to minimize chemical and physical hazards to on-site personnel, visitors, and the public.

7.1 Site Access

A daily log of security incidents and visitors granted access to the site will be maintained, as well as a log of all personnel entering and exiting the site.

All approved visitors to the site will be briefed by the SSO on safety and security, provided with temporary identification and safety equipment, and escorted throughout their visit. Site visitors will not be permitted to enter a hazardous work zone.

7.2 Work Zones

The groundwater treatment facility monitoring wells shall be the work zone. A first aid kit (sufficient to accommodate the field team) shall be placed in this work zone. These supplies may be located in the groundwater treatment system (GWTS) building.

7.3 Personnel Decontamination

Personnel decontamination areas will be established on-site. Personnel will decontaminate and/or dispose of soiled protective clothing if necessary (i.e., disposable boots and gloves, etc.) following acceptable protocol. Refer to Section 10 for further decontamination procedures.

7.4 Site Visitors

Visitors are required to report to the SSO prior to accessing the sites. The SSO will document decisions regarding their access to the sites. If granted limited access, visitors must provide the SSO with documented compliance with section 5.0 of this HASP, comply with other applicable sections, and satisfy additional conditions placed on them as deemed appropriate by the SSO to ensure visitor safety. Visitors must sign in and out daily under the SSO's direction for the duration of their approved visit. Under no circumstances will visitors be allowed to interfere with, or participate in operations. All visitors shall be escorted throughout the sites by appropriately trained personnel.

8.0 PERSONAL PROTECTIVE EQUIPMENT

8.1 General

The level of protection to be worn by field personnel will be defined and controlled by the SSO. Personal protective equipment for general operations will be consistent with the requirements of 29 CFR 1910 Subpart I, "Personal Protective Equipment." Basic levels of protection for hazardous waste operations will be selected in accordance with the provisions of 29 CFR 1910.120(g)(3), "Personal Protective Equipment Selection."

Modification to basic protective equipment ensembles may be necessary for specific operations. In these cases, further definition will be provided by review of specific hazards, conditions, and proposed operational requirements, and by conducting air monitoring if necessary at the particular operation. Protection may be upgraded or downgraded, as deemed appropriate by the SSO and verified by the project manager.

8.2 Anticipated Levels Of Protection For Site Operations

Clean Strainers	Level D/C
Monitoring Well Sampling and Sampling Inside the Building	Level D
Servicing Electrical Equipment	Level D
Remove well pump	Level D/C

Action levels used to determine the need to upgrade or downgrade the levels of protection are described in Section 9.2 of this HASP.

Level D personal protective clothing and equipment includes:

- Disposable Tyvek coveralls.
- Hardhat (when overhead hazards exist).
- Safety glasses or goggles.
- Steel toe, steel shank boots.
- Disposable latex gloves.
- Noise protection - as warranted.

Level C protective clothing and equipment includes:

- Air-purifying respirator that is National Institute for Occupational Safety & Health (NIOSH), Mining Safety and Health Administration (MSHA) approved fitted with organic vapor cartridges.
- Disposable Tyvek coveralls. (Polyethylene Coated Tyvek required in sampling areas when splashing by contaminated soils or water is a possibility).

Personnel

- Know the limitations of all personal protective equipment being used.
- Do not walk through areas of obvious or known contamination.
- Do not handle or touch contaminated materials directly.
- Make sure all personal protective equipment has no cuts or tears prior to donning.
- Fasten all closures on suits, covering with tape, if necessary.
- Particular care should be taken to protect any skin injuries.
- Do not carry cigarettes, gum, food, or candy into contaminated area.

Sampling/Monitoring

- Cover instruments with clear plastic, leaving openings for sampling ports, and sensor points.
- Bag sample containers prior to placement of sample material into containers.
- Spoils from sampling work should be placed so as not to be in the expected paths of individuals.

10.4 Disposal Procedures

Waste materials and other field equipment/supplies shall be handled in such a way as to preclude the potential for spreading contamination, creating a sanitary hazard, or causing litter to be left on-site. If PPE is 'econtaminated properly, then it may be taken off site and disposed of as municipal refuse.

11.0 GENERAL SAFE WORK PRACTICES AND COMMUNICATIONS

11.1 Safety Equipment

Basic emergency and first aid equipment will be available at the GWTS building. This shall include a first aid kit (sufficient to accommodate field team), and a telephone (communications). Fire extinguishers will be provided, inspected, and available on-site. A telephone is located adjacent to the control panel. The on-site phone number is 315/797-9768.

11.2 Safe Work Practices

The following safe work practices will be implemented during site operations:

- Only properly trained and equipped personnel will be allowed to work in the groundwater treatment facility.
- The number of personnel and equipment in the sampling areas will be kept to a minimum, consistent with safe site operations.
- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth transfer, ingestion, and inhalation of potentially contaminated materials is prohibited.
- Contact with potentially contaminated materials and surfaces shall be avoided. Personnel shall comply with contamination control measures.

- Personnel with facial hair or other face piece seal obstructions will not be permitted to work where respirators are required.
- Work shall only be conducted if adequate illumination is provided, i.e., visual observation is not impaired due to loss of daylight conditions.

12.0 CONTINGENCY PLAN

12.1 Emergency Phone List

PRIMOSHIELD, INC., SITE NO. 6-33-027
1212 St. Vincent Street
Utica, New York 13501
(315) 797-9768

Emergencies encountered on this site will be responded to via off-site emergency services. The following master phone list will be prominently posted at the site
treatment building.

PERSON OR AGENCY	PHONE NUMBER
PRIMARY POINT OF CONTACT:	
NYSDEC (Project Manager) 50 Wolf Road Albany, NY 12233-7010	(518) 457-0927
ALTERNATE POINT OF CONTACT:	
NYSDEC Region 6 State Office Building Utica, NY 13501	(315) 793-2554
LOCAL EMERGENCY SERVICES:	
FIRE - Central Fire Station 550 Bleecker St., Utica	911 or (315) 724-5151
AMBULANCE	911
POLICE - Utica City Police 413 Oriskany St W #1, Utica	911 or (315) 735-3301 (emer) (315) 735-3302 (info)
HOSPITAL - St. Elizabeth Medical Center 2209 Genesee St., Utica	911 or (315) 798-8111

Hospital Route:

From Primoshield Site take first left on to Eagle Street. Stay on Eagle until the end (1 mile). Take left on to Oneida Square, and light take left onto Genesee Street. Go 1.5 miles to Saint Elizabeth Medical Center at 2209 Genesee Street, on left. See attached Map.

- Disposable latex inner gloves.
- Hard hat (when overhead hazard exists).
- Steel toe, steel shank boots.
- Disposable out boots.

Level B protective clothing and equipment includes the above Level C clothing with the addition of a self-contained breathing apparatus (SCBA) or supplied air-line respirator in place of an air-purifying respirator. If action levels are exceeded and based on evaluation of the conditions, and level C protection is not sufficient and level B respiratory protection is deemed necessary, work activities will be halted and the project manager will be notified.

9.0 AIR MONITORING AND ACTION LEVELS

9.1 General

It may be necessary to monitor the atmospheric conditions during on-site field O&M activities to determine the possible need to upgrade the personal protection of on-site workers.

9.2 Action Levels

Air monitoring instrumentation will include a photoionization detector (PID) equipped with a 10.2 eV or 1.7 eV lamp and/or a flame ionization detector (FID). A combustible gas indicator (CGI) will be used to monitor for combustibles. The action levels in this HASP will apply to site work during the duration of activities at the project site.

Instrument	Action Levels	Level of Respiratory Protection/Action
PID/FID	Continuous sustained readings to 1 ppm above background (typically to 0.2 ppm) in BZ	Level D
PID/FID	Continuous sustained readings of 1 ppm to 5 ppm above background	Level C (based on identification of contaminants)
PID/FID	Continuous readings at 5 to 250 ppm above background in BZ	Level B (if applicable)
CGI	< 10% LEL	Proceed with caution
CGI	Greater than 10%	Cease work, vent, begin work only after levels return to 0%

In the event any action levels are exceeded, work activities shall be halted, and an attempt will be made to identify the contaminants present using colorimeter indicator tubes so that correct respiratory protection can be selected and action levels may be adjusted higher or more conservatively. The SSO shall notify the project manager immediately prior to upgrading the level of respiratory protection.

9.3 Exposure Monitoring/Air Sampling Program

9.3.1 Personal and Perimeter Monitoring

Personal and perimeter air monitoring will not be conducted unless Level D action levels are exceeded. The determination to perform personal and perimeter air monitoring will be determined by the project manager after discussions with SSO. If an air monitoring program is deemed necessary, work activities will be halted and an air monitoring plan will be developed by the SSO and project manager.

9.4 Instrument Calibration and Maintenance

Instrument calibration and maintenance shall be performed according to manufacturer's specifications and documented on Field Instrument Calibration Logs or Field Log Books. PID calibration shall be completed along with a FID calibration check on a daily basis. Combustible gas/oxygen meters shall be calibrated according to manufacturer's recommended frequency (i.e., daily or weekly).

10.0 DECONTAMINATION PROCEDURES

The SSO shall determine the level of decontamination necessary based on the evaluation of specific work activities and the potential degree of contamination.

10.1 Equipment

Non-disposable sampling equipment will be decontaminated before use, between samples, and the following sample collection. Personnel expect to use disposable bailers for groundwater monitoring.

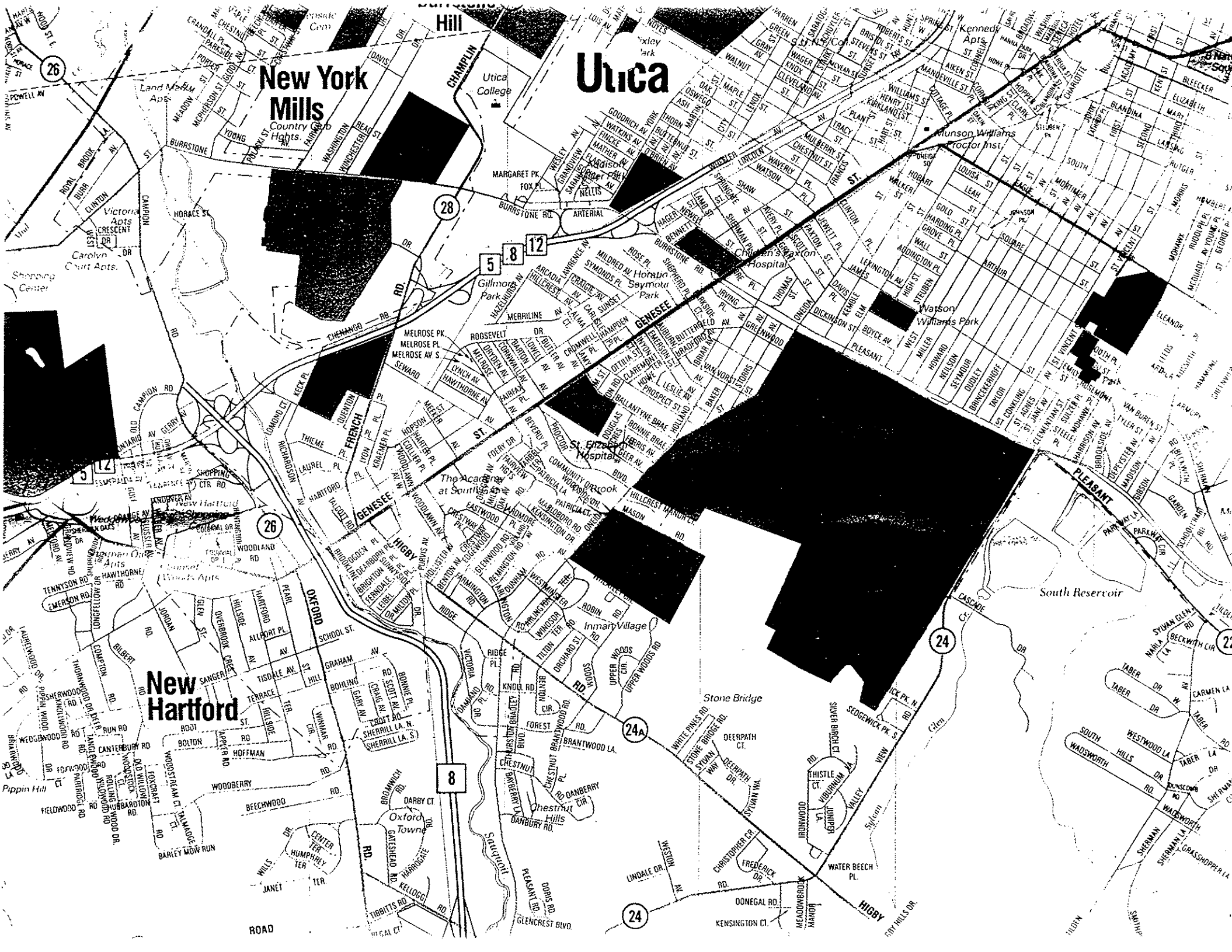
10.2 Personnel

Personnel will perform decontamination if necessary in a predesignated contamination area. Decontamination of personnel in Level D will consist of removal and disposal of coveralls (when worn) disposable boots, and gloves. Decontamination of personnel using Level C protective equipment will consist of:

- Arrangements shall be made by the SSO and project manager for washing boots, waders or other non-disposable protective equipment (i.e., hard hat, safety glasses/goggles, etc.) suspected of being contaminated, if necessary.
- Removal and disposal of boot covers and waders if worn.
- Removal and disposal of coveralls.
- Removal and disposal of gloves.
- Removal, cleaning, and storage of respiratory equipment.

10.3 Contamination Prevention

One of the most important aspects of decontamination is the prevention of contamination. Good contamination prevention should minimize worker exposure and help ensure valid sample results by precluding cross-contamination. Procedures for contamination avoidance include:


New York Mills
Utica
New Hartford
Hill
Utica College
Country Club Hgts.
Land Mark Apts
Victoria Apts
Carolyn Chrt Apts.
Shopping Center
Gillmore Park
Horatio Seymour Park
St. Elizabeth Hospital
St. Luke's Hospital
Kennedy Apts.
Munson Williams Proctor Inst.
Watson Williams Park
The Academy at Southside
Community Brook Apts.
Inman Village
Stone Bridge
South Reservoir
Oxford Towne
Chestnut Hills
Pippin Hill
Sauquoit
Glen
ROAD
RD.
ST.
AV.
DR.
PL.
CIR.
TER.
LA.
CT.
PKWY
HIGBY
OXFORD
GENESEE
FRENCH
PLEASANT
CHAMPLIN
CHENANGO
BURRSTONE
SCHOOL ST.
WOODBERRY
BEECHWOOD
BRANTWOOD LA.
WATER BEECH PL.
SEDGEWICK PK. S.
SYLVAN GLEN
SOUTH WESTWOOD LA
WADSWORTH
SHERMAN
GRASSHOPPER LA
26
28
5
8
12
24
24A

12.2 Implementation

The Site Emergency Coordinator (SSO) shall implement the emergency action procedures whenever conditions at the site warrant such action. The site emergency Coordinator (SSO) will be responsible for coordinating the evacuation, emergency treatment, and emergency transport of site personnel as necessary, and for notification of emergency response units and the appropriate management staff. In the event an evacuation is necessary, the SSO will take a role count at the designated gathering location with the use of the daily sign in and out sheet. The following conditions may require implementation of emergency action procedures:

- Fire or explosion on-site.
- Serious personal injury.
- Release of hazardous materials, including gases or vapors at levels greater than the maximum use concentrations of respirators.
- Unsafe working conditions, such as inclement weather.
- Spill of contaminated groundwater.

12.3 Fire or Explosion

If an actual fire or explosion has taken place, emergency steps will include 1) evacuation of work area and venting, and 2) notification of the fire department and other appropriate emergency response groups if necessary.

12.4 Personal Injury

Emergency first aid will be administered on-site as appropriate. Then the individual will be decontaminated if possible and necessary, depending on the severity of the injury, and transported to the nearest medical facility if needed.

12.5 Overt Chemical Exposure

Typical response procedures include:

SKIN CONTACT:	Use copious amounts of cleaner and water. Wash/rinse affected area thoroughly, the provide appropriate medical attention.
INHALATION:	Move to fresh air and/or, if necessary, decontaminate/transport to hospital.
INGESTION:	Decontaminate and transport to emergency medical facility.
PUNCTURE WOUND OR LACERATION:	Decontaminate and transport to emergency medical facility. The SSO will provide medical data sheets to medical personnel as requested.

12.5.1 Cold Exposure

If field activities occur during a period when temperatures average below freezing, the following guidelines will be followed.

Persons working outdoors in temperatures at or below freezing may be subject to frostbite. Extreme cold for a short time may cause severe injury to the surface of the body, or result in profound generalized cooling of the body core, resulting in coma and death. Areas of the body which have high surface area-to-volume ratio such as fingers, toes, and ears are the most susceptible.

Prevention of frostbite is vital. Keep the extremities warm. Wear insulated clothing as part of one's protective gear during extremely cold conditions. Check for symptoms of frostbite at every break. The onset is painless and gradual--you may never know you have been injured until it is too late.

12.6 Adverse Weather Conditions

In the event of adverse weather conditions, the SSO will determine if work can continue without endangering the health and safety of field workers. Some items to be considered before determining if work should continue are:

- Potential for heat stress and heat-related injuries.
- Potential for cold stress and cold-related injuries.
- Treacherous weather-related working conditions (i.e. mud, ice, rain).
- Limited visibility.
- Potential for electrical storms.

12.6.1 Heat Stress

The SSO shall visually monitor personnel to note for signs of heat stress. Field personnel will also be instructed to observe for symptoms of heat stress and methods on how to control it. One or more of the following control measures can be used to help control heat stress:

- Provide adequate liquids to replace lost body fluids. Personnel must replace water and salt lost from sweating. Personnel must be encouraged to drink more than the amount required to satisfy thirst. Thirst satisfaction is not an accurate indicator of adequate salt and fluid replacement.
- Replacement fluids can be commercial mixes such as Gatorade.
- Establish a work regime that will provide adequate rest periods for cooling down.
- Breaks are to be taken in a cool rest area (77° F is best).
- Personnel shall remove impermeable protective garments during rest periods.
- Personnel shall not be assigned other tasks during rest periods.
- Personnel shall be informed of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress.

Effects rising from cold exposure will be minimized by providing workers with insulated clothing when the equivalent chill temperature is less than 30°F as defined and presented in the ACGIH booklet in Table 5. Furthermore, field activities will generally be curtailed or halted if the equivalent chill temperature is below -20°F. The ultimate responsibility for delaying work at a site due to inclement weather rests with the SSO.

12.7 Poison Ivy

If personnel come in contact with poison ivy, the individual should immediately wash the affected area with Ivy Cleaner provided in the first aid kit. If a rash develops, it should be treated at a medical facility as soon as possible.

12.8 Snakes and Ticks

12.8.1 Snake Bite Prevention and First Aid

On project sites precautions against the possible presence of snakes should be taken when walking through overgrown vegetation and when moving debris (i.e., lumber, scrap metal, etc.). If someone is bitten by a snake a conservative approach is safest. Keeping the victim quiet, lying or sitting, and reassuring him/her is all that is required. He/she should be transported safely (no speeding) to the nearest medical facility. For the reassurance of both the victim and the first aider, a snake bite is not nearly as dangerous as popular mythology would suggest. In North America, death from snake bite to healthy adults is very rare. Field treatments advised against include ice, cutting and suction around the wound, and tourniquets. Cutting and sucking out the wound can be shown to offer some help if it is done with the correct technique and equipment and if the victim has received a large dose of venom. In light of the damage that can be done, the risk of such a procedure is too high. It is best to transport the person immediately to a medical facility.

12.8.2 Tick Bite Prevention and First Aid

Routinely check for ticks after being outdoors. Remove ticks as soon as possible before they embed. To minimize exposure, wear light-colored clothing so ticks can be detected. Tuck pants into boots or socks and wear long sleeved shirts. Apply tick/insect repellent to clothing.

When a tick is found embedded, remove it by gasping it with a tweezers as close to the skin as possible and gently pull it straight out. Do not twist or jerk the tick because the head may remain embedded. Once the tick is removed, wash the bite area and your hands with soap and water and apply an antiseptic to the bite. Save the tick in a jar labeled with the date and the place where the tick was acquired. A physician may find this information and the tick specimen helpful in diagnosis if an infection results.

12.9 Accident/Injury Report and Record Keeping

The SSO shall maintain logs and reports covering health and safety aspects of the project throughout the duration of work activities. In the event of an on-site accident resulting in an exposure or injury, the SSO shall immediately complete an Incident Report and send a copy to the project manager. The project manager shall be responsible for maintaining the routinely completed records and forms presented in this HASP.

13.0 HASP Acceptance

Each field team member shall sign this section after site-specific training is completed and before being permitted to work on site.

I have read and understand this health and Safety Plan. I will comply with the provisions contained therein.

Site/Project: Primoshield Plating Site #633027

Printed Name	Signature	Date

Site No. 633027
Primoshield Plating Site

Appendix A

Material Safety Data Sheets

Activated Carbon
Methyl Chloroform (1,1,1-Trichloroethane)
1,1-Dichloroethane
Vinylidene Chloride (1,1-Dichloroethene)
Chromium

MATERIAL SAFETY DATA SHEET

Barnebey & Sutcliffe Corporation
835 North Cassady Avenue, P.O. Box 2526
Columbus, Ohio 43216
Phone: (614) 258-9501 Fax: (614) 258-3464
Emergency Phone Number: (614) 258-4744

Section I - PRODUCT NAME

Activated Carbon Type : BR

Section II - HAZARDOUS INGREDIENTS

Name	CAS Number	% By Weight
1. Carbon Activated Carbon (Non-Regulated)	7440-44-0	100
2.		
3.		
4.		

(ACGIH, OSHA and other TLV are not applicable for activated carbon.)

Caution: Wet activated carbon removes oxygen from air causing a severe [redacted] hazard to workers inside carbon vessels and enclosed or confined spaces. Before entering such an area, sampling and work procedures for low oxygen levels should be taken to ensure adequate oxygen availability, observing all local, state and federal regulations.

SECTION III - PHYSICAL DATA

Boiling Point (°F)	: N/A	Specific Gravity (water=1)	: 1.9-2.2
Vapor Pressure	: N/A	Packing Density (g/cc)	: 0.4-0.8
Solubility In Water	: N/A	pH	: N/A
Appearance & Odor	: Black granular or powder odorless		

SECTION IV - FIRE & EXPLOSION HAZARD DATA

Flash Point : N/A LEL : N/A Ignition Temperature (°C) : 350
Flammable Limits : N/A UEL : N/A

Extinguishing Media : Flood with plenty of water or inert gas, such as N_2 and CO_2

Special Fire Fighting Procedure: None

SECTION V - REACTIVITY

Stability : Stable
Hazardous Polymerization : Will not occur
Hazardous Decomposition : CO may be generated in the event of fire

[redacted] : Contact with strong oxidizers, such as ozone, liquid oxygen, chlorine, permanganate and [redacted] ketone may cause a bad fire.

Condition to Avoid:

Incompatibility : Avoid contact with high concentration of [redacted]

ketone in air or liquid.

SECTION VI - HEALTH HAZARD DATA

Carcinogenicity	: N/A	Skin	: N/A	Ingestion	: N/A
Acute or Chronic	: N/A	NTP	: N/A	IARC Monograph	: N/A
Inhalation	: Dust may be inhaled	OSHA	: N/A		

Signs & Symptoms of Exposure : Slight irritation of eyes and nose may result from contact with carbon fines

Medical Conditions Generally Aggravated By Exposure : N/A

SECTION VII - EMERGENCY & FIRST AID PROCEDURE

Skin : N/A

Eye : Flush with plenty of water at least for 15 minutes

Ingestion : N/A

Inhalation : N/A

Follow-up with physician exam if necessary.

SECTION VIII - SAFE HANDLING & STORAGE

Protective Gloves : [redacted] RUBBER

Eye Protection : [redacted] SAFETY GLASSES

Protective Clothing : Not required

Respirator Protection: [redacted] A NIOSH approved particulate filter.

Ventilation : Local & Mechanical exhaust recommended

Storage & Handling : Avoid generation of dust and fines during handling

SECTION IX - SPILL OR LEAK PROCEDURE

Notify EPA If Product Spills : Report in accordance with local, state and federal regulations

Cleaning Procedure : Sweep up unused carbon and discard in refuse container or repackage for further use.

SECTION X - OTHER OPERATIONAL INSTRUCTIONS

Prepared By : Mohammed A. Bayati MAB Date : September 9, 1996

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Material Safety Data Sheets Collection:

Sheet No. 311
Methyl Chloroform

Issued: 11/75 Revision: F, 3/92 Errata: 6/9

Section 1. Material Identification

Methyl Chloroform ($C_2H_3Cl_3$) **Description:** Derived by catalytic addition of hydrogen chloride to 1,1-dichloroethylene or by re-fluxing chlorine monoxide with carbon tetrachloride and chloroethane. Available in technical and solvent grades which differ only in the amount of stabilizer added to prevent metal parts corrosion. Used as a solvent for oils, waxes, tars, cleaning precision instruments, and pesticides; as a component of inks and drain cleaners; in degreasing metals, and textile processing. In recent years, methyl chloroform has found widespread use as a substitute for carbon tetrachloride.

R 1
I 2
S 2*
K 1

Genium



HMIS
H 2
F 1
R 1
PPG*
* Sec. 8

Other Designations: CAS No. 71-55-6, α-trichloroethane; Inhibisol; 1,1,1-trichloroethane; Strobane.
Manufacturer: Contact your supplier or distributor. Consult latest *Chemical Week Buyers' Guide*[73] for a suppliers list.
Cautions: Methyl chloroform is a skin, eye, and respiratory tract irritant and can become narcotic with an anesthetic effect at high concentrations.
* Data on skin absorption via methyl chloroform is conflicting.[133] Some studies show definite absorption where others don't.

Section 2. Ingredients and Occupational Exposure Limits

Methyl chloroform, ca 92 to 97%*

1990 OSHA PELs
8-hr TWA: 350 ppm (1900 mg/m³)
15-min STEL: 450 ppm (2450 mg/m³)

1990 IDLH Level
1000 ppm

1990 NIOSH REL
15-min Ceiling: 350 ppm (1900 mg/m³)

1991-92 ACGIH TLVs
TWA: 350 ppm (1910 mg/m³)
STEL: 450 ppm (2460 mg/m³)

1990 DFG (Germany) MAKs
TWA: 200 ppm (1080 mg/m³)
Half-life: 2 hr to shift length
Peak Exposure Limit: 1000 ppm/30 min (average value)/2 per shift

1985-86 Toxicity Data†
Human, oral, TD_{Lo}: 670 mg/kg produced diarrhea, nausea, and vomiting
Human, inhalation, LC_{Lo}: 27 g/m³/10 min; toxic effects not yet reviewed
Man, eye: 450 ppm/8 hr produced irritation
Rat, inhalation, TC_{Lo}: 2100 ppm/24 hr for 14 days prior to mating and from 1 to 20 days of pregnancy produced specific developmental abnormalities of the musculoskelatal system

* Methyl chloroform usually contains inhibitors (3 to 8%) to prevent corrosion of aluminum and some other metals. Typical inhibitors are nitromethane, butylene oxide, secondary butyl alcohols, ketones, and glycol diesters.
† See NIOSH, *RTECS* (KJ2975000), for additional irritation, mutation, reproductive, and toxicity data.

Section 3. Physical Data

Boiling Point: 165 °F (75 °C)
Freezing Point: -22 °F (-30 °C)
Vapor Pressure: 100 mm Hg at 68 °F (20 °C)
Vapor Density (air = 1): 4.55
Corrosivity: Readily corrodes aluminum and its alloys
Refraction Index: 1.43765 at 69.8 °F (21 °C)
Viscosity: 0.858 cP at 68 °F (20 °C)
Molecular Weight: 133.42
Density: 1.3376 at 68/39.8 °F (20/4 °C)
Water Solubility: Insoluble
Other Solubilities: Soluble in acetone, alcohol, ether, benzene, carbon tetrachloride, and carbon disulfide
% In Saturated Air: 16.7% at 77 °F (25 °C)
Relative Evaporation Rate (butyl acetate = 1): 12.8
Appearance and Odor: Colorless liquid with a sweetish, chloroform-like odor. The odor threshold is 44 ppm.

Section 4. Fire and Explosion Data

Flash Point: None (in conventional CC tests)	Autoignition Temperature: 932 °F (500 °C)	LEL: 7% v/v	UEL: 16% v/v

Extinguishing Media: *Noncombustible liquid* whose *vapor* burns in the presence of excess oxygen or a strong ignition source. For small fires, use dry chemical or carbon dioxide (CO_2). For large fires use fog or regular foam. If these materials are unavailable, a water spray may be used but be aware that water reacts slowly with methyl chloroform to release hydrochloric acid.
Unusual Fire or Explosion Hazards: Vapors are heavier than air and may travel to a strong ignition source and flash back. Air/vapor mixtures may explode when heated. Container may explode in heat of fire. Exposure to open flames or arc welding can produce hydrogen chloride and phosgene.
Special Fire-fighting Procedures: Methyl chloroform's burning rate is 2.9 mm/min. Since fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode. Structural firefighters' protective clothing provides limited protection. Wear clothing specifically recommended by the manufacturer for use in fires involving methyl chloroform. Apply cooling water to container sides until after fire is extinguished. Stay away from ends of tanks. Isolate area for 1/2 mile if fire involves tank, truck, or rail car. Be aware of runoff from fire control methods. Do not release to sewers or waterways.

Section 5. Reactivity Data

Stability/Polymerization: Methyl chloroform is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization can occur in contact with aluminum trichloride.
Chemical Incompatibilities: Methyl chloroform is incompatible with sodium hydroxide, nitrogen tetroxide, oxygen (liquid or gas), strong oxidizer and chemically active metals like aluminum, zinc, and magnesium powders; reacts violently with caustics to form dichloroacetylene; reacts slowly with water to form hydrochloric acid; forms shock sensitive mixtures with potassium; and polymerizes in contact with aluminum trichloride.
Conditions to Avoid: Exposure to moisture, strong ignition sources, and arc-welding units, and contact with incompatibles.
Hazardous Products of Decomposition: Thermal oxidative decomposition (temperatures >500 °F, contact with hot metals, or under UV rays) of methyl chloroform can produce carbon dioxide (CO_2) and toxic dichloroacetylene, hydrogen chloride, and phosgene gases.

Section 6. Health Hazard Data

Carcinogenicity: The IARC (Class 3, inadequate evidence),[164] NTP,[142] and OSHA[164] do not list methyl chloroform as a carcinogen.
Summary of Risks: Methyl chloroform is considered one of the least toxic of the liquid chlorinated hydrocarbons. It is irritating to eyes, skin, and respiratory tract. Although low in systemic toxicity, methyl chloroform is an anesthetic capable of causing death at high concentrations (>15,000 ppm), generally in poorly ventilated, enclosed areas. Quick and complete recovery is observed after prompt removal of unconscious persons from area of exposure. Like many other solvents, methyl chloroform sensitizes the heart to epinephrine (blood pressure-raising hormone) and may induce cardiac arrhythmias and arrest.
Medical Conditions Aggravated by Long-Term Exposure: None reported.
Target Organs: Skin, eyes, central nervous (CNS) and cardiovascular (CVS) systems.

Continue on next page

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Section 6. Health Hazard Data, *continued*

Primary Entry Routes: Inhalation, skin contact. **Acute Effects:** Methyl chloroform defats the skin causing irritation, redness, dryness, and scaling. Contact with eyes produces irritation and mild conjunctivitis. Vapor inhalation can cause headache, dizziness, equilibrium disturbances, and in high concentrations may lead to CNS depression, unconsciousness, and coma. During a 60-min exposure period these effects are observed: 100 ppm is the observed odor threshold, at 500 ppm there is obvious odor and decreased reaction time, 1000 ppm causes slight equilibrium loss, at 5000 ppm there is definite uncoordination, and 20,000 ppm produces surgical strength anesthesia with possible death. Mild liver and kidney dysfunction may occur after CNS depression recovery. Although unlikely, if ingestion occurs, symptoms include nausea, vomiting, diarrhea, and possible esophageal burns. The acute lethal human dose is ~500 to 5000 mg/kg. **Chronic Effects:** None reported.

FIRST AID

Eyes: Gently lift eyelids and flush immediately and continuously with flooding amounts of water until transported to an emergency medical facility. *Do not* allow victim to rub or keep eyes tightly shut. Consult a physician immediately. **Skin:** *Quickly* remove contaminated clothing. Rinse with flooding amounts of water for at least 15 min. Wash exposed area with soap and water. For reddened or blistered skin, consult a physician. **Inhalation:** Remove exposed person to fresh air and support breathing as needed. **Ingestion:** Never give anything by mouth to an unconscious or convulsing person. Contact a poison control center, and unless otherwise advised, have that *conscious and alert* person drink 1 to 2 glasses of water to dilute. When deciding whether to induce vomiting, carefully consider amount ingested, time since ingestion, and availability of medical help. If large amounts are recently ingested (absorption into the body is not yet likely to have occurred), and medical help or transportation to a medical facility is not readily available, induce vomiting. Otherwise, vomiting is not recommended since aspiration of vomitus can produce chemical pneumonitis. **Note to Physicians:** Do not use adrenaline or sympathomimetic amines in treatment because of the increased cardiac sensitivity involved.

Section 7. Spill, Leak, and Disposal Procedures

Spill/Leak: Immediately notify safety personnel, isolate area, deny entry, and stay upwind. Shut off all ignition sources. If possible without risk, shut off leak. Cleanup personnel should wear fully encapsulating vapor-protective clothing. For small spills, take up with earth, sand, vermiculite, or other absorbent, noncombustible material. Using nonsparking tools, place in suitable containers for disposal or reclamation. For large spills, dike far ahead of liquid spill for later disposal or reclamation. Report any release in excess of 1000 lb. Follow applicable OSHA regulations (29 CFR 1910.120).
Environmental Transport: In water, methyl chloroform's half-life is hours to weeks depending on wind and mixing conditions. It is very persistent in groundwater. On land it volatilizes due to its high vapor pressure and leaches extensively. When released to the atmosphere, methyl chloroform can be transported long distances and returned to earth via rain. It is slowly degraded by reaction with hydroxyl radicals and has a half-life of 6 months to 25 years. The Natural Resources Defenses Council reported recently that methyl chloroform depletes ozone.
Ecotoxicity Values: *Pimephales promelas* (fathead minnow), LC_{50}: 52.8 mg/L/96 hr; *Poecilia reticulata* (guppy), LC_{50}: 133 ppm/7 day.
Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

EPA Designations
Listed as a RCRA Hazardous Waste (40 CFR 261.33): No. U226
Listed as a CERCLA Hazardous Substance* (40 CFR 302.4): Reportable Quantity (RQ), 1000 lb (454 kg) [* per RCRA, Sec. 3001, CWA, Sec. 307(a), and CAA, Sec. 112]
SARA Extremely Hazardous Substance (40 CFR 355): Not listed
Listed as a SARA Toxic Chemical (40 CFR 372.65)

OSHA Designations
Listed as an Air Contaminant (29 CFR 1910.1000, Table Z-1-A)

Section 8. Special Protection Data

Goggles: Wear splash-proof, protective chemical safety goggles or faceshields, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Because contact lens use in industry is controversial, establish your own policy.
Respirator: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a MSHA/NIOSH-approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.* If respirators are used, OSHA requires a respiratory protection program that includes at least: training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas.
Other: Wear chemically protective gloves, boots, aprons, and gauntlets to prevent repeated or prolonged skin contact. Viton and butyl rubber [with breakthrough times (BTs) of >8 hr and 4 to 7.9 hr, respectively] are recommended materials for protective gear. *Do not use* neoprene, polyvinyl chloride (PVC), natural rubber, or polyethylene because these materials have a BT of <1 hr.
Ventilation: Provide general and local exhaust (in some cases, explosion-proof) ventilation systems to maintain airborne concentrations below OSHA PELs (Sec. 2). Local exhaust ventilation is preferred since it prevents contaminant dispersion into work area by controlling it at its source.[103]
Safety Stations: Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities.
Contaminated Equipment: Separate contaminated work clothes from street clothes. Launder contaminated work clothing before wearing. Remove this material from your shoes and clean personal protective equipment.
Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9. Special Precautions and Comments

Storage Requirements: Prevent physical damage to containers. Store in cool, dry, well-ventilated (use pressure-vacuum ventilation) area away from ignition sources, arc-welding operations, and incompatibles (Sec. 5). Regularly monitor inhibitor levels. *Do not* store in aluminum containers or use pressure-spraying equipment when methyl chloroform is involved.
Engineering Controls: To reduce potential health hazards, use sufficient dilution or local exhaust ventilation to control airborne contaminants and to maintain concentrations at the lowest practical level. To prevent static sparks, electrically ground and bond all equipment used in methyl chloroform manufacturing, use, storage, transfer, and shipping.
Administrative Controls: Consider preplacement and periodic medical exams of exposed workers that emphasize CNS, CVS, liver and skin.

Transportation Data (49 CFR 172.101, .102)

DOT Shipping Name: 1,1,1-Trichloroethane
DOT Hazard Class: ORM-A
ID No.: UN2831
DOT Label: None
DOT Packaging Exceptions: 173.505
DOT Packaging Requirements: 173.605

IMO Shipping Name: 1,1,1-Trichloroethane
IMO Hazard Class: 6.1
ID No.: UN2831
IMO Label: St. Andrews Cross
IMDG Packaging Group: III

MSDS Collection **References:** 26, 38, 73, 89, 100, 101, 103, 124, 126, 127, 132, 133, 136, 148, 153, 159, 162, 163, 164
Prepared by: M Gannon, BA; **Industrial Hygiene Review:** D Wilson, CIH; **Medical Review:** AC Darlington, MPH, MD; **Edited by:** JR Stuart, MS

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Material Safety Data Sheets Collection:

Sheet No. 830
1,1-Dichloroethane

Issued: 6/92

Section 1. Material Identification

38

1,1-Dichloroethane (CH_3CHCl_2) Description: Derived by various methods; by direct chlorination of ethane, as a side product of chloral manufacture, by treating ethylene and chlorine with calcium chloride, by action of phosphorus chloride on acetaldehyde, and the reaction of hydrogen chloride and vinyl chloride at 20 to 55 °C in the presence of an aluminum, ferric, or zinc chloride catalyst. Found as an air contaminant in submarines and space craft. Its largest industrial use is in the production of 1,1,1-trichloroethane. Also used as a cleansing agent, degreaser, solvent for plastics, oils, and fats, grain fumigant, chemical intermediate; in insecticide sprays, rubber cementing, fabric spreading, paint and varnish removers, in ore flotation, vinyl chloride production, and as a coupling agent in anti-knock gasoline. Formerly used as an anesthetic.

Other Designations: CAS No. 75-34-3; assymetrical dichloroethane; chlorinated hydrochloric ether; ethylidene chloride; ethylidene dichloride.

Manufacturer: Contact your supplier or distributor. Consult latest *Chemical Week Buyers' Guide*[73] for a suppliers list.

Cautions: 1,1-Dichloroethane is volatile and highly flammable. It is irritating to the eyes and respiratory tract and inhalation of high concentrations causes an anesthetic effect.

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* Sec. 8

Section 2. Ingredients and Occupational Exposure Limits

1,1-Dichloroethane, reagent grade (99.7%). Impurities consist of ethyl chloride (0.02%), trichloroethylene (0.08%), butylene oxide (0.08%), ethylene dichloride (0.01%), and unknown (0.14%).

1991 OSHA PEL
8-hr TWA: 100 ppm (400 mg/m³)

1990 IDLH Level
4000 ppm

1990 NIOSH REL
8-hr TWA: 100 ppm (400 mg/m³)

1991-92 ACGIH TLVs*
TWA: 200 ppm (810 mg/m³)
STEL: 250 ppm (1010 mg/m³)

1990 DFG (Germany) MAK
100 ppm (400 mg/m³)
Half-life: < 2hr
Peak Exposure Limit: 200 ppm/30 min. average value/maximum of 4 peaks per shift

1985-86 Toxicity Data†
Mouse, oral, TD_{Lo}: 185 g/kg administered intermittently for 78 wk produced uterine tumors.
Rat, oral, LD_{50}: 725 mg/kg; toxic effects not yet reviewed.‡
Rat, inhalation, TC_{Lo}: 6000 ppm/7 hr administered during 6 to 15 days of pregnancy caused developmental abnormalities of the musculoskeletal system.

* Notice of intended change to 100 ppm/405 mg/m³.
†See NIOSH, *RTECS* (KI0175000), for additional reproductive, tumorigenic and toxicity data.
‡ Considered a possible error since subsequent studies at higher concentrations failed to produce comparative results.[133]

Section 3. Physical Data

Boiling Point: 135 °F (57.3 °C)
Melting Point: -143 °F (-96.98 °C)
Vapor Pressure: 230 mm Hg at 77 °F (25 °C)
Saturated Vapor Density (air = 1.2 kg/m³ or 0.075 lbs/ft³): 2.076 kg/m³ or 0.129 lbs/ft³
Refraction Index: 1.4166 at 68 °F (20 °C)
Surface Tension: 24.75 dyne/cm at 68 °F (20 °C)

Molecular Weight: 98.97
Specific Gravity: 1.174 at 68 °F (20/4 °C)
Water Solubility: Slightly, 0.5%
Other Solubilities: Very soluble in alcohol and ether, soluble in acetone, benzene, and fixed and volatile oils.
Relative Evaporation Rate (BuAc=1): 11.6
Odor Threshold: 49 to 1359 ppm; odor is not sufficient to warn against overexposure

Appearance and Odor: Colorless, mobile, oily liquid with a chloroform odor and a saccharin taste.

Section 4. Fire and Explosion Data

Flash Point: 17 °F (-8.33 °C) CC* | **Autoignition Temperature:** 856 °F (493 °C) | **LEL:** 5.6% v/v | **UEL:** 11.4% v/v

Extinguishing Media: A Class 1B Flammable Liquid. For small fires, use dry chemical, carbon dioxide (CO_2), or "alcohol-resistant" foam. For large fires, use fog or "alcohol-resistant" foam. Water may be ineffective unless used as a "blanket".
Unusual Fire or Explosion Hazards: Vapors may travel to an ignition source and flash back. Container may explode in heat of fire.
Special Fire-fighting Procedures: Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode. Structural firefighter's protective clothing will provide only limited protection. If possible without risk, move container from fire area. Apply cooling water to sides of containers until well after fire is out. Stay away from ends of tanks. For massive fire in cargo area, use monitor nozzles or unmanned hose holders; if this is impossible, withdraw from area and let fire burn. Withdraw immediately if you hear a rising sound from venting safety device or notice any tank discoloration due to fire. Do not release runoff from fire control methods to sewers (explosion) or waterways.

* 22 °F (-5.5 °C), OC[148]

Section 5. Reactivity Data

Stability/Polymerization: 1,1-Dichloroethane is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur.
Chemical Incompatibilities: Incompatible with strong oxidizers and forms acetaldehyde in contact with caustics. 1,1-Dichloroethane will attack some forms of plastics, rubber, and coatings.
Conditions to Avoid: Exposure to heat and ignition sources and contact with incompatibles.
Hazardous Products of Decomposition: Thermal oxidative decomposition of 1,1-dichloroethane can produce carbon dioxide (CO_2), irritating hydrogen chloride (HCl) and toxic phosgene ($COCl_2$) fumes.

Section 6. Health Hazard Data

Carcinogenicity: The IARC,[164] NTP,[169] and OSHA[164] do not list 1,1-dichloroethane as a carcinogen. However, the National Cancer Institute has recommended caution due to analogy to other chloroethanes such as 1,2-dichlorothane which are shown to cause cancer in animals.
Summary of Risks: 1,1-Dichloroethane is irritating to the eyes and respiratory system. It causes varying degrees of central nervous system (CNS) disturbance depending on the concentration and duration of exposure. Liver and kidney toxicity is controversial.

Continue on next page

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Section 6. Health Hazard Data, *continued*

Some sources report that severe, acute exposures can cause damage, some quote recent detailed chronic studies which indicate little capacity for damage; still others refute the possibility of acute damage even from very high exposures. In reviewing the data it appears likely that chronic exposure will not cause kidney or liver damage but acute exposures to high concentrations may. There is definite evidence that 1,1-dichloroethane produces liver damage in monkeys, dogs, and rats when exposed to 98 ppm/90 days. It is also unclear whether or not 1,1-dichloroethane is absorbed through the skin. There are reports of absorption (although not in toxic amounts) and others claiming there is no absorption. Given this controversial data it is best to take precautions as if skin absorption, and liver and kidney damage were proven to occur. **Medical Conditions Aggravated by Long-term Exposure:** Chronic respiratory and skin disease, neurological damage, and liver or kidney disorders. **Target Organs:** Skin, CNS, liver, kidney. **Primary Entry Routes:** Inhalation and skin contact. **Acute Effects:** Inhalation symptoms include eye, nose, and throat irritation, headache, dizziness, coughing, staggering, disturbed vision, irregular heartbeat (can result in sudden death), unconsciousness, narcosis, coma, and death due to cardiac or respiratory failure. There is the risk of pulmonary edema (fluid in lungs). Skin contact is irritating and causes defatting, redness and swelling. Vapor contact with the eyes causes irritation, watering eyes and lid inflammation. Splashes to the eyes produces a burning sensation, watering, and lid inflammation. **Chronic Effects:** Repeated skin contact can cause a rash and scaliness. Repeated inhalation may have neurological effects.

FIRST AID *Emergency personnel should protect against contamination.*

Eyes: Gently lift eyelids and flush immediately and continuously with flooding amounts of water until transported to an emergency medical facility. Do *not* allow victim to rub or keep eyes tightly shut. Immediately consult an ophthamiologist. **Skin:** 1,1-Dichloroethane vaporizes easily and poses an inhalation hazard as well. *Quickly and carefully* remove contaminated clothing; *1,1-dichloroethane is flammable!* Rinse with flooding amounts of water for at least 15 min. Wash exposed area with soap and water. For reddened or blistered skin, consult a physician. **Inhalation:** Remove exposed person to fresh air and support breathing as needed. **Ingestion:** Never give anything by mouth to an unconscious or convulsing person. Contact a poison control center. Unless the poison control center advises otherwise, have that *conscious and alert* person drink 1 to 2 glasses of water, then induce vomiting. After vomiting, give 2 tbsp activated charcoal in 8 oz water to drink.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: Proper ventilation is the main treatment for acute exposure. Be prepared to support respiration if needed. Monitor liver function studies, urine analysis, and creatinine with acute and chronic exposure.

Section 7. Spill, Leak, and Disposal Procedures

Spill/Leak: Immediately notify safety personnel, isolate and ventilate area, deny entry, and stay upwind. Shut off ignition sources. Cleanup personnel should protect against inhalation and skin contact. For small spills, take up with earth, sand, vermiculite, or other absorbent, noncombustible material and using nonsparking tools, place in a suitable container. For large spills, dike far ahead of liquid spill for disposal or reclamation. Do not allow 1,1-dichloroethane to enter confined areas such as a sewer because of potential explosion. Follow applicable OSHA regulations (29 CFR 1910.120). **Environmental Degradation:** In soil, 1,1-dichloroethane volatilizes rapidly but may leach into groundwater. In water it will volatilize from a pond, lake, or river with a half-life of 6 to 9 days, 5 to 8 days, and 24 to 32 hr, respectively. In the atmosphere it will degrade by reaction with photochemically produced hydroxyl radicals with a 62 day half-life. It may also be carried back to soil via rain.

Ecotoxicity Values: *Artemia salina*, brine shrimp, TLm 320 mg/L/24 hr; *Lagodon rhomboides*, pinperch, TLm 160 mg/L/24 hr; *Poecilia reticulata*, guppies, LC_{50} 202 ppm/7 days.

Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

EPA Designations

SARA Extremely Hazardous Substance (40 CFR 355): Not listed

SARA Toxic Chemical (40 CFR 372.65): Not listed

Listed as a RCRA Hazardous Waste (40 CFR 261.33): No. U076

Listed as a CERCLA Hazardous Substance* (40 CFR 302.4): Final Reportable Quantity (RQ), 1000 lb (454 kg)

[* per RCRA, Sec. 3001 & CWA, Sec. 307(a)]

OSHA Designations Listed as an Air Contaminant (29 CFR 1910.1000, Table Z-1-A)

Section 8. Special Protection Data

Goggles: Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Because contact lens use in industry is controversial, establish your own policy. **Respirator:** Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a NIOSH/MSHA-approved respirator. For < 1000 ppm, use any supplied-air respirator or SCBA. For < 2500 ppm, use any supplied-air respirator operated in a continuous flow mode. For < 4000 ppm, use any supplied-air respirator or SCBA with a full facepiece. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.* If respirators are used, OSHA requires a respiratory protection program that includes at least: training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas. **Other:** Wear chemically protective gloves, boots, aprons, and gauntlets to prevent repeated or prolonged skin contact. Polyvinyl alcohol is recommended as suitable material for PPG. **Ventilation:** Provide general and local exhaust ventilation systems to maintain airborne concentrations below the OSHA PEL (Sec. 2). Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.[103] **Safety Stations:** Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities. **Contaminated Equipment:** Separate contaminated work clothes from street clothes and launder before reuse. Thoroughly decontaminate personal protective equipment. **Comments:** Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9. Special Precautions and Comments

Storage Requirements: Prevent physical damage to containers. Store in a cool, dry, well-ventilated area away from ignition sources and incompatibles (Sec. 5). Label containers to indicate the contents' high flammability. Periodically inspect containers for cracks and leaks. To prevent static sparks, electrically ground and bond all equipment used in 1,1-dichloroethane manufacture, use, storage, transfer, and shipping.

Engineering Controls: To reduce potential health hazards, use sufficient dilution or local exhaust ventilation to control airborne contaminants and to maintain concentrations at the lowest practical level.

Administrative Controls: Consider preplacement and periodic medical exams of exposed workers emphasizing the skin, CNS, liver, and kidney. Educate workers about the hazards of 1,1-dichloroethane and the necessary precautions to reduce or prevent exposure.

Transportation Data (49 CFR 172.102)

IMO Shipping Name: 1,1-Dichloroethane

IMO Hazard Class: 3.2

ID No.: UN2362

IMO Label: Flammable Liquid

IMDG Packaging Group: II

***MSDS Collection* References:** 73, 89, 101, 103, 126, 127, 131, 132, 133, 136, 140, 148, 149, 153, 159, 162, 163, 164, 167, 168, 171

Prepared by: M Gannon, BA; **Industrial Hygiene Review:** PA Roy, MPH, CIH; **Medical Review:** AC Darlington, MPH, MD

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Genium Publishing Corporation
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Schenectady, NY 12303-1836 USA
(518) 377-8854

Material Safety Data Sheets Collection:

Sheet No. 708
Vinylidene Chloride

Issued: 4/90

Section 1. Material Identification

31

Vinylidene Chloride Description: Prepared from ethylene chloride. Also prepared from vinyl chloride by successive chlorination and dehydrochlorination steps. Used primarily as a co-monomer in producing vinylidene copolymers (Saran®, Velon®) for films and coatings. Also used in producing methyl chloroform, vinyl chloride resins, plastics, chloracetyl chloride; in adhesives; as a component of synthetic fibers; a chemical intermediate in vinylidene fluoride synthesis; and for 1,1,1-trichloroethane. A common constituent in our environment, measurable quantities of vinylidene chloride are found in poorly ventilated areas with a high concentration of plastics. It is a notable contaminant in recycled air environments such as nuclear submarines and spacecraft.
Other Designations: CAS No. 0075-35-4; $C_2H_2Cl_2$; 1,1-DCE; 1,1-dichloroethene; *asym*-dichloroethylene; VDC; vinylidene dichloride.
Manufacturer: Contact your supplier or distributor. Consult the latest *Chemicalweek Buyers' Guide*(TM) for a suppliers list.
Comment: At temperatures above 32 °F/0 °C and especially in the presence of oxygen or other suitable catalysts, vinylidene chloride polymerizes to a plastic. Therefore, commercial products may contain small proportions of inhibitors to preserve the monomer.

R 3
I 4
S 2
K 4

NFPA



HMIS
H 2
F 4
R 2
PPG*
* Sec. 8

Section 2. Ingredients and Occupational Exposure Limits

Vinylidene chloride, ca 100%

OSHA PEL
8-hr TWA: 1 ppm, 4 mg/m³

ACGIH TLVs, 1989-90
TLV-TWA: 5 ppm, 20 mg/m³
TLV-STEL: 20 ppm, 79 mg/m³

NIOSH REL, 1987
None established

Toxicity Data*
Mouse, skin, TD_{Lo}: 4840 mg/kg has tumorigenic effects on skin, appendages, lungs, thorax, and respiration
Rat, inhalation, LC_{50}: 6350 ppm/4 hr
Human, inhalation, TC_{Lo}: 25 ppm produces changes in behavior (general anesthetic), the liver, kidney, ureter, and bladder

* See NIOSH, *RTECS* (YZ8061000), for additional mutative, reproductive, tumorigenic, and toxicity data.

Section 3. Physical Data

Boiling Point: 89.1 °F/31.7 °C at 760 mm Hg
Melting Point: -188.5 °F/-122.5 °C
Vapor Pressure: 591 mm Hg at 77 °F/25 °C
Vapor Density (Air = 1): 3.4

Molecular Weight: 96.94 g/mol
Specific Gravity (H_2O = 1 at 39 °F/4 °C): 1.2129 at 68 °F/20 °C
Water Solubility: Sparingly soluble (0.04 % wt/vol in water at 68 °F/20 °C)

Appearance and Odor: Colorless, volatile liquid with a mild, sweet odor that resembles chloroform. Most persons can detect vinylidene chloride at 1000 ppm, but others can detect it at less than 500 ppm. Neither odor is adequate to warn of excessive exposure.

Section 4. Fire and Explosion Data

Flash Point: -19 °F/-28 °C	Autoignition Temperature: 1058 °F/570 °C	LEL: 5.6% v/v	UEL: 11.4% v/v

Extinguishing Media: Use dry chemical, alcohol foam, or carbon dioxide. Use water to cool fire-exposed containers.
Unusual Fire or Explosion Hazards: Vinylidene chloride is a very flammable and volatile liquid with a burning rate of 2.7 mm/min. This material is a very dangerous fire hazard and moderately explosive when exposed to heat or flame. It may explode spontaneously since the vapor forms explosive mixtures with air. At elevated temperatures, polymerization may take place and containers may rupture.
Special Fire-fighting Procedures: Since vinylidene chloride may be poisonous if inhaled or absorbed through the skin, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode with a fully encapsulating suit. Keep unnecessary people away from the hazard area. Vapors may travel to an ignition source and flash back. Be aware of runoff from fire control methods. Do not release to sewers or waterways.

Section 5. Reactivity Data

Stability/Polymerization: Vinylidene chloride is self-reactive. If stored between -40 °F/-40 °C and 77 °F/25 °C in air without an inhibitor, this material rapidly absorbs oxygen and forms a violently explosive peroxide. The heat of polymerization is -185 cal/g (inhibited). When unstable, vinylidene chloride decomposes into chlorine, hydrogen chloride, phosgene, and formaldehyde. Hazardous polymerization can occur if exposed to sunlight, air, copper, aluminum, or heat.
Chemical Incompatibilities: This material reacts violently with chlorosulfonic acid, nitric acid, and oleum; and vigorously with oxidizing materials.
Hazardous Products of Decomposition: Thermal oxidative decomposition of vinylidene chloride can produce highly toxic fumes of chlorine (Cl_2) and hydrogen chloride (HCl).

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Section 6. Health Hazard Data

Carcinogenicity: Neither the NTP, IARC, nor OSHA lists vinylidene chloride as a carcinogen, although the ACGIH suggests it is a suspected carcinogen. Various animal studies suggest a high rate of cancer in species-specific testing; application to humans does not appear valid.
Summary of Risks: Vinylidene chloride is an irritant to the skin, eyes, and mucous membranes, although any inhibitor in vinylidene chloride may partly cause the irritation. VDC is narcotic at concentrations greater than 4000 ppm, and has caused liver and kidney injury in experimental animals. Solutions containing the inhibitor MEHQ (monomethyl ether of hydroquinone) may cause leucoderma (white skin) and serious eye injury.
Medical Conditions Aggravated by Long-Term Exposure: None reported.
Target Organs: Skin, eyes, central nervous system, liver, and kidneys.
Primary Entry Routes: Inhalation.
Acute Effects: Inhalation of VDC causes narcosis and respiratory irritation. Concentrations of 4000 ppm lead to symptoms of drunkenness and eventually unconsciousness if the exposure continues. In monkey studies, exposure to 200 ppm caused acute liver injury with a mechanism similar to carbon tetrachloride. Animal studies indicate acute kidney changes in high-level exposures. Eye contact may cause conjunctivitis, transient corneal injury, and iritis. VDC also causes skin and mucous membrane irritation.
Chronic Effects: With chronic inhalation, vinylidene chloride may cause hepatic and renal dysfunction. In monkey studies, long-term inhalation at a 48-ppm level caused liver and kidney damage and death.
FIRST AID
Eyes: Flush immediately, including under the eyelids, gently but thoroughly with flooding amounts of running water for at least 15 min.
Skin: *Quickly* remove contaminated clothing. After rinsing affected skin with flooding amounts of water, wash it with soap and water.
Inhalation: Remove exposed person to fresh air and support breathing as needed.
Ingestion: Never give anything by mouth to an unconscious or convulsing person. If ingested, have a *conscious* person drink 1 to 2 glasses of water, then induce repeated vomiting until vomit is clear.
After first aid, get appropriate in-plant, paramedic, or community medical support.
Physician's Note: Solutions containing increased MEHQ concentrations are caustic and should not be removed by emesis. There is no specific treatment for VDC intoxication, but if significant amounts have been ingested, monitor the patient for liver and kidney failure.

Section 7. Spill, Leak, and Disposal Procedures

Spill/Leak: *Design and practice a vinylidene chloride spill control and countermeasure plan (SCCP).* Notify safety personnel, evacuate all unnecessary personnel from hazard area, remove all heat and ignition sources, and ventilate area. Cleanup personnel should protect against inhalation and skin and eye contact. For lab spills, absorb the spill with paper towels and place in a hood to allow liquid to evaporate. For large spills, absorb bulk spill with cement powder, fly ash, sawdust, or commercial sorbents. Place waste in appropriate disposal containers. Follow applicable OSHA regulations (29 CFR 1910.120).
Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.
EPA Designations
RCRA Hazardous Waste (40 CFR 261.33): Not listed
Listed as a CERCLA Hazardous Substance* (40 CFR 302.4), Reportable Quantity (RQ): 5000 lb (2270 kg) [* per Clean Water Act, Sec. 31 (b)(4), Sec. 307(a); per RCRA, Sec. 3001]
SARA Extremely Hazardous Substance (40 CFR 355): Not listed
Listed as a SARA Toxic Chemical (40 CFR 372.65)
OSHA Designations
Air Contaminant (29 CFR 1910.1000, Subpart Z): Not listed

Section 8. Special Protection Data

Goggles: Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133).
Respirator: Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a NIOSH-approved respirator. Respiratory canisters containing alkaline materials should not be used because dichloro acetylene can be formed. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA.
Warning: Air-purifying respirators do *not* protect workers in oxygen-deficient atmospheres.
Other: Wear impervious gloves, boots, aprons, and gauntlets to prevent skin contact. Rubber gloves are recommended.
Ventilation: Provide general and local explosion-proof ventilation systems to maintain airborne concentrations below the OSHA PEL and ACGIH TLVs (Sec. 2). Local explosion-proof exhaust ventilation is preferred since it prevents contaminant dispersion into the work area by controlling it at its source.[103]
Safety Stations: Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities.
Contaminated Equipment: Never wear contact lenses in the work area: soft lenses may absorb, and all lenses concentrate, irritants. Remove this material from your shoes and equipment. Launder contaminated clothing before wearing.
Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9. Special Precautions and Comments

Storage Requirements: Store vinylidene chloride in tanks with nickel, glass, or baked phenolic linings at 14 °F/-10 °C in the absence of light, air, water, and other polymerization initiators under a nitrogen blanket (at 10-psi pressure and an oxygen content less than 100 ppm). Outside or detached storage is preferable. If stored inside, store in a standard flammable liquids storage cabinet separate from oxidizing materials and incompatible materials (Sec. 5).
Engineering Controls: VDC requires special handling, precautions, and employee training. Do not handle VDC without adequate ventilation and personal protective gear. Limit exposures to vinylidene chloride by improving housekeeping procedures. Keep VDC away from all heat and ignition sources. All engineering systems should be of maximum explosion-proof design, electrically grounded, and bonded.

Transportation Data (49 CFR 172.101, .102)

DOT Shipping Name: Vinylidene chloride, inhibited
DOT Hazard Class: Flammable liquid
ID No.: UN1303
DOT Label: Flammable liquid
DOT Packaging Requirements: 173.119
DOT Packaging Exceptions: 173.118

IMO Shipping Name: Vinylidene chloride, inhibited
IMO Hazard Class: 3.1
IMO Label: Flammable liquid
IMDG Packaging Group: I
ID No.: UN1303

MSDS Collection **References:** 7, 26, 38, 53, 73, 84, 85, 87, 89, 100, 103, 124, 126, 127, 129, 134, 136
Prepared by: MJ Allison, BS; **Industrial Hygiene Review:** DJ Wilson, CIH; **Medical Review:** W Silverman, MD

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Chromium Oxide from Plating

BABCOCK & WILCOX -- MIX 49-A - REFRACTORY COATING
MATERIAL SAFETY DATA SHEET
FSC: 5640
NIIN: 00F008122
Manufacturer's CAGE: 19740
Part No. Indicator: A
Part Number/Trade Name: MIX 49-A

General Information

Item Name: REFRACTORY COATING
Company's Name: BABCOCK & WILCOX COMPANY
Company's Street: 2102 OLD SAVANNAH ROAD
Company's P. O. Box: 923
Company's City: AUGUSTA
Company's State: GA
Company's Zip Code: 30903
Company's Emerg Ph #: (404) 796-4200
Company's Info Ph #: (404) 796-4200
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Date MSDS Prepared: 01MAY87
Safety Data Review Date: 20APR89
Preparer's Company: BABCOCK & WILCOX COMPANY
Preparer's St Or P. O. Box: 2102 OLD SAVANNAH ROAD
Preparer's City: AUGUSTA
Preparer's State: GA
Preparer's Zip Code: 30903
MSDS Serial Number: BGVVT

Ingredients/Identity Information

Proprietary: NO
Ingredient: SODIUM PHOSPHATE, TRIBASIC (SARA III)
Ingredient Sequence Number: 01
Percent: 50%
NIOSH (RTECS) Number: TC9575000
CAS Number: 10101-89-0
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED

Proprietary: NO
Ingredient: CHROMIUM (III) OXIDE
Ingredient Sequence Number: 02
Percent: <25%
NIOSH (RTECS) Number: GB6475000
CAS Number: 1308-38-9
OSHA PEL: 0.5 MG/M3 (CR)
ACGIH TLV: 0.5 MG/M3 (CR); 8990

Proprietary: NO
Ingredient: PARTICULATES NOT OTHERWISE REGULATED (NUISANCE DUST)
Ingredient Sequence Number: 03
Percent: >25%
NIOSH (RTECS) Number: 1002113DN
OSHA PEL: 15 MG/M3 TOTAL DUST
ACGIH TLV: 10 MG/M3 TDUST; 8990

Physical/Chemical Characteristics

Appearance And Odor: GREEN LIQUID. ACID ODOR.
Solubility In Water: SOLUBLE

Fire and Explosion Hazard Data

Reactivity Data

Stability: YES
Cond To Avoid (Stability): THESE PRODUCTS CONTAIN CHROMIC OXIDE WHICH CAN REACT W/LI, NA, K, CA, MG AT HIGH TEMPS TO FORM HEXAVALENT CHROMIUM CPDS.
Materials To Avoid: ALKALINE MATERIALS, STRONG BASES, REACTIVE METALS.
Hazardous Poly Occur: NO

Health Hazard Data

Route Of Entry - Inhalation: YES
Route Of Entry - Skin: NO
Route Of Entry - Ingestion: NO
Health Haz Acute And Chronic: THESE PRODUCTS CONTAIN PHOSPHORIC ACID, WHICH MAY CAUSE IRRITATION TO SKIN & SEVERE BURNING TO EYES. PROLONGED/ REPEATED INHALATION OF TRIVALENT CHROMIUM COMPOUNDS (CHROMIC OXIDE IS A TRIVALENT CHROMIUM COMPOUND) MAY CAUSE DELAYED LUNG INJURY.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: CERTAIN WATER INSOLUBLE CHROME VI COMPOUNDS ARE A1A HUMAN CARCINOGENS.
Signs/Symptoms Of Overexp: EXPOSURE TO NUISANCE DUST MAY CAUSE TEMPORARY IRRITATION OR DISCOMFORT OF THE SKIN, EYES, NOSE, THROAT, OR LUNGS AND MAY AGGRAVATE BRONCHIAL DISORDERS. PROLONGED/REPEATED INHALATION OF TRIVALENT CHROMIUM COMPOUNDS (CHROMIC OXIDE IS A TRIVALENT CHROMIUM COMPOUND) MAY CAUSE DELAYED LUNG INJURY.
Med Cond Aggravated By Exp: BRONCHIAL DISORDERS
DRINK PLENTY OF WATER. SKIN: WASH WITH MILD SOAP & WATER. EYES: FLUSH WITH WATER FOR AT LEAST 15 MINUTES. CONSULT PHYSICIAN.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: DIKE, SALVAGE, OR NEUTRALIZE WITH SODA ASH OR LIME.
Neutralizing Agent: SODA ASH OR LIME
Waste Disposal Method: UNUSED PRODUCT - NEUTRALIZE & USE ANY APPROVED SOLID WASTE DISPOSAL METHOD OR DISPOSE OF AS HAZARDOUS WASTE IN ACCORDANCE WITH RCRA. IF HEXAVALENT CHROMIUM COMPOUNDS ARE DETECTED, USED PRODUCT IS A HAZARDOUS WASTE.
Precautions-Handling/Storing: REMOVAL OF THESE PRODUCTS AFTER SERVICE MAY GENERATE DUST CONTAINING CHROME COMPOUNDS.
Other Precautions: USED PRODUCTS SHOULD BE DISPOSED OF AS HAZARDOUS WASTE IF HEXAVALENT CHROMIUM COMPOUNDS ARE DETECTABLE.

Control Measures

Respiratory Protection: MSHA/NIOSH-APPROVED, AIR PURIFYING, HALF MASK OR FULL FACEPIECE RESPIRATOR WITH APPROPRIATE FILTER PAD OR CARTRIDGE.
Ventilation: LOCAL EXHAUST/MECHANICAL
Protective Gloves: RECOMMENDED
Eye Protection: ACID GOGGLES
Other Protective Equipment: PROTECTIVE CLOTHING TO AVOID SKIN CONTACT.
Work Hygienic Practices: APPROPRIATE EYE/CLOTHING PROTECTION SHOULD BE WORN TO MINIMIZE EYE/SKIN.

Transportation Data

Disposal Data

Disposal Data Review Date: 90039
Rec # For This Disp Entry: 01
Tot Disp Entries Per NSN: 001

Landfill Ban Item: YES
Disposal Supplemental Data: N/K IN CASE OF ACCIDENTAL EXPOSURE OR DISCHARGE, CONSULT HEALTH AND SAFETY FILE FOR PRECAUTIONS.
1st EPA Haz Wst Code New: D002
1st EPA Haz Wst Name New: CORROSIVE
1st EPA Haz Wst Char New: CORROSIVITY
1st EPA Acute Hazard New: NO

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Label Data

==========

Label Required: YES
Label Status: G
Common Name: MIX 49-A
Special Hazard Precautions: THESE PRODUCTS CONTAIN PHOSPHORIC ACID, WHICH MAY CAUSE IRRITATION TO SKIN & SEVERE BURNING TO EYES. PROLONGED/REPEATED INHALATION OF TRIVALENT CHROMIUM COMPOUNDS (CHROMIC OXIDE IS A TRIVALENT CHROMIUM COMPOUND) MAY CAUSE DELAYED LUNG INJURY. EXPOSURE TO NUISANCE DUST MAY CAUSE TEMPORARY IRRITATION OR DISCOMFORT OF THE SKIN, EYES, NOSE, THROAT, OR LUNGS AND MAY AGGRAVATE BRONCHIAL DISORDERS. PROLONGED/REPEATED INHALATION OF TRIVALENT CHROMIUM COMPOUNDS (CHROMIC OXIDE IS A TRIVALENT CHROMIUM COMPOUND) MAY CAUSE DELAYED LUNG INJURY.
Label Name: BABCOCK & WILCOX COMPANY
Label Street: 2102 OLD SAVANNAH ROAD
Label P.O. Box: 923
Label City: AUGUSTA
Label State: GA
Label Zip Code: 30903
Label Emergency Number: (404) 796-4200

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URL for this msds http://hazard.com. If you wish to change, add to, or delete information in this archive please sent updates to dan@hazard.com.

Site No. 633027
Primoshield Plating Site

Appendix B

Health & Safety Field Forms

HASP Modification Form
Site Safety Meeting Form
Instrument Calibration Log
Atmospheric Monitoring Log

Page No _____ of _____

Project: _____

Project Location: _____

Project No _____

Site Safety Officer: _____

Field Modification to HASP _____

Prepared By: _____
Site Safety Officer — Date

Accepted By: _____
Project Manager — Date

Page _____ of _____

Project: _____ Date: _____

Project Number: _____ Time: _____

Meeting Conducted By: _____ _____

Name Signature

Summary Of Items Discussed: _____

Personnel Present

	Name	Representing	Signature
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			

NOTE: Place in project files.

INSTRUMENT: _____

Date Calibrated	Known Standard	Actual Instrument Reading	Adjustments Made	Calibrated By	Comments

COMMENTS: _____

NOTE: Place in project files and/or Instrument Maintenance file.

Atmospheric Monitoring Log
Field Health and Safety

Page _____ of _____
Date ____/____/____
Circle: Sun Mon Tue Wed Thu Fri Sat

Site: _____ Project No.: _____
Site Safety Officer: _____
Action Levels: D ☐ → C ☐ → B ☐ → (Stop work, call in for instructions)
(Check box and write in levels for upgrade)
Task/Equipment: _____
Weather: _____

Time	OVA PPM	HNu PPM	O_2 %	LEL %	H_2S PPM	Comments: Duration of Readings, Upgrades, Location, etc.

Additional Comments: _____

Signature: _____

NOTE: Place in project files.

Site No. 633027
Primoshield Plating Site

Appendix C

Public Employee Safety and Health Act

All Regional Directors & Division Directors
Joe Lattanzio (Employee Relations Office)

PLEASE POST APPROPRIATELY

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State Office Building Campus
Albany, New York 12240

JAMES J. McGOWAN
Commissioner of Labor



February 5, 1999

To: New York State Agency Heads

I would like to take this opportunity to remind all state agencies of the requirements of Article 2, Section 27-a, of the New York State Labor Law – the Public Employee Safety and Health (PESH) Act – and the rules and regulations promulgated under the law as they relate to the safety and health of public employees.

The Department of Labor is charged with the responsibility of investigating any workplace incident which is fatal to one or more public employees or results in the in-patient hospitalization of two or more public employees. The purpose of these investigations is threefold: (1) to prevent a recurrence, (2) to ensure the adequacy of the workplace safety and health standards, and finally, (3) to determine if a violation of the Labor Law has contributed to the incident.

To ensure that the Department of Labor has prompt knowledge of these incidents, 12 NYCRR Part 801.9 requires all public employers to report such accidents or incidents to the nearest Division of Safety and Health District Office within eight hours of becoming aware of a reportable accident or incident. I am enclosing for your convenience a list of the locations and telephone and fax numbers for these offices.

The departmental policy of immediately starting an investigation when there are serious injuries or a death allows the inspection staff to gather information necessary to prevent a recurrence. It permits Department staff to interview witnesses and allows a review of the site as it existed at the time of the accident or incident.

As agency heads, you are responsible for ensuring that the various laws and regulations pertaining to the safety and health of your employees are adhered to. The Department of Labor stands ready to assist you in this regard. You or your staff may feel free to contact the Department's Public Employee Safety and Health Bureau at (518) 457-1263 for further clarification of the reporting requirements or any other safety and health issue.

Enclosure

NEW YORK LABOR Helping NYwork

(over)

Telephone (518) 457-2741 Fax (518) 457-6908

Division of Safety & Health

District Offices

Use the table below to locate the Division of Safety & Health office in your area.

Locations	Telephone/Fax	Counties Covered
Albany District State Office Campus Bldg. 12, Rm 159 Albany, NY 12240	Tel. (518) 457-5508 Fax (518) 485-1150	Albany, Clinton, Columbia, Dutchess, Essex, Green, Rensselaer, Saratoga, Schenectady, Schoharie, Ulster, Warren, Washington
Binghamton District 44 Hawley Street 9th Floor Binghamton, NY 13901	Tel. (607) 721-8211 Fax (607) 721-8207	Allegany, Broome, Chemung, Chenango, Delaware, Otsego, Schuyler, Steuben, Sullivan, Tioga, Tompkins
Buffalo District 65 Court Street Buffalo, NY 14202	Tel. (716) 847-7133 Fax (716) 847-7108	Cattaraugus, Chautauqua, Erie, Niagara
Hempstead District 175 Fulton Street Hempstead, NY 11550	Tel. (516) 485-4409 Fax (516) 485-0155	Nassau, Suffolk
New York City District 345 Hudson Street Mail Stop 7F PO Box 683 New York, NY 10014	Tel. (212) 352-6087 Fax (212) 352-6186	Bronx, Kings, New York, Queens, Richmond
Rochester District 155 W. Main Street Rochester, NY 14614	Tel. (716) 258-4753 Fax (716) 258-4593	Genesee, Livingston, Monroe, Ontario, Orleans, Wayne, Wyoming, Yates
Syracuse District South Salina Street Syracuse, NY 13201	Tel. (315) 479-3206 Fax (315) 479-3451	Cayuga, Cortland, Jefferson, Onondaga, Oswego, Seneca
Utica District 207 Genesee Street Utica, NY 13501	Tel. (315) 793-2316 Fax (315) 792-2303	Franklin, Fulton, Hamilton, Herkimer, Lewis, Madison, Montgomery, Oneida, St. Lawrence
White Plains District 30 Glenn Street White Plains, NY 10603	Tel. (914) 997-9509 Fax (914) 997-9528	Orange, Putman, Rockland, Westchester

ORIGINAL PRODUCT INFORMATION

HAYWARD INDUSTRIAL PRODUCTS
INSTALLATION OPERATION & MAINTENANCE
OF TRUE UNION BALL VALVES

SOCKET CONNECTION:

Socket end connections are manufactured to ASTM D2467-87A. Solvent cementing of socket end connections to pipe should be performed per ASTM specifications D2855-87. Cut pipe square. Chamfer and deburr pipe. Surfaces must be cleaned and free of dirt, moisture, oil and other foreign material. Remove assembly nuts and end connectors from valve body. Slide assembly nuts, with threads facing valve, onto pipe to which the end connector is to be cemented. Apply primer to inside socket surface of end connector. Never allow primer or cement to contact valve ball or end connector o-ring sealing surfaces, as leaking may result. Use a scrubbing motion. Repeat applications may be necessary to soften the surface of the socket. Next, liberally apply primer to the male end of the pipe to the length of the socket depth. Again apply to the socket, without delay apply cement to the pipe while the surface is still wet with primer. Next apply cement lightly, but uniformly to the inside of the socket. Apply a second coat of cement to the pipe, and assemble the end connector to the pipe, rotating the end connector 1/4 turn in one direction as it is slipped to full depth on to the pipe. The end connector should be held in position for approx. 30 seconds to allow the connection to "set". After assembly wipe off excess cement. Full set time is a minimum of 30 minutes at 60 to 100 F. Full cure time should be based on the chart below.

JOINT CURE SCHEDULE:

The cure schedules are suggested as guides. They are based on laboratory test data, and should not be taken to be the recommendations of all cement manufacturers. Individual manufacturer's recommendations for their particular cement should be followed.

Temperature Range During Cure Period(B) °F(°C)	Test Pressures for Pipe Sizes 1/2 to 1-1/4 In.		Test Pressures for Pipe Sizes 1-1/2 to 3 In.		Test Pressures for Pipe Sizes 4 to 5 In.		Test Pressures for Pipe Sizes 6 to 8 In.	
	Up to 180 PSI (1240 kPa)	Above 180 to 370 PSI (1240 to 2550 kPa)	Up to 180 PSI (1240 kPa)	Above 180 to 315 PSI 1240) to 2170 kPa)	Up to 180 PSI (1240 kPa)	Above 180 to 315 PSI (1240 to 2170 kPa)	Up to 180 PSI (1240 kPa)	Above 180 to 315 PSI (1240 to 2170 kPa)
60 to 100 (15 to 40)	1 h	6 h	2 h	12 h	6 h	18 h	8 h	24 h
40 to 60 (5 to 15)	2 h	12 h	4 h	24 h	12 h	36 h	16 h	48 h
20 to 40 (-7 to 5)	6 h	36 h	12 h	72 h	36 h A	4 days A	3 days A	9 days A
10 to 20) (-15 to 7)	8 h	48 h	16 h	96 h	72 h A	8 days A	4 days A	12 days A
Colder than 10 (-15)	Extreme care should be exercised on all joints made where pipe, fittings or cement is below 10°F.							

A: It is important to note that at temperatures colder than 20°F on sizes that exceed 3 in., test results indicate that many variables exist in the actual cure rate of the joint. The data expressed in these categories represent only estimated averages. In some cases, cure will be achieved in less time, but isolated test results indicate that even longer periods of cure may be required.
B: These cure schedules are based on laboratory test data obtained on Net Fit Joints (NET FIT=in a dry fit the pipe bottoms snugly in the fitting socket without meeting interference).

THREADED CONNECTION:

Threaded end connections are manufactured to ASTM specifications D2464-88. F437-88 and ANSI B2.1. Wrap threads of pipe with Teflon tape of 3 to 3-1/2 mil thickness. The tape should be wrapped in a clockwise direction starting at the first or second full thread. Overlap each wrap by, 1/2 the width of the tape. The wrap should be applied with sufficient tension to allow the threads of a single wrapped area to show through without cutting the tape. The wrap should continue for the full effective length of the thread. Pipe sizes 2" and greater will not benefit with more than a second wrap, due to the greater thread depth. To provide a leak proof joint, the pipe should be threaded into the end connection "hand tight". Using a strap wrench only. (Never use a stillson type wrench) tighten the joint an additional 1/2 to 1-1/2 turns past hand tight. Tightening beyond this point may induce excessive stress that could cause failure.

FLANGED CONNECTION:

Flange bolts should be tight enough to slightly compress the gasket and make a good seal, without distorting or putting excessive stress on the flanges. Suitable washers should be used between the bolt head and flange and the nut and flange. Bolts should be tightened in alternating sequence.

RECOMMENDED FLANGE BOLT TORQUE

FLANGE SIZE	BOLT DIA.	TORQUE FT. LBS.	FLANGE SIZE	BOLT DIA.	TORQUE FT. LBS.
1/2	1/2	10-15	2	5/8	15-25
3/4	1./2	10-15	2-1/2	5/8	20-25
1	1/2	10-15	3	5/8	20-25
1-1/4	1/2	10-15	4	5/8	20-25
1-1/2	1/2	10-15	6	3/4	30-40

NOTE: USE WELL LUBRICATED METAL BOLTS AND NUTS. USE SOFT RUBBER GASKETS.

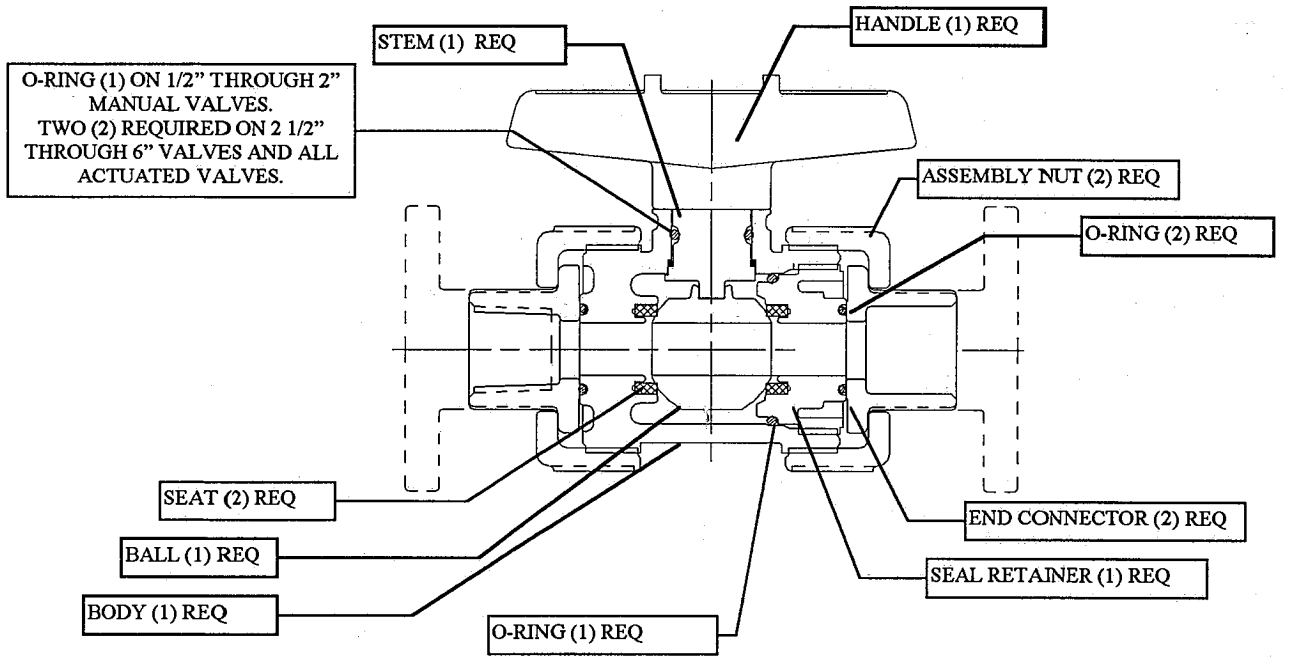
ADJUSTMENT:

EXTREME CAUTION MUST BE TAKEN WHEN WORKING ON THIS VALVE.
THE PIPING SYSTEM MUST BE DEPRESSURIZED AND DRAINED. PROPER CARE MUST BE TAKEN. CONSULT M.S.D.S. (MATERIAL SAFETY DATA SHEETS) INFORMATION REGARDING YOUR SPECIFIC APPLICATION.

Remove the assembly nut and end connector from the "adjust" end of the body, or the complete valve body from the piping system. The front face of the seal retainer indicates which direction of rotation tightens or loosens the seal retainer, with the word "tighten" and a directional arrow, and the word "loosen" and a directional arrow. Direction of rotation may vary depending on date of manufacture. The Assembly nut should be installed on the valve "hand tight". Using a strap wrench only the joint may be tightened 1/2 to 3/4 of a turn past hand tight.

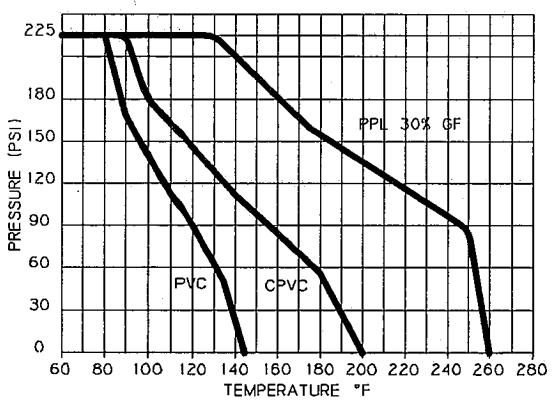
REPAIR:

Follow the adjustment sequence and information above, but rotating the seal retainer completely in the "loosen" direction and remove it from valve body. The o-rings and seals are now accessible for replacement using a "seal" repair kit. Carefully remove the o-rings from their respective locations taking care not to scratch their sealing surfaces. Use a non-petroleum base lubricant to lubricate the o-rings, and re-assemble the valve. See table below.



OPERATING PRESSURE TEMPERATURE

TRUE UNION, TRUE CHECK, & SINGLE ENTRY ONLY



Recommended valve stem torque to rotate the ball 360° when valve is reassembled.

VALVE SIZE	TORQUE IN*LB
1/2"	30
3/4"	40
1"	50
1 1/4"	60
1 1/2"	60
2"	80
3" & 2 1/2"	140
4" & 6"	170

HAYWARD INDUSTRIAL PRODUCTS
INSTALLATION OPERATION & MAINTENANCE OF SIMPLEX BASKET STRAINER

SOCKET CONNECTION INSTALLATION:

THE COVER OF THE BASKET STRAINER MUST BE REMOVED TO ALLOW THE CEMENT FUMES TO VENT.
Socket end connections are manufactured to ASTM D2467-87A. Solvent cementing of socket end connections to pipe should be performed per ASTM specifications D2855-87. Cut pipe square. Chamfer and deburr pipe. Surfaces must be cleaned and free of dirt, moisture, oil and other foreign material. Apply primer to inside socket surface of the Simplex strainer. Use a scrubbing motion. Repeat applications may be necessary to soften the surface of the socket. Next, liberally apply primer to the male end of the pipe to the length of the socket depth. Again apply to the socket, without delay apply cement to the pipe while the surface is still wet with primer. Next apply cement lightly, but uniformly to the inside of the socket. Apply a second coat of cement to the pipe, and assemble the pipe to the end socket of the Simplex, rotating the pipe 1/4 turn in one direction as it is slipped to full depth into the socket. The connection should be held in position for approx. 30 seconds to allow the connection to "set". After assembly wipe off excess cement. Full set time is a minimum of 30 minutes at 60 to 100 F. Full cure time should be based on the chart below.

JOINT CURE SCHEDULE:

The cure schedules are suggested as guides. They are based on laboratory test data, and should not be taken to be the recommendations of all cement manufacturers. Individual manufacturer's recommendations for their particular cement should be followed.

Temperature Range During	Test Pressures for Pipe Sizes 1/2 to 1-1/4 In.		Test Pressures for Pipe Sizes 1-1/2 to 3 In.		Test Pressures for Pipe Sizes 4 to 5 In.		Test Pressures for Pipe Sizes 6 to 8 In.	
Cure Period(B) °F(°C)	Up to 180 PSI (1240 kPa)	Above 180 to 370 PSI (1240 to 2550 kPa)	Up to 180 PSI (1240 kPa)	Above 180 to 315 PSI 1240) to 2170 kPa)	Up to 180 PSI (1240 kPa)	Above 180 to 315 PSI (1240 to 2170 kPa)	Up to 180 PSI (1240 kPa)	Above 180 to 315 PSI (1240 to 2170 kPa)
60 to 100 (15 to 40)	1 h	6 h	2 h	12 h	6 h	18 h	8 h	24 h
40 to 60 (5 to 15)	2 h	12 h	4 h	24 h	12 h	36 h	16 h	48 h
20 to 40 (-7 to 5)	6 h	36 h	12 h	72 h	36 h A	4 days A	3 days A	9 days A
10 to 20) (-15 to 7)	8 h	48 h	16 h	96 h	72 h A	8 days A	4 days A	12 days A
Colder than 10 (-15)	Extreme care should be exercised on all joints made where pipe, fittings or cement is below 10°F.							

A: It is important to note that at temperatures colder than 20°F on sizes that exceed 3 in., test results indicate that many variables exist in the actual cure rate of the joint. The data expressed in these categories represent only estimated averages. In some cases, cure will be achieved in less time, but isolated test results indicate that even longer periods of cure may be required.
B: These cure schedules are based on laboratory test data obtained on Net Fit Joints (NET FIT=in a dry fit the pipe bottoms snugly in the fitting socket without meeting interference).

THREADED CONNECTION INSTALLATION:

Threaded end connections are manufactured to ASTM specifications D2464-88. F437-88 and ANSI B2.1. Wrap threads of pipe with Teflon tape of 3 to 3-1/2 mil thickness. The tape should be wrapped in a clockwise direction starting at the first or second full thread. Overlap each wrap by, 1/2 the width of the tape. The wrap should be applied with sufficient tension to allow the threads of a single wrapped area to show through without cutting the tape. The wrap should continue for the full effective length of the thread. Pipe sizes 2" and greater will not benefit with more than a second wrap, due to the greater thread depth. To provide a leak proof joint, the pipe should be threaded into the end connection "hand tight". Using a strap wrench only. (Never use a stillson type wrench) tighten the joint an additional 1/2 to 1-1/2 turns past hand tight. Tightening beyond this point may induce excessive stress that could cause failure.

FLANGED CONNECTION INSTALLATION:

Flange bolts should be tight enough to slightly compress the gasket and make a good seal, without distorting or putting excessive stress on the flanges. Suitable washers should be used between the bolt head and flange and the nut and flange. Bolts should be tightened in alternating sequence.

RECOMMENDED FLANGE BOLT TORQUE

FLANGE SIZE	BOLT DIA.	TORQUE FT. LBS.	FLANGE SIZE	BOLT DIA.	TORQUE FT. LBS.
1/2	1/2	10-15	2	5/8	15-25
3/4	1./2	10-15	2-1/2	5/8	20-25
1	1/2	10-15	3	5/8	20-25
1-1/4	1/2	10-15	4	5/8	20-25
1-1/2	1/2	10-15	6	3/4	30-40
			8	3/4	30-40

NOTE: USE WELL LUBRICATED METAL BOLTS AND NUTS. USE SOFT RUBBER GASKETS.

METAL PIPING INSTALLATION:

Due to different thermal expansion rates between metal and plastic, transmittal of pipe vibration, and pipe loading forces, direct installation of plastic Simplex strainers into metal piping systems can potentially damage the Simplex strainer.

IT IS RECOMMENDED THAT AT LEAST 10 PIPE DIAMETERS IN LENGTH OF PLASTIC PIPING BE INSTALLED UPSTREAM AND DOWNSTREAM OF THE SIMPLEX STRAINER.

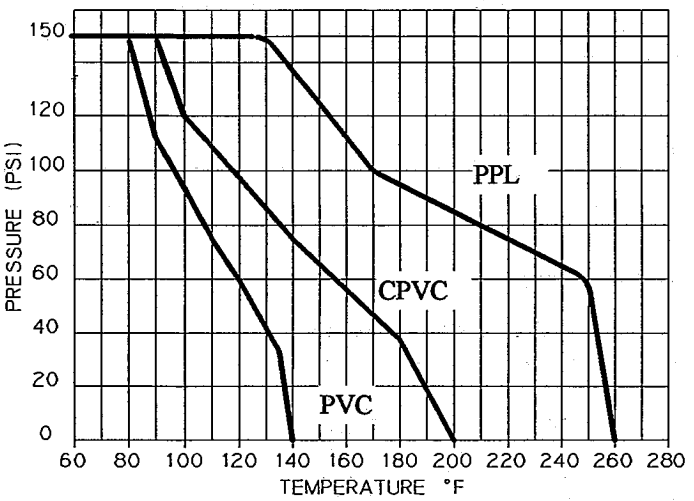
OPERATION and BASKET CLEANING:

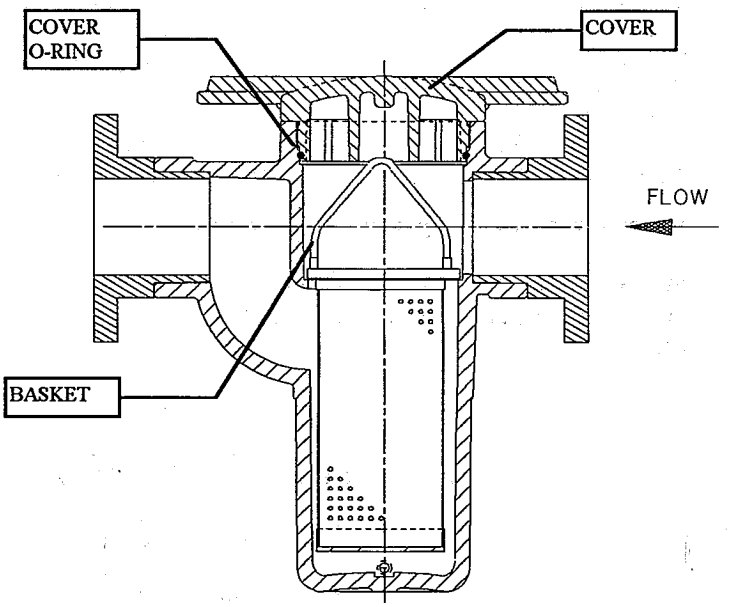
CAUTION: The Simplex basket strainer must be depressurized before proceeding further.
The cover must be installed per Step 5 below on the strainer before the system is pressurized.

The maximum recommended fluid velocity is 8 feet per second. This velocity minimizes the effects of valve closure and pump start up or shut down.

Pressure gauges may be installed on the inlet and the outlet piping to indicate by pressure loss, in excess of 5 psi, when the basket should be cleaned.

1. Valves should be installed just upstream and downstream of the Simplex Basket strainer. These valves must be closed and/or the system depressurized before proceeding.
2. The drain plug, from the strainer, should carefully be removed to depressurize and partially drain the strainer.
3. The strainer cover is removed by turning in a counter-clockwise direction. No tools are required. *Do not use wrenches or hammers.*
4. When the process fluid has been completely drained, remove the basket. Clean the basket by using a brush or soaking in an appropriate cleaning solution. **DO NOT USE SOLVENTS ON PLASTIC BASKETS.** Baskets should be cleaned as soon as possible after removal from the strainer, otherwise the contents may harden and become more difficult to remove. *Avoid striking baskets to loosen their contents as this may damage the basket.* To clean the basket strainer body wash the inside of the body with an appropriate cleaning solution. (NOT A SOLVENT)
5. Place a clean basket into the basket strainer body. The basket flange should rest squarely on the basket seat inside the body. Before replacing the cover, make sure that the "o"-ring for the cover is undamaged, clean, and lubricated. It is good practice to clean the body threads with a soft brush to remove all foreign material. **TIGHTEN THE COVER USING LIGHT HAND PRESSURE ONLY.** The cover holds the basket in place ensuring no material passes the basket. The cover does not have to be forced against the top surface of the body when tightening, as the seal is performed with a piston sealing action. A slight gap (approximately the thickness of a dime or a matchbook) between the cover and the top of the body will achieve a positive seal.
6. **Reinstall the drain plug.**
7. **Slowly open the upstream valve to pressurize the strainer.** It is good practice to provide a vent fitting so the air can be vented from the strainer.
8. **Slowly open the downstream valve.**





HAYWARD INDUSTRIAL PRODUCTS
INSTALLATION OPERATION & MAINTENANCE
OF DUPLEX BASKET STRAINER

SOCKET CONNECTION INSTALLATION:

BOTH THE COVERS OF THE BASKET STRAINERS MUST BE REMOVED TO ALLOW THE CEMENT FUMES TO VENT.
Socket end connections are manufactured to ASTM D2467-87A. Solvent cementing of socket end connections to pipe should be performed per ASTM specifications D2855-87. Cut pipe square. Chamfer and deburr pipe. Surfaces must be cleaned and free of dirt, moisture, oil and other foreign material. Apply primer to inside socket surface of the valve on the Duplex strainer. Never allow primer or cement to contact valve ball, as leaking may result. Use a scrubbing motion. Repeat applications may be necessary to soften the surface of the socket. Next, liberally apply primer to the male end of the pipe to the length of the socket depth. Again apply to the socket, without delay apply cement to the pipe while the surface is still wet with primer. Next apply cement lightly, but uniformly to the inside of the socket. Apply a second coat of cement to the pipe, and assemble the pipe to the end socket of the Duplex, rotating the pipe 1/4 turn in one direction as it is slipped to full depth into the socket. The connection should be held in position for approx. 30 seconds to allow the connection to "set". After assembly wipe off excess cement. Full set time is a minimum of 30 minutes at 60 to 100 F. Full cure time should be based on the chart below.

JOINT CURE SCHEDULE:

The cure schedules are suggested as guides. They are based on laboratory test data, and should not be taken to be the recommendations of all cement manufacturers. Individual manufacturer's recommendations for their particular cement should be followed.

Temperature Range During Cure Period(B) °F(°C)	Test Pressures for Pipe Sizes 1/2 to 1-1/4 In. Up to 180 PSI (1240 kPa)	Test Pressures for Pipe Sizes 1/2 to 1-1/4 In. Above 180 to 370 PSI (1240 to 2550 kPa)	Test Pressures for Pipe Sizes 1-1/2 to 3 In. Up to 180 PSI (1240 kPa)	Test Pressures for Pipe Sizes 1-1/2 to 3 In. Above 180 to 315 PSI 1240) to 2170 kPa)	Test Pressures for Pipe Sizes 4 to 5 In. Up to 180 PSI (1240 kPa)	Test Pressures for Pipe Sizes 4 to 5 In. Above 180 to 315 PSI (1240 to 2170 kPa)	Test Pressures for Pipe Sizes 6 to 8 In. Up to 180 PSI (1240 kPa)	Test Pressures for Pipe Sizes 6 to 8 In. Above 180 to 315 PSI (1240 to 2170 kPa)
60 to 100 (15 to 40)	1 h	6 h	2 h	12 h	6 h	18 h	8 h	24 h
40 to 60 (5 to 15)	2 h	12 h	4 h	24 h	12 h	36 h	16 h	48 h
20 to 40 (-7 to 5)	6 h	36 h	12 h	72 h	36 h A	4 days A	3 days A	9 days A
10 to 20) (-15 to 7)	8 h	48 h	16 h	96 h	72 h A	8 days A	4 days A	12 days A
Colder than 10 (-15)	Extreme care should be exercised on all joints made where pipe, fittings or cement is below 10°F.							

A: It is important to note that at temperatures colder than 20°F on sizes that exceed 3 in., test results indicate that many variables exist in the actual cure rate of the joint. The data expressed in these categories represent only estimated averages. In some cases, cure will be achieved in less time, but isolated test results indicate that even longer periods of cure may be required.
B: These cure schedules are based on laboratory test data obtained on Net Fit Joints (NET FIT=in a dry fit the pipe bottoms snugly in the fitting socket without meeting interference).

THREADED CONNECTION INSTALLATION:

Threaded end connections are manufactured to ASTM specifications D2464-88. F437-88 and ANSI B2.1. Wrap threads of pipe with Teflon tape of 3 to 3-1/2 mil thickness. The tape should be wrapped in a clockwise direction starting at the first or second full thread. Overlap each wrap by, 1/2 the width of the tape. The wrap should be applied with sufficient tension to allow the threads of a single wrapped area to show through without cutting the tape. The wrap should continue for the full effective length of the thread. Pipe sizes 2" and greater will not benefit with more than a second wrap, due to the greater thread depth. To provide a leak proof joint, the pipe should be threaded into the end connection "hand tight". Using a strap wrench only. (Never use a stillson type wrench) tighten the joint an additional 1/2 to 1-1/2 turns past hand tight. Tightening beyond this point may induce excessive stress that could cause failure.

FLANGED CONNECTION INSTALLATION:

Flange bolts should be tight enough to slightly compress the gasket and make a good seal, without distorting or putting excessive stress on the flanges. Suitable washers should be used between the bolt head and flange and the nut and flange. Bolts should be tightened in alternating sequence.

RECOMMENDED FLANGE BOLT TORQUE

FLANGE SIZE	BOLT DIA.	TORQUE FT. LBS.	FLANGE SIZE	BOLT DIA.	TORQUE FT. LBS.
1/2	1/2	10-15	2	5/8	15-25
3/4	1./2	10-15	2-1/2	5/8	20-25
1	1/2	10-15	3	5/8	20-25
1-1/4	1/2	10-15	4	5/8	20-25
1-1/2	1/2	10-15	6	3/4	30-40

NOTE: USE WELL LUBRICATED METAL BOLTS AND NUTS. USE SOFT RUBBER GASKETS.

METAL PIPING INSTALLATION:

Due to different thermal expansion rates between metal and plastic, transmittal of pipe vibration, and pipe loading forces, direct installation of plastic duplex strainers into metal piping systems can potentially damage the duplex strainer.

IT IS RECOMMENDED THAT AT LEAST 10 PIPE DIAMETERS IN LENGTH OF PLASTIC PIPING BE INSTALLED UPSTREAM AND DOWNSTREAM OF THE DUPLEX STRAINER.

OPERATION and BASKET CLEANING:

CAUTION: Only the strainer that the lever is not touching is off line and must be depressurized before proceeding further.
Both covers must be installed per Step 5 below on the strainers before the lever is moved.

The maximum recommended fluid velocity is 8 feet per second. This velocity minimizes the effects of valve closure and pump start up or shut down.

Pressure gauges may be installed on the inlet and the outlet piping to indicate by pressure loss, in excess of 5 psi, when the active basket should be cleaned.

1. The lever position indicates which is the active strainer. By being positioned toward a given strainer, the opposite strainer should be serviced. When a basket is to be removed from a strainer the **LEVER** must be moved ***SLOWLY*** from one position to the other.

2. The drain plug, from the strainer that has been taken off line for servicing, should carefully be removed to depressurize and partially drain the strainer.

3. The off line strainer cover is removed by turning in a counter-clockwise direction. No tools are required. *Do not use wrenches or hammers.*

4. When the process fluid has been completely drained, remove the basket. Clean the basket by using a brush or soaking in an appropriate cleaning solution. **DO NOT USE SOLVENTS ON PLASTIC BASKETS.** Baskets should be cleaned as soon as possible after removal from the strainer, otherwise the contents may harden and become more difficult to remove. *Avoid striking baskets to loosen their contents as this may damage the basket.* To clean the basket strainer body wash the inside of the body with an appropriate cleaning solution. (NOT A SOLVENT)

5. Place a clean basket into the basket strainer body. The basket flange should rest squarely on the basket seat inside the body. Before replacing the cover, make sure that the "o"-ring for the cover is undamaged, clean, and lubricated. It is good practice to clean the body threads with a soft brush to remove all foreign material. **TIGHTEN THE COVER USING LIGHT HAND PRESSURE ONLY.** The cover holds the basket in place ensuring no material passes the basket. The cover does not have to be forced against the top surface of the body when tightening, as the seal is performed with a piston sealing action. A slight gap (approximately the thickness of a dime or a matchbook) between the cover and the top of the body will achieve a positive seal.

6. **Reinstall the drain plug.**

ADJUSTMENT OF VALVES:

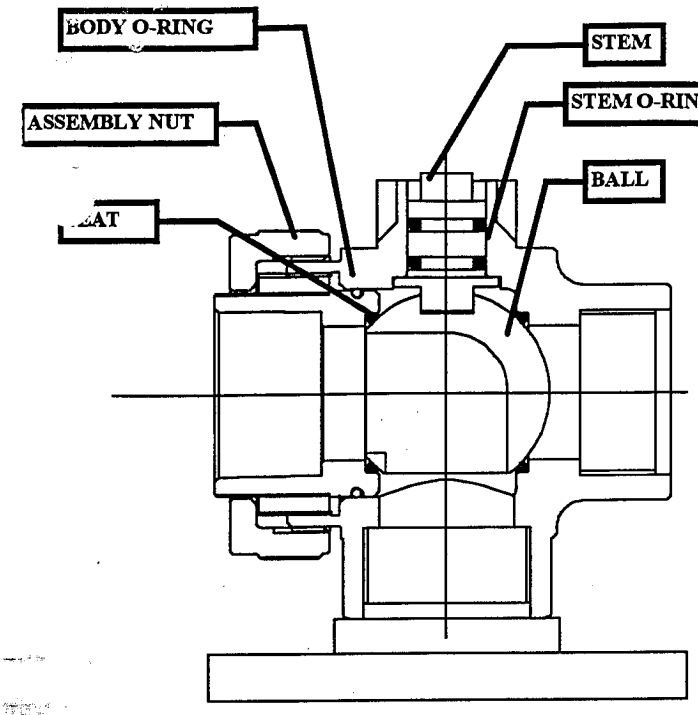
EXTREME CAUTION MUST BE TAKEN WHEN WORKING ON THE VALVES
THE PIPING SYSTEM MUST BE DEPRESSURIZED AND COMPLETELY DRAINED. PROPER CARE MUST BE TAKEN.
CONSULT M.S.D.S. (MATERIAL SAFETY DATA SHEETS) INFORMATION REGARDING YOUR SPECIFIC APPLICATION.

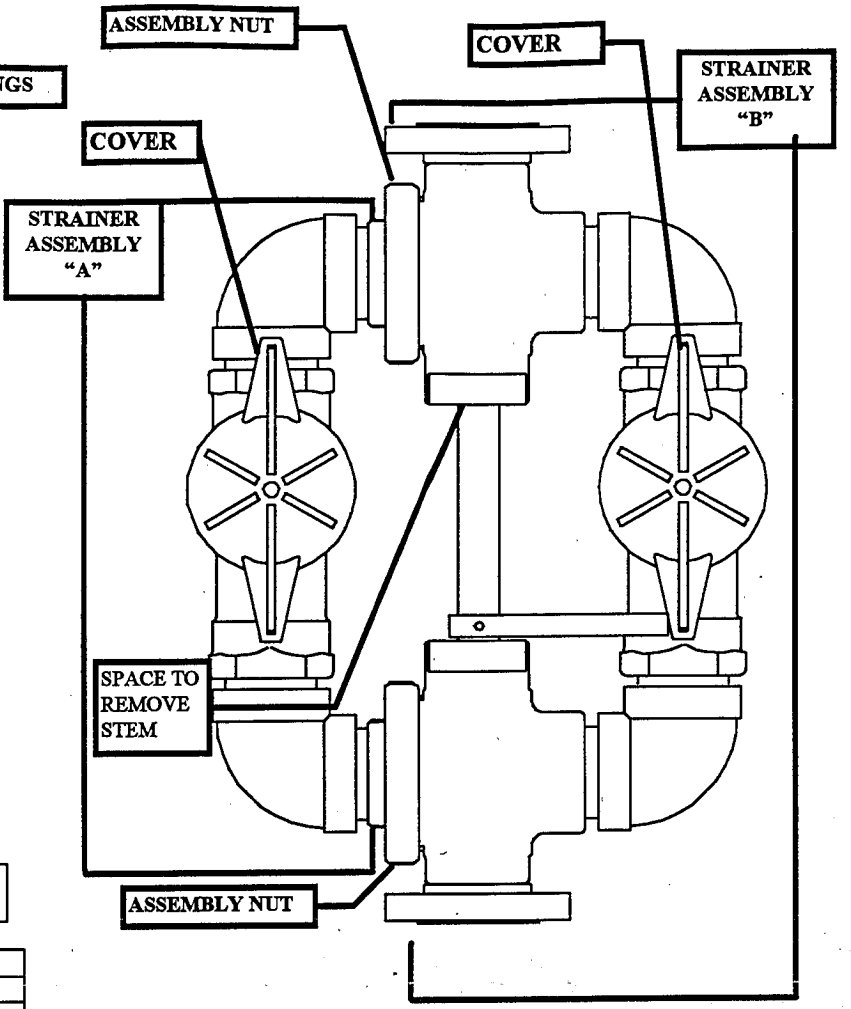
Rotation of the assembly nut clockwise will move the end connector toward the seats. This movement will tend to make a leaking valve stop leaking. The assembly nut adjustment must be made carefully as valve operating torque increases with increasing assembly nut torque. If the valve still leaks after adjustment, follow the "REPAIR OF VALVES" instructions. On 1/2" through 2" valves the seats can be reversed to provide a new seal surface.

REPAIR OF VALVES:

Rotate each of the assembly nuts completely in the counter clockwise direction and disengage them from valve bodies. The complete strainer assembly "A" section must be separated from strainer assembly "B" at the assembly nut portion of the valves. This can be achieved by lightly striking each elbow with a rubber or plastic mallet. Once the separation is completed, make a sketch of the ball orientations to assure proper positioning when reassembling. The o-rings and seals are now accessible for replacement using a "seal" repair kit. Carefully remove the o-rings from their respective locations taking care not to scratch their sealing surfaces. Use a non-petroleum base lubricant to lubricate the o-rings, and re-assemble.

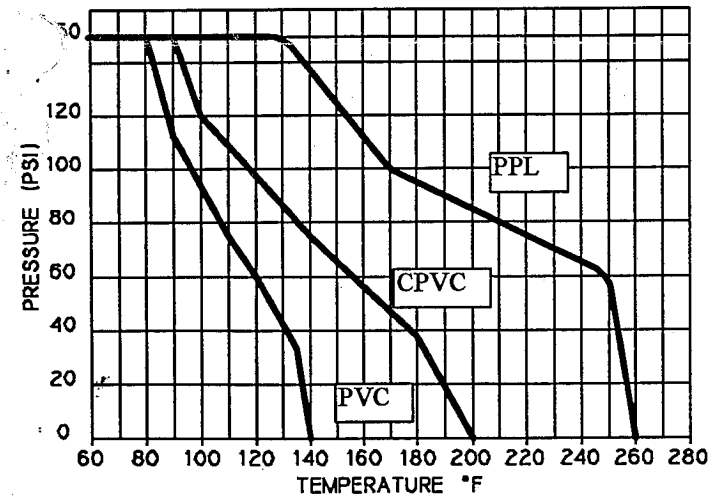
To replace the lever assembly, the stems must be removed from the valves.This will allow the lever to be removed. The stems can be pushed from the space between the lever and the valve bodies. The lever must be in place before the stems are installed in the valves.

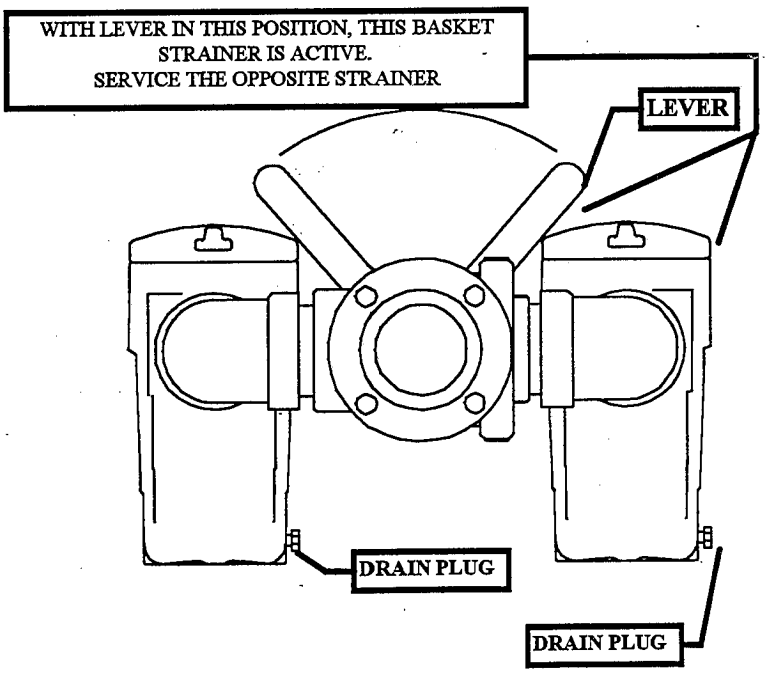




VALVE ILLUSTRATED

Operating Temperature vs. Pressure





Recommended valve stem torque to rotate the ball 360° when valve is reassembled.	
VALVE SIZE	TORQUE IN*LB
1/2"	30
3/4"	40
1"	50
1 1/4"	60
1 1/2"	60
2"	80
3"	180
4" & 6"	220

WHITE-RODGERS

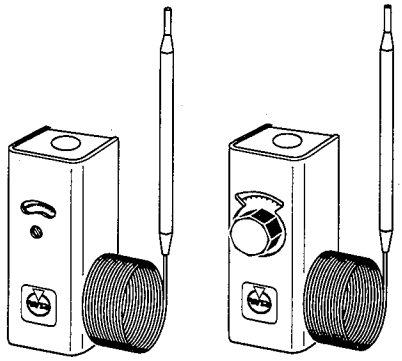
Séries 241-2 & 1609
Régulateurs de température de réfrigération
INSTRUCTIONS D'INSTALLATION

Utilisateur: conservez ces instructions pour vous y référer au besoin!

SI VOUS NE LISEZ PAS ATTENTIVEMENT CES INSTRUCTIONS AVANT D'INSTALLER ET D'UTILISER LA COMMANDE, VOUS RISQUEZ DE CAUSER DES BLESSURES ET DES DOMMAGES MATÉRIELS.

DESCRIPTION

Ces régulateurs de température à mécanisme hydraulique s'adaptent à toute mise en oeuvre d'un système de réfrigération commercial ou industriel. Ils ferment les contacts sur une hausse de température et les ouvrent sur une baisse.



PRÉCAUTIONS

LA PRÉSENTE COMMANDE DOIT ÊTRE INSTALLÉE PAR UN TECHNICIEN QUALIFIÉ.

Ne dépassez pas les charges nominales.

Tout le câblage doit être conforme aux codes et règlements locaux et nationaux qui régissent les installations électriques.

Cette commande est un instrument de précision qui doit être manipulé avec soin. Elle peut se détraquer si elle est manipulée de façon négligente ou si des composantes sont déformées.

La commande a été calibrée avec précision lors de la fabrication. Toute tentative de calibrer l'appareil annulera la garantie de White-Rodgers.

⚠ ATTENTION

Afin de prévenir les chocs électriques et les dommages matériels pendant l'installation, coupez l'alimentation électrique au panneau de distribution principal.

⚠ AVERTISSEMENT

N'installez pas cet appareil sur des circuits qui dépassent la tension nominale. Une tension trop élevée peut endommager la commande et poser des risques de chocs électriques et d'incendie.

INSTALLATION

L'interrupteur de la commande peut être placé à n'importe quel endroit pourvu que la température et l'humidité de l'air ambiant n'entraînent pas de condensation sur les pièces de l'interrupteur.

L'élément sensible ou « capteur » doit être placé là où la température correspond à la **moyenne** pour la zone que le régulateur doit contrôler.

Le tube capillaire doit être acheminé de façon à être protégé contre les chocs, les coupures, etc. Prendre soin de ne pas plier ou tordre le tube capillaire lors de l'installation. Fixer plusieurs points du tube à une surface : ne pas le laisser pendre. Le surplus de tube capillaire doit être enroulé et fixé à l'abri près de l'interrupteur.

Le capteur doit être manipulé soigneusement. Une bosse ou un coin aigu peut modifier le calibrage et amener le régulateur à déclencher et enclencher à une température autre que le point de consigne.

EMERSON

WHITE-RODGERS DIVISION
EMERSON ELECTRIC CO.
9797 REAVIS RD., ST. LOUIS, MO. 63123
(314) 577-1300, Télécopieur (314) 577-1517
9999 HWY. 48, MARKHAM, ONT. L3P 3J3
(905) 475-4653, Télécopieur (905) 475-4625

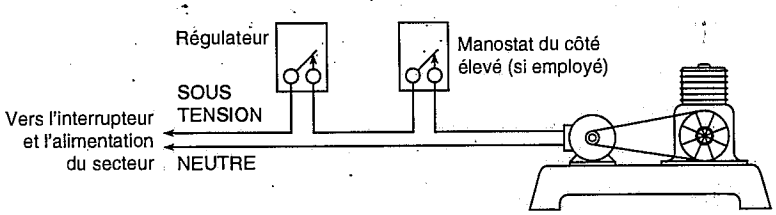
Imprimé aux États-Unis

PIÈCE No 37-1104D
Remplace 37-1104C & 37-9085
9545

CÂBLAGE

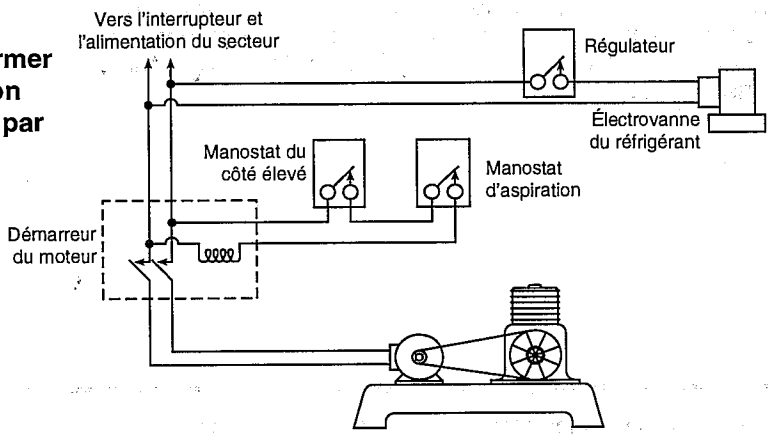
Tout le câblage doit être conforme aux codes et règlements locaux et nationaux qui régissent les installations électriques.

Si le fabricant de l'équipement de réfrigération recommande un schéma de câblage, alors veuillez vous y référer. Les schémas suivants correspondent à un usage typique du régulateur.



Circuit du régulateur contrôlant directement un compresseur.

Circuit du régulateur employé pour ouvrir et fermer la vanne du réfrigérant. Le manostat d'aspiration met le compresseur en marche et hors marche par l'intermédiaire du démarreur du moteur.



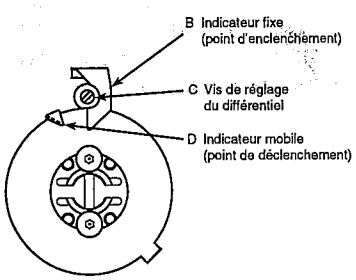
RÉGLAGE

RÉGULATEUR À DIFFÉRENTIEL REGLABLE

L'indicateur mobile donne la température à laquelle le compresseur sera mis en marche. L'indicateur fixe donne la température à laquelle le compresseur sera arrêté. Le différentiel est l'écart entre ces deux indicateurs.

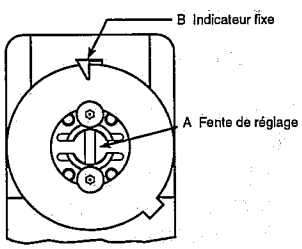
Pour régler le régulateur, procéder de la façon suivante :

1. Introduire un tournevis dans la fente située sur l'avant de la commande. Tourner le cadran jusqu'à ce que l'indicateur fixe (B) indique la température à laquelle le compresseur doit s'arrêter.
2. Tourner la vis de réglage du différentiel (C) jusqu'à ce que l'indicateur mobile (D) indique la température à laquelle le compresseur doit démarrer.



RÉGULATEUR À DIFFÉRENTIEL FIXE

L'indicateur (B) donne la température à laquelle les contacts sont ouverts et arrêtent le compresseur. **Pour régler la commande,** introduire un tournevis dans la fente située à l'avant. Tourner le cadran jusqu'à ce que l'indicateur (B) donne la température à laquelle le compresseur doit s'arrêter.



WHITE-RODGERS

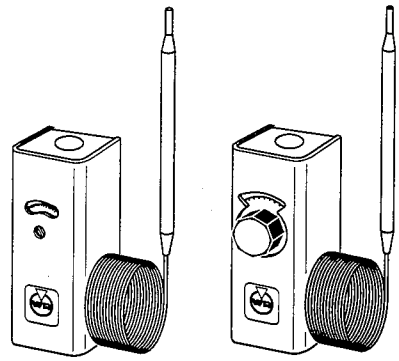
241-2 & 1609 Series
Refrigeration Temperature Controls
INSTALLATION INSTRUCTIONS

Operator: Save these instructions for future use!

FAILURE TO READ AND FOLLOW ALL INSTRUCTIONS CAREFULLY BEFORE INSTALLING OR OPERATING THIS CONTROL COULD CAUSE PERSONAL INJURY AND/OR PROPERTY DAMAGE.

DESCRIPTION

These hydraulic action temperature controls are applicable for all types of commercial or industrial refrigeration applications. These controls close contacts on rise in temperature and open them on a fall in temperature.



PRECAUTIONS

THESE CONTROLS MUST BE INSTALLED BY A QUALIFIED INSTALLER.

Do not exceed the specification ratings.

All wiring must conform to local and national electrical codes and ordinances.

This control is a precision instrument, and should be handled carefully. Rough handling or distorting components could cause the control to malfunction.

This control has been accurately calibrated at the factory. Any attempt to calibrate this control will void the White-Rodgers warranty.

⚠CAUTION

To prevent electrical shock and/or equipment damage, disconnect electric power to system, at main fuse or circuit breaker box, until installation is complete.

⚠WARNING

Do not use on circuits exceeding specified voltages. Higher voltages will damage control and could cause shock or fire hazard.

INSTALLATION

The switch mechanism of this control may be mounted in any location, provided that the temperature and humidity of the air in which it is located do not cause a condensation on the switch parts.

The sensitive element, or "bulb", should be located in the **average temperature** of the controlled area.

Capillary tubing should be led over a path that protects it from damage from blows, cuts, etc., and should be installed without kinking or twisting. The tubing should be attached to some surface at frequent intervals along its length, and should not hang loosely. Excess tubing should be coiled and secured at a convenient protected location close to the switch mechanism.

The bulb should be handled with reasonable care, as a dent or sharp bend may change the calibration and cause the control to cycle at a temperature different from the dial setting.

EMERSON
WHITE-RODGERS DIVISION
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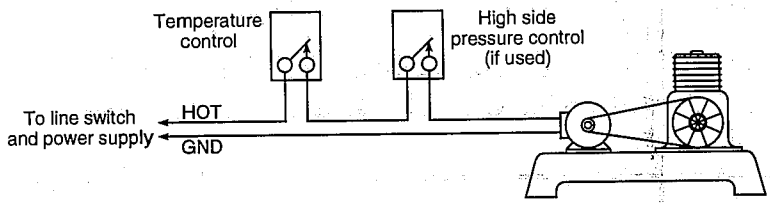
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PART NO. 37-1104D
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9545

WIRING

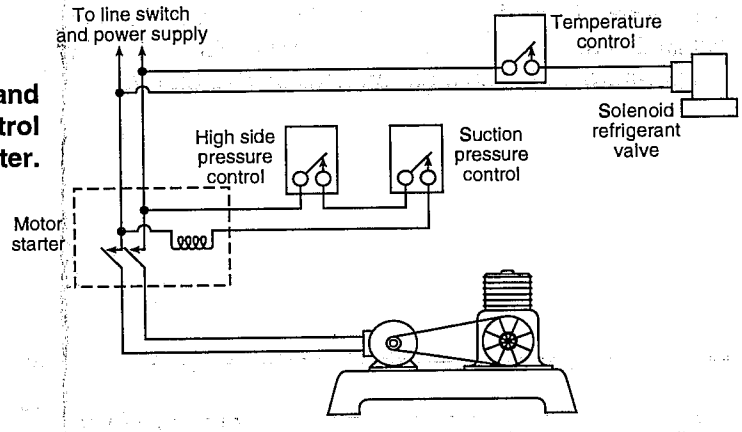
All wiring should be done in accordance with local and national electrical codes and ordinances.

If the manufacturer of the cooling equipment has supplied a wiring diagram, follow the manufacturer's recommendations. The following diagrams show the general use of these controls.



Circuit showing temperature control controlling compressor directly.

Circuit showing temperature control to open and close refrigerant valve. Suction pressure control starts and stops compressor through motor starter.



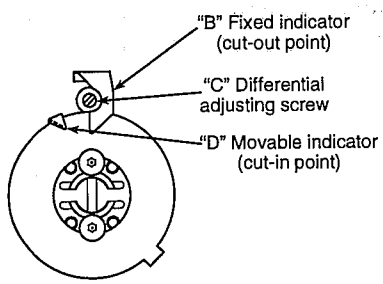
SETTING THE CONTROLS

CONTROLS WITH ADJUSTABLE DIFFERENTIAL

The movable indicator points to the temperature at which the compressor starts. The fixed indicator points to the temperature at which the compressor will stop. The difference between these two indicators is the differential.

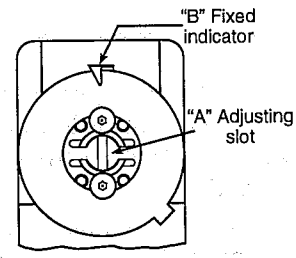
To set the control, do the following:

1. Use a screwdriver in the slot on the front of the control to turn the dial so that the fixed indicator (B) points to the temperature at which the compressor is to stop.
2. Turn the differential adjusting screw (C) until the movable indicator (D) points to the temperature at which the compressor is to start.



CONTROLS WITH FIXED DIFFERENTIAL

The indicator (B) points to the temperature at which the contacts open to stop the compressor. **To set the control,** use a screwdriver in the slot on the front of the control to rotate dial until the desired temperature at which the compressor is to stop is positioned directly under the indicator (B).



GREENHECK
P.O. BOX 410 SCHOFIELD, WISCONSIN 54476-0410
PH. 715-359-6171

Wall Housing Assembly Instructions
for Sizes 8 - 48

NOTE: Unit sizes 8-18 use spinlock fasteners in lieu of weldstuds as listed in these instructions.

Reference Number	Item	Qty.
1	Wall Housing Mounting Angle	4
2	Side Panel	2
3	Top Panel	1
4	Bottom Panel	2
--	Fasteners	1 Bag

1. Determine if a supply fan or exhaust fan is to be used in the wall housing. (Fig. 4) Two rows of holes are provided for attaching the wall housing panels to the fan panel. Note that exhaust fans are mounted farthest from and supply fans nearest to the damper end (NOTE: damper end 0.149 holes) (Fig. 1,2). The wall housing panels are attached to the fan panel before securing to each other.

2. Using weldstuds and neoprene washers, attach the wall housing bottom panel (4) to the bottom of the fan panel. With the weldstud heads and neoprene washers on the exterior of the housing, (Fig. 3) place hex nuts on the spinlock bolts and finger tighten.

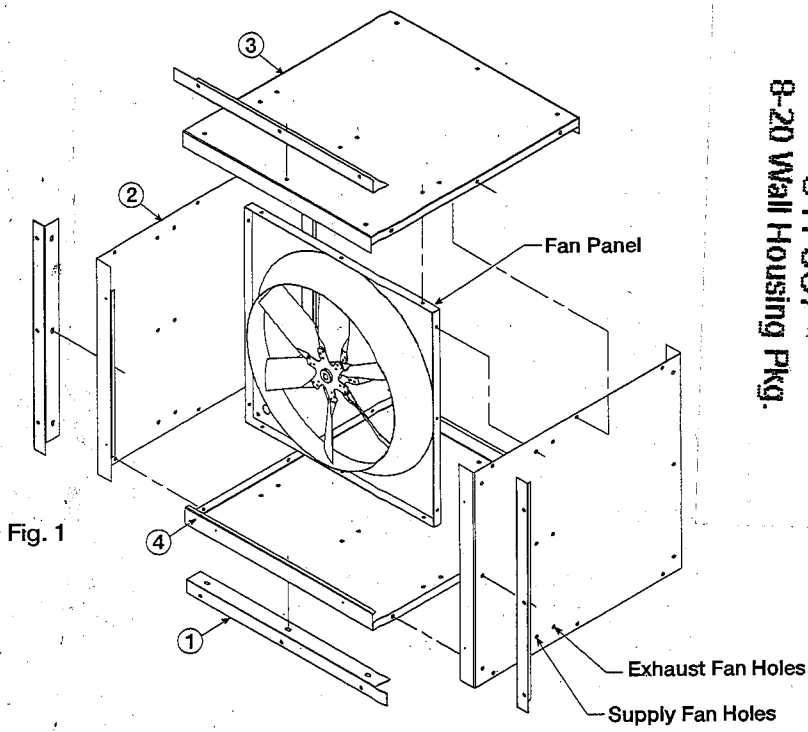


Fig. 1

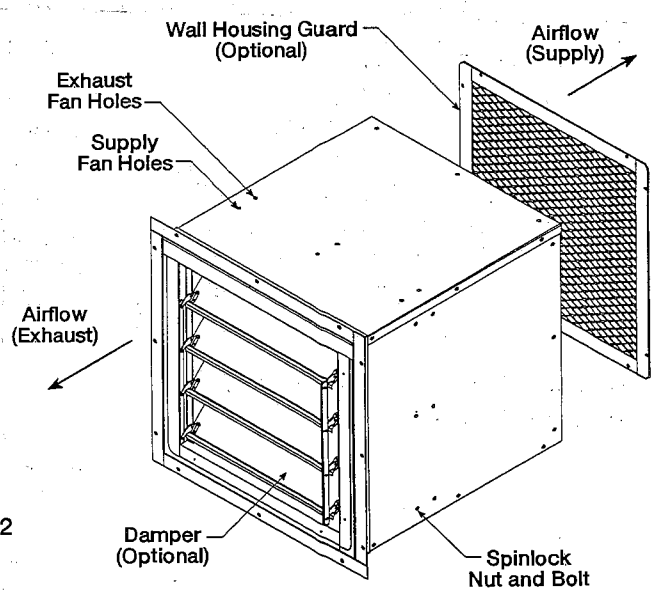


Fig. 2

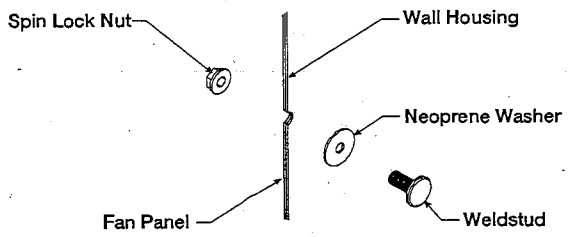


Fig. 3

8-20 Wall Housing Pkg. 87067

3. Attach side panels to the fan panel, overlapping the bottom panel for weatherproofing. Install weldnuts, neoprene washers, and hex nuts. Finger tighten all fasteners.

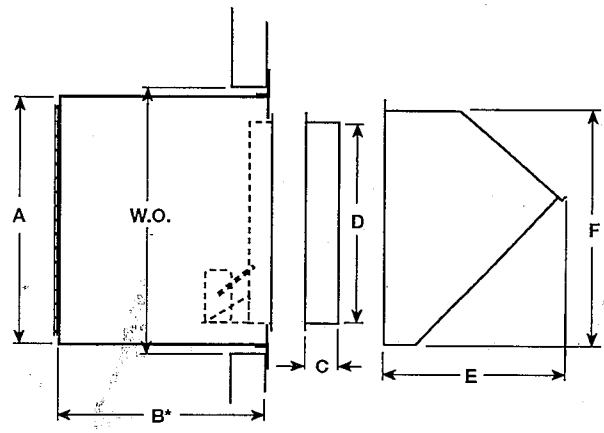
4. Attach the top panel to the fan panel, assuring the formed edges overlap the side panels for weatherproofing. Install weldstuds, neoprene washers, and hex nuts. Finger tighten all fasteners.

5. Attach both side panels to the top and bottom panels using 5/16-18 x 1 weldstuds, neoprene washers and hex nuts.

6. Install weldstuds with neoprene washers in the unused holes of the top and side panels to keep the wall housing weathertight. Unused holes in the bottom panel are used as drain holes. Tighten all fasteners securely.

7. A versatile feature of the Greenheck wall housing is a mounting flange which may be used in either a standard arrangement (Fig. 4) or moved any where along the housing. This permits the distance the wall housing protrudes outside or inside the wall to be varied. 5/16" holes must be drilled in the housing if the factory punched holes are not used.

8. Conduit holes are provided in each side of the housing.



Size	Wall Housing			Damper Guard		Weatherhood			Damper Size Sq.
	A	B*	W.O.	C	D	E	F	Width	
8	13 1/4	19	14 1/4	5 1/2	10 1/4	13 1/4	11 1/4	10 1/2	10
10	15 1/4	19	16 1/4	5 1/2	12 1/4	14 7/8	13 3/8	12 1/2	12
12	18 1/4	23	19 1/4	5 1/2	14 1/4	16 3/8	15 5/8	14 1/2	14
14	20 1/4	23	21 1/4	6 1/2	16 1/4	17 1/2	17 5/8	16 1/2	16
16	22 1/4	24	23 1/4	6 3/4	18 1/4	19 3/8	19 5/8	18 1/2	18
18	24 1/4	25	25 1/4	6 3/4	20 1/4	22	21 5/8	20 1/2	20
20	26 1/4	29	27 1/4	6 3/4	22 1/4	24 3/4	23 5/8	22 1/2	22
24	32 1/4	34	33 3/4	6 3/4	26 1/4	26 7/8	30 3/8	29 1/2	26
30	38 1/4	38	39 3/4	6 3/4	32 1/4	29 1/8	36 1/2	35 1/8	32
36	44 1/4	39	45 3/4	6 3/4	38 1/4	33	42 1/2	41 1/8	38
42	50 1/4	42	51 3/4	7 1/2	44 1/4	35 3/4	48 1/2	47 1/2	44
48	56 3/8	44	57 3/4	7 1/2	50 1/4	40 3/8	54 5/8	53 1/4	50
54	62 3/8	50	63 3/4	7 1/2	56 1/4	44 3/4	60 7/8	59 1/2	56
60	68 3/8	54	69 3/4	7 1/2	62 1/4	48 3/8	67	65 5/8	62
72	83 1/8	60	84 3/4	7 1/2	74 1/4	53 1/4	79 1/2	78 1/8	74

* B dimension will increase by 6" when a heavy duty motorized backdraft damper is specified.
For complete dimensional information refer to submittal.
All dimensions given in inches.

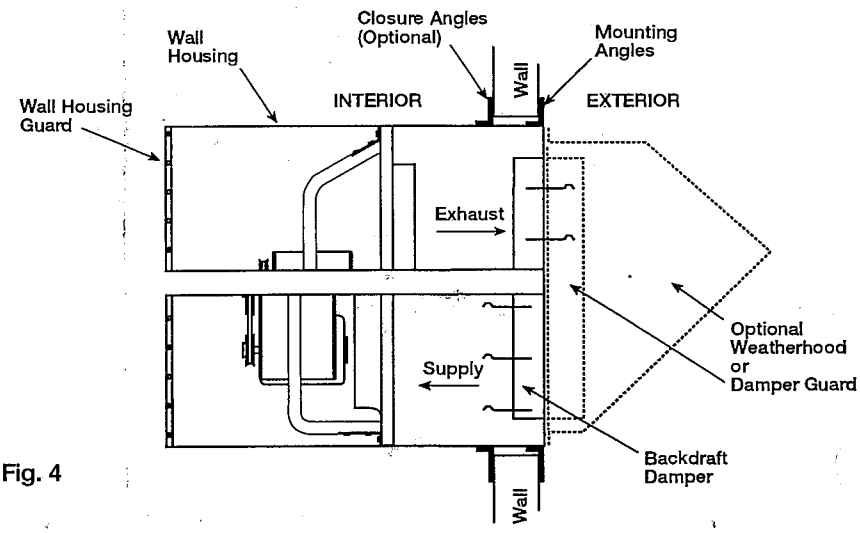


Fig. 4

Damper Installation

9. To install an optional damper see (Fig. 5). If an optional damper guard or weatherhood is to be installed, go to step 10. Using a pneumatic or electric drill, run the self drilling screws through the holes provided in the side and bottom damper flanges into the wall housing. Check damper for freedom of movement.

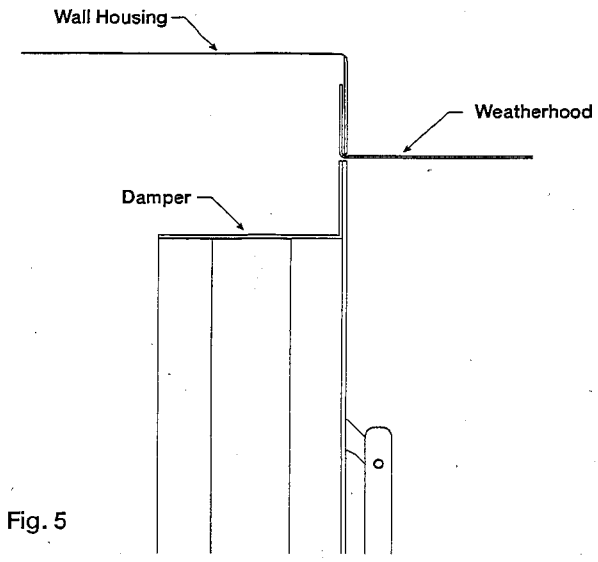
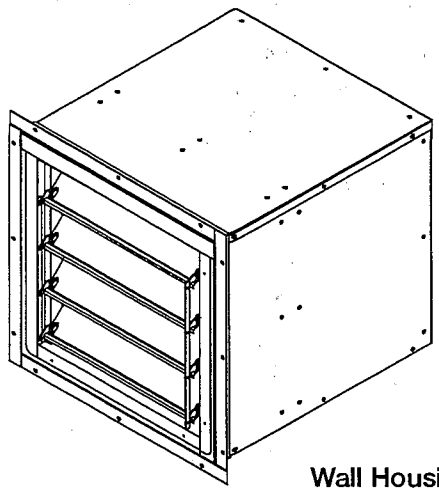


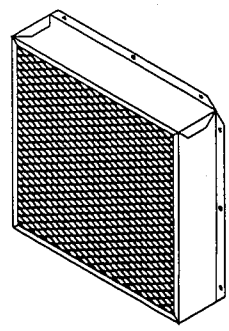
Fig. 5

Damper Guard or Weatherhood Installation

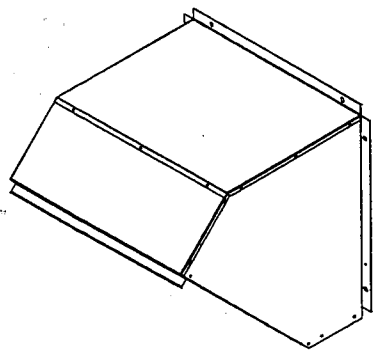
10. To install a damper guard or weatherhood over a damper, the weatherhood is slid under the damper lip. Using self drilling screws and a socket on the end of a pneumatic or electric drill, run the self drilling screws in holes provided on the damper guard and/or weatherhood flange sides. Check damper for freedom of movement.



Wall Housing



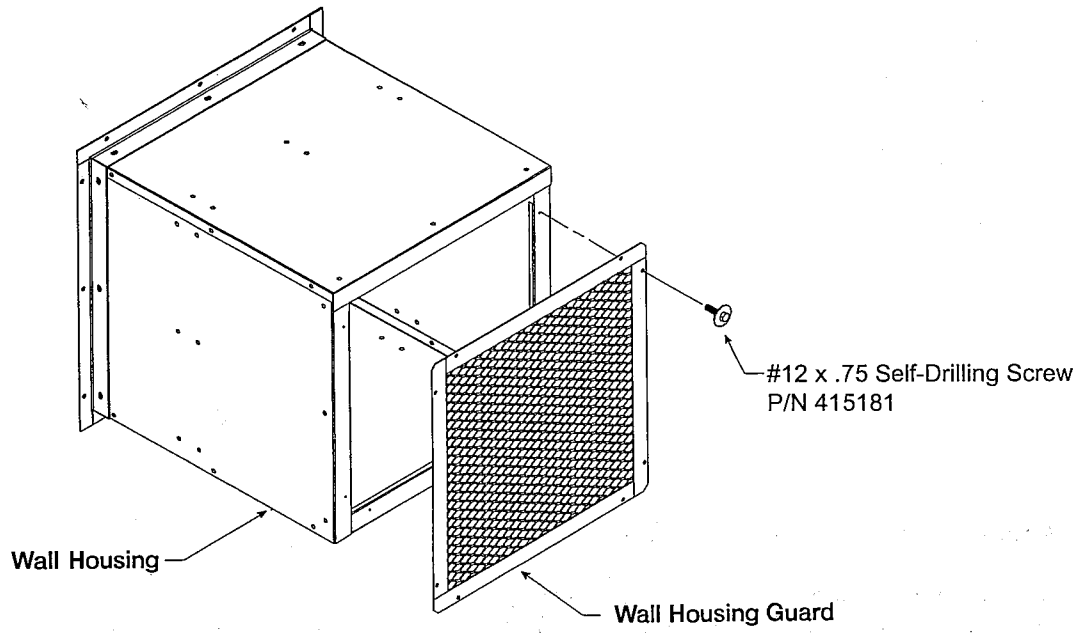
Damper Guard



Weatherhood

11. Attach wall housing guard to wall housing with a 5/16" socket on the end of a pneumatic or electric drill. Align (2) holes in top of guard with (2) holes on wall housing top and run #12 x .75 self-drilling screws with neoprene washer into wall housing top. Use remaining self-drilling screws to secure guard to wall housing sides and bottom.

NOTE: 48" units use a (2) piece guard design. 48" (2) piece guards will align with (4) h wall housing top when guard edges are butted together.



Marley Electric Heating
A United Dominion Company

Mechanical Accessories

For MUH, HUHAA, Dayton 3UF75 - 3UF99 Series Unit Heaters

INSTALLATION OF VERTICAL SECTION (Common Part for Radial and Anemostat Diffusers)

1. Remove louvers from front of heater by gripping louver close to spring and compressing spring until other end of the louver is free.
2. For Dayton Unit Heaters - Remove bird screen from venturi opening.
3. Position vertical section over venturi outlet and rotate vertical section until holes in mounting brackets align with matching hole in front of heater.
4. Secure vertical section with four No. 6-32 x 3/8" (9.5mm) mounting screws (supplied) as shown in Figure 1.

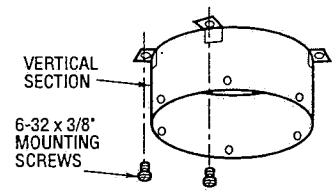


Figure 1. Installation of Vertical Section

INSTALLATION OF RADIAL DIFFUSER

1. Mount vertical section (supplied as part of radial diffuser). (Refer to INSTALLATION OF VERTICAL SECTION above.)
2. Loosen all six screws in radial diffuser hub until blades move freely (See Figure 2, View A).
3. Rotate the radial diffuser hub clockwise until the radial diffuser can be inserted into the vertical section.
4. Insert blade rods into matching holes in vertical section while rotating the radial diffuser hub counter-clockwise. (See Figure 2, View B).
5. Center all blades radially and tighten screws enough to allow each blade to rotate yet maintain a set position.
6. Rotate each blade to desired position and tighten screws to secure blades.

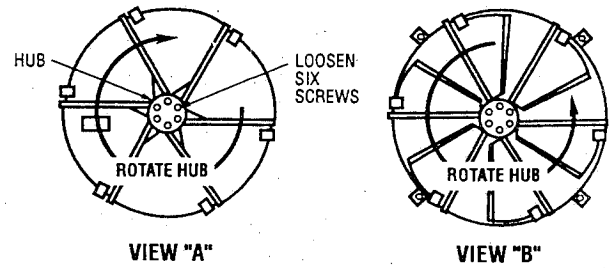


Figure 2. Installation of Radial Diffuser

INSTALLATION OF ANEMOSTAT DIFFUSER

1. Mount vertical section (supplied as part of anemostat diffuser). (Refer to INSTALLATION OF VERTICAL SECTION.)
2. For small (-S) and large (-L) diffusers, slide anemostat over vertical section and secure with three No. 10-32 x 3/8" (9.5mm) bolts and nuts. (See Figure 3, View A).
3. For medium (-M) diffuser, slide anemostat into vertical section and secure with three No. 10-32 x 3/4" (19mm) bolts, nuts and spacers. (See Figure 2, View B).

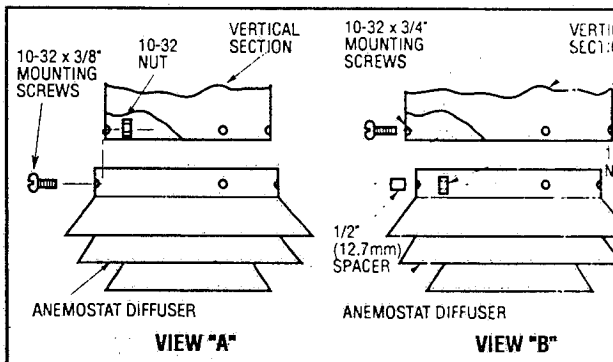
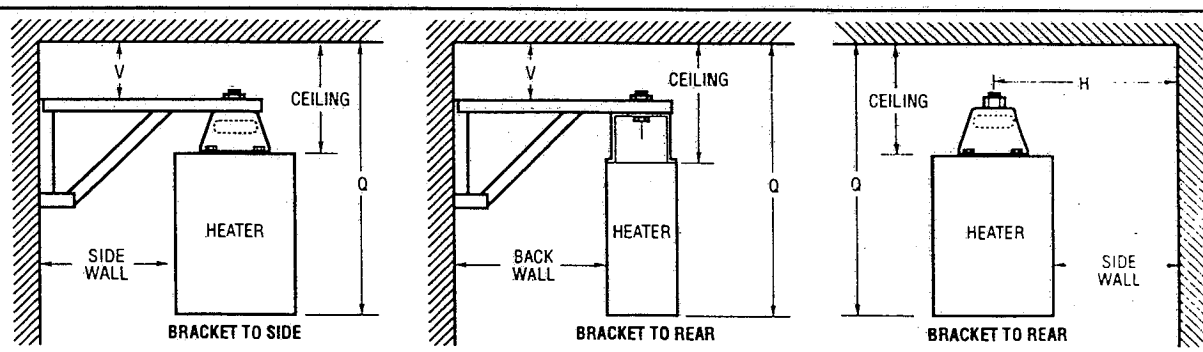


Figure 3. Installation of Anemostat Diffuser



Minimum Mounting Clearances

Heaters	Discharge	Ceiling	Side Wall	Back Wall	H (Min.)	V (Min.)	Q
3 KW - 5 KW	Horizontal	2" (50.8mm)	6" (152.4mm)	9" (228.6mm)	13" (330.2mm)	"0"	18 1/2" (462.0mm)
7.5 KW - 10 KW	Horizontal	6" (152.4mm)	6" (152.4mm)	13" (330.2mm)	15 1/2" (393.7mm)	2" (50.8mm)	27 7/8" (708.2mm)
15 KW - 20 KW	Horizontal	6" (152.4mm)	9" (228.6mm)	12 1/2" (317.5mm)	18 1/2" (470.0mm)	2" (50.8mm)	27 7/8" (708.2mm)
25 KW - 50 KW	Horizontal	16"	12"	18 1/2"	25 1/2"	10 1/2"	46 3/4"

Figure 4. Mounting Bracket Clearances

INSTALLATION OF LOUVERED DIFFUSER ON MUH HEATERS

1. Louvers may be left in place or removed from the heater. (Refer to Step 1, INSTALLATION OF VERTICAL SECTION on previous page).
2. Insert mounting springs into four 3/16" (4.8mm) holes in inside flange of front cover.
3. Place louvered diffuser against front of unit.

NOTE: Position locating tabs toward the top and sides of heater flange.

4. Secure louvered diffuser to heater by using long-nosed pliers to hook free ends of springs into four 3/16" (4.8mm) holes in inside flange of louvered diffuser.

INSTALLATION OF LOUVERED DIFFUSER ON HUHAA & DAYTON HEATERS

1. Louvers may be left in place or removed from the heater. (Refer to Step 1, INSTALLATION OF VERTICAL SECTION on previous page).
2. Place louvered diffuser against front of unit.

NOTE: Position locating tabs toward the top and sides of heater flange.

3. Secure louvered diffuser to heater with three (3) screws (provided) through the mounting tabs.

INSTALLATION OF B SERIES MOUNTING BRACKETS

WARNING

THE BUILDING STRUCTURE AND THE ANCHORING PROVISIONS MUST BE SUFFICIENT TO SUPPORT THE COMBINED WEIGHT OF THE HEATER AND MOUNTING BRACKET.

1. Locate the position of the heater wall mounting bracket. Refer to Figure 4 for minimum mounting clearances. Refer to Figure 5 for mounting bracket dimensions.

WARNING

MOUNTING BRACKET MUST BE INSTALLED WITH OPENING IN BRACKET TOWARD REAR OF HEATER.

2. The hole locations for the mounting bracket can be determined by holding the bracket in position and marking through the holes. Mounting bracket dimensions with hole locations are also given in Figure 5.
3. A minimum screw size of 3/8-inch (9.5mm) diameter should be used to mount the bracket to the wall or ceiling. A heavy washer should be used between the bolt head and the bracket. USE THE TYPE OF SCREW THAT IS BEST SUITED TO THE BUILDING STRUCTURE.
4. Remove four bolts and washers from top of heater and secure unit mounting bracket to top of heater using the four bolts and washers. (See Figure 6).
5. Bolt the unit mounting bracket to the wall mounting bracket using one 1/2-13 pivot bolt, two flat washers, one split lockwasher, and one 1/2-13 nut. (See Figure 7).

INSTALLATION OF CMB MOUNTING BRACKETS

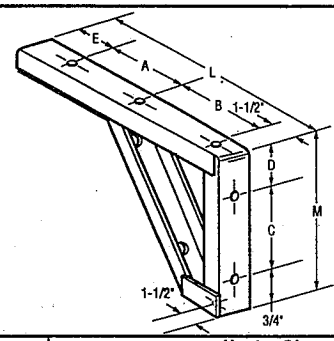
1. Mount bracket per step 4 above.
2. Hang heater from ceiling using center hole in unit mounting bracket, maintaining clearances shown in Figure 4.

INSTALLATION OF VDMB MOUNTING BRACKETS

WARNING

THE BUILDING STRUCTURE AND THE ANCHORING PROVISIONS MUST BE SUFFICIENT TO SUPPORT THE COMBINED WEIGHT OF THE HEATER AND MOUNTING BRACKET.

1. Locate the position of the vertical discharge mounting bracket. Refer to Figure 4 for minimum mounting clearances. Refer to Figure 8 for bracket dimensions.
2. A minimum screw size 3/8" diameter should be used to mount two of the brackets to the ceiling. A heavy washer should be used between the bolt head and the bracket. **Use the type of screw that is best suited to the building structure.**
3. Remove four bolts and washers from the back of the heater and secure the other two brackets to the back of the heater using the four bolts and washers.
4. Bolt the unit mounted brackets to the ceiling mounted brackets using the 5/16" bolts, split lockwashers and nuts provided. See Figure 8.



Dimensions	Heater Size	
	3-20 KW	25-50KW
A	7 1/4" (184.2mm)	9 7/16" (239.8mm)
B	9 1/2" (241.3mm)	14 3/8" (365.3mm)
C	7 1/4" (184.2mm)	12 1/8" (308.1mm)
D	1 15/16" (49.3mm)	2 1/16" (52.3mm)
E	2 1/4" (57.2mm)	3" (76.2mm)
L	20 1/2" (520.7mm)	28 5/16" (719.1mm)
M	9 15/16" (252.5mm)	14 15/16" (379.5mm)

Figure 5. Mounting Bracket Hole Dimensions

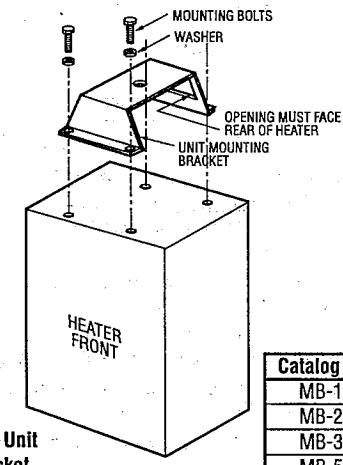


Figure 6. Installation of Unit Mounting Bracket

Catalog No.	Used on
MB-10	3 - 10 KW
MB-20	15 - 20 KW
MB-30	25 - 30 KW
MB-50	40 - 50 KW
CMB-10	3 - 10 KW
CMB-20	15 - 20 KW
CMB-30	25 - 30 KW
CMB-50	40 - 50 KW

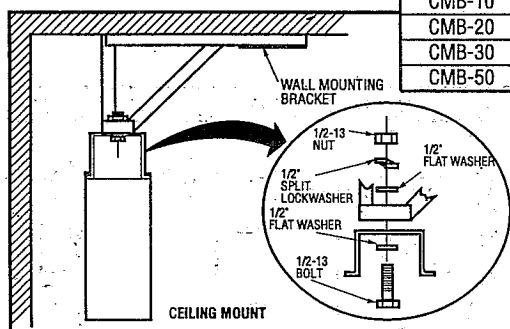
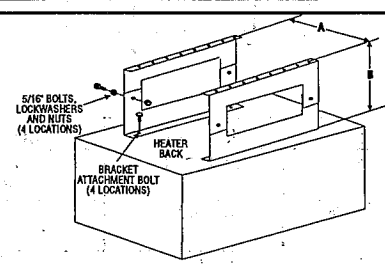


Figure 7. Installation of Heater on Mounting Bracket



Model No.	KW	A	B
VDMB5	3 - 5 KW	6"	6 1/8"
VDMB20	7.5 - 20 KW	8 7/8"	6 1/8"
VDMB50	25 - 50 KW	12 1/2"	12 1/8"

Figure 8. Installation of Heater on Mounting Bracket

Marley Electric Heating

Una Compañía de United Dominion

Accesorios Mecánicos

Para Calentadores de Unidades de la Serie 3UF75-3UF99 de Dayton, HUHAA y MUH

INSTALACION DE LA SECCION VERTICAL (Parte Común para Difusores Radiales y Anemostáticos)

1. Saque la rejilla de ventilación del frente del calentador, agarrándola cerca del resorte y comprimiendo a este último hasta que el otro extremo de la rejilla quede suelto.
2. En los Calentadores de Unidad Dayton - Quite la reja para detener pájaros de la abertura del venturi.
3. Coloque la sección vertical sobre la salida del venturi y hágala girar hasta que los agujeros de los soportes de montaje queden alineados con los agujeros que les corresponden en el frente del calentador.
4. Asegure la sección vertical con cuatro tornillos de montaje No. 6-32 x 3/8" (9,5mm) (provistos) como se muestra en la Figura 1.

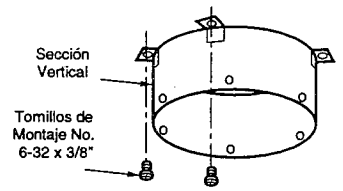


Figura 1. Instalación de la Sección Vertical

INSTALACION DEL DIFUSOR RADIAL

1. Monte la sección vertical (provista como parte integrante del difusor radial). (Use como referencia INSTALACION DE LA SECCION VERTICAL que está arriba.)
2. Afloje los seis tornillos del cubo del difusor radial hasta que las aspas se muevan libremente (Estudie la Figura 2, Vista A).
3. Haga girar el cubo en el sentido de las agujas del reloj hasta que el difusor radial se pueda insertar dentro de la sección vertical.
4. Inserte las varillas de las aspas dentro de los agujeros correspondientes en la sección vertical mientras hace girar el cubo del difusor radial en contra del sentido de las agujas del reloj. (Estudie la Figura 2, Vista B).
5. Centre todas las aspas radialmente y apriete los tornillos lo suficiente para permitir que cada aspa gire pero al mismo tiempo mantenga una posición fija.
6. Haga girar cada una de las aspas hasta la posición deseada y apriete los tornillos para asegurarlas.

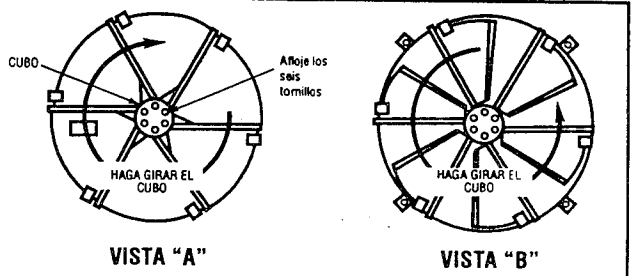


Figura 2. Instalación del Difusor Radial

INSTALACION DEL DIFUSOR ANEMOSTATICO

1. Monte la sección vertical (provista como parte integrante del difusor anemostático). (Use como referencia INSTALACION DE LA SECCION VERTICAL.)
2. Cuando use difusores pequeños (-S) o grandes (-L), deje deslizar el anemostato sobre la sección vertical y asegúrelo con tres pernos 10-32 x 3/8" (9,5mm) y tuercas. (Estudie la Figura 3, Vista A).
3. Si usa un difusor mediano (-M), deje deslizar el anemostato dentro de la sección vertical y asegúrelo con tuercas, separadores y tres pernos No. 10-32 x

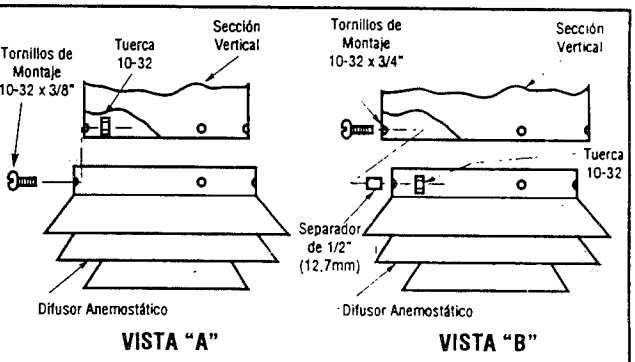
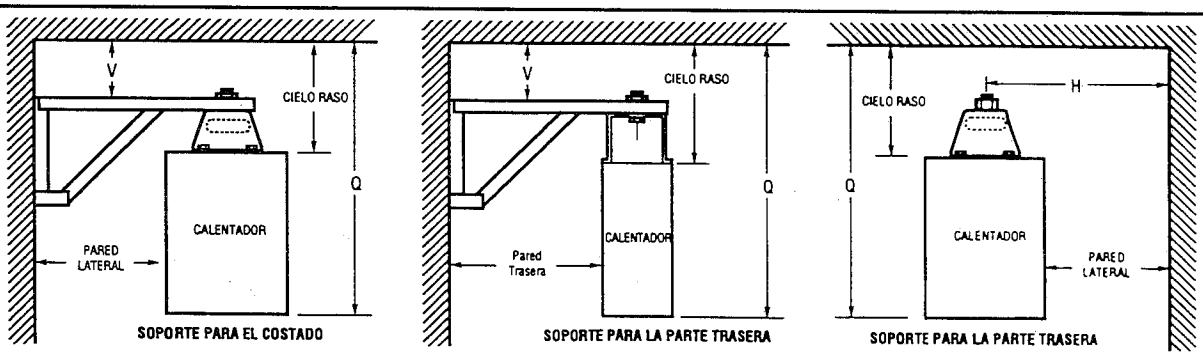


Figura 3. Instalación del Difusor Anemostático.



Espacios de Montaje Mínimos

Calentadores.	Descarga	Cielo Raso	Pared Lateral	Pared Trasera	H (Min.)	V (Min.)	Q
3 KW - 5 KW	Horizontal	2" (50.8mm)	6" (152.4mm)	9" (228.6mm)	13" (330.2mm)	"0"	18 3/16" (462.0mm)
7.5 KW - 10 KW	Horizontal	6" (152.4mm)	6" (152.4mm)	13" (330.2mm)	15 1/2" (393.7mm)	2" (50.8mm)	27 7/8" (708.2mm)
15 KW - 20 KW	Horizontal	6" (152.4mm)	9" (228.6mm)	12 1/2" (317.5mm)	18 1/2" (470.0mm)	2" (50.8mm)	27 7/8" (708.2mm)
25 KW - 50 KW	Horizontal	16"	12"	18 1/2"	25 1/2"	10 5/8"	46 3/16"

Figura 4. Espacios de Separación para Soportes de Montaje

INSTALACION DEL DIFUSOR CON REJILLA DE VENTILACION EN LOS CALENTADORES MUH

1. Las rejillas de ventilación se pueden dejar en sus lugares o sacarlas del calentador. (Use como referencia el Paso 1, INSTALACION DE LA SECCION VERTICAL de la página anterior).
2. Inserte los resortes de montaje en los cuatro agujeros de 3/16" (4,8mm) que están en la parte interna del reborde de la cubierta frontal.
3. Coloque el difusor con rejilla de ventilación contra la parte frontal de la unidad.

NOTA: Coloque las lengüetas de ubicación en sus posiciones orientadas hacia la parte superior y los costados del reborde del calentador.

4. Asegure el difusor con rejilla de ventilación al calentador, usando pinzas finas y largas para enganchar los extremos sueltos de los resortes en los cuatro agujeros de 3/16" (4,8mm) que están en la parte interna del reborde del difusor.

INSTALACION DEL DIFUSOR CON REJILLA DE VENTILACION EN LOS CALENTADORES HUHAA Y DAYTON

1. Las rejillas de ventilación se pueden dejar en sus lugares o sacarlas del calentador. (Use como referencia el Paso 1, INSTALACION DE LA SECCION VERTICAL de la página anterior).
2. Coloque el difusor con rejilla de ventilación contra la parte frontal de la unidad.

NOTA: Coloque las lengüetas de ubicación en sus posiciones, orientadas hacia la parte superior y los costados del reborde del calentador.

3. Asegure el difusor con rejilla de ventilación al calentador, usando los tres (3) tornillos (provistos) a través de las lengüetas.

INSTALACION DE LOS SOPORTES DE MONTAJE DE LA SERIE B

ADVERTENCIA

LA ESTRUCTURA DEL EDIFICIO Y LA FORMA DE ANCLAJE PROVISTA DEBERAN TENER LA FORTALEZA SUFICIENTE PARA SOPORTAR EL PESO COMBINADO DEL CALENTADOR Y EL SOPORTE DE MONTAJE.

1. Ubique la posición del soporte de montaje de la pared del calentador. Use como referencia la Figura 4 para conocer los espacios de separación mínimos para hacer el montaje. Utilice como referencia la Figura 5 para obtener las dimensiones del soporte de montaje.

ADVERTENCIA

EL SOPORTE DE MONTAJE SE DEBERA INSTALAR CON LA ABERTURA QUE TIENE HACIA LA PARTE TRASERA DEL CALENTADOR.

2. La ubicación de los agujeros para el soporte de montaje se puede determinar sosteniendo a éste último en su posición y marcando a través de los agujeros. Las dimensiones del soporte de montaje con la ubicación para los agujeros también se presentan en la Figura 5.
3. Se deberá usar un tornillo con un tamaño mínimo de 3/8 de pulg. (9,5mm) de diámetro para montar el soporte a la pared o al cielo raso. Se tendrá que insertar una arandela fuerte entre la cabeza del perno y el soporte. USE EL TIPO DE TORNILLO QUE MEJOR SE ADAPTE A LA ESTRUCTURA DEL EDIFICIO.
4. Saque los cuatro pernos y las arandelas de la parte superior del calentador. Asegure el soporte de montaje de la unidad a la parte superior del calentador, usando los cuatro pernos y arandelas (Estudie la Figura 6).
5. Aperne el soporte de montaje de la unidad al soporte de montaje de la pared usando un perno pivote de 1/2-13, dos arandelas planas, una arandela de seguridad partida y una tuerca de 1/2-13. (Estudie la Figura 7).

INSTALACION DE SOPORTES DE MONTAJE CMB

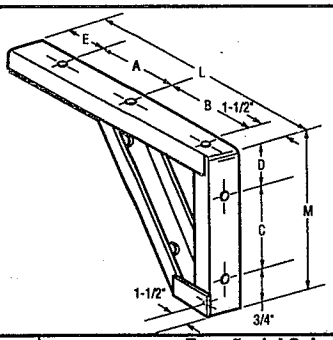
1. Monte el soporte de acuerdo con el paso 4 de arriba.
2. Cuelgue el calentador del cielo raso usando en agujero del centro que está en el soporte de montaje de la unidad, manteniendo los espacios de separación que se muestran en la Figura 4.

ADVERTENCIA

LA ESTRUCTURA DEL EDIFICIO Y LA FORMA DE ANCLAJE PROVISTA DEBERAN TENER LA FORTALEZA SUFICIENTE PARA SOPORTAR EL PESO COMBINADO DEL CALENTADOR Y EL SOPORTE DE MONTAJE.

INSTALACION DE SOPORTES DE MONTAJE VDMB

1. Ubique la posición del soporte de montaje para la descarga vertical. Use como referencia la Figura 4 para conocer los espacios de separación mínimos para hacer el montaje. Utilice la Figura 8 para conocer las dimensiones de los soportes.
2. Se deberá usar un tornillo con un tamaño mínimo de 3/8" de diámetro para montar dos de los soportes al cielo raso. Se tendrá que insertar una arandela fuerte entre la cabeza del perno y el soporte. **Use el tipo de tornillo que mejor se adapte a la estructura del edificio.**
3. Saque cuatro pernos y las arandelas de la parte trasera del calentador. Asegure los otros dos soportes a la parte trasera del calentador usando los cuatro pernos y las arandelas.
4. Aperne los soportes montados en la unidad a los soportes montados en el cielo raso, usando los pernos de 5/16", las arandelas de seguridad partidas y las tuercas que se han provisto. Estudie la Figura 8.



Dimensiones	Tamaño del Calentador	
	3-20 KW	25-50KW
A	7 1/4" (184.2mm)	9 7/16" (239.8mm)
B	9 1/2" (241.3mm)	14 3/8" (365.3mm)
C	7 1/4" (184.2mm)	12 1/8" (308.1mm)
D	1 15/16" (49.3mm)	2 1/16" (52.3mm)
E	2 1/4" (57.2mm)	3" (76.2mm)
L	20 1/2" (520.7mm)	28 5/16" (719.1mm)
M	9 15/16" (252.5mm)	14 15/16" (379.5mm)

Figura 5. Dimensiones de los Agujeros del Soporte de Montaje

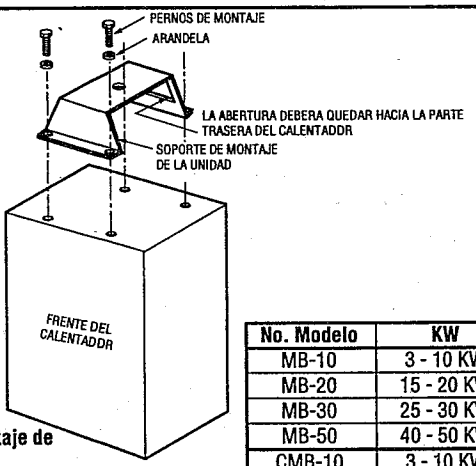


Figura 6. Instalación del Soporte de Montaje de la Unidad

No. Modelo	KW
MB-10	3 - 10 KW
MB-20	15 - 20 KW
MB-30	25 - 30 KW
MB-50	40 - 50 KW
CMB-10	3 - 10 KW
CMB-20	15 - 20 KW
CMB-30	25 - 30 KW
CMB-50	40 - 50 KW

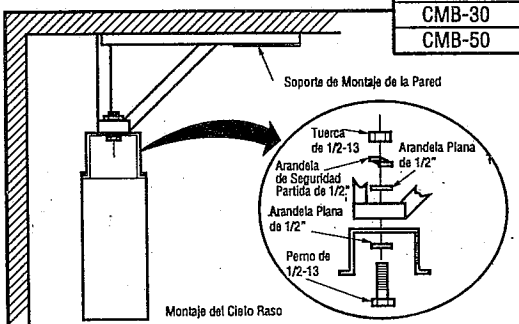
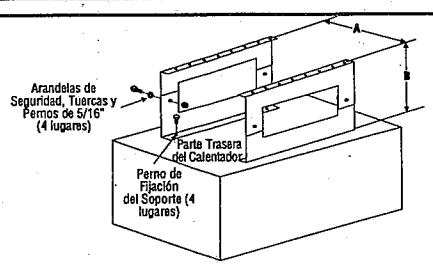


Figura 7. Instalación del Calentador sobre el Soporte de Montaje



No.Modelo	KW	A	B
VDMB5	3 - 5 KW	6"	6 1/8"
VDMB20	7.5 - 20 KW	8 7/8"	6 1/8"
VDMB50	25 - 50 KW	12 1/2"	12 1/8"

Figura 8. Instalación del Calentador sobre el Soporte de Montaje

Marley Electric Heating
A United Dominion Company

Accessoires mécaniques

pour radiateurs des séries MUH, HUHAA et Dayton 3UF75 - 3UF99

MONTAGE D'UN TRONÇON VERTICAL
(Pièce commune aux diffuseurs radiaux et à anémostat)

1. Retirer la claire-voie de l'avant du radiateur en saisissant celle-ci à proximité du ressort et en compressant le ressort de façon à dégager l'autre extrémité.
2. Pour les radiateurs Dayton - Retirer la grille à oiseaux de l'ouverture de venturi.
3. Placer le tronçon vertical sur la sortie du venturi et faire tourner le tronçon vertical de façon à faire coïncider les trous des supports de montage avec les trous correspondants situés à la face avant du radiateur.
4. Fixer le tronçon vertical à l'aide de quatre vis de montage (fournies) de 9,5 mm (N° 6-32 x 3/8) comme l'indique la figure 1.

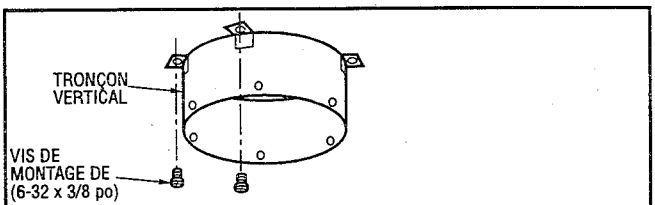


Figure 1. Montage du tronçon vertical

MONTAGE D'UN DIFFUSEUR RADIAL

1. Monter le tronçon vertical (fourni avec le diffuseur radial dont il fait partie). (Consulter la partie MONTAGE DU TRONÇON VERTICAL ci-dessus).
2. Desserrer les six vis du moyeu du diffuseur radial jusqu'à ce que les ailettes se déplacent facilement. (Voir la figure 2, vue A).
3. Faire tourner le moyeu du diffuseur radial dans le sens horaire jusqu'à ce que l'on puisse introduire le diffuseur radial dans le tronçon vertical.
4. Introduire les tiges des ailettes dans les trous correspondants du tronçon vertical tout en faisant tourner le moyeu du diffuseur radial dans le sens anti-horaire. (Voir la figure 2, vue B).
5. Centrer toutes les ailettes radialement et serrer suffisamment les vis pour permettre aux lamelles de tourner tout en conservant une position donnée.

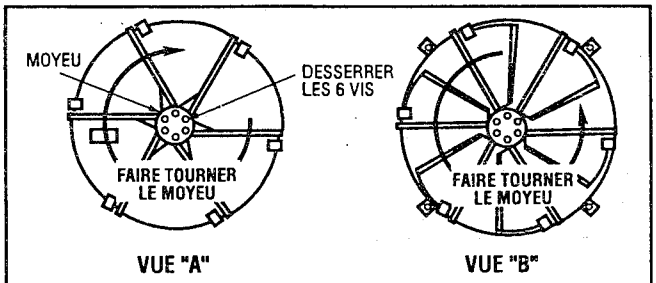


Figure 2. Montage du diffuseur radial

6. Amener toutes les ailettes à la position désirée et serrer les vis pour maintenir les ailettes.

MONTAGE D'UN DIFFUSEUR À ANÉMOSTAT

1. Monter le tronçon vertical (fourni avec le diffuseur à anémostat dont il fait partie). (Consulter la partie MONTAGE DU TRONÇON VERTICAL).
2. Dans le cas des petits (-S) et des grands (-L) diffuseurs, glisser l'anémostat sur le tronçon vertical et le fixer à l'aide de trois boulons de 9,5 mm (N° 10-32 x 3/8 po) et d'écrous. (Voir la figure 3, vue A).

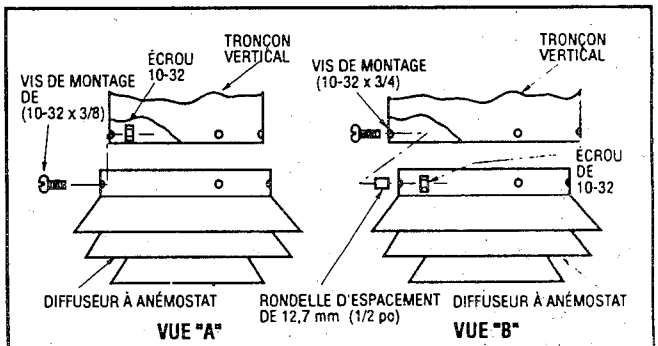
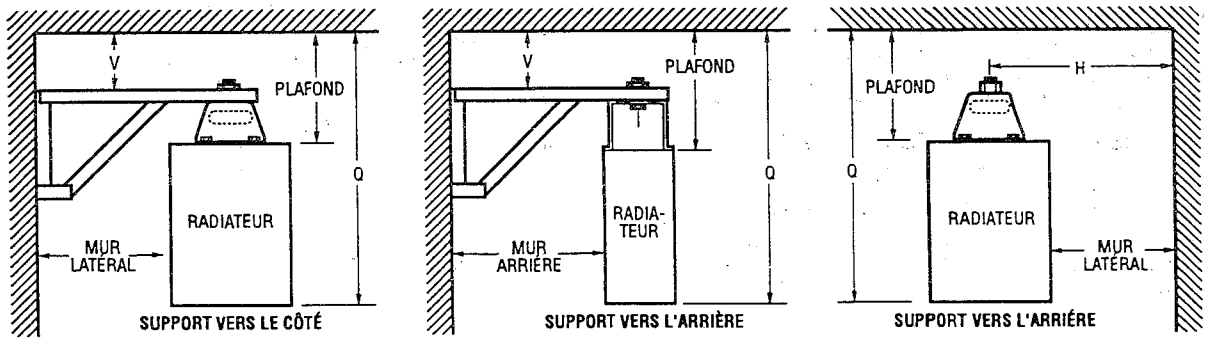


Figure 3. Montage d'un diffuseur à anémostat



Espacements minimaux de montage

Radiateurs	Décharge	Plafond	Mur latéral	Mur arrière	H (Min)	V (Min.)	Q
3 KW à 5 KW	Horizontale	2 po (50,8mm)	6 po (152,4mm)	9 po (228,6mm)	13 po (330,2mm)	"0"	18 3/16 po (462,0mm)
7.5 KW à 10 KW	Horizontale	6 po (152,4mm)	6 po (152,4mm)	13 po (330,2mm)	15 1/2 po (393,7mm)	2 po (50,8mm)	27 7/8 po (708,2mm)
15 KW à 20 KW	Horizontale	6 po (152,4mm)	9 po (228,6mm)	12 1/2 po (317,5mm)	18 1/2 po (470,0mm)	2 po (50,8mm)	27 7/8 po (708,2mm)
25 KW à 50 KW	Horizontale	16 po	12 po	18 1/2 po	25 1/2 po	10 5/8 po	46 3/16 po

Figure 4. Espacements pour le support de montage

MONTAGE D'UN DIFFUSEUR À CLAIRE-VOIE SUR LES RADIATEURS MUH

1. On peut laisser la claire-voie du radiateur en place ou la retirer. (Se reporter au paragraphe 1, MONTAGE D'UN TRONÇON VERTICAL à la page précédente).
2. Introduire les ressorts de montage dans les quatre trous de 4,8 mm (3/16 po) du rebord intérieur de la plaque avant.
3. Placer le diffuseur à claire-voie contre l'avant de l'appareil.

REMARQUE : Diriger les languettes de repère vers le haut et les côtés du rebord du radiateur.

4. Fixer le diffuseur à claire-voie au radiateur à l'aide de pinces à long bec pour accrocher les extrémités libres des ressorts dans les quatre trous de 4,8 mm (3/16 po) du rebord intérieur du diffuseur à claire-voie.

MONTAGE D'UN DIFFUSEUR À CLAIRE-VOIE SUR LES RADIATEURS HUHAA ET DAYTON

1. On peut laisser la claire-voie du radiateur en place ou la retirer. (Se reporter au paragraphe 1, MONTAGE DU TRONÇON VERTICAL à la page précédente).
2. Placer le diffuseur à claire-voie contre la face avant de l'appareil.

REMARQUE : Diriger les languettes de repère vers le haut et les côtés du rebord du radiateur.

3. Fixer le diffuseur à claire-voie au radiateur à l'aide de trois vis (fournies) passées dans les languettes de montage.

POSE DE SUPPORTS DE MONTAGE DE LA SÉRIE B

AVERTISSEMENT

IL FAUT QUE LA STRUCTURE DE LA CONSTRUCTION ET QUE LES DISPOSITIONS D'ANCRAGE SOIENT SUFFISANTES POUR SOUTENIR LE POIDS TOTAL DU RADIATEUR ET DU SUPPORT DE MONTAGE.

1. Déterminer la position du support mural de montage du radiateur. Consulter la figure 4 pour connaître les espacements minimum. La figure 5 indique les dimensions du support de montage.

AVERTISSEMENT

DIRIGER L'OUVERTURE DU SUPPORT DE MONTAGE VERS L'ARRIÈRE DU RADIATEUR.

2. On peut déterminer l'emplacement du support de montage en maintenant le support en place et en faisant des repères dans les trous. La figure 5 indique également les dimensions du support de montage et l'emplacement des trous.
3. Il faut utiliser une vis d'un diamètre minimum de 9,5 mm (3/8 po) pour monter le support au mur ou au plafond. Utiliser une rondelle épaisse entre la tête du boulon et le support. UTILISER LE TYPE DE VIS QUI CONVIENT LE MIEUX À LA STRUCTURE DU BÂTIMENT.
4. Retirer les quatre boulons et rondelles du dessus du radiateur et fixer le support de montage au-dessus du radiateur à l'aide des quatre boulons et rondelles. (Voir la figure 6).
5. Boulonner le support de montage de l'appareil au support de montage mural à l'aide d'une cheville ouvrière 1/2-13, de deux rondelles plates, d'une rondelle-frein fendue, et d'un écrou de 1/2-13. (Voir la figure 7).

POSE DES SUPPORTS DE MONTAGE CMB

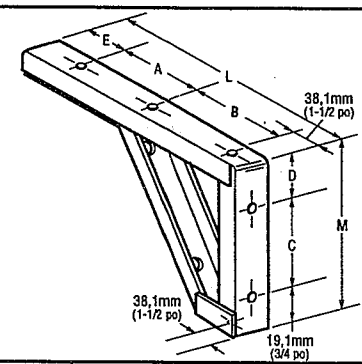
1. Monter le support conformément au paragraphe 4 ci-dessus.
2. Accrocher le radiateur au plafond en utilisant le trou central du support de fixation de l'appareil, en conservant le dégagements indiqués à la figure 4.

INSTALLATION DES SUPPORTS DE FIXATION VDMB

AVERTISSEMENT

LA STRUCTURE DE L'IMMEUBLE ET LES DISPOSITIFS D'ANCRAGE DOIVENT ETRE SUFFISANTS POUR SUPPORTER LE POIDS COMBINÉ DU RADIATEUR DU SUPPORT DE FIXATION.

1. Identifier la position du support vertical de fixation de refoulement. Voir la figure 4 pour les dégagements minimum de fixation. Voir la figure 8 pour les dimensions du support.
2. Une vis de diamètre minimum de 9,5mm doit être utilisée pour monter deux des supports au plafond. Une rondelle épaisse doit entre la tête de boulon et le support. Utiliser le type de vis qui convient le mieux à la structure de l'immeuble.
3. Retirer quatre boulons et rondelles du dos du radiateur et fixer les deux autres supports ar dos du radiateur en utilisant les quatre boulons et rondelles.
4. Boulonner les supports montés sur l'appareil sur les supports montés au plafond en utilisnat les boulons de 5/16po., les rondelles frein fendues et les écrous fournis. Voir la figure 8.



Dimensions	Encombrement du radiateur	
	3 à 20 KW	25 à 50KW
A	7 1/4 po (184,2mm)	9 7/16 po (239,8mm)
B	9 1/2 po (241,3mm)	14 3/8 po (365,3mm)
C	7 1/4 po (184,2mm)	12 1/8 po (308,1mm)
D	1 15/16 po (49,3mm)	2 1/16 po (52,3mm)
E	2 1/4 po (57,2mm)	3 po (76,2mm)
L	20 1/2 po (520,7mm)	28 5/16 po (719,1mm)
M	9 15/16 po (252,5mm)	14 15/16 po (379,5mm)

Figure 5. Dimension des trous du support de montage

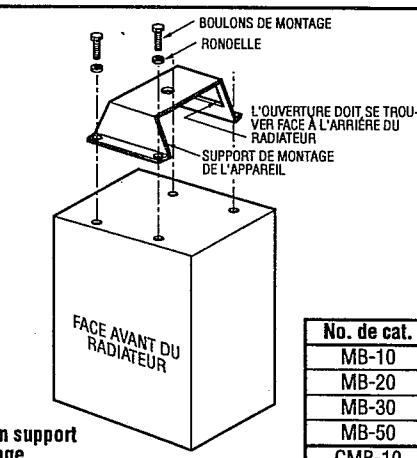


Figure 6. Pose d'un support de montage d'appareil

No. de cat.	Pour modèle
MB-10	3 - 10 KW
MB-20	15 - 20 KW
MB-30	25 - 30 KW
MB-50	40 - 50 KW
CMB-10	3 - 10 KW
CMB-20	15 - 20 KW
CMB-30	25 - 30 KW
CMB-50	40 - 50 KW

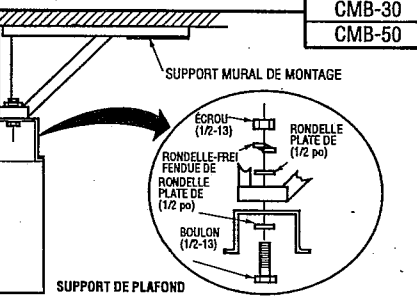
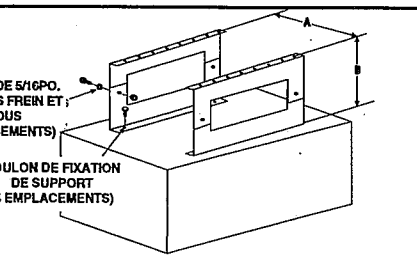


Figure 7. Pose du radiateur sur un support de montage



Modèle No.	kW	A	B
VDMB5	3 à 5 KW	152mm	155,5mm
VDMB20	7.5 à 20 KW	225mm	155,5mm
VDMB50	25 à 50 KW	317,5mm	308mm

Figure 8. Installation du radiateur sur les supports de fixation.

Marley Electric Heating
A United Dominion Company

Electrical Accessories

For MUH, HUHAA & 3UF77-3UF98 Series Unit Heaters

INSTALLATION OF INTERNAL THERMOSTAT

1. Remove 5/16" (7.9mm) knockout from back of heater and route capillary tube through hole (Figure 1).
2. Install thermostat bulb clip in slot provided in the back panel of the heater. Secure capillary bulb in clip.
3. Press on left side of logo label on front of heater to locate shaft and screw holes. Punch holes through label.
4. Install thermostat as shown in Figure 2, coiling any excess capillary tubing inside the heater.

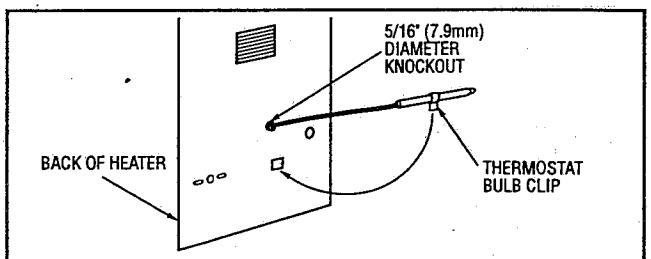


Figure 1. Installation of Internal Thermostat Capillary

WARNING

TO PREVENT POSSIBLE ELECTRICAL SHORT CIRCUIT OR FIRE, KEEP CAPILLARY TUBING AWAY FROM INTERNAL ELECTRICAL COMPONENTS.

5. Refer to wiring diagram, Figure 6, for wiring procedure on 3KW and 5KW (208V, 240V and 277V only). Refer to wiring diagram, Figure 7, for wiring procedure on all other heaters.
6. Remove backing from label (supplied) and install over thermostat shaft. Install knob by pushing onto the thermostat shaft.

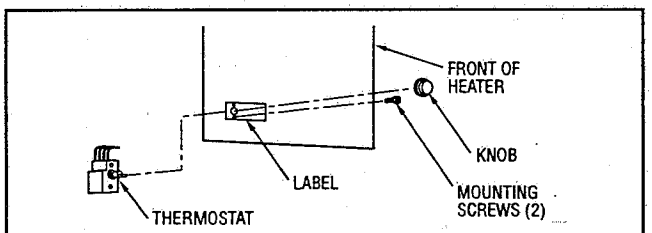


Figure 2. Installation of Internal Thermostat

INSTALLATION OF FAN SWITCH

1. Remove 1/2" (12.7mm) knockout (located between ON and AUTO) from back of heater (Figure 3).
2. Install manual fan switch as shown in Figure 3. (Note orientation of slot in switch nozzle. Locate slot in the switch nozzle towards the "AUTO" position.) Be sure to use lockwasher to prevent rotation of switch.

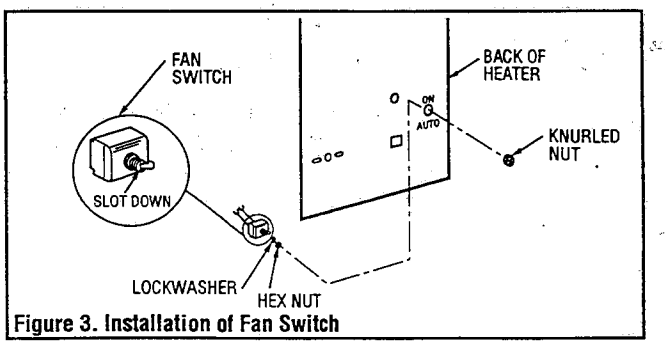


Figure 3. Installation of Fan Switch

3. Install leads to terminal block. Refer to wiring diagram, Figure 6, for wiring procedure on 3KW and 5KW units (208V, 240V, and 277V only). Refer to wiring diagram, Figure 7, for wiring procedure on all other heaters.

INSTALLATION OF REMOTE FAN SWITCH

The Remote Fan Switch is mounted external and remote from the unit heater. The voltage of the remote fan switch circuit is the same as the supply voltage to the heater.

1. Use 14 gauge copper, NEC Class 1, 600V rated insulated wire. Wiring must meet all local and NEC requirements.
2. Install the remote fan switch in a standard wall box in any convenient location that is protected from traffic or other accidental damage.
3. Connect the 14 gauge copper field wire to the switch lead wires with suitable connectors.
4. A 1/2-inch (12.7mm) knockout is provided in the back of the heater adjacent to the control terminal board. Use a crimp-on terminal suitable for No. 8 screw on the control terminal board. Connect one field wire terminated lead to terminal F1 and the other terminated lead to terminal F2. Refer to Figure 6 for connecting to heaters without built-in contactors. Refer to Figure 7 for connecting to heaters equipped with built-in contactors.

INSTALLATION OF REMOTE PILOT DUTY FAN SWITCH (Including Wall Switch and Relay)

The Remote Fan Switch is mounted external and remote from the unit heater.

1. Use 18 gauge (min.), NEC Class 1, 600V wiring that meets all local and NEC requirements.
2. Install the remote fan switch in a standard wall box in any convenient location that is protected from traffic or other accidental damage.
3. Connect the field wire to the switch lead wires with suitable connectors.
4. A 1/2-inch (12.7mm) knockout is provided in the back of the heater adjacent to the control terminal board. Use a crimp-on terminal suitable for No. 8 screw on the control terminal board. Connect one field wire terminated lead to terminal "R" and the other terminated field wire lead to terminal "G". Refer to Figure 7.
5. Install relay as indicated below.

INSTALLATION OF FAN RELAY

1. Mount relay in control compartment with two No. 8 mounting screws as shown in Figure 4.
2. Connect the lead wires from the relay to the control terminal board as shown in Figure 7. Each lead wire is marked for proper terminal location; connect the lead wires as indicated.

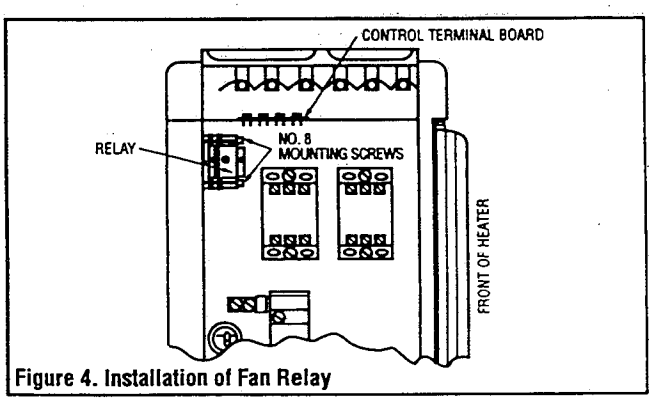


Figure 4. Installation of Fan Relay

INSTALLATION OF HEAT RECOVERY THERMOSTAT

NOTE: This accessory cannot be installed on heaters equipped with built-in single-pole or two-stage thermostats.

(For heaters with 24 Volt Control Circuit refer to Fig. 7 and proceed to step 1. For heaters with Line Voltage Control refer to Fig. 6 and proceed to step 3.)

1. Mount relay in baffle compartment with two No. 8 mounting screws as shown in Figure 4.
2. Connect the lead wires from the relay to the control terminal board as shown in Figure 7. Each lead wire is marked for proper terminal location; connect lead wires as indicated.
3. Remove 5/16" (7.9mm) knockout from back of heater and route capillary tube through hole (See Figure 1).
4. Install thermostat bulb clip in slot provided in the back panel of the heater. Secure capillary bulb in clip.
5. Press on left side of logo label on the front of heater to locate shaft and screw holes. Punch holes through label.
6. Install heat recovery thermostat as shown in Figure 2, coiling any excess capillary tubing inside the heater.
7. Use the wire tie to hold the thermostat leads to other wiring at approximately the midpoint of the leads between control terminal board and thermostat.

WARNING

TO PREVENT A POSSIBLE ELECTRICAL SHORT CIRCUIT OR FIRE, KEEP CAPILLARY TUBING AWAY FROM INTERNAL ELECTRICAL COMPONENTS.

8. Refer to wiring diagram, Figure 6 or Figure 7 for wiring procedure.
9. Remove backing from the label (supplied) and install over thermostat shaft as shown in Figure 2.
10. Install knob by pushing onto the thermostat shaft.
11. Set thermostat for desired turn-on temperature. Full counter-clockwise rotation of the knob is approximately 70°F (21° C). Full clockwise rotation of the knob is approximately 120°F (49° C).

INSTALLATION OF 25 AMP AND 60 AMP POWER DISCONNECT SWITCH

1. Use copper conductor supply wire only when using these switches.
2. Remove the 5/8" (16mm) knockout and the two knockout slots from back of heater, below OFF-ON markings.
3. Install power disconnect switch with two mounting screws as shown in Figure 5.
4. Install the knob with the pointer position at the "OFF" position marking when the switch is rotated to the full counterclockwise position.
5. Before connecting the wires of the switch, check the pointer index. Check to be sure the pointer end of the knob points to "OFF" when the switch is rotated full counterclockwise. It may be necessary to rotate the switch 180° to index the pointer knob.
6. Refer to wiring diagram, Figure 8, for wiring procedure.

(NOTE: For single-phase, remove and discard leads "L2" and "S2").

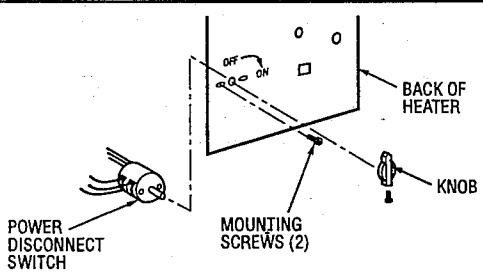
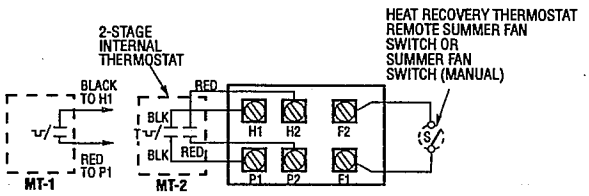
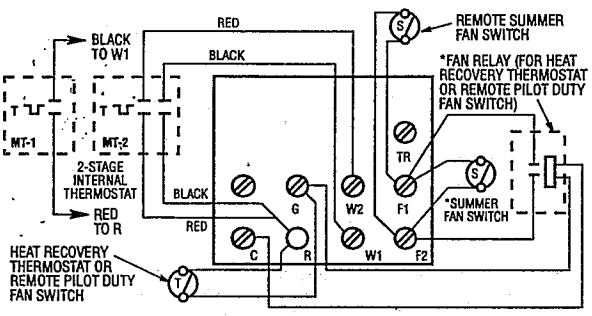


Figure 5. Installation of Power Disconnect Switch



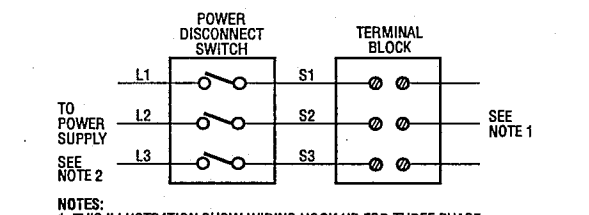
NOT
1. THIS STYLE CONTROL TERMINAL BOARD USED WITH MODELS 3KW AND 5KW UNITS (208V, 240V AND 277V ONLY).
2. WHEN UNIT IS WIRED FOR SINGLE PHASE, JUMPER H1 TO H2. IF SINGLE POLE THERMOSTAT IS USED WITH SINGLE PHASE UNIT, CONNECT THERMOSTAT LEADS TO P1 AND H1.
3. EXTERNAL LINE VOLTAGE THERMOSTAT SHOULD BE TREATED AS SINGLE STAGE ONLY.

Figure 6. Control Terminal Board (for Heaters without Contactors)



NOTES:
1. THIS STYLE CONTROL TERMINAL BOARD USED WITH ALL MODELS EXCEPT 3KW AND 5KW UNITS (208V, 240V AND 277V ONLY).
2. REMOVE JUMPER W1 TO W2 WHEN 2-STAGE THERMOSTAT IS USED.
3. *ONLY ONE OF THESE ACCESSORIES MAY BE INSTALLED IN A SINGLE HEATER.
4. EXTERNAL LINE VOLTAGE THERMOSTATS SHOULD BE TREATED AS SINGLE STAGE ONLY.

Figure 7. Control Terminal Board (for Heaters with Contactors)



NOTES:
1. THIS ILLUSTRATION SHOW WIRING HOOK UP FOR THREE PHASE SERVICE. REMOVE LEAD WIRES MARKED L2 AND S2 WHEN USING ONE PHASE POWER SERVICE.
2. USE COPPER SUPPLY WIRE ONLY WITH THIS SWITCH.

Figure 8. Power Disconnect Switch Wiring Diagram

Marley Electric Heating
A United Dominion Company
470 Beauty Spot Road East
Bennettsville, SC 29512 USA

Marley Electric Heating

Una Compañía de United Dominion

Para Calentadores de Unidades de la Serie 3UF77-3UF98, HUHAA y MUH

INSTALACION DEL TERMOSTATO INTERNO

1. Quite la pieza desmontable de 5/16" (7,9mm) que está en la parte trasera del calentador y haga pasar el tubo capilar a través del agujero (Figura 1).
2. Instale la pinza de la bombilla del termostato en la ranura provista en el panel trasero del calentador. Asegure la bombilla capilar en la pinza.
3. Presione sobre el costado izquierdo del rótulo del logotipo situado en el frente del calentador para ubicar los agujeros de los tornillos y el eje. Perfore los agujeros a través del rótulo.
4. Instale el termostato como se muestra en la Figura 2 y enrolle el exceso del tubo capilar adentro del calentador.

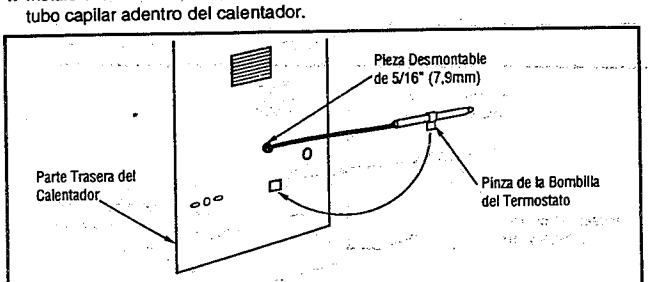


Figura 1. Instalación del Sistema Capilar con Termostato Interno

ADVERTENCIA

PARA PREVENIR POSIBLES CORTOS CIRCUITOS O FUEGOS, MANTENGA EL TUBO CAPILAR ALEJADO DE LOS COMPONENTES ELECTRICOS INTERNOS.

5. Use como referencia el diagrama del cableado, Figura 6, para conocer la conexión de los cables en los modelos de 3KW y 5KW (208V, 240V y 277V solamente). Use como referencia el diagrama del cableado, Figura 7, para conocer la conexión de cables en los otros calentadores.
6. Saque la pieza de respaldo del rótulo (provista) e instale el eje del termostato. Instale la perilla, empujándola encima del eje del termostato.

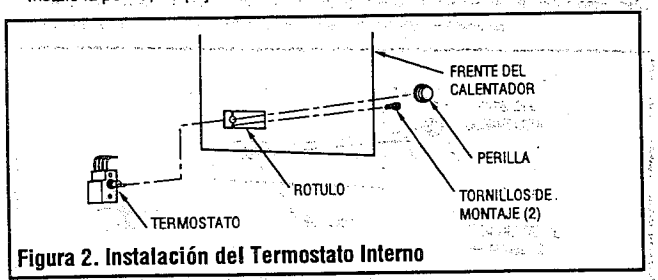


Figura 2. Instalación del Termostato Interno

INSTALACION DEL INTERRUPTOR DEL VENTILADOR

1. Quite la pieza desmontable de 1/2" (12,7mm) (ubicada entre ON y AUTO) de la parte trasera del calentador (Figura 3).
2. Instale el interruptor del ventilador manual como se muestra en la Figura 3. (Tenga en cuenta la orientación de la ranura en el pitón del interruptor. Ubique la ranura en el pitón del interruptor que está hacia la posición "AUTO"). Asegúrese de haber utilizado arandelas de seguridad para prevenir la rotación del interruptor.

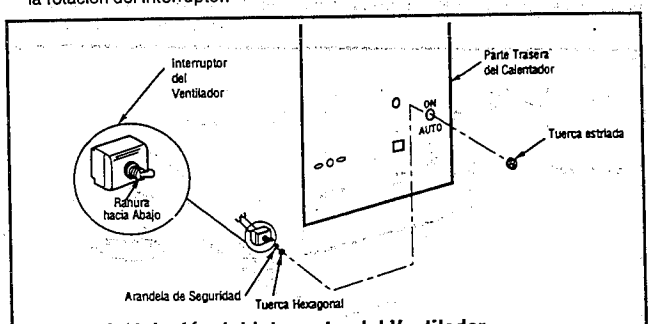


Figura 3. Instalación del Interruptor del Ventilador

3. Instale los conductores correspondientes al bloque terminal. Use como referencia el diagrama del cableado, Figura 6, para conocer el procedimiento de conexión de cables en las unidades de 3KW y 5KW (208V, 240V y 277V solamente). Use como referencia el diagrama del cableado, Figura 7, para conocer la conexión de cables en los otros calentadores.

INSTALACION DEL INTERRUPTOR DEL VENTILADOR REMOTO

El Interruptor del Ventilador Remoto queda montado en forma externa y remota con respecto al calentador de la unidad. El voltaje del circuito de ese interruptor es igual al voltaje que se le suministra al calentador.

1. Use cables aislados de cobre calibre 14, Clase 1 de NEC, autorizados para 500V. El cableado debe cumplir con todos los requerimientos locales y de NEC.
2. Instale el interruptor del ventilador remoto en una caja para pared estándar que esté situada en un lugar conveniente protegido de los daños accidentales generados por el tránsito y otros elementos.
3. Conecte el cable de campo de cobre calibre 14 a los cables conductores del interruptor con conectores apropiados.
4. Se provee una pieza desmontable de 1/2 pulg (12,7mm) en la parte trasera del calentador, adyacente a la tarjeta terminal de control. Use un terminal plegable adaptable a un trillo No. 8 en la tarjeta terminal de control. Conecte un conductor terminado con cable de campo al terminal F1 y el otro conductor de cable de campo al termainal F2. Refiera a la Figura 6 para conectar calentadores sin contactores integrados. Refiera a la figura 7 para conectar calentadores con contactores integrados.

INSTALACION DELINTERRUPTUR PILOTO DE DEBER DEL VENTILADOR REMOID (Incluye el interruptor de pared y rele)

El interruptor del ventilador remoto queda montado en forma extrema y remota con respecto al calentador de la unidad.

1. Use cables calibre 18 (min.) , Clase I de NEC, cableado de 600V que cumple con todos los de requerimientos locales y de NEC.
2. Instale el interruptor del ventilador remoto en una caja para pared estándar que esté situada en un lugar conveniente protegido de los daños accidentales generados por el tránsito y otros elementos.
3. Conecte el cable de campo a los cables conductores del interruptor con conectores apropiados.
4. Se proveé una pieza desmontable de 1/2 pulg. (12,7mm) en la parte trasera del calentador, adyacente a la tarjeta terminal de control. Use un terminal plegable adaptable a un tornillo No. 8 en la tarjeta terminal de control. Conecte un conductor terminado con cable de campo al terminal "R" y el otro conductor de cable de campo terminado al terminal "G." Use la Figura 7 como referencia.
5. Instale el relé como se indica abajo.

INSTALACION DEL RELE DEL VENTILADOR

1. Monte el relé en el compartimiento de control con dos tornillos de montaje No. 8, como se muestra en la Figura 4.
2. Conecte los cables conductores desde el relé a la tarjeta terminal de control, como se muestra en la Figura 7. Cada cable conductor está marcado para colocarlo en la conexión terminal apropiada; conecte los cables conductores como está indicado.

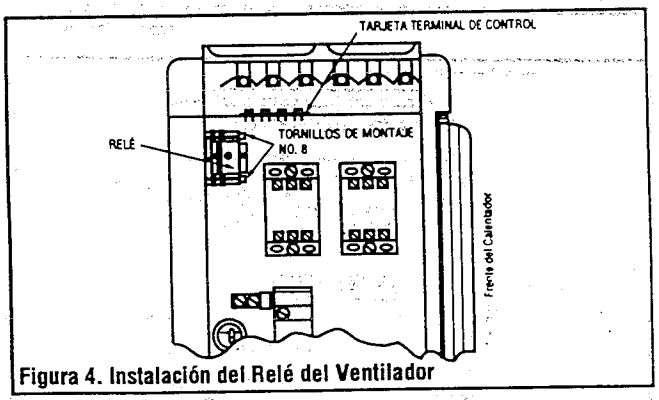


Figura 4. Instalación del Relé del Ventilador

INSTALACION DEL TERMOSTATO DE RECUPERACION DE CALOR

NOTA: Este accesorio no se puede instalar en calentadores equipados con termostatos de dos etapas o unipolares integrados.

(Para hacer la instalación en calentadores con circuitos de control de 24 voltios, use la Figura 7 como referencia y proceda con el paso 1. Si usa calentadores con control de voltaje de línea, use la Figura 6 como referencia y proceda con el paso 3.)

1. Monte el relé en el compartimiento del deflector con dos tornillos No. 8, como se muestra en la Figura 4.
2. Conecte los cables conductores desde el relé a la tarjeta terminal de control, como se muestra en la Figura 7. Cada cable conductor está marcado para conectarlo al terminal apropiado; conecte los cables conductores como está indicado.
3. Quite la pieza desmontable de 5/16" (7,9mm) que está en la parte trasera del calentador y haga pasar el tubo capilar a través del agujero (Figura 1).
4. Instale la pinza de la bombilla del termostato en la ranura provista en el panel trasero del calentador. Asegure la bombilla capilar en la pinza.
5. Presione sobre el costado izquierdo del rótulo del logotipo situado en el frente del calentador para ubicar los agujeros de los tornillos y el eje. Perfore los agujeros a través del rótulo.
6. Instale el termostato como se muestra en la Figura 2 y enrolle el exceso del tubo capilar adentro del calentador.
7. Use sujetadores de cable para sostener los conductores del termostato a los otros cables en un punto medio aproximado entre la tarjeta terminal de control y el termostato.

ADVERTENCIA

PARA PREVENIR POSIBLES CORTOS CIRCUITOS O FUEGOS, MANTENGA EL TUBO CAPILAR ALEJADO DE LOS COMPONENTES ELECTRICOS INTERNOS.

8. Use como referencia el diagrama del cableado, Figuras 6 ó 7, para conocer el procedimiento de la conexión de los cables.
9. Saque la pieza de respaldo del rótulo (provista) e instale el eje del termostato, como se muestra en la Figura 2.
10. Instale la perilla, empujándola encima del eje del termostato.
11. Ajuste el termostato para que la operación comience a la temperatura deseada. Un giro completo de la perilla en contra de las agujas del reloj corresponde a aproximadamente 70°F (21°C). Un giro completo en el sentido de las agujas del reloj corresponde a aproximadamente 120°F (49°C).

INSTALACION DE INTERRUPTORES DE DESCONEXION DE POTENCIA DE 25 Y 60 AMPERIOS

1. Use cable para suministro con conductor de cobre solamente al utilizar estos interruptores.
2. Quite la pieza desmontable de 5/8" (16mm) y de las dos ranuras que están en la parte de atrás del calentador, abajo de las marcas OFF-ON.
3. Instale el interruptor de desconexión de potencia con los dos tornillos de montaje, como se muestra en la Figura 5.
4. Instale la perilla de manera que el indicador quede en la posición marcada "Off" (Apagado) cuando el interruptor se haga girar completamente en el sentido contrario a las agujas del reloj.
5. Antes de conectar los cables al interruptor, inspeccione el índice del indicador. Verifique para asegurarse de que el extremo del indicador perteneciente a la perilla quede apuntando hacia la marca "Off" (Apagado) cuando el interruptor se haga girar completamente en sentido contrario a las agujas del reloj. Podrá ser necesario hacer girar el interruptor 180° para ajustar la perilla indicadora con respecto al índice.
6. Use el diagrama de cableado como referencia, Figura 8, para conocer el procedimiento de conexión de cables.

(Nota: En las unidades unipolares, saque y descarte los conductores "L2" y "S2")

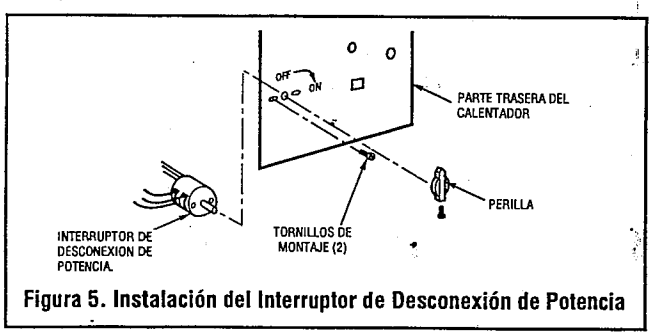
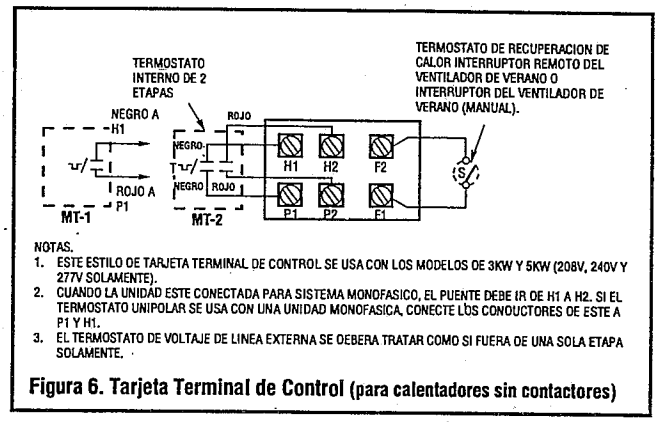
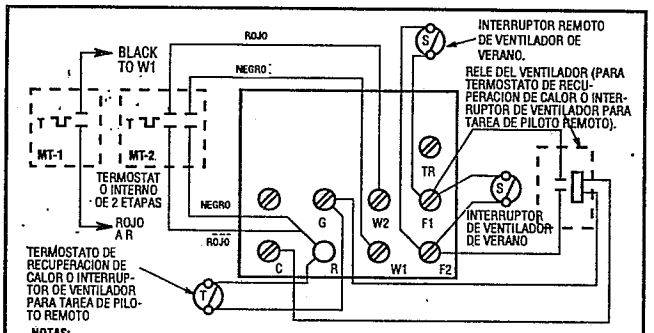


Figura 5. Instalación del Interruptor de Desconexión de Potencia



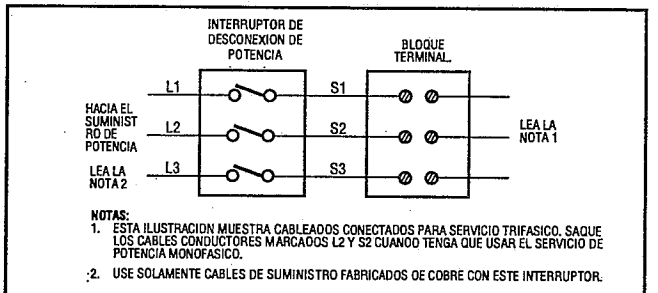
NOTAS.
1. ESTE ESTILO OE TARJETA TERMINAL DE CONTROL SE USA CON LOS MODELOS OE 3KW Y 5KW (208V, 240V Y 277V SOLAMENTE).
2. CUANDO LA UNIDAD ESTE CONECTADA PARA SISTEMA MONOFASICO, EL PUENTE DEBE IR OE H1 A H2. SI EL TERMOSTATO UNIPOLAR SE USA CON UNA UNIDAD MONOFASICA, CONECTE LOS CONDUCTORES DE ESTE A P1 Y H1.
3. EL TERMOSTATO DE VOLTAJE DE LINEA EXTERNA SE DEBERA TRATAR COMO SI FUERA DE UNA SOLA ETAPA SOLAMENTE.

Figura 6. Tarjeta Terminal de Control (para calentadores sin contactores)



NOTAS:
1. ESTE ESTILO DE TARJETA TERMINAL DE CONTROL SE USA EN TODOS LOS MODELOS, EXCEPTO EN LAS UNIOADES DE 3KW Y 5KW (208V, 240V Y 277V SOLAMENTE).
2. TRANSFIERA EL PUENTE OESDE W1 A W2 CUANDO USE UN TERMOSTATO DE 2 ETAPAS.
3. SOLAMENTE UNO DE ESTOS ACCESORIOS SE PODRA INSTALAR EN UN CALENTADOR.
4. EL TERMOSTATO OE VOLTAJE DE LINEA EXTERNA SE DEBERA TRATAR COMO SI FUERA DE UNA SOLA ETAPA SOLAMENTE.

Figura 7. Tarjeta Terminal de Control (Para calentadores con contactores)



NOTAS:
1. ESTA ILUSTRACION MUESTRA CABLEADOS CONECTADOS PARA SERVICIO TRIFASICO. SAQUE LOS CABLES CONDUCTORES MARCADOS L2 Y S2 CUANOO TENGA QUE USAR EL SERVICIO DE POTENCIA MONOFASICO.
2. USE SOLAMENTE CABLES DE SUMINISTRO FABRICADOS OE COBRE CON ESTE INTERRUPTOR.

Figura 8. Diagrama de Cables del Interruptor para Desconexión de Potencia

Marley Electric Heating

Una Compañía United Dominion

470 Beauty Spot Road East
Bennettsville, SC 29512 EE.U.U.

Marley Electric Heating
A United Dominion Company

Accessoires électriques

pour radiateurs des séries MUH, HUHAA et Dayton 3UF77 - 3UF98

MONTAGE D'UN THERMOSTAT INTERNE

1. Retirer la pastille défonçable de 7,9 mm (5/16 po) du panneau arrière du radiateur et acheminer le tube capillaire par le trou (Figure 1).
2. Monter l'attache de la sonde du thermostat dans l'encoche prévue à cet effet dans le panneau arrière du radiateur. Fixer la sonde capillaire dans l'attache.
3. Appuyer sur le côté gauche de l'étiquette de logo collée à la face avant du radiateur pour repérer l'emplacement de la tige et des trous des vis. Percer des trous dans l'étiquette.
4. Monter le thermostat comme l'indique la figure 2 en enroulant la longueur inutile de tuyau capillaire à l'intérieur du radiateur.

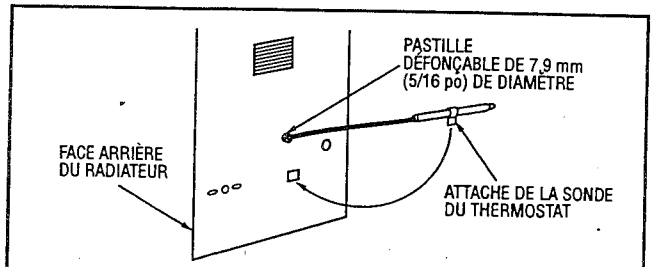


Figure 1. Montage d'un capillaire de thermostat interne

AVERTISSEMENT

POUR ÉVITER TOUT RISQUE DE COURT-CIRCUIT OU D'INCENDIE, ÉLOIGNER LE TUBE CAPILLAIRE DES COMPOSANTS ÉLECTRIQUES INTERNES.

5. Effectuer le câblage sur les 3 KW et les 5 KW (208 V, 240 V et 277V uniquement) conformément à la figure 6. Effectuer le câblage sur tous les autres radiateurs conformément à la figure 7.
6. Détacher l'étiquette (fournie) de la pellicule de protection et poser celle-ci sur la tige du thermostat. Monter le bouton en l'enfonçant sur la tige du thermostat.

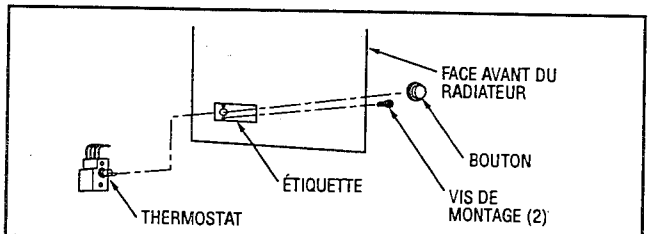


Figure 2. Montage d'un thermostat interne

MONTAGE D'UN INTERRUPTEUR DE VENTILATEUR

1. Retirer la pastille défonçable de 12,7 mm (1/2 po) (située entre ON et AUTO) de la facearrière du radiateur (figure 3).
2. Monter l'interrupteur manuel du ventilateur comme l'indique la figure 3. (Veiller à l'orientation de la fente du levier de l'interrupteur. Orienter la fente du levier de l'interrupteur vers la position "AUTO". Ne pas omettre la rondelle-frein qui empêche l'interrupteur de tourner.

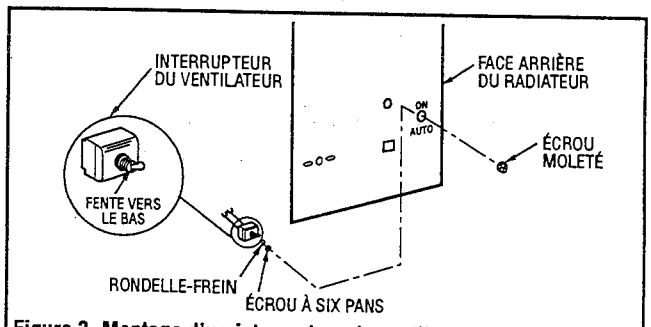


Figure 3. Montage d'un interrupteur de ventilateur

3. Monter les fils vers la borne serre-fils. Effectuer le câblage des 3 KW et des 5 KW (208 V, 240 V et 277V seulement) conformément à la figure 6. Câbler tous les autres radiateurs conformément à la figure 7.

MONTAGE D'UN INTERRUPTEUR DE VENTILATEUR À DISTANCE

Un interrupteur de ventilateur à distance se monte à l'extérieur et à distance du radiateur. La tension du circuit de l'interrupteur de ventilateur à distance est la même que celle de l'alimentation du radiateur.

1. Utiliser un fil de cuivre de jauge 14, de classe 1 NEC, isolé, de classe d'isolement 600V. Le câblage doit être conforme à tous les règlements locaux et NEC.
2. Monter l'interrupteur de ventilateur à distance dans un boîtier mural standard dans un endroit facilement accessible, à l'abri du passage ou de tout risque de dommage accidentel.
3. Raccorder le câblage client de cuivre de jauge 14 aux fils de l'interrupteur à l'aide de connecteurs adéquats.
4. Une pastille défonçable de 12,7 mm (1/2 po) se trouve sur la face arrière du radiateur, à côté du bornier de commande. Utiliser une borne vissable convenant à la vis n°8 du bornier de commande. Raccorder l'extrémité d'un fil conducteur client à la borne F1 et l'extrémité de l'autre fil conducteur à la borne F2. Effectuer les raccordements aux radiateurs non munis de contacteurs intégrés conformément à la figure 6. Effectuer les raccordements aux radiateurs munis de contacteurs intégrés conformément à la figure 7.

MONTAGE D'UN INTERRUPTEUR DE VENTILATEUR PILOTE À DISTANCE (y compris interrupteur mural et relais)

Un interrupteur de ventilateur à distance se monte à l'extérieur et à distance du radiateur.

1. Utiliser un fil de cuivre de jauge 18 (min.), de classe 1 NEC, de classe d'isolement 600V conforme à tous les règlements locaux et NEC.
2. Monter l'interrupteur de ventilateur à distance dans un boîtier mural standard situé dans un endroit facilement accessible, à l'abri du passage ou de tout risque de dommage accidentel.
3. Raccorder le câblage client aux fils conducteurs de l'interrupteur à l'aide de connecteurs adéquats.
4. Une pastille détachable de 12,7 mm (1/2 po) se trouve à la face arrière du radiateur, à côtédu bornier de commande. Utiliser une borne vissable convenant à la vis n°8 du bornier de commande. Raccorder l'extrémité d'un fil conducteur à la borne "R" et l'extrémité de l'autre fil conducteur à la borne "G". Consulter la figure 7.
5. Monter le relais en suivant les explications ci-dessous.

MONTAGE D'UN RELAIS DE VENTILATEUR

1. Monter le relais dans le logement de la commande à l'aide de deux vis de montage N°8 comme l'indique la figure 4.
2. Raccorder les fils conducteurs du relais au bornier de commande comme l'indique la figure 7. La borne correspondante est indiquée sur chaque fil; raccorder les fils comme l'indique le schéma.

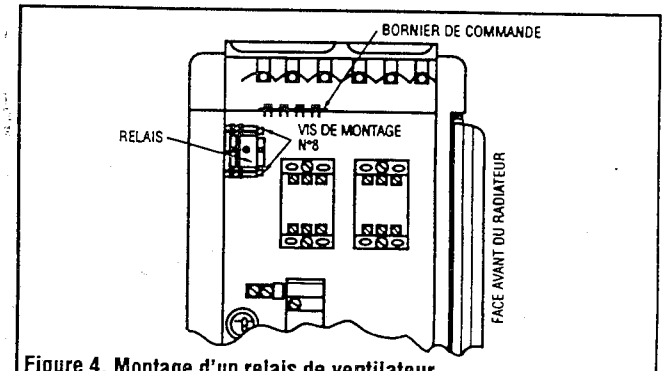


Figure 4. Montage d'un relais de ventilateur

MONTAGE D'UN THERMOSTAT DE RÉCUPÉRATION DE CHALEUR

REMARQUE: On ne peut le monter sur des radiateurs équipés d'un thermostat unipolaire intégré ou d'un thermostat à deux niveaux.

(Pour les radiateurs munis d'un circuit de commande de 24 volts, voir la figure 7 et passer à l'étape 1. Pour les radiateurs avec commande alimentée par le secteur, voir la figure 6 et passer à l'étape 3).

1. Monter le relais dans le renfoncement à l'aide de deux vis N°8 comme l'indique la figure 4.
2. Raccorder les fils conducteurs provenant du relais au bornier de commande comme l'indique la figure 7. La borne correspondante est indiquée sur chaque fil; raccorder les fils comme l'indique le schéma.
3. Retirer la pastille défonçable de 7,9 mm (5/16 po) de la face arrière du radiateur et acheminer le tube capillaire par ce trou (voir la figure 1).
4. Monter l'attache de la sonde du thermostat dans l'encoche prévue à cet effet dans le panneau arrière du radiateur. Fixer la sonde capillaire dans l'attache.
5. Appuyer sur le côté gauche de l'étiquette de logo collée à la face avant du radiateur pour repérer l'emplacement de la tige et des trous des vis. Percer des trous dans l'étiquette.
6. Monter le thermostat de récupération de chaleur comme l'indique la figure 2 en enroulant la longueur inutile de tuyau capillaire à l'intérieur du radiateur.

AVERTISSEMENT

POUR ÉVITER TOUT RISQUE DE COURT-CIRCUIT OU D'INCENDIE, ÉLOIGNER LE TUBE CAPILLAIRE DES COMPOSANTS ÉLECTRIQUES INTERNES.

7. Utiliser le serre-fils pour fixer les fils du thermostat aux autres fils à mi-chemin des fils entre le bornier de commande et le thermostat.
8. Effectuer le câblage conformément au schéma de câblage, figure 7.
9. Détacher l'étiquette (fournie) de la pellicule de protection et poser celle-ci sur la tige du thermostat comme l'indique la figure 2.
10. Monter le bouton en l'enfonçant sur la tige du thermostat.
11. Régler le thermostat à la température de déclenchement désirée. Un tour complet du bouton dans le sens anti-horaire représente environ 21°C (70°F). Un tour complet du bouton dans le sens horaire représente environ 49°C (120°F). Le point médian représente normalement environ 32°C (90°F).

MONTAGE D'UN SECTIONNEUR DE 25 A ET 60 A

1. N'utiliser qu'un fil d'alimentation conducteur en cuivre avec ces interrupteurs.
2. Retirer la pastille défonçable de 16 mm (5/8 po) et les deux fentes défonçables situées à la face arrière du radiateur, au-dessous des inscriptions OFF-ON.
3. Poser le sectionneur à l'aide de deux vis de montage comme l'indique la figure 5.
4. Monter le bouton de façon à ce que l'indicateur soit orienté sur le repère OFF lorsque celui-ci est tourné à fond en position anti-horaire.
5. Avant de raccorder les fils à l'interrupteur, vérifier la languette de l'indicateur. S'assurer que l'indicateur du bouton est dirigé sur le "OFF" lorsqu'on tourne le bouton à fond dans le sens anti-horaire. Il faut parfois faire tourner le bouton de 180° pour indexer le bouton à indicateur.
6. Effectuer le câblage conformément au schéma 8.

(REMARQUE : Dans le cas d'un courant monophasé, retirer et jeter les fils "L2" et "S2").

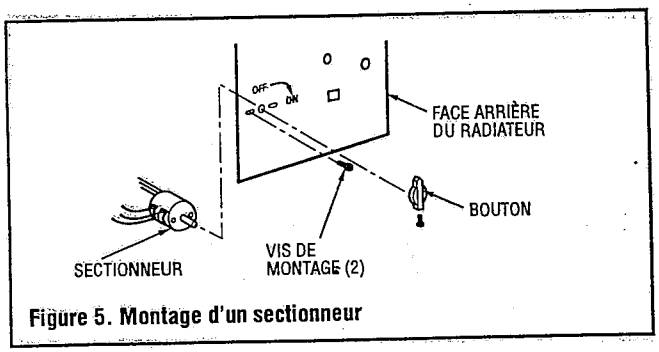
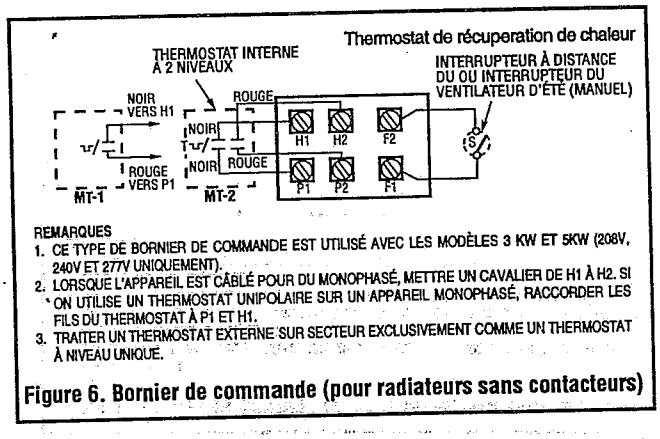
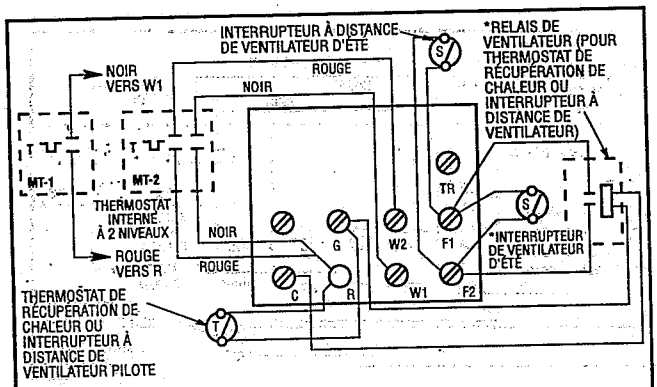


Figure 5. Montage d'un sectionneur



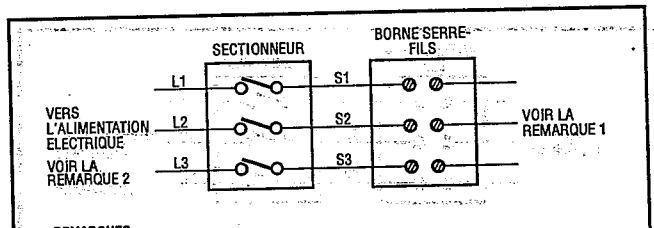
REMARQUES
1. CE TYPE DE BORNIER DE COMMANDE EST UTILISÉ AVEC LES MODÈLES 3 KW ET 5KW (208V, 240V ET 277V UNIQUEMENT).
2. LORSQUE L'APPAREIL EST CÂBLÉ POUR DU MONOPHASÉ, METTRE UN CAVALIER DE H1 À H2. SI ON UTILISE UN THERMOSTAT UNIPOLAIRE SUR UN APPAREIL MONOPHASÉ, RACCORDER LES FILS DU THERMOSTAT À P1 ET H1.
3. TRAITER UN THERMOSTAT EXTERNE SUR SECTEUR EXCLUSIVEMENT COMME UN THERMOSTAT À NIVEAU UNIQUE.

Figure 6. Bornier de commande (pour radiateurs sans contacteurs)



REMARQUE:
1. CE TYPE DE BORNIER DE COMMANDE EST UTILISÉ POUR TOUS LES MODÈLES, SAUF LES APPAREILS DE 3 KW ET 5 KW (208V, 240V ET 277V UNIQUEMENT).
2. RETIRER LE CAVALIER ENTRE W1 ET W2 LORSQU'ON UTILISE UN THERMOSTAT À 2 NIVEAUX.
3. *ON NE PEUT UTILISER QU'UN SEUL DE CES ACCESSOIRES SUR UN RADIATEURUNIQUE.
4. TRAITER UN THERMOSTAT EXTERNE SUR SECTEUR EXCLUSIVEMENT COMME UN THERMOSTAT À NIVEAU UNIQUE.

Figure 7. Bornier de commande (pour radiateurs à contacteurs)



REMARQUES:
1. CE SCHÉMA MONTRE LE BRANCHEMENT DANS LE CAS D'UN COURANT TRIPHASÉ. RETIRER LES FILS MARQUÉS L2 ET S2 LORSQU'ON UTILISE DU COURANT MONOPHASÉ.
2. UTILISER UNIQUEMENT UN FIL D'ALIMENTATION EN CUIVRE AVEC CET INTERRUPTEUR.

Figure 8. Schéma de câblage du sectionneur

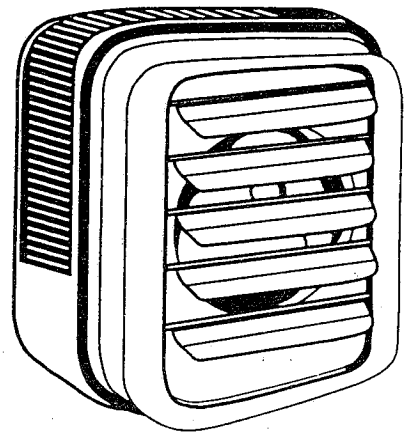
Marley Electric Heating

A United Dominion Company

470 Beauty Spot Road East

Bennettsville, SC 29512 USA

QMARK®
A Division of Marley Electric Heating



MUH Series
Modular Unit Heaters

LISTED c LISTED
FILE #E21609

Installation & Maintenance Instructions

Dear Owner,

Congratulations! Thank you for purchasing this new heater manufactured by a division of Marley Electric Heating. You have made a wise investment selecting the highest quality product in the heating industry. Please carefully read and follow the installation and maintenance directions shown in this manual. You should enjoy years of efficient heating comfort with this product from Marley Electric Heating... the industry's leader in design, manufacturing, quality and service.

... The Employees of
Marley Electric Heating

⚠ WARNING ⚠

Read Carefully - These instructions are written to help you prevent difficulties that might arise during installation of heaters. Studying the instructions first may save you considerable time and money later. Observe the following procedures, and cut your mounting time to a minimum.

To reduce risk of fire or electric shock:

1. To prevent electrical shock, disconnect all power coming to heater at main service panel before wiring or servicing.
2. All wiring must be in accordance with the National and Local Electrical Codes and the heater must be grounded as a precaution against possible electric shock.
3. Verify the power supply voltage coming to heater matches the ratings printed on the heater name plate before energizing.
4. This heater is hot when in use. To avoid burns, do not let bare skin touch hot surfaces.
5. Do not insert or allow foreign objects to enter any ventilation or exhaust opening as this may cause an electric shock, fire,or damage to the heater.
6. To prevent a possible fire, do not block air intakes or exhaust in any manner. Keep combustible materials, such as crates, drapes, etc., away from heater. Do not install behind door, furniture, towels, or boxes.
7. A heater has hot and arcing or sparking parts inside. Do not use it in areas where gasoline, paint or flammable liquids are stored.
8. Use this heater only as described in this manual. Any other use not recommended by the manufacturer may cause fire, electric shock, or injury to persons.
9. This heater is not approved for use in corrosive atmospheres such as marine, green house or chemical storage areas.

SAVE THESE INSTRUCTIONS

IMPORTANT ⚠

CAUTION ⚠

THE HEATER MUST BE MOUNTED AT LEAST 7' (2134mm) ABOVE THE FLOOR TO PREVENT ACCIDENTAL CONTACT WITH THE FAN BLADE WHICH COULD CAUSE INJURY.

CAUTION ⚠

THE CEILING MOUNTING STRUCTURE AND THE ANCHORING PROVISIONS MUST BE OF SUFFICIENT STRENGTH TO SUPPORT THE COMBINED WEIGHT OF THE HEATER AND MOUNTING BRACKET. (SEE TABLE 4).

DO NOT MOUNT MERCURY TYPE THERMOSTAT DIRECTLY ON UNIT. VIBRATION COULD CAUSE HEATER TO MALFUNCTION.

MANUAL RESET LIMIT (FACTORY INSTALLED OPTION ONLY.) THE LIMIT SWITCH IS LOCATED INTERNALLY ON THE REAR OF THE HEATER. ON THE MUH03 AND MUH05 MODELS, THE ACCESS TO THE RESET BUTTON IS

CAUTION ⚠

ALL BUILT-IN THERMOSTATS: IF THE HEATER IS USED TO PREVENT PIPING OR LIQUIDS FROM FREEZING, AND IF THE THERMOSTAT IS SET BELOW 45° F (7°C), THE FAN MUST RUN CONTINUOUSLY.

CAUTION ⚠

TO PREVENT POSSIBLE OVERHEATING OR DAMAGE DUE TO OVERHEATING, KEEP AT LEAST 5' (1524mm) CLEARANCE IN FRONT OF HEATER. REFER TO TABLE 1 FOR SIDE, TOP, AND BACK CLEARANCE REQUIREMENTS.

ON THE RIGHT SIDE (WHEN FACING REAR OF HEATER); ON ALL OTHER MODELS IT IS NEAR THE TOP REAR OF THE HEATER.

THE MANUAL RESET LIMIT IS IN SERIES WITH THE AUTOMATIC RECYCLING PROTECTOR (LIMIT). THE MANUAL RESET LIMIT WILL NOT RESET UNTIL THE HEATER HAS COOLED AND THE BUTTON IS PUSHED IN.

HEATER LOCATION INSTRUCTIONS

Arrange units so their discharge air streams:

a. are subjected to a minimum of interference from columns, machinery and partitions;
b. wipe exposed walls without blowing directly at them;
c. are directed away from room occupants in comfort heating;
d. are directed along the windward side when installed in a building exposed to a prevailing wind.

Locate thermostats approximately 5' (1524mm) above the floor on interior partition walls or post away from cold drafts, internal heat sources and away from heater discharge air streams.

Small rooms can be heated by one unit heater.

Large rooms require multi-unit installations. Number and capacity of units will be determined by volume of building and square feet of floor area to be heated. Arrange units to provide perimeter air circulation where each unit supports the air stream from another.

MOUNTING THE HEATER

GENERAL

The heater may be mounted to discharge the heated air either horizontally or vertically. When the heater is mounted for vertical discharge, it is recommended that the heater be positioned so that the access door will open away from the wall to provide greater access to the wiring and control compartment. If the heater is to be mounted with the access door facing a wall, the heater must be mounted far enough from that wall to allow full opening of the access door (a distance approximately equal to the width of the heater ... check clearance before installing). Refer to Table 1 for wall and ceiling clearances before mounting heater.

The heater may be mounted for either vertical or horizontal discharge by the use of threaded rods. (Refer to Table 2 for threaded rod sizes required.) Observe the detailed procedures in the following installation instructions.

The heater may also be suspended from the wall or ceiling by means of an optional mounting bracket (type MMB or MCMB) which permits horizontal pivoting of the heater.

After the heater is installed, the louvers may be positioned to

direct the heated air in the desired direction. When the heater is installed for horizontal discharge, the louvers should direct the air either straight ahead or downward. Directing the air upward may cause the heated air to remain in the ceiling area and waste energy.

HORIZONTAL DISCHARGE (Rod-mount from Ceiling)

1. Install four threaded mounting rods in the threaded holes and secure in place using lock nuts. (See Table 2).
2. Securely attach the four mounting rods to the ceiling. (Refer to Table 1 for wall and ceiling clearances, and Table 2 for mounting rod spacing).

Table 1. Wall and Ceiling Clearance, inches (mm)

Unit	Discharge	Ceiling	Side Wall	Back Wall
3 & 5 kW	Horiz.	2 (50.8)	6 (152.4)	9 (228.6)
	Vert.	6 (152.4)	18 (457.2)	18 (457.2)
7.5 to 10 kW	Horiz.	6 (152.4)	6 (152.4)	13 (330.2)
	Vert.	6 (152.4)	24 (609.6)	24 (609.6)
15 to 10 kW	Horiz.	6 (152.4)	9 (228.6)	12 1/2 (317.5)
	Vert	6 (152.4)	24 (609.6)	24 (609.6)
25 to 50 kW	Horiz.	16 (406.4)	12 (304.8)	18 1/2 (470.0)
	Vert.	12 (304.8)	39 (914.4)	39 (914.4)

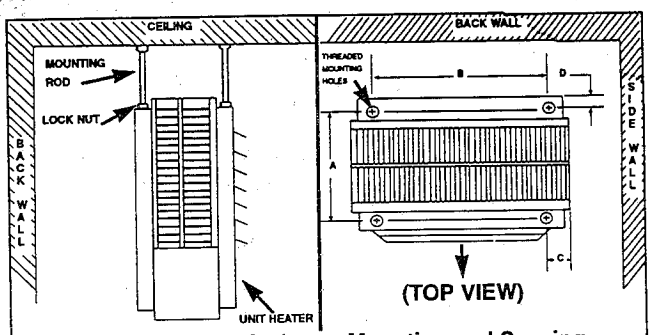


Figure 1. Horizontal Discharge Mounting and Spacing.

Table 2. Rod Thread and Spacing Dimensions, inches (mm) for Horizontal Discharge

Unit	Rod Thread Type	A	B	C	D
3 - 5 kW	5/16 - 18	6 1/16 (153.9)	6 (152.4)	4 1/16 (103.1)	3/4 (19.0)
7.5 - 10 kW			8 7/8 (225.6)	5 1/8 (130.3)	3/4 (19.0)
15 - 20 kW		11 3/8 (289.0)			
25 - 30 kW	3/8 - 16	10 9/16 (268.2)	14 - 12 (368.3)	6 3/16 (157.2)	5/8 (16.0)
40 - 50 kW		15 15/16 (404.9)	14 - 12 (368.3)	6 3/16 (157.2)	5/8 (16.0)

VERTICAL DISCHARGE (Rod-Mount from Ceiling)

1. Remove bolts from the threaded holes in the back of the heater.
2. Install four threaded mounting rods in the threaded holes and and secure in place using lock nuts.
3. Securely attach the four mounting rods to the ceiling. (Refer to Table 1 for wall and ceiling clearances, and Table 3 for mounting rod spacing dimensions.)

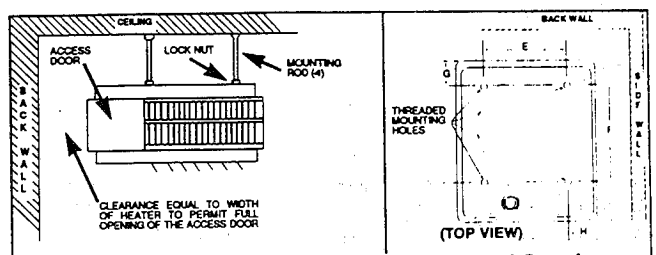


Figure 2. Vertical Discharge Mounting and Rod Spacing

Table 3. Rod Thread Type and Spacing Dimensions, inches (mm) for Vertical Discharge

Unit	Rod Thread Type	E	F	G	H
3 - 5 kW	5/16 - 18	6 (152.4)	9 3/4 247.7)	2 (50.8)	4 1/16 (103.1)
7.5 - 20 kW		8 7/8 (225.6)	14 5/8 (371.6)	2 (50.8)	5 1/8 (130.3)
25 - 30 kW	3/8 - 16	14 1/2 (368.3)	21 1/4 (539.8)	2 3/16 (56.0)	6 3/16 (157.2)

WIRING

BRANCH CIRCUIT (POWER)

1. Connect heater only to the voltage, amperage and frequency specified on the nameplate.
2. Field wiring must be properly sized to carry the amperage in accordance with the NEC.
3. The access door is hinged. There are either one or two screws accessible from the side that must be loosened to gain access. These screws are the captive type; do not try to remove them.
4. A knockout is provided in the back of the heater close to the power terminal block and the control terminal board. The control terminal board knockout is 1/2 inch (12.7 mm) conduit size. The power terminal block knockout is multiple diameter. Use the diameter that fits the required conduit size.
5. A ground terminal is provided near the power terminal board. The ground wire should be connected before other connections are made.
6. The power terminal board is equipped with box terminals sized to accept the correct size power supply wire. Wire rated at 600 V and 60° C is satisfactory for the heater branch circuit. Either aluminum or copper wire is satisfactory for connection to the heater power terminal board box terminal. Copper wire is recommended and must be used with built-in disconnect switch.

7. Each heater has a wiring diagram affixed to the inside of the access door. Consult this diagram before making any field connections.
8. Single or three-phase power connections may be used with heater models MUH0521, MUH07, MUH0581, MUH07, MUH078, MUH102, MUH108, and MUH158. These units are factory wired for single-phase operation. If these heaters are for use with three-phased power, reconnect the wires as indicated in the wiring diagram attached to the heater. Additional information can be found by looking at the wiring illustrations in Figures 3a and 3b and following the directions shown below.

On models MUH0521,MUH0581, MUH072, MUH078, MUH102, and MUH058 (Figure 3a), move only the two wires marked "A1" and marked "B1"; do not move or change any other wiring. The element lead wire marked "B1" which is factory connected to the power terminal block (terminal located closest to the elements) must be moved to terminal "B" on the three-phase terminal block. The relay (contactor) lead wire "A1" must be moved from the end terminal of the power terminal block (terminal closest to the contactor or control terminal board) to the "A" terminal of the lower terminal block (center terminal).

Model MUH158 (Figure 3b) has two three-phase terminal blocks located adjacent to the relays (contactors). Move only the two wires marked "C1" and "D1" on each of these two three-phase terminal blocks to terminal "B". Do not move or change any other wires.

9. Electrical Accessories, either kits or factory-installed options, are shown connected by a dash line on the heater wiring diagram.
10. **208/240 VOLT HEATER.** Interchange transformer red and black primary leads (see wiring diagram) when the heater is to be connected to 208 volts supply.

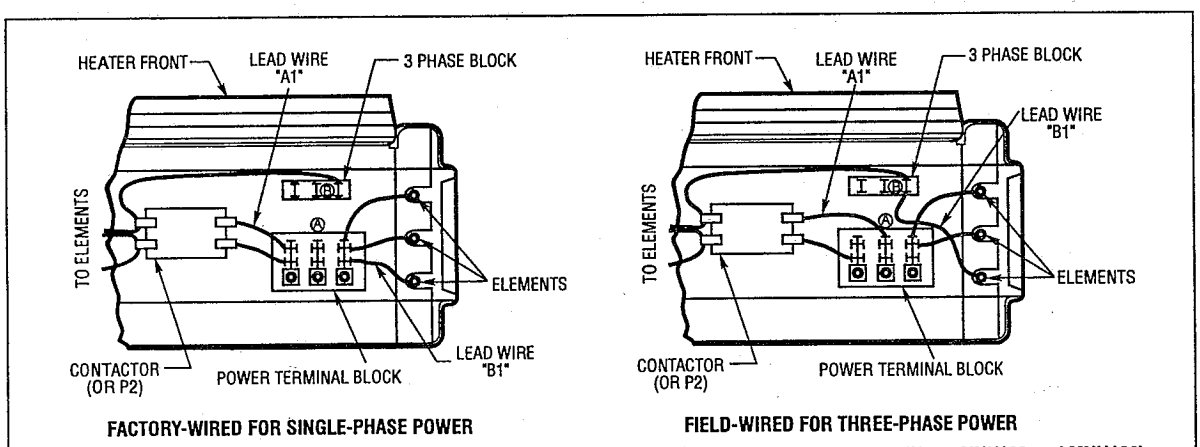


Figure 3a. Wiring Connections for Single-Phase and Three -Phase Power(MUH0521, MUH0581, MUH072, MUH078, MUH102 and MUH108)

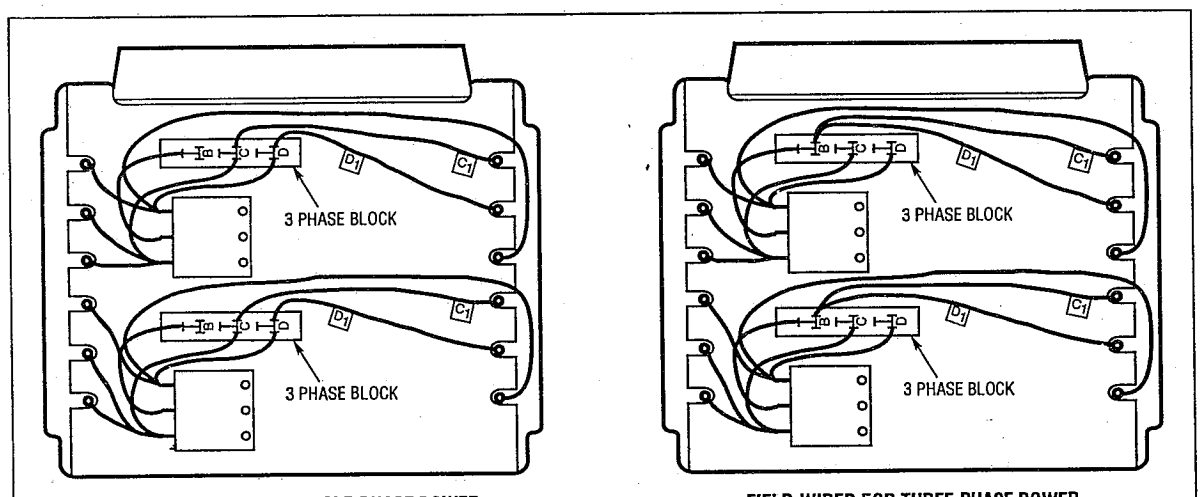


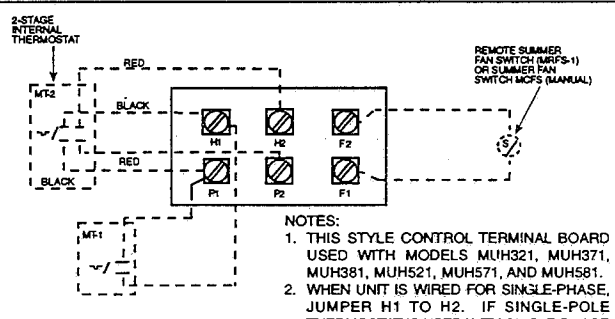
Figure 3b. Wiring Connections for Single-Phase and Three -Phase Power (MUH158)

CONTROL WIRING

⚠ WARNING ⚠

LINE VOLTAGE IS PRESENT ON SOME OF THE TERMINALS ON THE CONTROL TERMINAL BOARD. ALWAYS DISCONNECT THE POWER FROM THE HEATER BEFORE MAKING ANY CONNECTIONS TO THE CONTROL BOARD TO PREVENT ELECTRIC SHOCK HAZARD.

1. Use 600 volts, NEC Class 1 insulated wire with a minimum 18 gage for thermostats and a minimum 14 gage for line voltage motor switch (remote fan switch without relay).
2. Use a crimp-on type fork terminal on the wire end that attaches to the MUH control terminal board if more than one connection is to be made under the terminal screw.
3. Wire per Figure 4 for unit without contactors.
4. Wire per Figure 5 for unit with contactors.

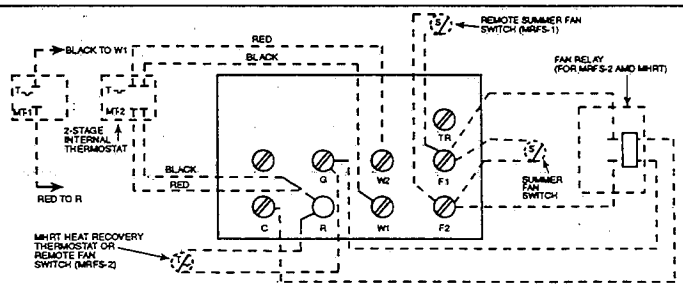


NOTES:
1. THIS STYLE CONTROL TERMINAL BOARD USED WITH MODELS MUH321, MUH371, MUH381, MUH521, MUH571, AND MUH581.
2. WHEN UNIT IS WIRED FOR SINGLE-PHASE, JUMPER H1 TO H2. IF SINGLE-POLE THERMOSTAT IS USED WITH SINGLE-PHASE UNIT, CONNECT THERMOSTAT LEADS TO P1 AND H1.
3. EXTERNAL LINE VOLTAGE THERMOSTATS SHOULD BE TREATED AS SINGLE STAGE ONLY.

Figure 4. Control Terminal Board (for Heaters Without Contactors)

Table 4. Specifications

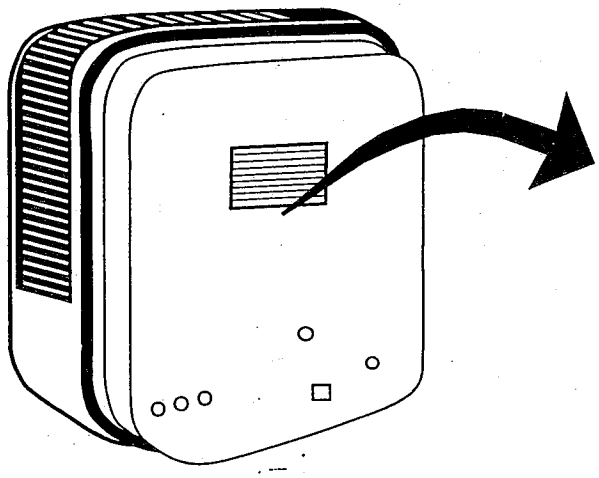
Basic Model No.	Height in (mm)	Width in. (mm)	Depth in. (mm)	Mounting Weight lbs. (kg)	Wiring Compartment Volume
MUH0381	16 (406.4)	14 (355.6)	7½ (190.5)	27 (12.2)	90 in³ (14.70 cm³)
MUH0321				27 (12.2)	
MUH0371				27 (12.2)	
MUH0341				30 (13.6)	
MUH0581				27 (12.2)	
MUH0521				27 (12.2)	
MUH0571				27 (12.2)	
MUH0541				30 (13.6)	
MUH0331				30 (13.6)	
MUH0361				30 (13.6)	
MUH0531				30 (13.6)	
MUH0561				30 (13.6)	
MUH078	21¾ (552.5)	19 (482.6)	7½ (190.5)	38 (17.2)	100 in³ (1639 cm³)
MUH072				38 (17.2)	
MUH077				38 (17.2)	
MUH074				38 (17.2)	
MUH108				38 (17.2)	
MUH102				38 (17.2)	
MUH107				38 (17.2)	
MUH104				38 (17.2)	
MUH073				38 (17.2)	
MUH076				38 (17.2)	
MUH103				38 (17.2)	
MUH106				38 (17.2)	
MUH158	21¾ (552.5)	19 (482.6)	12¾ (323.9)	54 (24.5)	140 in³ (2295 cm³)
MUH152				50 (22.7)	
MUH154				50 (22.7)	
MUH208				60 (27.2)	
MUH202				55 (24.9)	
MUH204				55 (24.9)	
MUH156				55 (24.9)	
MUH206				55 (24.9)	
MUH252	30 (76.2)	26⅝ 676.4)	11¾ (298.5)	89 (40.4)	504 in³ (8260 cm³)
MUH254				89 (40.4)	
MUH308				89 (40.4)	
MUH302				89 (40.4)	
MUH304				89 (40.4)	
MUH256				89 (40.4)	
MUH306				89 (40.4)	
MUH402	30 (76.2)	26⅝ 676.4)	17¼ (435.1)	119 (54.0)	648 in³ (10620 cm³)
MUH404				119 (54.0)	
MUH508				119 (54.0)	
MUH502				119 (54.0)	
MUH504				119 (54.0)	
MUH406				119 (54.0)	
MUH506				119 (54.0)	



NOTES:
1. THIS STYLE CONTROL TERMINAL BOARD USED WITH MODELS EXCEPT MUH321, MUH371, MUH381, MUH521, MUH571, AND MUH581.
2. REMOVE JUMPER W1 TO W2 WHEN 2-STAGE THERMOSTAT IS USED.
3. *ONLY ONE OF THESE ACCESSORIES MAY BE INSTALLED IN A SINGLE HEATER.
4. EXTERNAL LINE VOLTAGE THERMOSTATS SHOULD BE TREATED AS SINGLE STAGE ONLY

Figure 5. Control Terminal Board (for Heaters With Contactors)

IMPORTANT INFORMATION



NAMEPLATE

MODEL NO. MUH321 DATE CODE 0395
MFG. NO.

VOLTS AC 60 HZ	KILOWATTS	PHASE	MIN. SUPPLY CIR. AMPACITY
208 / 240	2.2 /3	1	
MAX. FUSE	MOTOR	CONTROLS	CUSTOMER NO
	VAC AMP 208/240 .25	VAC 208/240	

AIR FLOW	MINIMUM MOUNTING CLEARANCE SIDE	BACK	CEILING	FLOOR
HORIZ.	6"	9.5"	2"	7'
VERT.	18"	18"	6"	7'

WARNING: DO NOT TURN LOUVERS ABOVE LEVEL OF THE UNIT. DISCONNECT POWER BEFORE SERVICING. IF EXTERNAL CONTROL IS USED, ALSO DISCONNECT EXTERNAL POWER SUPPLY.

NE PAS RELEVER LES LAMES AU-DEL A DU NIVEAU PREVU DE L'APPAREIL. METTRE HORS TENSION AVANT DE PROCEDER A L'ENTRETIEN. SI UNE COMMANDE EXTERNE EST UTILISEE, COUPER AUSSE L'ALIMENTATION EXTERNE. ASSURER UN DEGAGEMENT D'AU MOINS 6 PI ENTRE L'APPAREIL DE CHAUFFAGE ET LEPLANCHER.

774G LISTED AIR HEATER

MARLEY ELCTRIC HEATING
BENNETTSVILLE, SC 29512

4104-0275-036

LIMITED WARRANTY

All products manufactured by Marley Electric Heating are warranted against defects in workmanship and materials for one year from date of installation, except heating elements which are warranted against defects in workmanship and materials for five years from date of installation. This warranty does not apply to damage from accident, misuse, or alteration; nor where the connected voltage is more than 5% above the nameplate voltage; nor to equipment improperly installed or wired or maintained in violation of the product's installation instructions. All claims for warranty work must be accompanied by proof of the date of installation.

The customer shall be responsible for all costs incurred in the removal or reinstallation of products, including labor costs, and shipping costs incurred to return products to Marley Electric Heating Service Center.Within the limitations of this warranty, inoperative units should be returned to the nearest Marley authorized service center or the Marley Electric Heating Service Center, and we will repair or replace, at our option, at no charge to you with return freight paid by Marley. It is agreed that such repair or replacement is the exclusive remedy available from Marley Electric Heating.

THE ABOVE WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WHICH EXCEED THE AFORESAID EXPRESSED WARRANTIES ARE HEREBY DISCLAIMED AND EXCLUDED FROM THIS AGREEMENT. MARLEY ELECTRIC HEATING SHALL NOT BE LIABLE FOR CONSEQUENTIAL DAMAGES ARISING WITH RESPECT TO THE PRODUCT, WHETHER BASED UPON NEGLIGENCE, TORT, STRICT LIABILITY, OR CONTRACT.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion or limitation may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

For the address of your nearest authorized service center, contact Marley Electric Heating in Bennettsville, SC, at 1-800-642-4328. Merchandise returned to the factory must be accompanied by a return authorization and service identification tag, both available from Marley Electric Heating. When requesting return authorization, include all catalog numbers shown on the products.

HOW TO ORDER REPAIR PARTS

In order to obtain any needed repair or replacement parts, warranty service or technical information, please contact Marley Electric Heating Service Center toll-free by calling 1-800-642-HEAT.

When ordering repair parts, always give the information listed as follows:

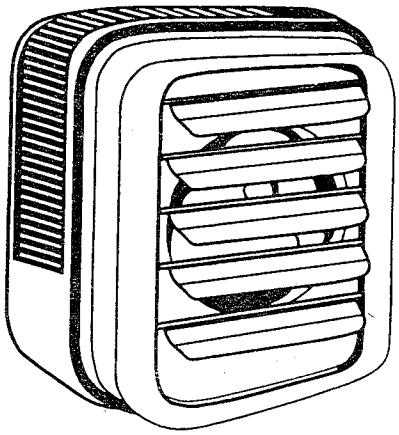
1. The Part Number
2. The Model Number
3. The Part Description
4. Date of Manufacture

Marley Electric Heating
A United Dominion Company
470 Beauty Spot Rd. East
Bennettsville, SC 29512 USA

ECR 33386
2/97

Part No. 5200-0722-009

QMARK®
Una División de Marley Electric Heating



Serie MUH
Unidades de Calentadores Modulares

LISTED c UL
EXPEDIENTE No. E21609

Instrucciones de Instalación y Mantenimiento

Estimado propietario:

¡Felicitaciones! Gracias por comprar este nuevo calentador fabricado por una división de Marley Electric Heating. Usted ha efectuado una sabia inversión al seleccionar el producto de la más alta calidad en la industria de calefacción. Por favor lea cuidadosamente las instrucciones de instalación y mantenimiento indicadas en este manual. Usted debería gozar de años de calefacción eficiente con este producto de Marley Electric Heating...el líder de la industria en diseño, fabricación, calidad y servicio.

... Los empleados de
Marley Electric Heating

⚠ ADVERTENCIA ⚠

Lea cuidadosamente - Estas instrucciones están escritas para ayudarle a prevenir dificultades que podrían surgir durante la instalación de los calentadores. El estudiar primero las instrucciones puede ahorrarle un tiempo considerable y dinero después. Observe los procedimientos siguientes, y reduzca a un mínimo su tiempo de instalación.

Para reducir el riesgo de incendio o choque eléctrico:

1. Antes de cablear o prestar servicio y para prevenir el choque eléctrico, desconecte la potencia entrante al calentador por el panel principal de servicio.
2. Todo el cableado debe conformar con los códigos eléctricos nacionales y locales, y el calentador debe estar conectado a tierra como precaución contra un choque eléctrico posible.
3. Antes de activar, verifique que el voltaje del suministro de potencia entrante al calentador corresponda a las clasificaciones principales impresas en la placa de nombre.
4. Este calentador está caliente durante el uso. Para evitar quemaduras, no permita que la piel expuesta toque las superficies calientes.
5. No inserte ni permita que objetos extraños entren a ninguna apertura de ventilación o escape ya que esto puede causar un choque eléctrico, incendio o daños al calentador.
6. No bloquee de ninguna manera las tomas de aire o los escapes, para prevenir un posible incendio. Mantenga los materiales combustibles, tales como cajas de madera, cortinas, etc. alejados del calentador. No instale detrás de puertas, muebles, toallas, o cajas.
7. Un calentador tiene adentro piezas calientes y productoras de arcos eléctricos o de chispas. No use en áreas donde estén almacenados gasolina, pintura o líquidos inflamables.
8. Use este calentador solo de la manera descrita en este manual. Cualquier otro uso no recomendado por el fabricante puede causar incendio, choque eléctrico, o lesiones a las personas.
9. Este calentador no está aprobado para usar en atmósferas corrosivas tales como de mar, invernaderos o áreas de almacenamiento de productos químicos.

GUARDE ESTAS INSTRUCCIONES

IMPORTANTE

PRECAUCION

EL CALENTADOR DEBE SER INSTALADO POR LO MENOS 7'(2134 mm) SOBRE EL PISO PARA PREVENIR QUE EL CONTACTO ACCIDENTAL CON LAS HOJAS DEL ABANICO PUEDA CAUSAR LESIONES.

PRECAUCION

LA ESTRUCTURA DE MONTAJE EN EL TECHO Y LAS PROVISIONES PARA SU ASEGURAMIENTO DEBEN SER LO SUFICIENTEMENTE FUERTES PARA SOPORTAR EL PESO COMBINADO DEL CALENTADOR Y DEL SOPORTE DE MONTAJE. (VEA TABLA 4).

NO INSTALE TERMOSTATOS DE MERCURIO DIRECTAMENTE EN LA UNIDAD. LA VIBRACION PUEDE CAUSAR FALLAS EN EL CALENTADOR.

LIMITE DE REPOSICIONAMIENTO MANUAL (OPCION INSTALADA EN LA FABRICA SOLAMENTE.) EL INTERRUPTOR DE LIMITE ESTA COLOCADO INTERNAMENTE EN LA PARTE TRASERA DEL CALENTADOR. EN LOS MODELOS MUH03 Y MUH05, EL ACCESO AL BOTON DE REPOSICIONAMIENTO ESTA A LA DERECHA (OBSERVANDO AL CALENTADOR DESDE ATRAS); EN TODOS LOS DEMAS MODELOS, EL BOTON ESTA CERCA DE LA PARTE SUPERIOR TRASERA DEL CALENTADOR.

PRECAUCION

TODOS LOS TERMOSTATOS INCORPORADOS: SI EL CALENTADOR ES UTILIZADO PARA PREVENIR QUE TUBERIAS O LIQUIDOS SE CONGELEN, Y SI EL TERMOSTATO SE AJUSTA A MENOS DE 45°F (7°C), EL ABANICO DEBE DE FUNCIONAR CONTINUAMENTE.

PRECAUCION

PARA PREVENIR POSIBLE SOBRECALENTAMIENTO O DAÑOS POR SOBRECALENTAMIENTO, MANTENGA UN ESPACIO MINIMO DE 5' (1524 mm) EN LA PARTE FRONTAL DEL CALENTADOR. REFIERASE A LA TABLA 1 PARA LOS REQUERIMIENTOS DE ESPACIO A LOS LADOS, ARRIBA Y ABAJO.

EL LIMITE DE REPOSICIONAMIENTO MANUAL ESTA EN SERIE CON EL PROTECTOR DE RECICLAJE AUTOMATICO (LIMITE). EL LIMITE DE REPOSICIONAMIENTO MANUAL NO VA A REPOSICIONAR HASTA QUE EL CALENTADOR SE HAYA ENFRIADO Y EL BOTON SEA PRESIONADO.

INSTRUCCIONES PARA UBICAR EL CALENTADOR

Coloque las unidades de manera tal que las corrientes de aire de descarga:

a. sean sujetas a un mínimo de interferencia por columnas, maquinaria y particiones;
b. contacten las paredes expuestas sin soplar directamente a ellas;
c. no se dirijan directamente a los ocupantes de un cuarto en calor confortable;
d. estén dirigidas barlovento cuando son instaladas en edificios expuestos a vientos imperantes.

Ubique los termostatos aproximadamente a 5' (1524 mm) sobre el piso, en paredes de división interior o postes lejos de corrientes de aire frías, fuentes internas de calor y lejos de corrientes de aire de descarga de calentadores.

Cuartos pequeños pueden ser calentados por un solo calentador.

Cuartos grandes requieren de la instalación de varias unidades. El número y la capacidad de las unidades serán determinados con base en el volumen del edificio y la dimensión, en pies cuadrados, del área de piso que va a ser calentada. Coloque las unidades de manera tal que el aire circule en forma circular cuando cada unidad coopera con la corriente de aire de otra unidad.

COMO INSTALAR EL CALENTADOR

GENERAL

El calentador puede ser instalado para que descargue el aire caliente vertical u horizontalmente. Cuando el calentador es instalado para que descargue verticalmente, se recomienda que el calentador sea ubicado de manera tal que la puerta de acceso abra hacia el lado contrario de la pared, para permitir mayor acceso al compartimiento de control y cableado. Si el calentador va a ser instalado con la puerta de acceso mirando hacia la pared, el calentador debe ser instalado con suficiente espacio, que permita que la puerta de acceso pueda abrirse en su totalidad (una distancia aproximadamente igual al ancho del calentador ... confirme el espacio antes de la instalación). Refiérase a la Tabla 1 para los espacios en el techo y la pared antes de instalar el calentador.

El calentador puede ser instalado para descarga vertical u horizontal mediante el uso de varillas con rosca. (Refiérase a la Tabla 2 para los tamaños de varilla con rosca requeridos). Observe los procedimientos en forma detallada en las siguientes instrucciones para la instalación.

El calentador también puede ser suspendido desde la pared o techo con la ayuda de un soporte de montaje opcional (tipo MMB o MCMB), el cual permite que el calentador gire horizontalmente.

Luego de que el calentador ha sido instalado, las persianas pueden ser colocadas para dirigir el aire caliente en la dirección deseada.

Cuando el calentador ha sido instalado para descarga horizontal, las persianas deben dirigir el aire ya sea hacia el frente o hacia abajo. Dirigir el aire hacia arriba puede causar que el aire caliente se quede en el área del techo, lo que es un desperdicio de energía.

DESCARGA HORIZONTAL
(Instalado con varillas desde el techo)

1. Instale cuatro varillas de montaje con rosca en los huecos con rosca y asegure utilizando tuercas de seguridad. (Vea Tabla 2).
2. Pegue firmemente las cuatro varillas de montaje al techo. (Refiérase a la Tabla 1 para los espacios de las paredes y el techo y a la Tabla 2 para la separación entre varillas de montaje).

Tabla 1. Espacios de pared y techo, en pulgadas (mm)

Unidad	Descarga	Techo	Pared Lateral	Pared Trasera
3 y 5 kW	Horiz.	2 (50.8)	6 (152.4)	9 (228.6)
	Vert.	6 (152.4)	18 (457.2)	18 (457.2)
7.5 a 10 kW	Horiz.	6 (152.4)	6 (152.4)	13 (330.2)
	Vert.	6 (152.4)	24 (609.6)	24 (609.6)
15 a 10 kW	Horiz.	6 (152.4)	9 (228.6)	12 1/2 (317.5)
	Vert	6 (152.4)	24 (609.6)	24 (609.6)
25 a 50 kW	Horiz.	16 (406.4)	12 (304.8)	18 1/2 (470.0)
	Vert.	12 (304.8)	39 (914.4)	39 (914.4)

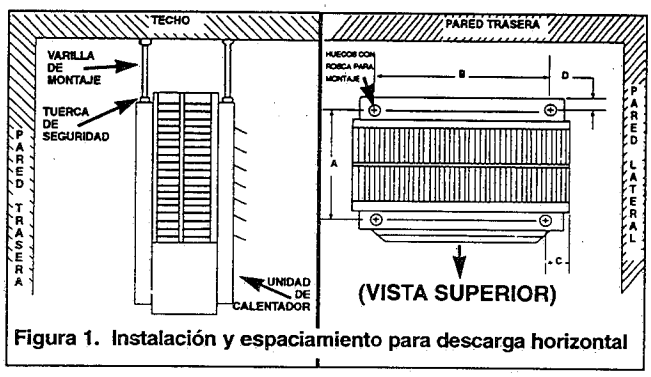


Figura 1. Instalación y espaciamiento para descarga horizontal

Tabla 2. Rosca de varilla y dimensiones de espaciamiento, en pulgadas (mm), para descarga horizontal

Unidad	Tipo de rosca de varilla	A	B	C	D
3 - 5 kW	5/16 - 18	6 1/16 (153.9)	6 (152.4)	4 1/16 (103.1)	3/4 (19.0)
7.5 - 10 kW			8 7/8 (225.6)	5 1/8 (130.3)	3/4 (19.0)
15 - 20 kW		11 3/8 (289.0)			
25 - 30 kW	3/8 - 16	10 9/16 (268.2)	14 - 12 (368.3)	6 3/16 (157.2)	5/8 (16.0)
40 - 50 kW		15 15/16 (404.9)	14 - 12 (368.3)	6 3/16 (157.2)	5/8 (16.0)

DESCARGA VERTICAL
(Instalado con varilla desde el techo)

1. Remueva los tornillos de los huecos con rosca en la parte trasera del calentador.
2. Instale cuatro varillas de montaje con rosca en los huecos con rosca y asegure utilizando tuercas de seguridad.
3. Pegue firmemente las cuatro varillas de montaje al techo. (Refiérase a la Tabla 1 para los espacios de las paredes y el techo y a la Tabla 3 para la separación entre varillas de montaje).

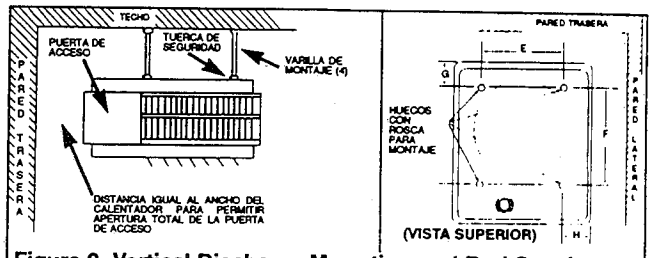


Figura 2. Vertical Discharge Mounting and Rod Spacing

Tabla 3. Tipos de rosca de varilla y dimensiones de espaciamiento, en pulgadas (mm), para descarga vertical

Unidad	Tipo de rosca de varilla	E	F	G	H
3 - 5 kW	5/16 - 18	6 (152.4)	9 3/4 247.7)	2 (50.8)	4 1/16 (103.1)
7.5 - 20 kW		8 7/8 (225.6)	14 5/8 (371.6)	2 (50.8)	5 1/8 (130.3)
25 - 30 kW	3/8 - 16	14 1/2 (368.3)	21 1/4 (539.8)	2 3/16 (56.0)	6 3/16 (157.2)

CABLEADO
CIRCUITO DERIVADO (ALIMENTACION)

1. Conecte el calentador solo al voltaje, amperaje y frecuencia especificadas en la placa del fabricante.
2. El tamaño del cableado de campo debe ser el apropiado para el amperaje que se va a movilizar, de acuerdo al NEC.
3. La puerta de acceso tiene bisagras. Existen uno o dos tornillos, accesibles desde el lado, que deben de ser aflojados para accesar. Estos tornillos son cautivos, no trate de sacarlos totalmente.
4. Se provee un agujero en la parte de atrás del calentador, cerca del bloque de terminales de alimentación y de la tarjeta de terminales de control. El agujero de la tarjeta de terminales de control es del tamaño de una tubería eléctrica de 1/2 pulgada (12.7 mm). El agujero del bloque de terminales de alimentación sirve para varios diámetros. Utilice el diámetro que calza con el tamaño de la tubería eléctrica.
5. Se provee de una terminal tierra cerca de la tarjeta de terminales de alimentación. El cable tierra debe ser conectado antes de que cualquier otra conexión se lleve a cabo.
6. La tarjeta de terminales de alimentación está equipada con cajas terminales dimensionadas para aceptar el tamaño adecuado del cable fuente de alimentación. Cable especificado para 600V y 60°C es satisfactorio para el circuito derivado del calentador. Tanto cable de aluminio como de cobre son satisfactorios para la conexión con la caja terminal de la tarjeta de terminales de alimentación del calentador. Se recomienda cable de cobre y debe ser usado con interruptores de desconexión incorporados.

7. Cada calentador tiene un diagrama de cableado pegado en la parte interior de la puerta de acceso. Consulte este diagrama antes de hacer cualquier conexión de campo.
8. Para los calentadores modelo MUH0521, MUH07, MUH0581, MUH07, MUH078, MUH102, MUH108 y MUH158 se pueden utilizar conexiones de alimentación tri-fásicas o mono-fásicas. Estas unidades son cableadas de fabrica para operación mono-fásica. Si los calentadores se van a utilizar con alimentación tri-fásica, reconecte los cables tal y como es indicado en el diagrama de cableado pegado al calentador. Información adicional puede ser encontrada en las ilustraciones de cableado en las Figuras 3a y 3b y siguiendo las indicaciones presentadas a continuación.

En los modelos MUH0521, MUH0581, MUH072, MUH078, MUH102 y MUH058 (Figura 3a) mueva solamente los dos cables marcados con "A1" y "B1", no mueva o cambie ningún otro cable. El cable del elemento marcado "B1", el cual es el cable conectado de fabrica, al bloque de terminales de alimentación (terminal localizada más cerca de los elementos) debe ser movido a la terminal "B" en el bloque de terminales tri-fásico. El cable relé (contactor) "A1" debe ser movido de la terminal final del bloque de terminales de alimentación (terminal más cercana al contactor o tarjeta de terminales de control) a la terminal "A" del bloque de terminales inferior (terminal central).

El modelo MUH158 (Figura 3b) tiene dos bloques de terminales tri-fásicos colocados a la par de los relés (contactores). Mueva solamente los dos cables marcados "C1" y "D1" en cada uno de esos bloques de terminales tri-fásicos a la terminal "B". No mueva o cambie ningún otro cable.

El modelo MUH158 (Figura 3b) tiene dos bloques de terminales tri-fásicos colocados a la par de los relés (contactores). Mueva solamente los dos cables marcados "C1" y "D1" en cada uno de esos bloques de terminales tri-fásicos a la terminal "B". No mueva o cambie ningún otro cable.

9. Accesorios eléctricos, ya sea juegos u opciones instaladas de fábrica, se presentan conectados por una línea de rayas en el diagrama de cableado del calentador.
10. **CALENTADOR DE 208/240 VOLTIOS.** Intercambie los cables primarios negro y rojo del transformador (vea diagrama de cableado) cuando el calentador vaya a ser conectado a una fuente de 208 voltios.

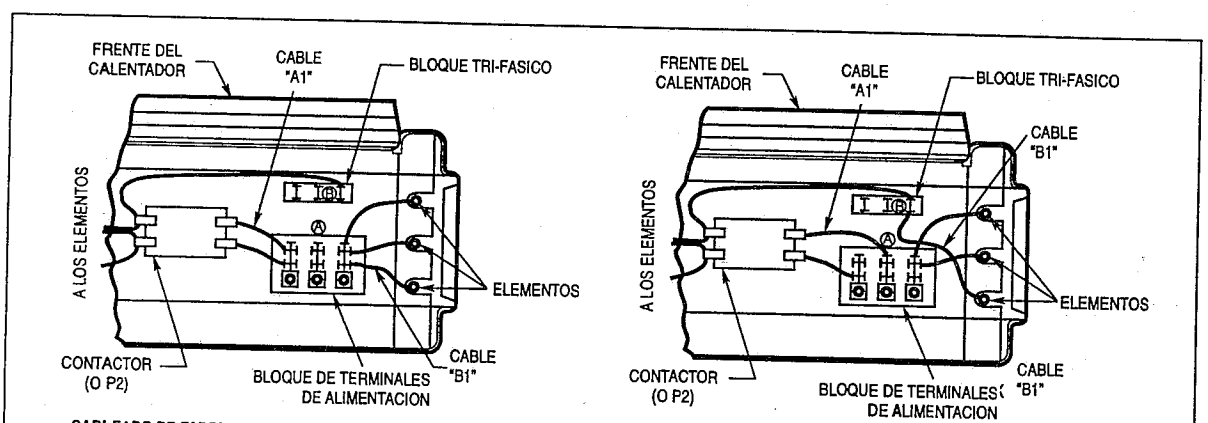


Figura 3a. Conexión de cables para alimentación mono-fásica y tri-fásica (MUH0521, MUH0581, MUH072, MUH078, MUH102 y MUH108)

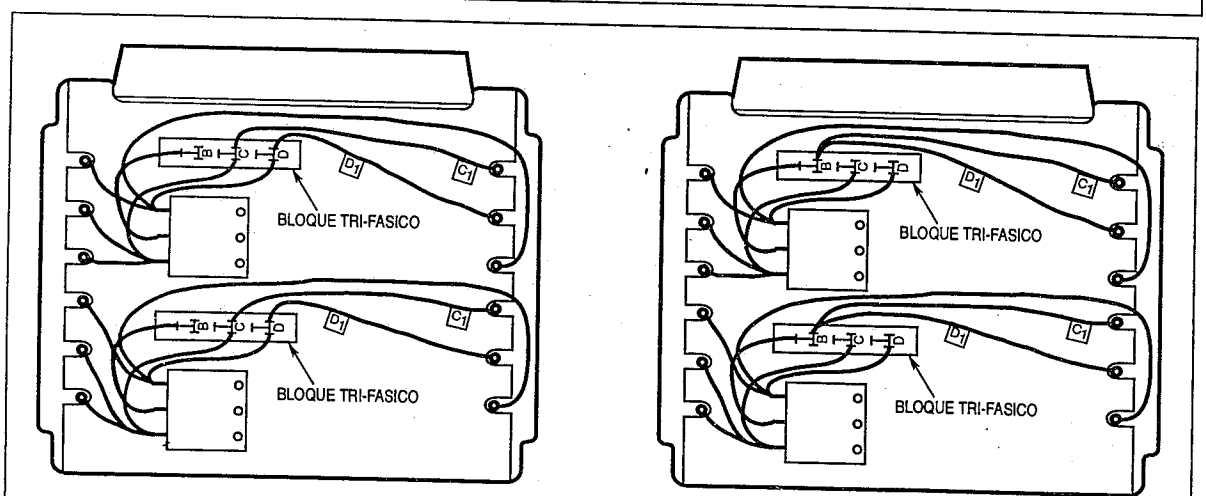


Figura 3b. Conexiones de cableado para alimentaciones mono-fásicas y tri-fásicas

CABLEADO DE CONTROL

⚠ ADVERTENCIA ⚠

ALGUNAS DE LAS TERMINALES EN LA TARJETA DE TERMINALES DE CONTROL PUEDEN PRESENTAR VOLTAJE DE LINEA. SIEMPRE DESCONECTE LA ALIMENTACION DEL CALENTADOR ANTES DE HACER CUALQUIER CONEXION A LA TARJETA DE CONTROL PARA PREVENIR EL PELIGRO DE CHOQUES ELECTRICOS.

1. Use cable aislado, clase NEC 1 de 600 voltios, calibre mínimo 18, para el termostato y un cable calibre mínimo 14 para el interruptor del motor del voltaje de línea (interruptor remoto del abanico sin relé).
2. Use una terminal de horquilla en el extremo del cable que se pega a la tarjeta de terminales de control MUH si se debe hacer más de una conexión en el tornillo de la terminal.
3. Cablee de acuerdo a la Figura 4 para unidades sin contactor.
4. Cablee de acuerdo a la Figura 5 para unidades con contactor.

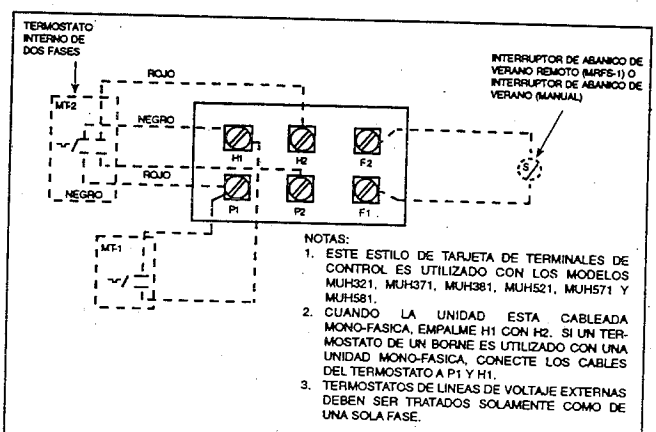
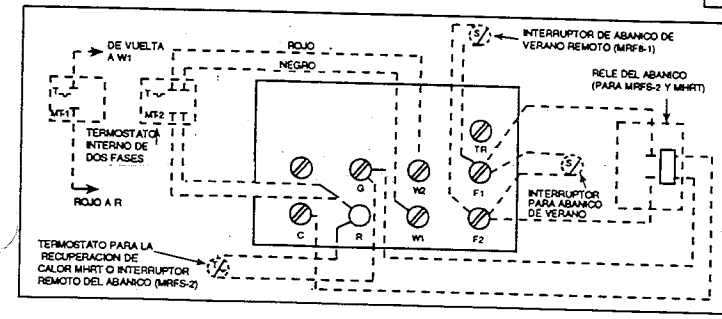


Figura 4. Tarjeta de Terminales de Control (para Calentadores sin Interruptor)

Tabla 4. Especificaciones

Modelo Básico Nº	Altura pulgadas (mm)	Ancho pulgadas (mm)	Profundidad pulgadas (mm)	Peso de instalación lbs. (kg)	Volumen del Compartimiento de Cableado
MUH0381	16 (406.4)	14 (355.6)	7½ (190.5)	27 (12.2)	90 in³ (14.70 cm³)
MUH0321				27 (12.2)	
MUH0371				27 (12.2)	
MUH0341				30 (13.6)	
MUH0581				27 (12.2)	
MUH0521				27 (12.2)	
MUH0571				27 (12.2)	
MUH0541				30 (13.6)	
MUH0331				30 (13.6)	
MUH0361				30 (13.6)	
MUH0531				30 (13.6)	
MUH0561				30 (13.6)	
MUH078	21¾ (552.5)	19 (482.6)	7½ (190.5)	38 (17.2)	100 in³ (1639 cm³)
MUH072				38 (17.2)	
MUH077				38 (17.2)	
MUH074				38 (17.2)	
MUH108				38 (17.2)	
MUH102				38 (17.2)	
MUH107				38 (17.2)	
MUH104				38 (17.2)	
MUH073				38 (17.2)	
MUH076				38 (17.2)	
MUH103				38 (17.2)	
MUH106				38 (17.2)	
MUH158	21¾ (552.5)	19 (482.6)	12¾ (323.9)	54 (24.5)	140 in³ (2295 cm³)
MUH152				50 (22.7)	
MUH154				50 (22.7)	
MUH208				60 (27.2)	
MUH202				55 (24.9)	
MUH204				55 (24.9)	
MUH156				55 (24.9)	
MUH206				55 (24.9)	
MUH252	30 (76.2)	26⅝ 676.4)	11¾ (298.5)	89 (40.4)	504 in³ (8260 cm³)
MUH254				89 (40.4)	
MUH308				89 (40.4)	
MUH302				89 (40.4)	
MUH304				89 (40.4)	
MUH256				89 (40.4)	
MUH306				89 (40.4)	
MUH402	30 (76.2)	26⅝ 676.4)	17¼ (435.1)	119 (54.0)	648 in³ (10620 cm³)
MUH404				119 (54.0)	
MUH508				119 (54.0)	
MUH502				119 (54.0)	
MUH504				119 (54.0)	
MUH406				119 (54.0)	
MUH506				119 (54.0)	

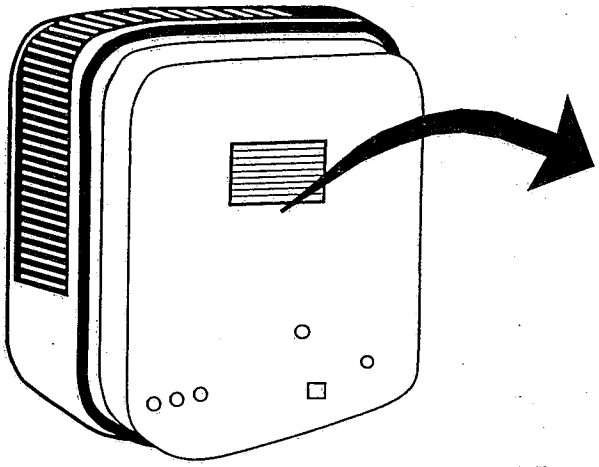


NOTAS:

1. ESTE ESTILO DE TARJETA DE TERMINALES DE CONTROL NO ES UTILIZADO CON LOS MODELOS MUH321, MUH371, MUH381, MUH521, MUH571 Y MUH581
2. REMUEVA EL EMPALME DE W1 A W2 CUANDO SE UTILICE UN TERMOSTATO DE DOS FASES
3. *SOLAMENTE UNO DE ESTOS ACCESORIOS PUEDE SER CONECTADO A UN CALENTADOR INDIVIDUAL
4. TERMOSTATOS DE LINEAS DE VOLTAJE EXTERNAS DEBEN SER TRATADOS SOLAMENTE COMO DE UNA SOLA FASE

Figura 5. Tarjeta de Terminales de Control (para Calentadores con Contactor).

INFORMACION IMPORTANTE



PLACA DEL FABRICANTE

MODELO NO. MUH321
MFG. NO.

CODIGO DE FECHA 0395

VOLTS AC 60 HZ	KILOWATTS	FASE	AMPACIDAD MIN. DE ALIMENTACION DE CIR.
208 / 240	2.2 /3	1	

MAX. FUSIBLE	MOTOR		CONTROLES	CLIENTE Nº
	VAC	AMP	VAC	
	208/240	.25	208/240	

FLUJO DE AIRE	ESPACIO MINIMO DE INSTALACION			
	LADO	ATRAS	TECHO	PISO
HORIZ.	6"	9.5"	2"	7'
VERT.	18"	18"	6"	7'

¡ADVERTENCIA! NO VOLTEE LAS PERSIANAS POR ENCIMA DEL NIVEL DE LA UNIDAD. DESCONECTE ANTES DE REPARAR. SI SE UTILIZA CONTROL EXTERNO, TAMBIEN SE DEBE DESCONECTAR LA FUENTE DE ALIMENTACION EXTERNA.

NE PAS RELEVER LES LAMES AU-DEL A DU NIVEAU PREVU DE L'APPAREIL. METTRE HORS TENSION AVANT DE PROCEDER A L'ENTRETIEN. SI UNE COMMANDE EXTERNE EST UTILISEE, COUPER AUSSE L'ALIMENTATION EXTERNE. ASSURER UN DEGAGEMENT D'AU MOINS 6 PI ENTRE L'APPAREIL DE CHAUFFAGE ET LEPLANCHER.

c UL CALENTADOR DE AIRE LISTADO 774G

MARLEY ELCTRIC HEATING
BENNETTSVILLE, SC 29512

4104-0275-036

GARANTIA LIMITADA

Todos los productos fabricados por Marley Electric Heating están garantizados contra defectos de mano de obra y materiales durante un año a partir de la fecha de instalación, excepto los elementos calefactores que están garantizados contra defectos en mano de obra y materiales durante cinco años a partir de la fecha de instalación. Esta garantía no se aplica por daños ocurridos por accidente, mal uso, o alteración, ni cuando el voltaje conectado sea 5% mayor que el indicado en la placa de nombre; ni al equipo instalado o cableado indebidamente, o mantenido en violación de esta hoja de instrucciones. Todos los reclamos de trabajo de garantía deben estar acompañados por prueba de la fecha de instalación.

El cliente será responsable por todos los costos incurridos en la extracción o reinstalación de los productos, incluyendo costos de mano de obra, y costos de transporte incurridos al retornar los productos a Marley Electric Heating Service Center, y nosotros las repararemos o reemplazaremos, a nuestra opción, sin cargo para usted, con transporte de regreso pagado por Marley. Se acuerda mutuamente que tal reparación o reemplazo es el remedio exclusivo disponible de Marley Electric Heating.

LAS GARANTIAS INDICADAS ARRIBA SON A CAMBIO DE CUALQUIER OTRA GARANTIA EXPRESA O IMPLICITA Y SE DESCONOCEN Y EXCLUYEN DE ESTE ACUERDO TODAS LAS GARANTIAS IMPLICITAS DE COMERCIALIZACION Y APTITUD PARA UN FIN PARTICULAR QUE EXCEDAN LAS GARANTIAS PREVIAMENTE EXPRESADAS. MARLEY ELECTRICAL NO SERA RESPONSABLE POR DAÑOS CONSECUENTES ORIGINADOS POR EL PRODUCTO, YA SEAN QUE ESTEN BASADOS EN NEGLIGENCIA, LITIGACION, RESPONSABILIDAD ESTRICTA O CONTRATO.

Algunos estados no permiten la exclusión o limitación de los daños incidentales o consecuentes, de manera que la exclusión o limitación indicada arriba puede no aplicarse a usted. Esta garantía le otorga derechos legales específicos, y usted puede tener también otros derechos que varían de estado a estado.

Llame a Marley Electric Heating en Bennettsville, SC al 1-800-642-4328 para la dirección de su centro autorizado de servicio más cercano. La mercancía retomada a la fábrica debe estar acompañada por una autorización de retorno y una etiqueta de identificación de servicio, ambas disponibles de la ubicación indicada. Incluya todos los números de catálogo mostrados en el producto, al requerir autorización de retorno.

COMO ORDENAR PIEZAS DE REPUESTO

Por favor llame libre de cargo al Centro de Servicio de Marley Electric Heating, al 1-800-642-HEAT para obtener todas las piezas de reparación o repuesto, servicio de garantía o información técnica, requeridas.

Siempre comunique la información listada como sigue al ordenar piezas de repuesto:

1. El número de pieza
2. El número de modelo
3. La descripción de la pieza
4. Fecha de fabricación

Marley Electric Heating
Una Compañía United Dominion
470 Beauty Spot Rd. East
Bennettsville, SC 29512 EE.U.U.

ECR 33386
2/97

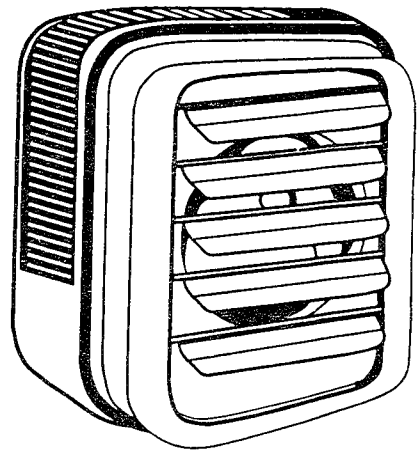
No. de Pieza 5200-0722-009

QMARK®

Une division de Marley Electric Heating

Série MUH

Radiateurs modulaires



Homologués U.L.

Notice d'installation et d'entretien

Cher utilisateur,

Félicitations ! Nous vous remercions d'avoir fait l'acquisition de ce nouveau radiateur fabriqué par une division de Marley Electric Heating. Vous avez fait un bon investissement en choisissant un appareil de qualité imbattable. Veuillez lire attentivement et suivre scrupuleusement les consignes de ce manuel concernant l'installation et l'entretien. Nous sommes sûrs que vous bénéficierez de nombreuses années de confort grâce à cet appareil de chauffage efficace de Marley Electric Heating... le numéro 1 du secteur du chauffage en matière de conception, fabrication, qualité et service.

... Les employés de
Marley Electric Heating

⚠ AVERTISSEMENT ⚠

À lire attentivement : Cette notice a pour objet de vous aider à éviter les difficultés qui pourraient surgir lors de l'installation des radiateurs. Vous économisez beaucoup de temps, et réaliserez des économies plus tard en prenant connaissance de cette notice. Procédez de la façon indiquée ci- dessous et abrégez le temps nécessaire à l'installation.

Pour diminuer les risques d'incendie et d'électrocution :

1. Pour empêcher tout risque possible d'électrocution, couper le courant arrivant au radiateur au niveau du tableau de distribution principal avant d'entreprendre un câblage ou une réparation.
2. Tout câblage doit être conforme aux codes électriques national et local en vigueur et le radiateur doit être raccordé à la terre, pour les mesures préventives contre les risques d'électrocution.
3. Vérifier que la tension d'alimentation vers l'appareil et la tension du circuit de commande arrivant au radiateur et aux accessoires correspondent aux valeurs nominales indiquées sur la plaque signalétique du radiateur et des accessoires avant de les mettre sous tension.
4. La surface de ce radiateur est chaude pendant son utilisation. Pour éviter de se brûler, ne pas laisser la peau nue entrer en contact avec la surface chaude.
5. Ne pas introduire ou ne pas laisser pénétrer de corps étrangers dans les ouvertures de ventilation ou d'échappement, cela pouvant provoquer électrocution, incendie ou dommages au radiateur.
6. Pour empêcher tout risque d'incendie, ne pas obstruer les prises d'air ni les orifices d'échappement de quelque façon que ce soit. Éloigner les matériaux combustibles tels que caisses, tentures, etc. du radiateur. Ne pas installer cet appareil de chauffage derrière une porte, un meuble, un porte-serviettes ou des cartons.
7. Un radiateur comporte des pièces internes chaudes dans lesquelles se produisent des arcs ou des étincelles. Ne pas s'en servir dans des lieux dans lesquels on utilise ou entrepose de l'essence, de la peinture ou des liquides inflammables.
8. N'utiliser ce radiateur que de la façon décrite dans cet ouvrage. Toute autre utilisation non conseillée par le manufacturier risque de provoquer incendie, électrocution ou blessures.
9. Ce radiateur n'est pas agréé pour une utilisation dans une atmosphère corrosive telle que celle d'un bateau, d'une serre ou d'un entrepôt de produits chimiques.

CONSERVER CETTE NOTICE

AVIS IMPORTANTS ⚠

MISE EN GARDE ⚠

MONTER LE RADIATEUR À 213.4 cm (7 PIEDS) MINIMUM AU-DESSUS DU SOL AFIN D'EMPÊCHER TOUT CONTACT ACCIDENTEL AVEC LES PALES DU VENTILATEUR, CE QUI POURRAIT PROVOQUER DES BLESSURES.

MISE EN GARDE ⚠

IL FAUT QUE LA STRUCTURE DE MONTAGE AU PLAFOND ET QUE LES DISPOSITIFS D'ANCRAGE SOIENT SUFFISAMMENT RÉSISTANTS POUR POUVOIR SUPPORTER LE POIDS DU RADIATEUR ET DU SUPPORT DE MONTAGE. (VOIR LE TABLEAU 4).

NE JAMAIS MONTER DE THERMOSTAT À MERCURE DIRECTEMENT SUR L'APPAREIL. LES VIBRATIONS POURRAIENT PROVOQUER UN MAUVAIS FONCTIONNEMENT DU RADIATEUR.

INTERRUPTEUR MANUEL DE REMISE EN MARCHE (OPTION INSTALLÉE EN USINE UNIQUEMENT). L'INTERRUPTEUR MANUEL DE REMISE EN MARCHE EST SITUÉ À L'INTÉRIEUR DU RADIATEUR, À LA PARTIE ARRIÈRE. SUR LES MODÈLES MUH03 ET MUH05, L'ACCÈS AU BOUTON MANUEL DE REMISE

MISE EN GARDE ⚠

POUR TOUS LES APPAREILS À THERMOSTATS INTÉGRÉS : SI LE RADIATEUR SERT À EMPÊCHER DES TUYAUX OU DES LIQUIDES DE GELER, ET SI LE THERMOSTAT EST RÉGLÉ À MOINS DE 7°C (45°F), IL FAUT QUE LE VENTILATEUR TOURNE EN PERMANENCE.

MISE EN GARDE ⚠

POUR EMPÊCHER TOUT RISQUE POSSIBLE DE SURCHAUFFE OU DE DOMMAGES PROVOQUÉS PAR UNE SURCHAUFFE, LAISSER UNE DISTANCE DE 152.4 cm (5 PIEDS) MINIMUM À L'AVANT ET CONSULTER LE TABLEAU 1 POUR CONNAÎTRE LES DISTANCES MINIMALES SUR LES CÔTÉS ET À L'ARRIÈRE.

EN MARCHE EST SITUÉ SUR LE CÔTÉ DROIT (LORSQU'ON SE PLACE À L'ARRIÈRE DE L'APPAREIL); SUR TOUS LES AUTRES MODÈLES IL EST SITUÉ PRÈS DE LA PARTIE SUPÉRIEURE ARRIÈRE DU RADIATEUR.

L'INTERRUPTEUR MANUEL DE REMISE EN MARCHE EST MONTÉ EN SÉRIE AVEC LE PROTECTEUR DE RECYCLAGE AUTOMATIQUE (LIMITE). L'APPAREIL NE REFONCTIONNERA PAS TANT QUE L'ON N'AURA PAS APPUYÉ SUR CE BOUTON.

CONSEILS POUR L'EMPLACEMENT DU RADIATEUR

Disposer les radiateurs pour que le flux d'air chaud :

a. rencontre un minimum d'obstacles tels que colonnes, machines ou cloisons;
b. balaie les murs exposés sans souffler directement sur eux;
c. soit dirigé à l'opposé des occupants de la pièce dans le cas d'un chauffage de confort;
d. soit dirigé du côté venté lorsque les radiateurs sont installés dans un bâtiment exposé à un vent prédominant.

Placer les thermostats à 1524 mm (5 pieds) du sol sur des cloisons intérieures, ou sur des colonnes à l'abri de courants d'air froid, de sources de chaleur internes et de flux d'air chaud provenant de radiateurs.

Les petites pièces peuvent être chauffées par un seul appareil de chauffage.

Les plus grandes pièces nécessitent plusieurs appareils. Le nombre et la puissance des appareils dépendra du volume des locaux et de la superficie à chauffer. Disposer les appareils pour fournir un périmètre de circulation d'air où chaque appareil favorise le courant d'air d'un autre appareil.

MONTAGE DU RADIATEUR
GÉNÉRALITÉS

Le radiateur peut être monté de façon à décharger l'air chaud soit horizontalement, soit verticalement. Lorsque le radiateur est monté pour une décharge verticale, il est conseillé de le disposer de façon à ce que la porte d'accès se trouve ailleurs que face à un mur afin de faciliter l'accès au compartiment de câblage et de commande. Si le radiateur est monté de façon à ce que la porte d'accès se trouve face au mur, laisser une distance au mur suffisante pour permettre la pleine ouverture de la porte d'accès (la distance doit être environ égale à la largeur du radiateur... vérifier qu'il existe un espace suffisant avant l'installation). Avant de monter le radiateur, se reporter au tableau 1 qui indique les distances à respecter par rapport au mur et au plafond.

Le radiateur peut se monter pour une décharge verticale ou horizontale à l'aide de tiges filetées. (Se reporter au tableau 2 pour connaître les dimensions des tiges filetées requises). Suivre les méthodes détaillées dans les instructions d'installation suivantes.

Le radiateur peut aussi se suspendre au mur ou au plafond à l'aide d'un support en option (de type MMB ou MCMB) qui permet le pivotement horizontal du radiateur.

Une fois le radiateur installé, on peut orienter les persiennes de manière à diriger le flux d'air chaud de la façon souhaitée.

Lorsque le radiateur est installé pour une décharge horizontale, les persiennes doivent diriger l'air tout droit ou vers le bas. L'air dirigé vers le haut peut rester dans la zone du plafond, ce qui gaspille de l'énergie.

DÉCHARGE HORIZONTALE (Montage sur tige au plafond)

1. Monter quatre tiges filetées de fixation dans les trous filetés et les bloquer en place à l'aide de contre-écrous (Voir tableau 2).
2. Fixer fermement les quatre tiges filetées au plafond. (Se reporter au tableau 1 indiquant les distances à respecter par rapport aux murs et au plafond et au tableau 2 qui indique l'espacement des tiges de fixation).

Tableau 1. Distances par rapport aux murs et au plafond en mm (pouces)

Appareil	Dégagement	Plafond	Mur latéral	Mur arrière
3 & 5 kW	Horiz.	50.8 (2)	152.4 (6)	228.6 (9)
	Vert.	152.4 (6)	457.2 (18)	457.2 (18)
7.5 à 10 kW	Horiz.	152.4 (6)	152.4 (6)	330.2 (13)
	Vert.	152.4 (6)	609.6 (24)	609.6 (24)
15 à 20 kW	Horiz.	152.4 (6)	228.6 (9)	317.5 (12 1/2)
	Vert	152.4 (6)	609.6 (24)	609.6 (24)
25 à 50 kW	Horiz.	406.4 (16)	304.8 (12)	470.0 (18 1/2)
	Vert.	304.8 (12)	914.4 (39)	914.4 (39)

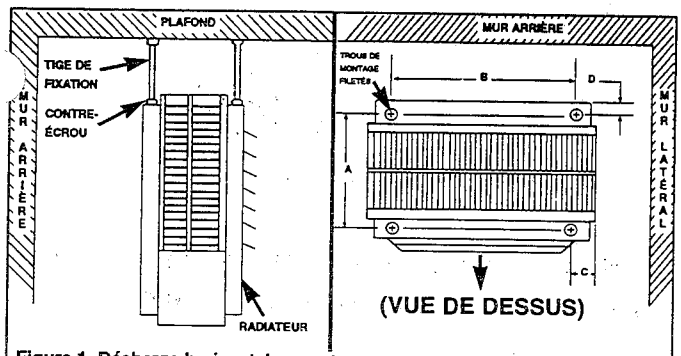


Figure 1. Décharge horizontale, montage et espacements.

Tableau 2. Filetage de la tige et dimensions de l'espacement en mm (po) pour décharge horizontale

Appareil	Type de filetage de la tige	A	B	C	D
3 - 5 kW	5/16 - 18	153.9 (6 1/16)	152.4 (6)	103.1 (4 1/16)	19.0 (3/4)
7.5 - 10 kW			225.6 (8 7/8)	130.3 (5 1/8)	19.0 (3/4)
15 - 20 kW		289.0 (11 3/8)			
25 - 30 kW	3/8 - 16	268.2 (10 9/16)	368.3 (14 - 12)	157.2 (6 3/16)	16.0 (5/8)
40 - 50 kW		404.9 (15 15/16)	368.3 (14 - 12)	157.2 (6 3/16)	16.0 (5/8)

DÉCHARGE VERTICALE (Tige montée au plafond)

1. Enlever les boulons des tiges filetées à l'arrière du radiateur.
2. Monter quatre tiges de fixation filetées dans les trous filetés et fixer en place à l'aide de contre-écrous.
3. Fixer solidement les quatre tiges filetées au plafond. (Se reporter au tableau 1 où figurent les distances à respecter par rapport au mur et au plafond et au tableau 3 indiquant les dimensions pour l'espacement des tiges de fixation).

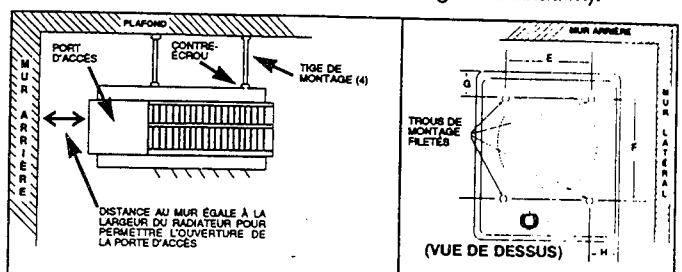


Figure 2. Montage pour déchargement vertical et espacement des tiges

Tableau 3. Type de tiges filetées et dimensions de l'espacement des tiges en mm (po) pour une décharge verticale

Appareil	Type de filetage de la tige	E	F	G	H
3 - 5 kW	5/16 - 18	152.4 (6)	247.7 (9 3/4)	50.8 (2)	103.1 (4 1/16)
7.5 - 20 kW		225.6 (8 7/8)	371.6 (14 5/8)	50.8 (2)	130.3 (5 1/8)
25 - 30 kW	3/8 - 16	368.3 (14 1/2)	539.8 (21 1/4)	56.0 (2 3/16)	157.2 (6 3/16)

CÂBLAGE

CIRCUIT D'ALIMENTATION (PUISSANCE)

1. Brancher le radiateur uniquement à la tension, au courant et à la fréquence spécifiés sur la plaque de firme.
2. La taille des fils de câblage sur site doit être convenablement choisie pour transporter l'ampérage en conformité avec le NEC.
3. La porte d'accès est munie de chamières. Il faut desserrer une ou deux vis accessibles par les côtés pour y accéder. Il s'agit de vis prisonnières : ne pas essayer de les retirer.
4. Une pastille défonçable est fournie à l'arrière du radiateur près du bornier secteur et de la plaque à bornes de commande. La partie défonçable du bornier de commande est pour un conduit de 12,7 mm (1/2 po). La pastille défonçable pour bornier de puissance est de diamètre multiple. Utiliser le diamètre correspondant à la taille requise du conduit.
5. Une borne de masse est fournie près de la plaque à bornes de puissance. Le fil de masse doit être branché avant d'effectuer tout autre raccordement.
6. La plaque à bornes de puissance est équipée de bornes d'une taille suffisante pour accepter la taille adéquate de fil d'alimentation de puissance. Un fil prévu pour 600 V et 60°C est satisfaisant pour le circuit d'alimentation du radiateur. Un fil de cuivre ou d'aluminium est satisfaisant pour le raccordement au bornier de la boîte de puissance. Un fil de cuivre est conseillé et doit être utilisé avec un sectionneur intégré.

7. Un schéma de câblage est collé sur la face interne de la porte d'accès. Se reporter au schéma avant d'effectuer un quelconque raccordement sur le site.
8. Un raccordement sur secteur monophasé ou triphasé peut être utilisé sur les radiateurs modèles MUH0521, MUH07, MUH0581, MUH07, MUH078, MUH102, MUH108, et MUH158. Ces unités sont câblées en usine pour un fonctionnement en monophasé. Si ces radiateurs doivent être utilisés sur une alimentation en triphasé, rebrancher les fils comme l'indique le schéma de câblage livré avec le radiateur. Les figures 3a et 3b illustrant le câblage ainsi que les consignes ci-dessous apportent des renseignements supplémentaires.

Sur les modèles MUH0521, MUH0581, MUH072, MUH078, MUH102, et MUH058 (figure 3a), déplacer uniquement les deux fils marqués "A1" et "B1"; ne déplacer et ne changer aucun autre fil. Le fil principal de l'élément marqué "B1" qui est branché en usine sur le bornier de puissance (le bornier le plus proche des éléments) doit être déplacé sur la borne marquée "B" du bornier triphasé.

Le fil du relais (contacteur) "A1" doit être déplacé de la borne d'extrémité du bornier de puissance (borne la plus proche du contacteur ou de la plaque à bornes de commande) vers la borne "A" du bornier inférieur (borne centrale).

Le modèle MUH158 (figure 3b) est doté de deux blocs de borniers de triphasé situés tout près des relais (contacteurs). Déplacer uniquement les deux fils marqués "C1" et "D1" de chacun de ces blocs de borniers de triphasé vers le bornier "B". Ne déplacer et ne changer aucun autre fil.

9. Les accessoires électriques, kits ou options installés en usine, sont indiqués par un trait en pointillé sur le schéma de câblage du radiateur.
10. **RADIATEUR DE 208/240 V.** Échanger les fils rouge et noir primaires du transformateur (voir schéma de câblage) si le radiateur doit être branché sur du secteur en 208 Volts.

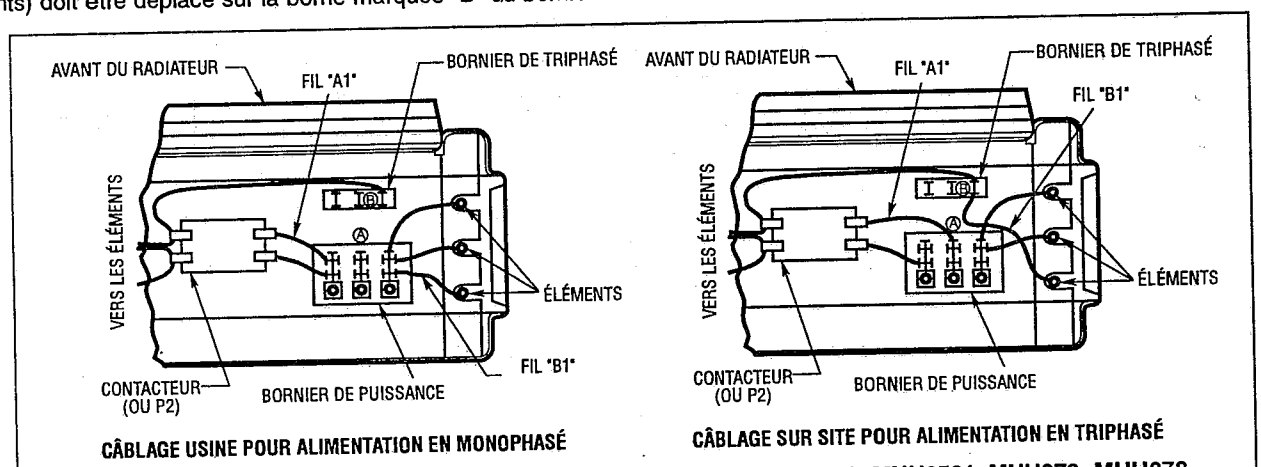


Figure 3a. Câblage pour alimentation en monophasé et triphasé (MUH0521, MUH0581, MUH072, MUH078, MUH102 et MUH108)

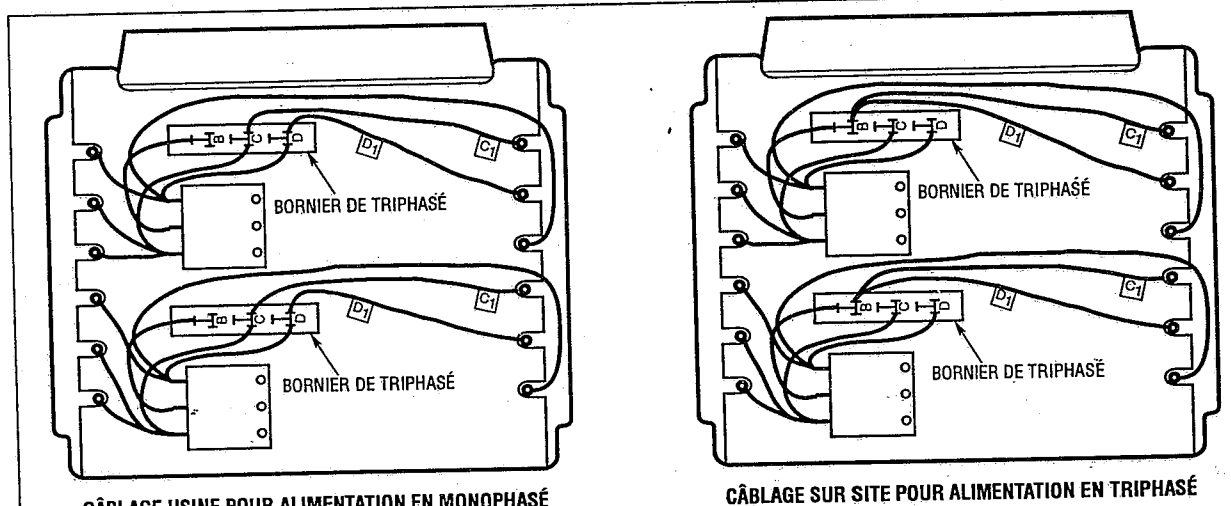


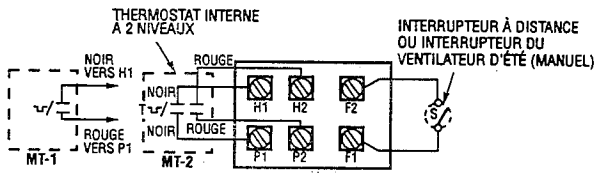
Figure 3b. Câblage pour alimentation en monophasé et en triphasé (MUH158)

CÂBLAGE DE COMMANDE

AVERTISSEMENT

LA TENSION SECTEUR EST PRÉSENTE SUR CERTAINES DES BORNES DE LA PLAQUE À BORNES DE COMMANDE. TOUJOURS DÉBRANCHER L'ALIMENTATION DU RADIATEUR AVANT DE PROCÉDER À UN RACCORDEMENT SUR LA PLAQUE DE COMMANDE AFIN D'ÉVITER TOUT RISQUE D'ÉLECTROCUTION.

1. Utiliser des fils isolés de 600 V NEC classe 1 d'un calibre minimum de 18 pour le thermostat et d'un calibre minimum 14 pour l'interrupteur moteur de la tension secteur (interrupteur de ventilateur à distance sans relais).
2. Utiliser une cosse à sertir en forme de fourche sur les extrémités des fils qui se fixent sur la plaque à bornes de commande du MUH si plus d'un raccordement doit être effectué sous la borne à vis.
3. Câbler en suivant le schéma de la figure 4 pour les appareils sans contacteur.
4. Câbler en suivant le schéma de la figure 5 pour les appareils avec contacteurs.

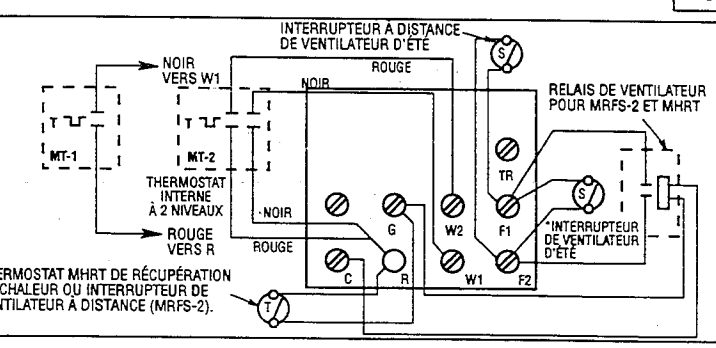


REMARQUES :
1. CE TYPE DE PLAQUE À BORNES DE COMMANDE EST UTILISÉ SUR MODÈLES MUH321, MUH371, MUH381, MUH521, MUH571 ET MUH581.
2. LORSQUE L'APPAREIL EST CÂBLÉ POUR DU MONOPHASÉ, METTRE UN CAVALIER DE H1 À H2. SI ON UTILISE UN THERMOSTAT UNIPOLAIRE SUR UN APPAREIL MONOPHASÉ, RACCORDER LES FILS DU THERMOSTAT À P1 ET H1.
3. TRAITER UN THERMOSTAT EXTERNE SUR SECTEUR EXCLUSIVEMENT COMME UN THERMOSTAT À NIVEAU UNIQUE.

Figure 4. Plaque à bornes de commande (pour radiateur sans contacteurs)

Table 4. Spécifications

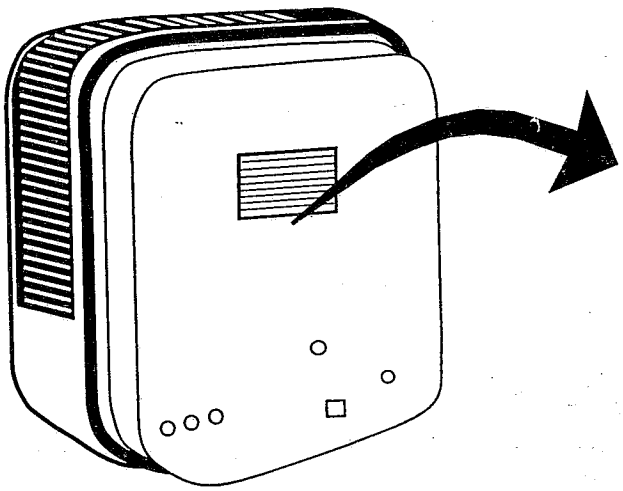
Modèle de base N°	Hauteur po (mm)	Largeur po (mm)	Profondeur po (mm)	Poids monté kg (livres)	Volume du compartiment de câblage
MUH0381	16 (406.4)	14 (355.6)	7 1/2 (190.5)	27 (12.2)	90 in³ (1470 cm³)
MUH0321				27 (12.2)	
MUH0371				27 (12.2)	
MUH0341				30 (13.6)	
MUH0581				27 (12.2)	
MUH0521				27 (12.2)	
MUH0571				27 (12.2)	
MUH0541				30 (13.6)	
MUH0331				30 (13.6)	
MUH0361				30 (13.6)	
MUH0531				30 (13.6)	
MUH0561				30 (13.6)	
MUH078	21 3/4 (552.5)	19 (482.6)	7 1/2 (190.5)	38 (17.2)	100 in³ (1639 cm³)
MUH072				38 (17.2)	
MUH077				38 (17.2)	
MUH074				38 (17.2)	
MUH108				38 (17.2)	
MUH102				38 (17.2)	
MUH107				38 (17.2)	
MUH104				38 (17.2)	
MUH073				38 (17.2)	
MUH076				38 (17.2)	
MUH103				38 (17.2)	
MUH106				38 (17.2)	
MUH158	21 3/4 (552.5)	19 (482.6)	12 3/4 (323.9)	54 (24.5)	140 in³ (2295 cm³)
MUH152				50 (22.7)	
MUH154				50 (22.7)	
MUH208				60 (27.2)	
MUH202				55 (24.9)	
MUH204				55 (24.9)	
MUH156				55 (24.9)	
MUH206				55 (24.9)	
MUH252	30 (762.0)	26 5/8 (676.4)	11 3/4 (298.5)	89 (40.4)	504 in³ (8260 cm³)
MUH254				89 (40.4)	
MUH308				89 (40.4)	
MUH302				89 (40.4)	
MUH304				89 (40.4)	
MUH256				89 (40.4)	
MUH306				89 (40.4)	
MUH402	30 (762.0)	26 5/8 (676.4)	17 1/4 (435.1)	119 (54.0)	648 in³ (10620 cm³)
MUH404				119 (54.0)	
MUH508				119 (54.0)	
MUH502				119 (54.0)	
MUH504				119 (54.0)	
MUH406				119 (54.0)	
MUH506				119 (54.0)	



REMARQUES :
1. CE TYPE DE PLAQUE À BORNES DE COMMANDE EST UTILISÉ SUR LES MODÈLES À L'EXCEPTION DE MUH321, MUH371, MUH381, MUH521, MUH571 ET MUH581.
2. RETIRER LE CAVALIER ENTRE W1 ET W2 LORSQU'ON UTILISE UN THERMOSTAT À 2 NIVEAUX.
3. *ON NE PEUT UTILISER QU'UN SEUL DE CES ACCESSOIRES SUR UN RADIATEURUNIQUE.
4. TRAITER UN THERMOSTAT EXTERNE SUR SECTEUR EXCLUSIVEMENT COMME UN THERMOSTAT À NIVEAU UNIQUE

Figure 5. Plaque à bornes de commande (pour radiateur avec contacteurs)

RENSEIGNEMENT IMPORTANT



PLAQUE SIGNALÉTIQUE

MODEL NO. MUH321
MFG. NO.

DATE CODE 0395

VOLTS AC 60 HZ	KILOWATTS	PHASE	MIN. SUPPLY CIR. AMPACITY
208 / 240	2.2 /3	1	
MAX. FUSE	MOTOR	CONTROLS	CUSTOMER NO
	VAC AMP 208/240 .25	VAC 208/240	

AIR FLOW	MINIMUM MOUNTING CLEARANCE SIDE	BACK	CEILING	FLOOR
HORIZ.	6"	9.5"	2"	7'
VERT.	18"	18"	6"	7'

WARNING: DO NOT TURN LOUVERS ABOVE LEVEL OF THE UNIT. DISCONNECT POWER BEFORE SERVICING. IF EXTERNAL CONTROL IS USED, ALSO DISCONNECT EXTERNAL POWER SUPPLY.

NE PAS RELEVER LES LAMES AU-DEL A DU NIVEAU PREVU DE L'APPAREIL. METTRE HORS TENSION AVANT DE PROCEDER A L'ENTRETIEN. SI UNE COMMANDE EXTERNE EST UTILISEE, COUPER AUSSE L'ALIMENTATION EXTERNE. ASSURER UN DEGAGEMENT D'AU MOINS 6 PI ENTRE L'APPAREIL DE CHAUFFAGE ET LEPLANCHER.

774G LISTED AIR HEATER

MARLEY ELCTRIC HEATING
BENNETTSVILLE, SC 29512

4104-0275-036

GARANTIE LIMITÉE

Tous les produits mentionnés dans la présente notice sont garantis contre tout vice de matière et de construction pour une durée d'une année à partir de la date de montage, à l'exception des éléments de chauffage qui sont garantis contre tout défaut de matière et de construction pour une durée de cinq années à partir de la date de montage. Cette garantie ne s'applique pas aux dommages provoqués par un accident, une mauvaise utilisation ou une modification; elle ne s'applique pas non plus lorsque l'appareil a été branché sur un courant de tension supérieure de plus de 5% à la tension indiquée sur la plaque signalétique, ni à du matériel incorrectement monté, câblé ou entretenu, des instructions de'installation du produit.
Toute réclamation dans le cadre de la garantie doit être accompagnée d'une preuve de la date de montage.

Les frais de démontage et de remontage des produits, y compris de main- d'oeuvre ainsi que les frais d'expédition à un centre de réparation Marley Electric Heating seront à la charge du client. Retourner, dans les limites de cette garantie, l'appareil en panne, à l'atelier de réparations agréé Marley le plus proche ou au Centre de réparations Marley Electric Heating et nous le réparerons ou le remplacerons à notre choix, sans frais pour vous, l'expédition de retour étant à notre charge. Il est entendu que la réparation ou le remplacement constitue le remède exclusif fourni par Marley Electric Heating.

LES GARANTIES CI-DESSUS REMPLACENT TOUTES LES AUTRES GARANTIES EXPLICITES OU IMPLICITES ET TOUTES LES GARANTIES IMPLICITES DE QUALITÉ MARCHANDE ET D'ADAPTATION À UN BUT PARTICULIER DÉPASSANT LES GARANTIES EXPLICITES SUS-MENTIONNÉES SONT REJETÉES ET EXCLUES DE CE CONTRAT. MARLEY ELECTRIC HEATING NE SERA PAS RESPONSABLE DES DOMMAGES INDIRECTS PROVOQUÉS PAR LE PRODUIT, QUE LA RÉCLAMATION SE FONDE SUR UNE FAUTE, LA NÉGLIGENCE, LA STRICTE RESPONSABILITÉ OU LE CONTRAT.

Certains états ne permettent pas les exclusions ou les limites aux dommages indirects ou consécutifs; los exclusions ou limites exposées ci-dessus risquent donc de ne pas s'appliquer à vous. Cette garantie vous donne des droits spécifiques face à la loi et vous pouvez disposer d'autres droits, variables d'un état à un autre.

Pour obtenir l'adresse du centre de réparation autorisé le plus proche, appelez Marley Electric Heating à Bennettsville, SC, États-Unis, au 1-800-642-4328. Les marchandises retournées à l'usine doivent être accompagnées du numéro d'autorisation et de l'étiquette d'identification du service,tous deux fournis par Marley Electric Heating. Inclure toutes les références figurant sur les produits dans toute demande d'autorisation de retour.

COMMENT COMMANDER DES PIÈCES DE RECHANGE

Afin d'obtenir des pièces détachées ou de remplacement, une réparation sous garantie ou un renseignement technique, veuillez contacter Marley Electric Heating Service Center sans frais en appelant le 1-800-642-HEAT.

Pour commander des pièces détachées, toujours mentionner les informations indiquées ci-dessous:

1. La référence de la pièce
2. Le numéro du modèle
3. La description de la pièce
4. La date de fabrication

Marley Electric Heating
Un Société United Dominion
470 Beauty Spot Rd. East
Bennettsville, SC 29512 USA

Part No. 5200-0722-009

ECR 33386
02/97

MUH REPLACEMENT PARTS

MUH

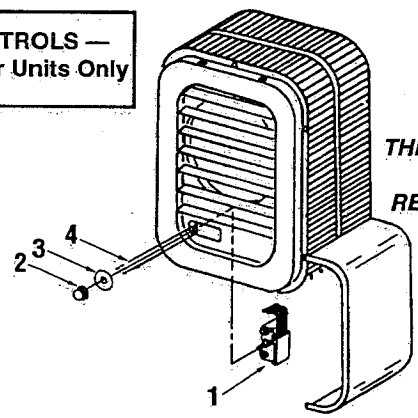
Built-in Controls

Key No.	Description	Part Number
1	Thermostat, One Pole (MT-1)	5813-0036-000
	Thermostat, Two Stage (MT-2)	5813-0035-000
2	Knob, Thermostat	3301-0060-000
3	Label, Thermostat	3502-1781-000
4	Screws, Fl. Hd., 6-32 x 1/4	5202-7009-021
5	Clip, Thermostat	1403-0041-000
6	Switch, 25A, OEM	5216-0132-000
	Switch, 25A, K & N	5216-0204-000
	Switch, 63A, OEM	5216-0131-000
	Switch, 63A, K & N	5216-0203-000
	Switch 25A, Electro	5216-0200-000
7	Screw, M4 x 10, Rd. Hd., (25A)	—
	Screw, 63A, M5 x 16, Rd. Hd.	—
8	Knob, 25A, OEM "T1"	OEM "T1"
	Knob, 25A, K & N	K & N S1B 6001
	Knob, 63A, OEM	OEM "S4"
	Knob, 63A, K & N	K & N S2B G001
	Knob, Electro	EI 141747
9	Switch, Toggle, 600V	5216-0130-000
10	Relay, Fan, 24V Coil	5018-0008-000
11	Switch Assembly	5216-0199-000
12	Manual Reset Limit	4520-0012-000

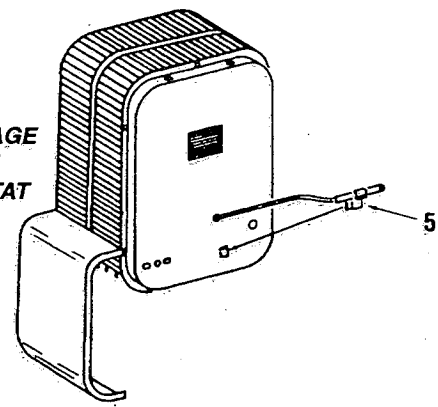
Heater Replacement Parts

Key No.	Description	Part Number
1	Spring, Element (used on MUH03 thru MUH-20 only)	5208-0073-000
	Spring, Element (used on MUH-25 thru MUH-50 only)	5208-0073-001
2	Spring, Capillary Tube	5208-0072-000
3	Spring, Element Retainer	5208-0074-000
4	Switch (used on MUH-25 thru MUH-50 only)	5216-7076-001
5	Insulator (used on MUH-25 thru MUH-50 only)	2900-0031-000
6	Bracket Extension (used on MUH-15, MUH-20, MUH-40 and MUH-50 only)	1215-0282-000
7	Switch Bracket	1215-0256-000
8	Fan Delay Protector	4520-0010-000
14	Speed Nut	4100-7036-026
15	Bracket, Captive Screw (used on MUH-03 thru MUH-20 only)	1215-0291-000
	Bracket, Captive Screw (used on MUH-25 thru MUH-50 only)	1215-0289-000
17	Protector, Linear Limit (used on MUH03 thru MUH05 only)	4520-0011-000
	Protector, Linear Limit (used on MUH-07 thru MUH-20 only)	4520-0011-001
	Protector, Linear Limit (used on MUH-25 thru MUH-50 only)	4520-0011-002
20	Clamp (used on MUH-20 thru MUH-50 only)	1417-5004-000
	Bracket, Mounting Capacitor (used on MUH-20-8 only)	1215-0314-000
22	Terminal Lug (used on MUH-07 thru MUH-50 only)	3504-7002-001
25	Bushing (used on MUH-20 thru MUH-50 only)	25221-60131
26	Washer, Ground (used on MUH03 thru MUH05 only)	6401-0084-000
27	Screw, Ground (used on MUH03 thru MUH05 only)	5202-0290-002
28	Louver (used on MUH03 thru MUH05 only)	3503-0036-000
	Louver (used on MUH-07 thru MUH-20 only)	3503-0036-001
	Louver (used on MUH-25 thru MUH-50 only)	3503-0036-002
29	Spring, Louver	5208-7005-001
32	Terminal Block, 3-Phase (used on MUH05-21, MUH-07-02, and MUH-10-2 only)	5823-0003-000
	Terminal Block, 3-Phase (used on MUH05-81, MUH-07-8, and MUH-15-8 only)	5823-0003-000
33	Terminal Doublers (used where required)	5819-7012-005

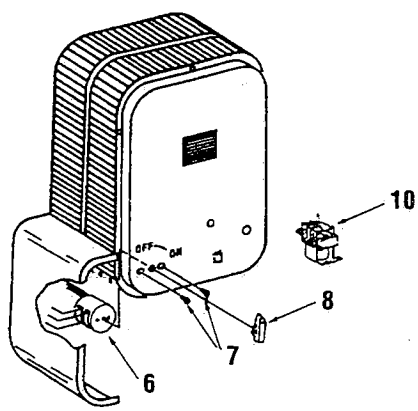
BUILT-IN CONTROLS — Made-to-Order Units Only



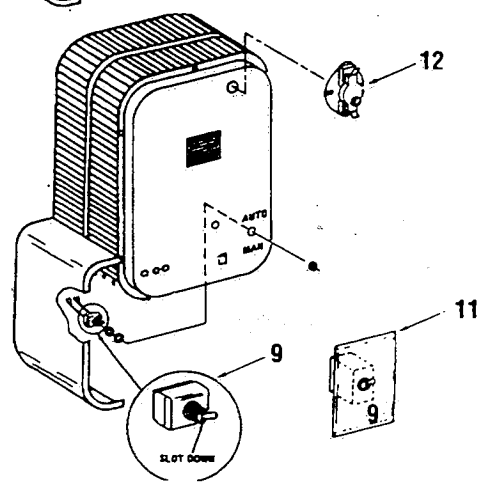
SINGLE-POLE THERMOSTAT, TWO-STAGE THERMOSTAT, HEAT RECOVERY THERMOSTAT



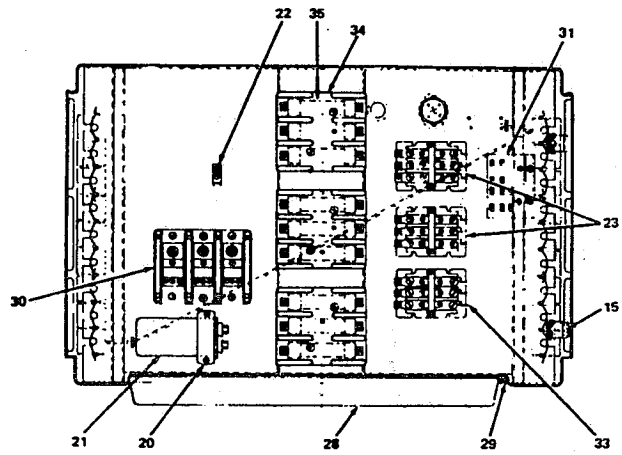
POWER DISCONNECT SWITCH



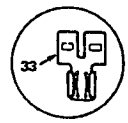
SUMMER FAN SWITCH



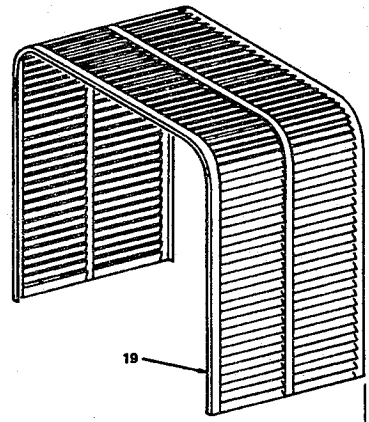
MUH (Con't.)



VIEW D-D
(MUH-25 THRU MUH-50 ONLY)

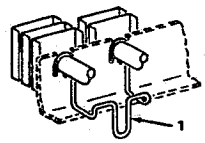


TERMINAL DOUBLER
(USED AS REQUIRED)

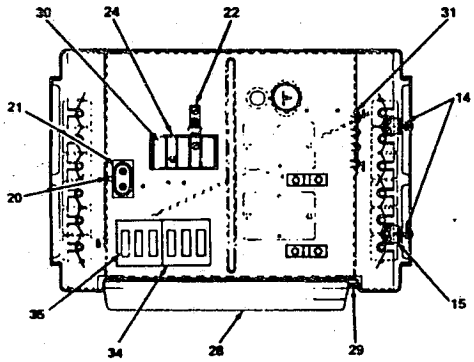




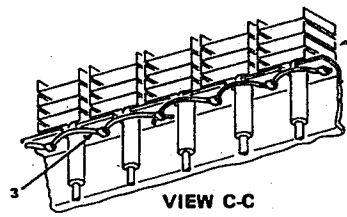
VIEW A-A



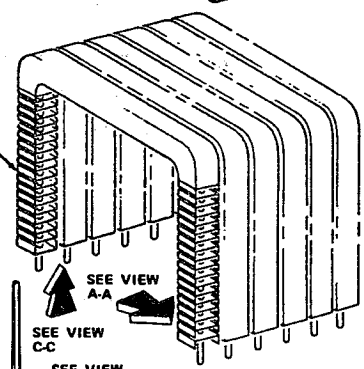
VIEW B-B

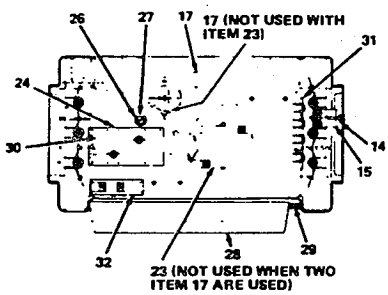


VIEW D-D
(MUH-07 THRU MUH-20 ONLY)

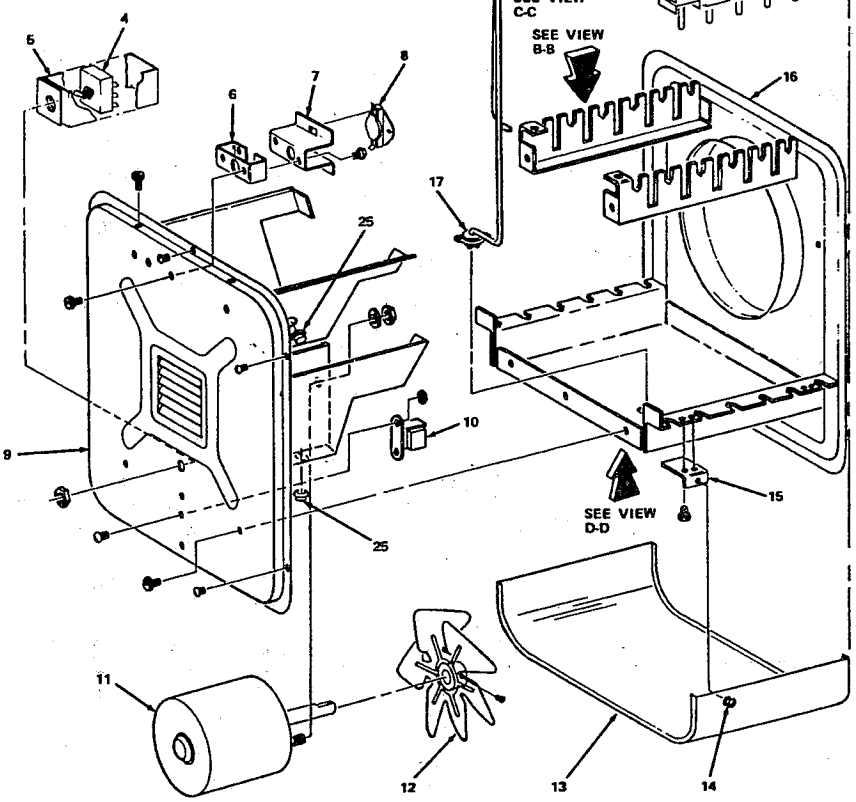


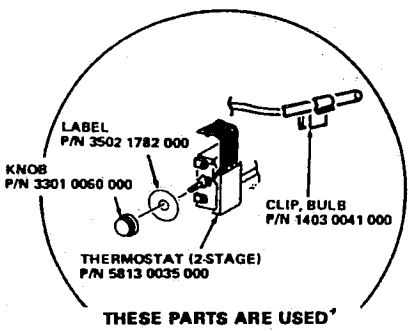
VIEW C-C





VIEW D-D
(MUH03 THRU MUH05 ONLY)





THESE PARTS ARE USED
ON MODEL MUH05-21T ONLY

MUH (Con't.)

Model No.	⑨ Back Case	⑩ Transformer**	⑪ Motor	⑫ Fan Blade	⑬ Cover	⑯ Front Case	⑱ Element Assy.	⑲ Element Guard	㉑ Capacitor
MUH03-21	1425-2004-000	–	3900-2002-006	1210-2000-000	1402-0336-001	1425-0009-005	1802-0087-000	2504-0011-000	–
MUH03-41	1425-2004-000	5814-0003-002	3900-2005-000	1210-2000-000	1402-0336-001	1425-0009-005	1802-0087-002	2504-0011-000	–
MUH03-71	1425-2004-000	–	3900-2002-007	1210-2000-000	1402-0336-001	1425-0009-005	1802-0087-001	2504-0011-000	–
MUH03-81	1425-2004-000	–	3900-2002-006	1210-2000-000	1402-0336-001	1425-0009-005	1802-0087-024	2504-0011-000	–
MUH05-21	1425-2004-000	–	3900-2002-006	1210-2000-000	1402-0336-001	1425-0009-005	1802-0087-003	2504-0011-000	–
MUH05-41	1425-2004-000	5814-0003-002	3900-2005-000	1210-2000-000	1402-0336-001	1425-0009-005	1802-0087-005	2504-0011-000	–
MUH05-71	1425-2004-000	–	3900-2002-007	1210-2000-000	1402-0336-001	1425-0009-005	1802-0087-004	2504-0011-000	–
MUH05-81	1425-2004-000	–	3900-2002-006	1210-2000-000	1402-0336-001	1425-0009-005	1802-0087-025	2504-0011-000	–
MUH-07-2	1425-0010-004	5814-0003-000	3900-2014-002	1210-0090-000	1402-0339-002	1425-0009-006	1802-0087-006	2504-0013-001	–
MUH-07-4	1425-0010-004	5814-0003-002	3900-0347-005	1210-0090-000	1402-0339-002	1425-0009-006	1802-0087-008	2504-0013-001	–
MUH-07-7	1425-0010-004	5814-0003-001	3900-2014-003	1210-0090-000	1402-0339-002	1425-0009-006	1802-0087-007	2504-0013-001	–
MUH-07-8	1425-0010-004	5814-0003-000	3900-2014-001	1210-0090-000	1402-0339-002	1425-0009-006	1802-0087-031	2504-0013-001	–
MUH-10-2	1425-0010-004	5814-0003-000	3900-2014-002	1210-0090-000	1402-0339-002	1425-0009-006	1802-0087-031	2504-0013-001	–
MUH-10-4	1425-0010-004	5814-0003-002	3900-0347-005	1210-0090-000	1402-0339-002	1425-0009-006	1802-0087-011	2504-0013-001	–
MUH-10-7	1425-0010-004	5814-0003-001	3900-2014-003	1210-0090-000	1402-0339-002	1425-0009-006	1802-0087-010	2504-0013-001	–
MUH-10-8	1425-0010-004	5814-0003-000	3900-2014-001	1210-0090-000	1402-0339-002	1425-0009-006	1802-0087-036	2504-0013-001	–
MUH-15-2	1425-0014-000	5814-0003-000	3900-0361-000	1210-0090-001	1402-0339-003	1425-0009-007	1802-0087-012	2504-0012-001	–
MUH-15-4	1425-0014-000	5814-0003-002	3900-0361-001	1210-0090-001	1402-0339-003	1425-0009-007	1802-0087-013	2504-0012-001	–
MUH-15-8	1425-0014-000	5814-0003-000	3900-0361-002	1210-0090-001	1402-0339-003	1425-0009-009	1802-0087-031	2504-0012-001	–
MUH-20-2	1425-0013-000	5814-0003-000	3900-0362-000	1210-0096-000	1402-0339-003	1425-0009-007	1802-0087-014	2504-0012-001	1432-0002-003
MUH-20-4	1425-0013-000	5814-0003-002	3900-0362-001	1210-0096-000	1402-0339-003	1425-0009-007	1802-0087-015	2504-0012-001	1432-0002-003
MUH-20-8	1425-0013-000	5814-0003-000	3900-0362-002	1210-0096-000	1402-0339-003	1425-0009-011	1802-0087-026	2504-0012-001	1432-0002-003
MUH-25-2	1425-0011-003	5814-0003-000	3900-0364-000	1210-0098-000	1402-0340-002	1425-0012-003	1802-0087-016	2504-0014-001	1432-0002-001
MUH-25-4	1425-0011-003	5814-0003-002	3900-0363-001	1210-0098-000	1402-0340-002	1425-0012-003	1802-0087-017	2504-0014-001	1432-0002-003
MUH-30-2	1425-0011-003	5814-0003-000	3900-0364-000	1210-0098-000	1402-0340-002	1425-0012-003	1802-0087-018	2504-0014-001	1432-0002-001
MUH-30-4	1425-0011-003	5814-0003-002	3900-0363-000	1210-0098-000	1402-0340-002	1425-0012-003	1802-0087-019	2504-0014-001	1432-0002-003
MUH-30-8	1425-0011-003	5814-0003-000	3900-0364-000	1210-0098-000	1402-0340-002	1425-0009-009	1802-0087-028	2504-0014-001	1432-0002-001
MUH-40-2	1425-0011-001	5814-0003-000	3900-0350-000	1210-0097-000	1402-0340-003	1425-0012-002	1802-0087-020	2504-0015-001	1432-0002-004
MUH-40-4	1425-0011-001	5814-0003-002	3900-0350-001	1210-0097-000	1402-0340-003	1425-0012-002	1802-0087-021	2504-0015-001	1432-0002-004
MUH-50-2	1425-0011-001	5814-0003-000	3900-0350-000	1210-0097-000	1402-0340-003	1425-0012-002	1802-0087-022	2504-0015-001	1432-0002-004
MUH-50-4	1425-0011-001	5814-0003-002	3900-0350-001	1210-0097-000	1402-0340-003	1425-0012-002	1802-0087-023	2504-0015-001	1432-0002-004
MUH-50-8	1425-0011-001	5814-0003-000	3900-0350-002	1210-0097-000	1402-0340-003	1425-0012-002	1802-0087-030	2504-0015-001	1432-0002-004

Model No.	㉓ Relay***	㉔ Insulator	㉚ Terminal Block, Power	㉛ Terminal Block, Control	㉞ Fuse Block	㉟ Fuse
MUH03-21	–	–	5823-0004-000	5823-0001-000	–	–
MUH03-41	5018-0004-100	2900-0030-000	5823-0004-000	5823-0002-000	–	–
MUH03-71	–	2900-0030-000	5823-0004-000	5823-0001-000	–	–
MUH03-81	–	–	5823-0004-000	5823-0001-000	–	–
MUH05-21	–	–	5823-0004-000	5823-0001-000	–	–
MUH05-41	5018-0004-100	2900-0030-000	5823-0004-000	5823-0002-000	–	–
MUH05-71	–	2900-0030-000	5823-0004-000	5823-0001-000	–	–
MUH05-81	–	–	5823-0004-000	5823-0001-000	–	–
MUH-07-2	5018-0003-000	–	5823-0004-000	5823-0002-000	–	–
MUH-07-4	5018-0004-100	2900-0030-000	5823-0004-000	5823-0002-000	–	–
MUH-07-7	5018-0004-100	2900-0030-000	5823-0004-000	5823-0002-000	–	–
MUH-07-8	5018-0003-000	–	5823-0004-000	5823-0002-000	–	–
MUH-10-2	5018-0003-000	–	5823-0004-000	5823-0002-000	–	–
MUH-10-4	5018-0004-100	2900-0030-000	5823-0004-000	5823-0002-000	–	–
MUH-10-7	5018-0003-000	2900-0030-000	5823-0004-000	5823-0002-000	–	–
MUH-10-8	5018-0004-100	–	5823-0004-000	5823-0002-000	–	–
MUH-15-2	5018-0005-004	–	5823-0004-001	5823-0002-000	–	–
MUH-15-4	5018-0004-100	2900-0030-000	5823-0004-000	5823-0002-000	–	–
MUH-15-8	5018-0005-008	–	5823-0004-003	5823-0002-000	2025-0002-000	2019-0007-010
MUH-20-2	5018-0006-000	–	5823-0004-002	5823-0002-000	–	–
MUH-20-4	5018-0004-100	2900-0030-000	5823-0004-000	5823-0002-000	–	–
MUH-20-8	5018-0005-000	–	5823-0004-002	5823-0002-000	2025-0002-000	2019-0007-008
MUH-25-2	5018-0005-004	–	5823-0004-002	5823-0002-000	2025-7002-000	2019-7008-077
MUH-25-4	5018-0005-004	2900-0030-000	5823-0004-001	5823-0002-000	–	–
MUH-30-2	5018-0005-004	–	5823-0004-003	5823-0002-000	2025-7002-000	2019-7008-079
MUH-30-4	5018-0005-004	2900-0030-000	5823-0004-001	5823-0002-000	–	–
MUH-30-8	5018-0006-000	–	5823-0005-000	5823-0002-000	2025-7002-000	2019-7008-080
MUH-40-2	5018-0005-004	–	5823-0005-000	5823-0002-000	2025-7002-000	2019-7008-079
MUH-40-4	*	2900-0030-000	5823-0004-002	5823-0002-000	2025-7002-000	2019-7008-079
MUH-50-2	5018-0005-004	–	5823-0005-000	5823-0002-000	2025-7002-000	2019-7008-080
MUH-50-4	*	2900-0030-000	5823-0004-002	5823-0002-000	–	–
MUH-50-8	5018-0006-000	–	5823-0005-000	5823-0002-000	2025-7002-000	2019-7008-078

* Two relays are used: 35A relay P/N 5018-0004-000 and 40A relay P/N 5018-0005-12.

** 24V secondary shown. For 120V secondary, increase last digit by 3. (i.e. for MUH03-41, 24V secondary use 5814-0003-002; for 120V secondary use 5814-0003-005.)

*** 24V H.C. shown. For 120 H.C., increase last digit by 1. (i.e.: for MUH03-41, 24V H.C. use 5018-0004-000; for 120V H.C. use 5018-0004-001.)

QMARK®
A Division of Marley Electric Heating
470 Beauty Spot Rd. East
Bennettsville, SC 29512

GREENHECK
P.O. BOX 410 SCHOFIELD, WISCONSIN 54476-0410
PH. 715-359-6171

Sidewall Propeller Fans Belt Drive and Direct Drive

Installation, Operating and Maintenance Manual

Upon receiving the unit, check for any damage and report it immediately to the shipper. Also assure all accessory items are accounted for.

Move fan to the desired location and determine the method by which the fan is to be mounted as shown below in figures 1, 2 and 3. Optional wall mount housings (Fig. 1) and wall mount collars (Fig. 2) provide a convenient means of mounting sidewall fans while maintaining the proper distance between propeller and damper.

Attach the fan by inserting a suitable fastener through each of the pre-punched mounting holes in the fan panel. Care should be taken not to bend or distort the fan panel or drive components during installation.

The motor voltage and amperage rating must be checked for compatibility with the electrical supply. Supply wiring to the fan must be properly fused and conform to local and national electrical codes.

TYPICAL INSTALLATIONS

Wall opening size and propeller-to-damper distance are two important dimensions for fan installation. Fans mounted to the wall require a different opening (W.O.) size than those mounted in collars or wall housings. Propeller-to-damper distance (M) is important to reduce turbulence and damper flutter which may lead to premature damper failure.

Figs. #1 and #2 , show the wall opening (W.O.) required for installations with either a wall housing or collar.

Fig. #3 shows the recommended wall opening (W.O.) and the minimum distance (M) suggested between the fan and damper for direct to wall installations.

Wall Opening Requirements

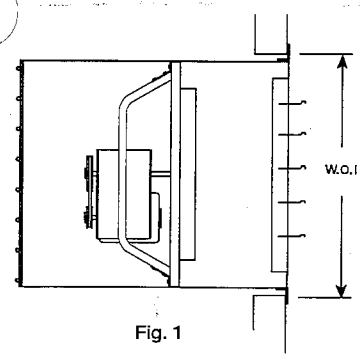


Fig. 1
Wall Housing Installation

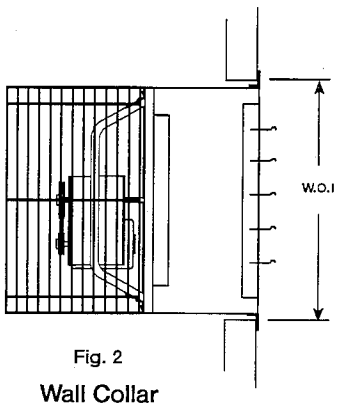


Fig. 2
Wall Collar Installation

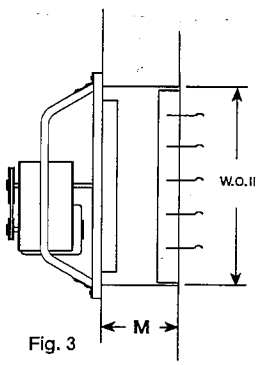


Fig. 3
Direct to Wall Installation

Fan Size	D Damper Size	WO-I Sq.	WO-II Sq.	M Min.
8	10x10	14 1/4	10 1/2	13
10	12x12	16 1/4	12 1/2	13
12	14x14	19 1/4	14 1/2	13
14	16x16	21 1/4	16 1/2	13
16	18x18	23 1/4	18 1/2	13
18	20x20	25 1/4	20 1/2	13
20	22x22	27 1/4	22 1/2	13
24	26x26	33 3/4	26 1/2	13
30	32x32	39 3/4	32 1/2	13
36	38x38	45 3/4	38 1/2	14
42	44x44	51 3/4	45 1/2	15
48	50x50	57 3/4	50 1/2	16
54	56x56	63 3/4	56 1/2	17
60	62x62	69 3/4	62 1/2	18
72	74x74	83 3/4	74 1/2	19

PRESTARTING CHECKS

Check all fasteners and set screws for tightness. This is especially important for bearing set screws.

The propeller should rotate freely and not rub on the fan panel venturi. Rotation direction of the propeller should be checked by momentarily turning the unit on. Rotation should be in the same direction as the rotation decal affixed to the unit or as shown in Fig. 4. For 3-phase installations, fan rotation can be reversed by simply interchanging any two of the three electrical leads. For single phase installations follow the wiring diagram located on the motor.

FOR BELT DRIVE FANS

The adjustable motor pulley is preset at the factory for the specified fan RPM. Fan speed can be increased by closing or decreased by opening the adjustable pulley. Two or three groove variable pitch pulleys must be adjusted an equal number of turns open. Any increase in fan speed represents a substantial increase in horsepower required from the motor. Always check motor load amperage and compare to name plate rating when changing fan speed.

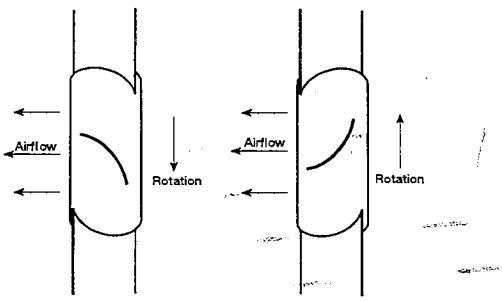


Fig. 4

ROUTINE MAINTENANCE

WARNING

DISCONNECT AND SECURE TO THE "OFF" POSITION ALL ELECTRICAL POWER TO THE FAN PRIOR TO INSPECTION OR SERVICING. FAILURE TO COMPLY WITH THIS SAFETY PRECAUTION COULD RESULT IN SERIOUS INJURY OR DEATH.

Once the fan has been put into operation, a periodic maintenance program should be set up to preserve the reliability and performance of the fan. Items to be included in this program are:

- **BELTS**
- **BEARINGS**
- **FASTENERS**
- **SET SCREWS**
- **LUBRICATION**
- **REMOVAL OF DUST/DIRT**

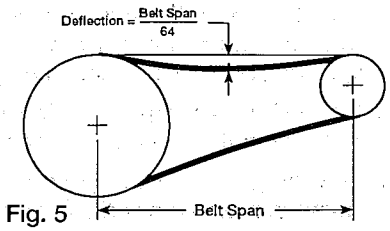


Fig. 5

BELTS

Premature belt failures are frequently caused by improper belt tension (either too tight or too loose) or misaligned pulleys. The proper tension for operating a V-belt is the lowest tension at which the belts will not slip at peak load conditions. For initial tensioning, the proper belt deflection half way between pulley centers is 1/64" for each inch of belt span. For example, if the belt span is 64 inches, the belt deflection should be one inch using moderate thumb pressure at midpoint of the drive (Fig. 5).

Check belt tension two times during the first 24 hours of operation and periodically thereafter. To adjust belt tension, simply loosen four fasteners (two on each side of the motor plate) and slide the motor plate away from the fan shaft until proper belt tension is attained. On some fans, fasteners attaching the motor to the motor plate must be loosened in order to adjust the belt.

It is very important that the drive pulleys remain in proper alignment after adjustments are made. Misalignment of pulleys will result in premature belt wear noise, vibration and power loss. See Fig. 6.

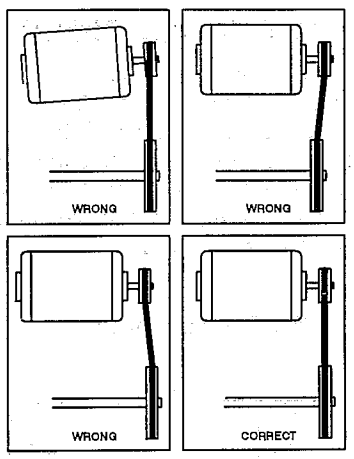


Fig. 6

BEARINGS (For belt drive fans only)

Bearings are the most critical moving part of the fan and should be inspected at periodic intervals. Locking collars and set screws, in addition to fasteners attaching the bearings to the bearing plate, must be checked for tightness. In a clean environment and temperatures above 32°F./below 200° F., fan shaft bearings with grease fittings should be lubricated semi-annually using a high quality lithium based grease. If unusual environmental conditions exist temperatures below 32°F./above 200°F., moisture or contaminants, more frequent lubrication is required.

With the unit running, add grease very slowly with a manual grease gun until a slight bead of grease forms at the seal. Be careful not to unseat the seal by over lubricating or using excessive pressure. Bearings without grease fittings are lubricated for life.

FASTENERS AND SET SCREWS

Any fan vibration has a tendency to loosen mechanical fasteners. A periodic inspection should include checking all fasteners and set screws for tightness. Particular attention should be paid to set screws attaching the propeller to the shaft and the shaft to the bearings. Loose bearing set screws will lead to premature failure of the fan shaft.

LUBRICATION

Refer to the paragraph on bearings for bearing lubrication. Many fractional horsepower motors installed on the smaller fans are lubricated for life and require no further attention. Motors equipped with oil holes should be oiled in accordance with the manufacturer's instructions printed on the motor. Use a high grade SAE 20 machine oil and use caution not to over lubricate. Motors supplied with grease fittings should be greased according to directions printed on the motor.

REMOVAL OF DUST AND DIRT

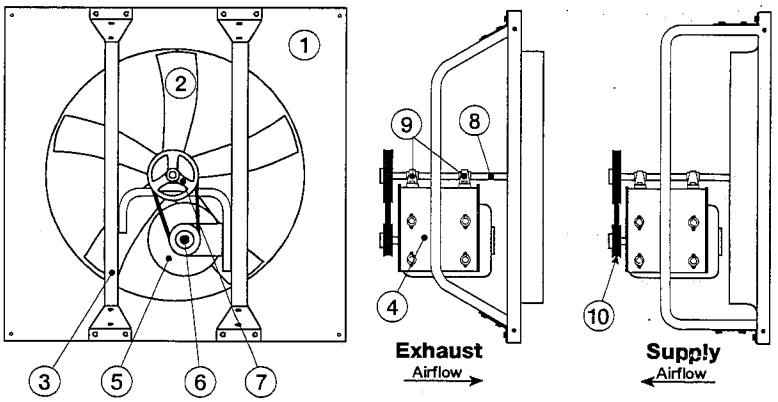
Dirt clogs cooling openings on the motor housing, contaminates bearing lubricant and collects on propeller blades causing severe imbalance if left unchecked. The exterior surface of the motor, fan panel and entire propeller should be thoroughly cleaned periodically. Use caution and do not allow water or solvents to enter the motor or bearings. Under no circumstances should motors or bearings be sprayed with steam or water.

TROUBLESHOOTING		
PROBLEM	**CAUSE**	**CORRECTIVE ACTION**
Reduced airflow	System resistance is too high.	Check backdraft dampers for proper operation. Remove obstructions in ductwork. Clean dirty filters. Check for adequate supply air for exhaust fans or exhaust air for supply fans.
	Fan too close to damper.	Increase distance between fan and damper.
	Unit running backwards.	See pre-starting checks.
	Fan speed too low.	Increase fan speed.
	Excessive dirt on propeller.	Clean propeller.
Excessive Noise	Bearings	Tighten bearing collars and set screws Lubricate bearings. Replace defective bearings.
	V-Belt drive	Tighten pulleys on motor and fan shaft. Adjust belt tension. Align pulleys. Replace worn belts or pulleys. See "Routine Maintenance".
	Excessive vibration	Clean dirt build-up from propeller. Check all set screws and fasteners for tightness. Check for worn bearing. Correct propeller imbalance. Check for loose dampers. guards or ductwork.
	Defective Motor	Replace motor.

Motor load amperage must be checked and compared to nameplate rating to avoid serious damage to motor when speed is increased.

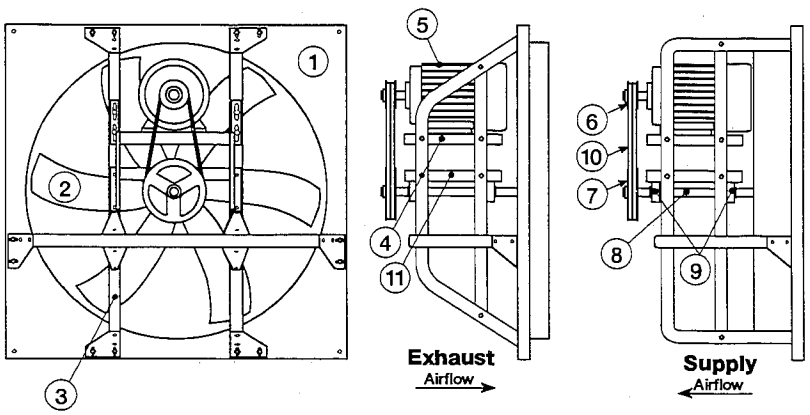
Belt Drive Fans Parts List

For SB-1L/H and SBC-2L/H Fans



1. Fan Panel
2. Propeller
3. Drive Frame Channel (2)
4. Motor / Bearing Plate
5. Motor
6. Motor Pulley
7. Shaft Pulley
8. Fan Shaft
9. Bearings (2)
10. Belt

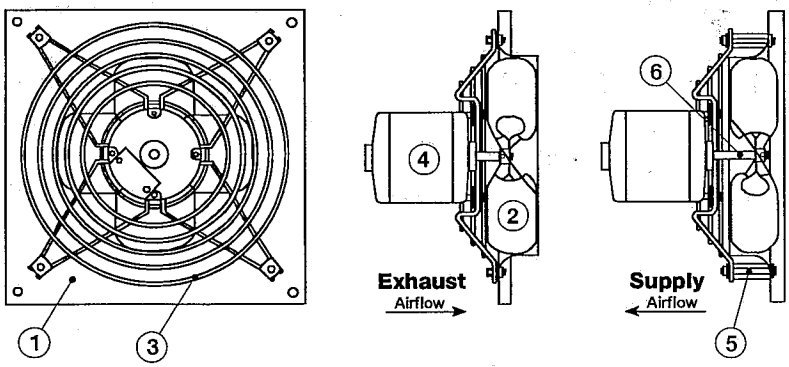
For SB-3L/H and SBC-3L/H Fans



1. Fan Panel
2. Propeller
3. Drive Frame Channel (2)
4. Motor Plate
5. Motor
6. Motor Pulley
7. Shaft Pulley
8. Fan Shaft
9. Bearings (2)
10. Belt
11. Bearing Plate

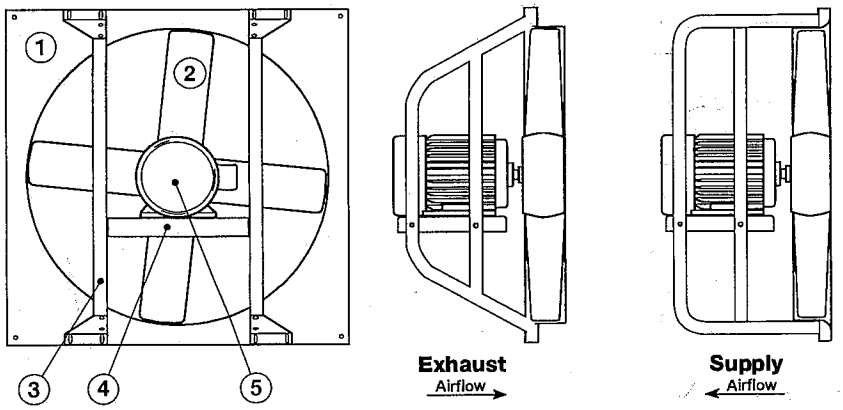
Direct Drive Fans Parts List

For S1 Fans



1. Fan Panel
2. Propeller
3. Drive Frame/Motor Support
4. Motor
5. Riser Blocks (4) - supply fan only
6. Shaft Extension- supply fan only

For S2 and SC3 Fans



1. Fan Panel
2. Propeller
3. Drive Frame Channels (2)
4. Motor Plate
5. Motor

Replacement Parts

Always provide the unit serial number when requesting parts or information.

JOB _____

MODEL _____ SERIAL NO. _____

GREENHECK PRODUCTION ORDER NO. _____

SALES OFFICE _____ CITY _____

SELECT ONE:

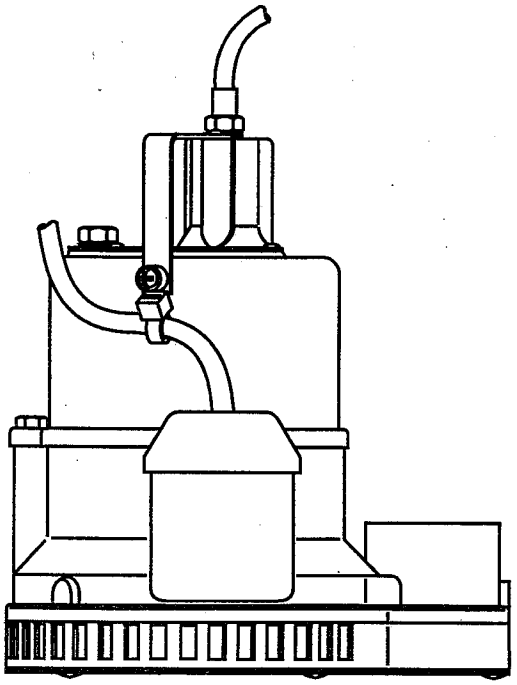
❑ BELT DRIVE ❑ DIRECT DRIVE

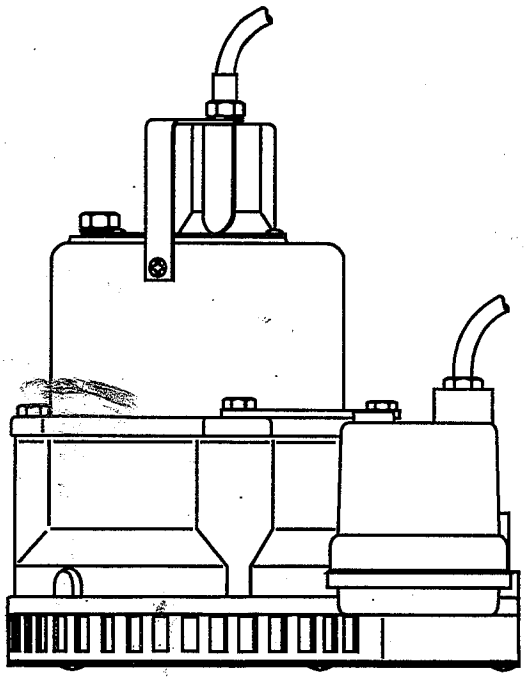
Part Description	Quantity	Remarks

Installation and
Service Manual

HYDROMATIC SW & SD 25/33

Submersible Sump/Effluent Pump





NOTE!
To the installer: Please make sure you provide this manual to the owner of the pumping equipment or to the responsible party who maintains the system.

HYDROMATIC™ PUMPS

Table of Contents

Subject	Page
Introduction	3
Installation	3
Typical Installation Drawing	4
Service	5
Trouble Shooting	6
Parts List	7-8
Warranty	9
Application Notes	10-11

1 Introduction

Warning: Read all instructions before starting any operation on pump. All labels must meet UL standards for warnings.

Before operation, read the following instructions carefully. Reasonable care and safe methods should be practiced. Check local codes and requirements before installation. Servicing should be performed by knowledgeable pump service contractors or authorized service stations.

Always disconnect the pump and controls from its power source before handling or making any adjustments. Always wear rubber boots when there is water on the floor and you must unplug the pump.

Warning: All labels must meet UL standards for warnings. To reduce risk of electrical shock or severe personal injury:

1. This pump has not been investigated for use in swimming pool areas.
2. Connect only to a properly grounded, grounding-type receptacle.
3. Septic tank to be vented in accordance with local plumbing codes.
4. Do not smoke or use sparkable electrical devices or flame in a septic (gaseous) or possible septic sump.
5. A septic sump condition may exist and if entry into sump is necessary, then 1) provide proper safety precautions per OSHA requirements and 2) do not enter sump until these precautions are strictly adhered to.
6. Do not install pump in location classified as hazardous per N.E.C., ANSI/NFPA 70 - 1984.

Failure to heed above cautions could result in injury or death.

2 Installation

These important instructions must be followed for satisfactory performance of your pump. Before installation, check your local electrical and plumbing codes.

1. Provide proper sump.

Minimum Sump Diameter	
SW25A/SW33A	18"
SD25A/SD33A	12"
Approx. Turn-On Level	
SW25A/SW33A	9-1/2"*
SD25A/SD33A	7-7/8"
Approx. Turn-Off Level	
SW25A/SW33A	3-1/2"*
SD25A/SD33A	3-3/8"

2. Make sure float (Model SW25A or SW33A) hangs free. It should not come into contact with side or bottom of sump.
3. Make sure sump is free of string, cloth, nails, gravel, etc. before installing pump.
4. Do not set pump directly on the bottom of sump if it is not solid. Raise the pump by using bricks or concrete blocks underneath it.
5. Use steel or plastic pipe for all connecting lines between pump and sewer outlet.

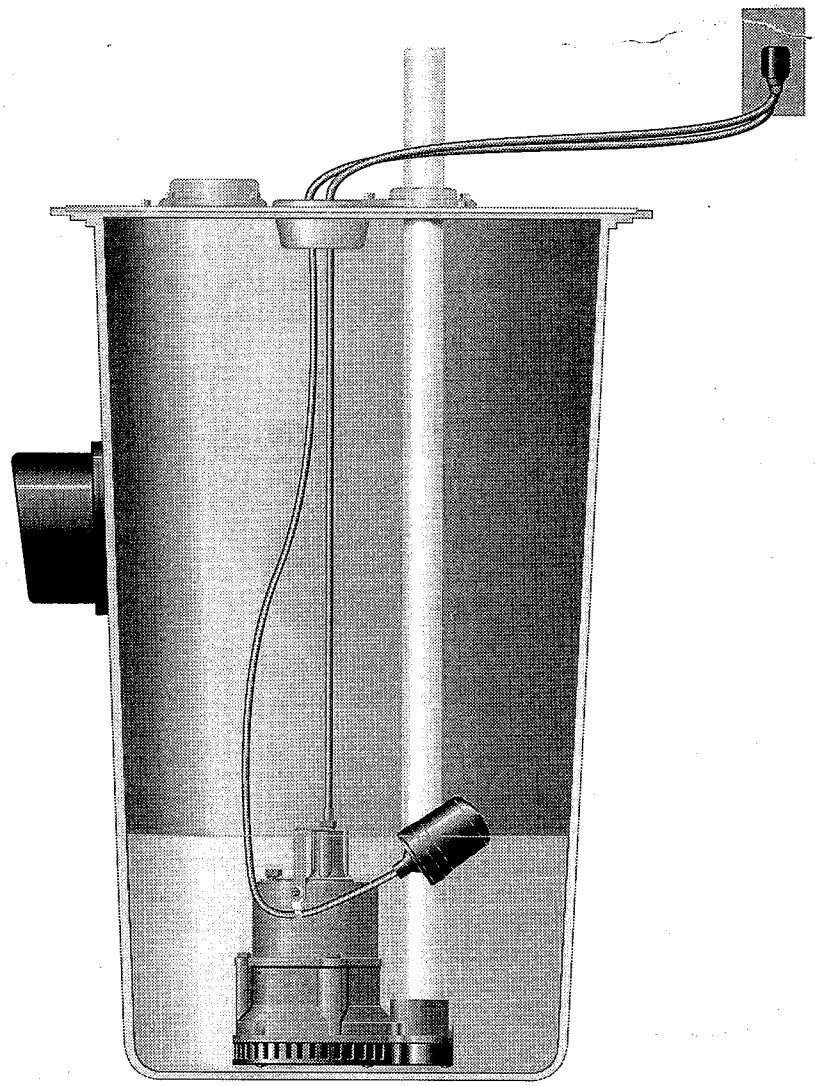
   Note: Some city regulations do not allow installing a pump with plastic pipe. Check local regulations.
6. Hydromatic check valve should be installed in discharge pipe, at least twelve inches above the discharge outlet of the pump.
7. Connect to power source using 3-prong grounded 115 volt AC receptacle. Do not remove ground pin from electrical plug. Do not use an extension cord.
8. For proper automatic operation make sure the pump power cord is plugged into the back of the "piggyback" receptacle on the switch cord.
9. Use pump submerged for pumping waterlike liquids (temperature to 120° F).

   Warning: Risk of Electrical Shock – This pump has not been investigated for use in swimming pool areas.
10. **Caution:** Do not pump flammable liquids, strong chemicals or salt water.
11. In applications where the pump may sit idle for months at a time, it is recommended that the pump(s) be cycled every month to insure pumping system is working properly when needed.

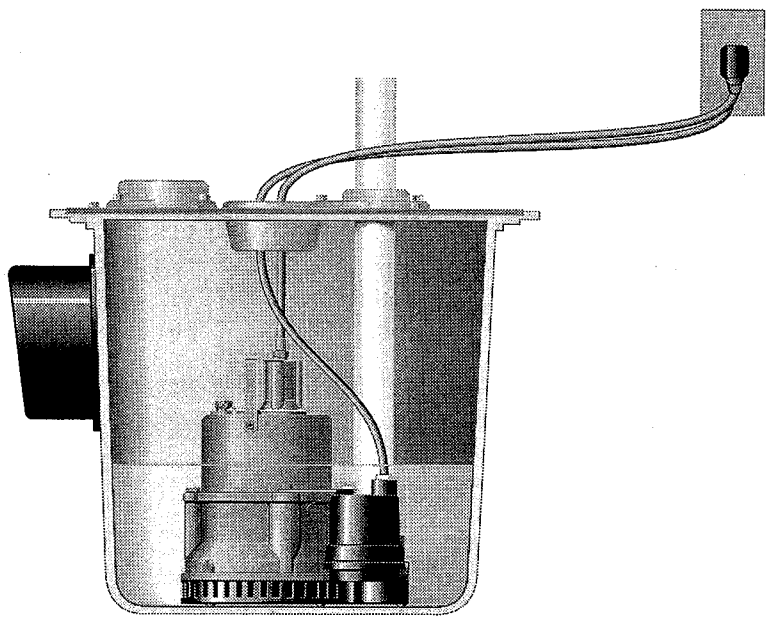
    Note: The Q Alert alarm panel is for indoor use only. For applications and products contact your Hydromatic distributor.
12. An audible alarm system such as the Q Alert for high water conditions should be installed for additional protection against high water conditions.

*Adjustable subject to size limitations of sump pit.

3 Typical Installation



SW25A/SW33A



SD25A/SD33A

4 Service

Servicing should be performed only by knowledgable pump service contractors or authorized service stations.

1. **Warning:** Always disconnect the pump from power source before handling or making any adjustments. Always wear rubber boots when there is water on the floor and you must unplug the pump.

2. Before removing pump from sump for repair, check if the trouble could simply be a blown fuse, tripped circuit breaker, or a power cord not completely inserted into the receptacle.

3. **Note:** Automatic thermal overload protects the sealed-in-oil motor. Running dry will overheat the motor and activate the overload protector until the unit cools.

4. If the unit is being operated by the optional float control or diaphragm switch, unplug the pump from the "piggyback" receptacle and plug the pump directly into the power source. If the pump starts each time it is plugged directly into the receptacle and does not start each time when plugged into the piggyback switch with the float raised up (or the diaphragm switch pressed in) to a start position, replace the complete piggyback switch assembly and retest with new assembly.

5. If pump fails the above two steps, unplug and pull the pump from the sump by the handle. Sandblast, if possible, any dirt or trash from the outside of the pump before proceeding.

6. Check for an obstruction in the impeller cavity by laying the pump on its side and removing the 5 screws (20) to remove the plastic base (18 & 19). If the impeller does not rotate freely, clear the impeller and cavity walls before reassembling the base. Repeat Step 4.

7. **Air Locking:** A sump pump is said to be air locked if air traps in the pump and it cannot get out, thus preventing pump from operation. Hydromatic sump pumps have a small air vent hole in the impeller cavity to let out trapped air. If the hole becomes plugged, pump may air lock. To break the air lock, use a small screwdriver to clear the hole in the impeller cavity. As a secondary precaution in installations of this type – ⅛" hole should be drilled in the discharge pipe below the check valve. The check valve should be 12 to 18 inches above pump discharge. Do not put check valve directly into pump discharge opening.

   Note: In sumps where the pump is operating daily, air locking rarely occurs.

8. If the above tests have not resolved the problem, the problem may be in the electrical components of the pump. Starting with the power cord, inspect for cuts or nicks in the insulation. If the cord is damaged, it must be replaced!

9. Using the ohmmeter, check the resistance of the motor windings by connecting one lead clip to each electric "flat" prong on the power cord plug. The ohmmeter should be on R x 1 setting. Normal reading is as follows:

1/4 HP 115V 1Ø	–	2.1/2.3
1/3 HP 115V 1Ø	–	1.10/1.27

To check for ground, place the ohmmeter on R x 100k, connect one lead clip to the "round" ground prong on the power cord and touch the other lead clip to each "flat" prong individually. If the reading is other than infinity (∞ on the ohmmeter scale), a leakage through stator insulation or moisture in the windings is occuring and the pump must be replaced.



Warning: Before handling these pumps and controls, always disconnect the power first.

Do not smoke or use sparkable electrical devices or flames in a septic (gaseous) or possible septic sump.

Pump does not run or hum.

1. Line circuit breaker may be off, blown or loose.
2. Water level in sump may be too low. Run in more water. Turn on level is 12 to 13 inches above sump bottom.
3. Pump and/or switch cord plug may not be making contact in receptacle.
4. If pump is using the series cord plug, the two plugs may not be plugged tight together.
5. Float may be stuck. Be sure float operates freely in basin.
6. If all symptoms check OK, motor winding may be open; take to service center for check.

Pump runs but does not deliver water.

1. Check valve may be installed backwards. Arrow in valve points in direction of flow.
2. Discharge gate valve, if used, may be closed.
3. Pump may be air locked. Start and stop several times by plugging and unplugging cord. Check vent hole in pump case for plugging.
4. Pump head may be too high. Pump cannot deliver water over 24' (¼ hp.) 26' (⅓ hp.) vertical. Horizontal distance does not affect pumping, except loss due to friction.
5. Inlet in pump base may be clogged. Remove pump and clean out openings.
6. Impeller or volute openings may be plugged or partially plugged. Remove pump and clean per maintenance instructions.

Pump runs and pumps out sump but does not stop.

1. Float is stuck in up position. Be sure float operates freely in basin.

Pump runs but delivers only small amount of water.

1. Pump may be air locked. Start and stop several times by plugging and unplugging cord. Check vent hole in pump case for plugging.
2. Pump head may be too high. Pump cannot deliver water over 24' (¼ hp.) 26' (⅓ hp.) vertical. Horizontal distance does not affect pumping, except loss due to friction.
3. Inlet in pump base may be clogged. Remove pump and clean out openings.
4. Impeller or volute openings may be plugged or partially plugged. Remove pump and clean per maintenance instructions.
5. Pump impeller may be partially clogged causing motor to run slow, resulting in motor overload. Clear impeller.

Fuse blows or circuit breaker trips when pump starts.

1. Inlet in pump base may be clogged. Remove pump and clean out openings.
2. Impeller or volute openings may be plugged or partially plugged. Remove pump and clean per maintenance instructions.
3. Pump impeller may be partially clogged causing motor to run slow, resulting in motor overload. Clear impeller.
4. Fuse size or circuit breaker is too small.
5. Defective motor stator: return to Hydromatic service center for verification.

Motor runs for short time then stops. Then after short period starts again. Indicates tripping overload caused by symptom shown.

1. Inlet in pump base may be clogged. Remove pump and clean out openings.
2. Impeller or volute openings may be plugged or partially plugged. Remove pump and clean per maintenance instructions.
3. Pump impeller may be partially clogged causing motor to run slow, resulting in motor overload. Clear impeller.
4. Defective motor stator: return to Hydromatic service center for verification.

Your pump warranty is void...

If... power cord has been cut or spliced.

If... pump has been used to pump mud, cement, tar, abrasives or chemicals.

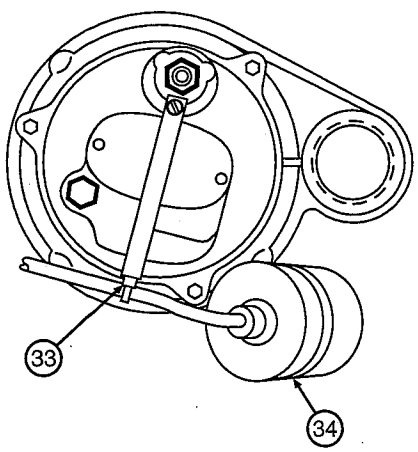
If... pump has been used for pumping of hot water (above 120°F).

If... pump has been dismantled by other than authorized Hydromatic service center or distributor.

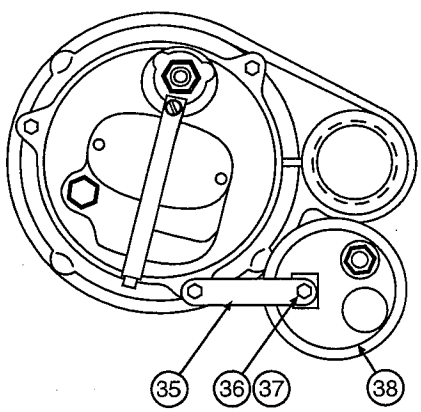
6 Parts List

SW25A/SW33A • SD25A/SD33A • SW25M/SW33M

Ref. No.	Part No.	Description	Qty.	Ref. No.	Part No.	Description	Qty.
1	13439-000-1	Screw – Machine #10 - 32 3/8"	2	24	–	–	–
2	–	–	–	25	12133-001-1	Stator (1/4 HP)	1
3	–	–	–	25	12136-001-1	Stator (1/3 HP)	1
4	8522-006-3	Handle – Pump	1	26	12133-011-1	Rotor (1/4 HP) Shaft & Bearing	1
5	14077-000-1	Plug – Pipe	1	26	12136-011-5	Rotor (1/3 HP) Shaft & Bearing	1
6	–	–	–	27	8507-012-5	Housing – Motor	1
7	–	–	–	29	–	–	–
9	–	–	–	30	–	–	–
10	13439-006-1	Screw – Machine #6	1	31	13469-100-1	Cord – Power (SD25A1-10', SD33A1-10') SW	1
11	6000-053-1	Wire Ground	1	31	13469-101-1	Cord – Power (SD25A1-20', SD33A1-20') SW	1
12	145-024-1	Screw – Hex #8-32 (1/4 HP)	2	32	–	–	–
12	145-009-1	Screw – Hex #8-32 (1/3 HP)	2	33	1055-001-1	Tie – Float Cord	1
13	176-005-1	Screw – Hex, 1/4 & 20	3	34	12150-026-7	Float Switch – Wide Angle (10' cord)	1
14	5484-001-1	Seal – Shaft (Stationary Seat)	1	34	12150-023-7	Float Switch – Wide Angle (20' cord)	1
15	5484-003-1	Seal – Shaft (Rototing Seat)	1	35	5502-001-1	Brocket	1
16	8504-002-2	Case – Volute	1	36	176-015-1	Screw, 1/4-20 x 3/8	1
17	8498-003-1	Impeller	1	37	995-008-1	Lockwasher	1
18	8520-002-1	Base – Strainer	1	38	51752-100-7	Switch – Diaphragm (SD25A1-10', SD33A1-10')	1
19	8521-001-1	Plate – Bottom (1/4 HP)	1	38	51752-101-7	Switch – Diaphragm (SD25A1-20', SD33A1-20')	1
19	8521-002-1	Plate – Bottom (1/3 HP)	1	39	65-024-1	Bearing	1
20	13439-007-1	Screw – Machine #10 -24 x 1 ¼ self tapping	5	40	8922-000-1	Spacer	1
21	–	–	–	41	75-000-1	Cord Nut	1
22	–	–	–	42	139-013-1	Seal Ring	1
23	149-001-1	Ring – Seal	1				



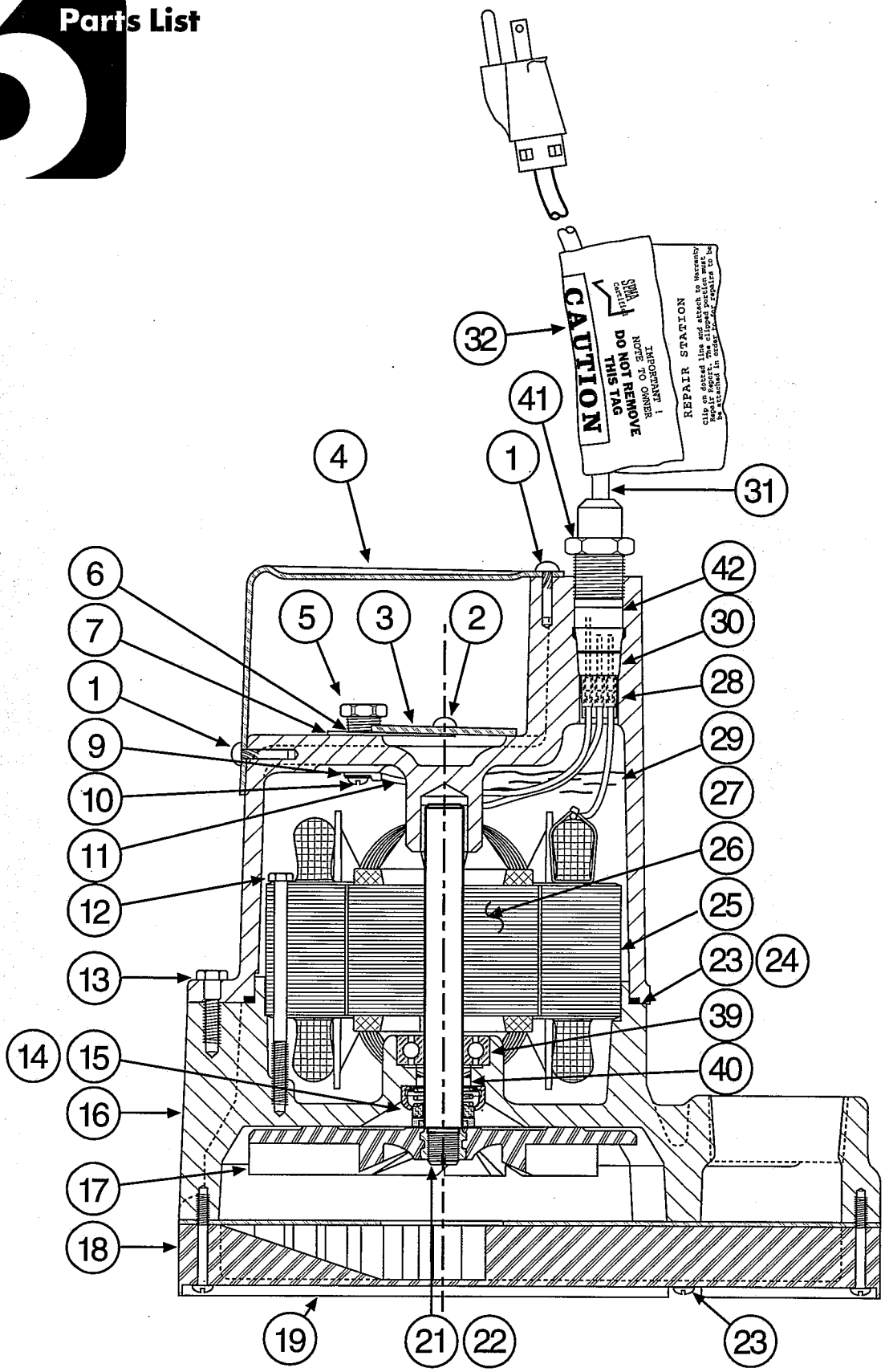
SW25A and SW33A MODELS



SD25A and SD33A MODELS

3/9/95

6 Parts List


CAUTION
DO NOT REMOVE THIS TAG
IMPORTANT !
NOTE TO OWNER
REPAIR STATION
32
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23



Hydromatic Pump, a Unit of General Signal, warrants to the original purchaser of each of Hydromatic Pump product(s) that any part thereof which proves to be defective in material or workmanship within one year from date of installation or 18 months from manufacture date, whichever comes first, will be replaced at no charge with a new or remanufactured part, F.O.B. factory. Purchaser shall assume all responsibility and expense for removal, reinstallation and freight. Any item(s) designated as manufactured by others shall be covered only by the express warranty of the manufacturer thereof. This warranty does not apply to damage resulting from accident, alteration, design misuse or abuse.

If the material furnished to the Buyer shall fail to conform to this contract or to any of the terms of this written warranty, Hydromatic Pump shall replace such nonconforming material at the original point of delivery and shall furnish instruction for its disposition. Any transportation charges involved in such disposition shall be for the Buyer's account. The Buyer's exclusive and sole remedy on account or in respect of the furnishing of material that does not conform to this contract, or to this written warranty, shall be to secure replacement thereof as aforesaid. Hydromatic Pump shall not in any event be liable for the cost of any labor expended on any such material or for any incidental or consequential damages to anyone by reason of the fact that such material does not conform to this contract or to this written warranty.

ALL IMPLIED WARRANTIES, INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY AND THE IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO THE SAME EXTENT AS THE EXPRESS WARRANTY CONTAINED HEREIN. Some States do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply.

MANUFACTURER EXPRESSLY DISCLAIMS AND EXCLUDES ANY LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY ARISING IN CONNECTION WITH THIS PRODUCT. INCLUDING WITHOUT LIMITATION, WHETHER IN TORT, NEGLIGENCE, STRICT LIABILITY CONTRACT OR OTHERWISE. Some States do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from State to State.

NOTE:
PUMP MUST BE REPAIRED BY AUTHORIZED HYDROMATIC REPAIR CENTER OR WARRANTY WILL BE VOID. IF REPAIR CENTER IS NOT AVAILABLE, RETURN PUMP TO PLACE OF PURCHASE.


Application
Notes


8
Application
Notes

[redacted]

- Your Local Authorized Distributor -

HYDROMATIC PUMPS, INC.
1840 BANEY ROAD
ASHLAND, OHIO 44805 U.S.A.
PHONE: (419) 289-3042
PHONE: (419) 289-8224 (Parts Distribution Center)
FAX: (419) 289-8058 (Parts Distribution Center)

5 vendors

SSPMA Certified PUMP

ISO 9001 QUALITY SYSTEM CERTIFIED HYDROMATIC PUMPS

Part #5625-195-1

Stock #: HP-INST-195-1 (8/97) - 15M (9/97)

HYDROMATIC

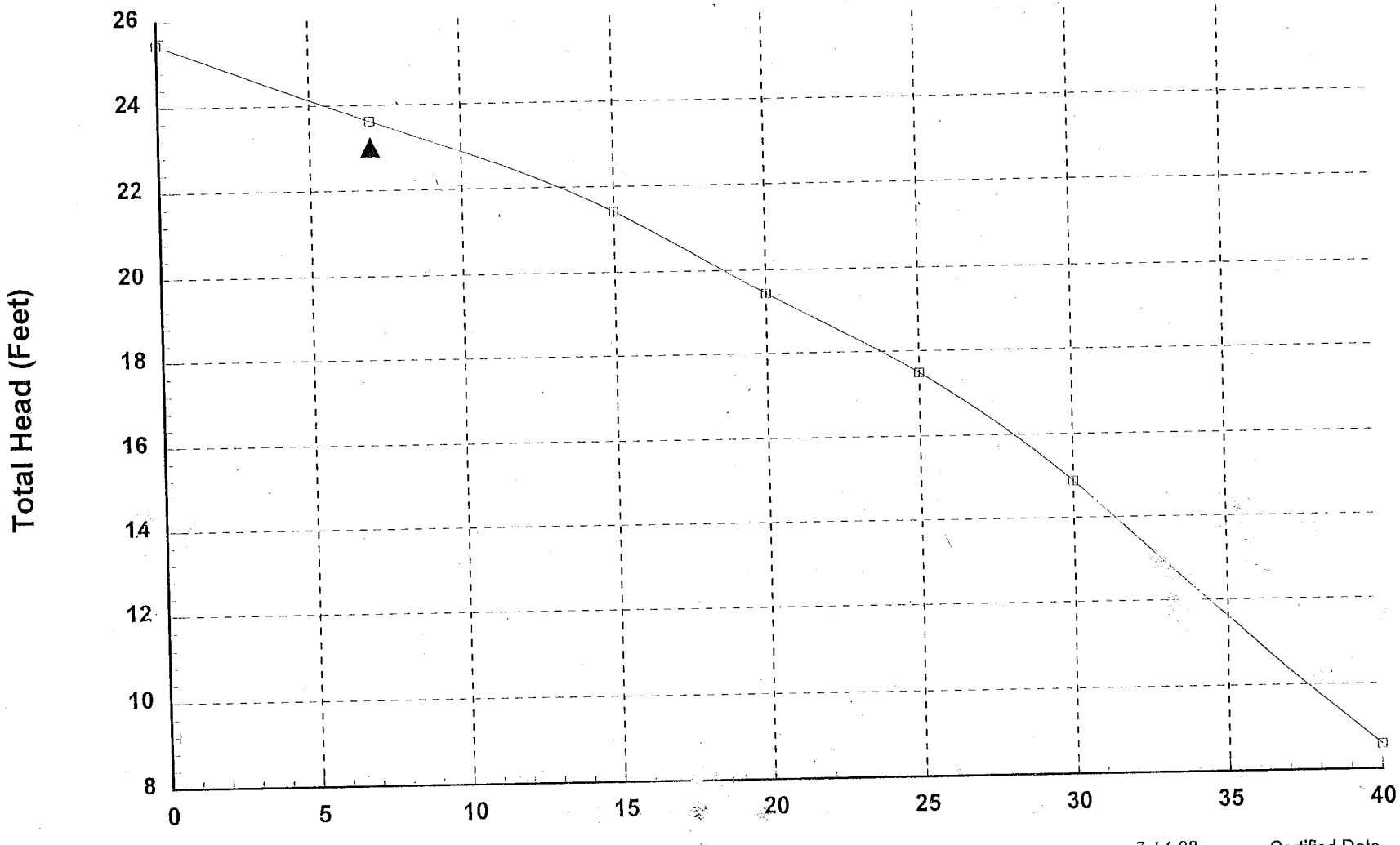
AURORA/HYDROMATIC PUMPS, INC.

Ashland, Ohio

Customer	*BISCO.*				
Order #	*5775*	HPC #	*31090*		
Voltage	*115* Phase	*1*	Imp. Dia.	*STD.*	
Watts	*540* Amps	*7.3*	Speed		

Pump SW25M-1 S/N 0

Condition of Service 7 GPM @ 23 Ft.



Test Date *7-14-98* Certified Date *7-14-98*

Authorized Signature *Brandon Gant*

Test Voltage *115* Test Frequency *60*

Notes: *0*

Certified Test SW25M-1/T1

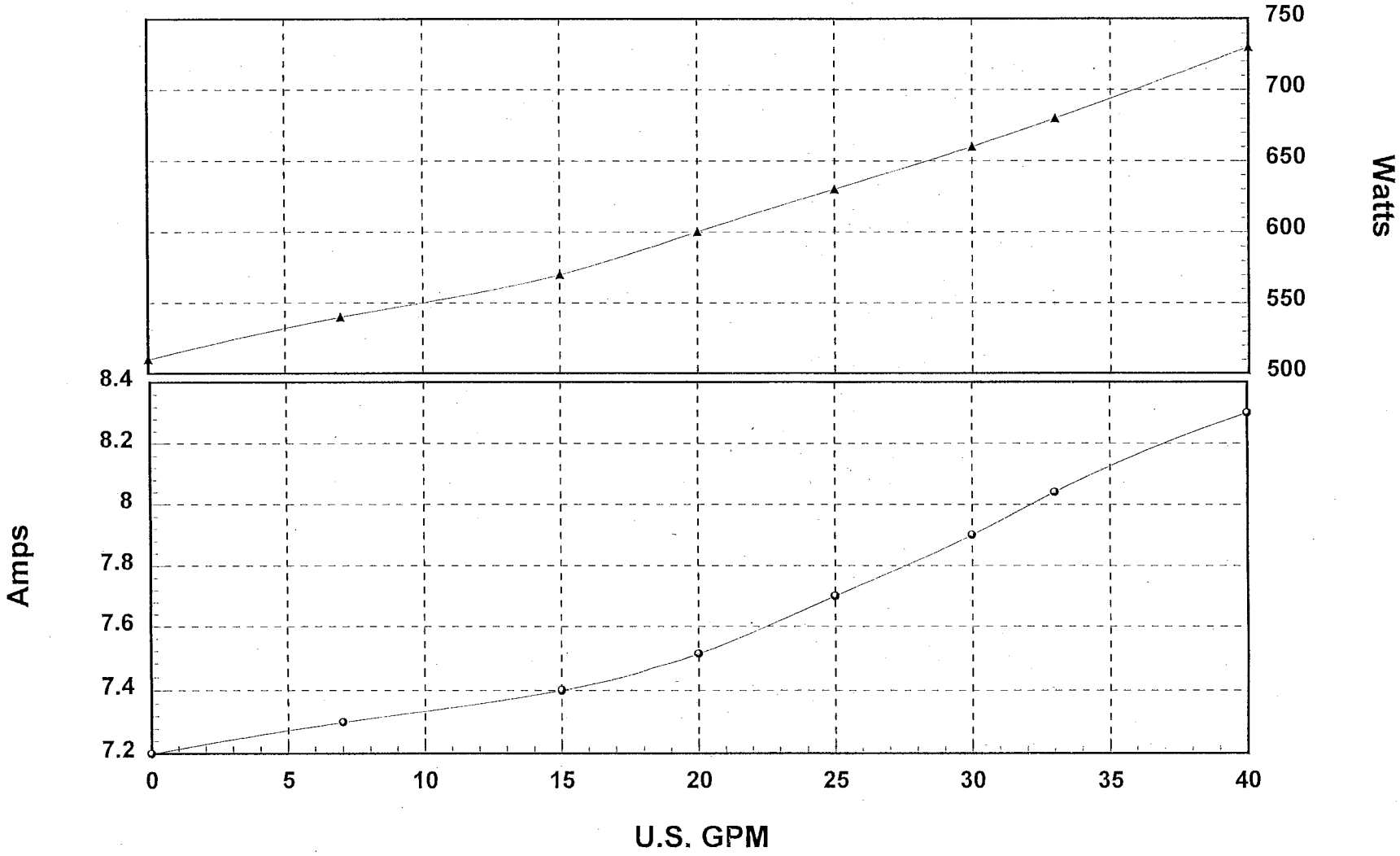
HYDROMATIC

AURORA/HYDROMATIC PUMPS, INC.

Ashland, Ohio

Pump SW25M-1 S/N 0

Condition of Service 7 GPM @ 23 Ft.



Certified Test SW25M-1/T1

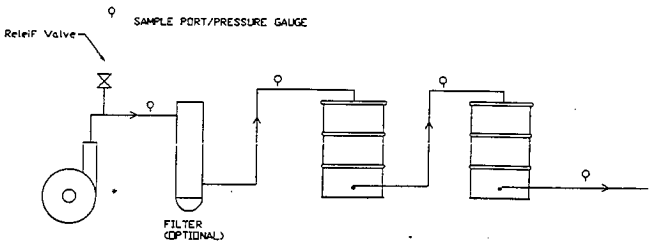
LIQUID FILTERS - STEEL DRUM SERIES
INSTALLATION & OPERATION INSTRUCTIONS

Drum Series Adsorbers are manufactures of carbon steel with vinyl ester lining (other systems available).

The specific drum series data sheet with drawing may be referred in these instructions.

SHIPMENT

Drum Series Adsorbers are shipped when possible upright with GAC pre-loaded. Certain special systems may be pre-plumbed and skid mounted and may require specific shipment methods. Contact your sales representative if you have any questions regarding shipment.



TYPICAL STEEL DRUM SERIES INSTALLATION

WETTING AND DEAERATION

Dry activated carbon must be wetted and deaerated prior to use. This procedure displaces air from the internal structure of the carbon granule, thus assuring that the liquid to be treated is in contact with the carbon surface.

Prior to operation, the adsorber must be filled with clean, uncontaminated liquid. The recommended method for filling the vessel is through the outlet line. Open the inlet line to purge air from the system. Feed water into the outlet line until water flows from the inlet line. The wet carbon should be allowed to set for a minimum of 24 hours, but preferably for 72 hours, to allow most of the carbon internal surface to be wetted. A guide is available to indicate how much of the internal surface becomes wetted over time.

After wetting, the carbon bed can be deaerated by draining the adsorber, and again filling the adsorber upflow with uncontaminated water. This procedure will eliminate any air pockets which may have formed between the carbon granules. The Adsorber is now ready for operation.

INSTALLATION

The Adsorber(s) should be set on a flat surface, capable of supporting the operating weight of the unit or system. Operating weights are listed on the specification sheet.

If the filter(s) is supplied individually the inlet and outlet piping should be connected to the unit using either flexible hose or hard piped. The outlet piping should be designed to allow flooded operation of the Adsorber at all times to assure effective operation. If the outlet line does not provide for back pressure on the Adsorber unit, then the discharge piping should include an elevated piping loop to assure flooded operation.

If the supply pump is capable of producing pressure greater than the design limitation of the filter it is recommended that a rupture disk or pressure relief valve be installed

Carbon filters can be manifolded in parallel operation for higher flowrates. Series operation is the preferred method of operation as it provides for the greatest degree of bed utilization.

If water conditions such as high suspended solids exist a filter should be installed prior to the Adsorber. A simple cartridge or screen filter helps prevent pressure buildup in the GAC bed. Many other water issues may effect Adsorber operation and we therefore recommend you discuss your specific installation with your sales representative.

OPERATION

With the Adsorber full of liquid, flow can be intro-

duced to the unit. Liquid enters through the inlet connection, flows downward through the carbon bed and exits through the outlet connection.

Flowrates to the Adsorber should be determined based upon the required contact time between the liquid and the carbon media. The required contact time normally is determined prior to installation and operation of the Adsorber.

BACKFLUSHING

Standard Steel Drum Series Filters do not provide adequate free space above the carbon bed to provide for typical bed expansion during backflushing. However, these units have been succesfully backflushed by following the directions outlined below with greater caution. Follow the backflushing directions below but begin at a much slower flow rate.

It is generally recommended that carbon beds be backflushed periodically. Backflushing helps to reduce and equalize pressure drop across the GAC bed as well as removes collected particulate from the top of the bed. Backflow rates generally are 4 to 20 GPM/FT^2 . Backflushing should begin at a low rate and proceed upwards.

Clean, uncontaminated liquid should introduced to the unit through the outlet connection. This liquid flows upwards through the unit and should exit through the inlet line - directed to a backflush water collection point or drain. The flow rate should not be high enough to cause a significant quantity of carbon granules to exit.

MONITORING

Adsorber units only require periodic monitoring if properly installed. The following items may be monitored:

1) Pressure: Check inlet and outlet pressure. Increase in pressure differential may indicate build-up of filtered solids. Never exceed maximum design pressure of filter.

2) Samples: Inlet and outlet sample points if provided for liquid analysis to determine system performance.

3) Air: Check for trapped air by opening upper vent valve (if installed option) and allowing small amount of liquid to flow out. If your system was provided with automatic vent systems it is still necessary to periodically verify their operation.

ADSORBER SERVICING

The Adsorber may be serviced on-site using vacuum removal methods. Prior to servicing the unit should be closed off from influent and effluent lines and any electrical devices or connections should be tagged off. If the unit is to be vacuum serviced it is recommended that the filter be drained of all water 24 hours prior to service.

After removal of the spent carbon is complete, it is recommended that the inside of the Adsorber be washed to remove all contamination and any trace of spent carbon. After system is washed, the Adsorber should also be checked thoroughly and any minor maintenance conducted.

The filter may also be shipped complete to our spent carbon receiving station upon carbon acceptance.

WINTERIZING

If adsorber will be shutdown for extended periods in climates where freezing may be a problem certain procedures should be taken to protect the adsorber. If possible backflush the unit. Drain all water from the adsorber utilizing the effluent connection and the drain port if available. When draining allow air to enter the system by venting the influent line. Store the drained filter with system vented. Caution should be taken during system startup following exposure to freezing conditions as the carbon may still be in a frozen state days or weeks after. Refer to the startup procedure earlier in this document.

SAFETY CONSIDERATIONS

Wet or dry activated carbon preferentially removes oxygen from air. In closed or partially closed containers, oxygen depletion may reach hazardous levels. If workers must enter a container containing carbon, appropriate sampling and work procedures should be followed for potentially low-oxygen spaces - including all applicable federal and state requirements.

Never exceed maximum operating pressure of the adsorber.

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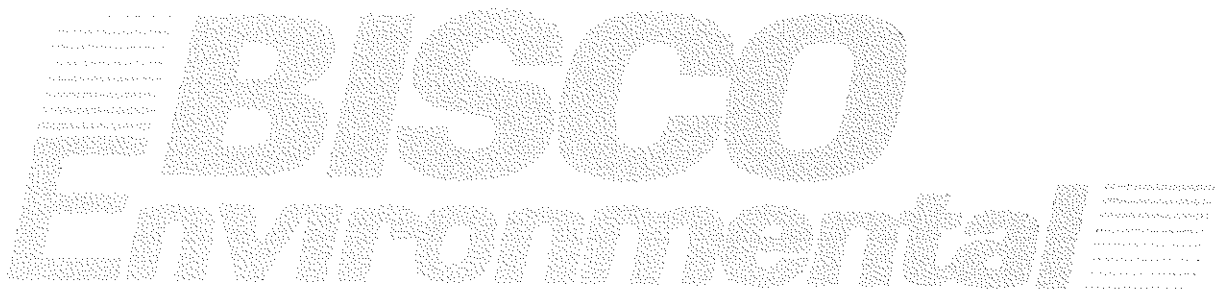
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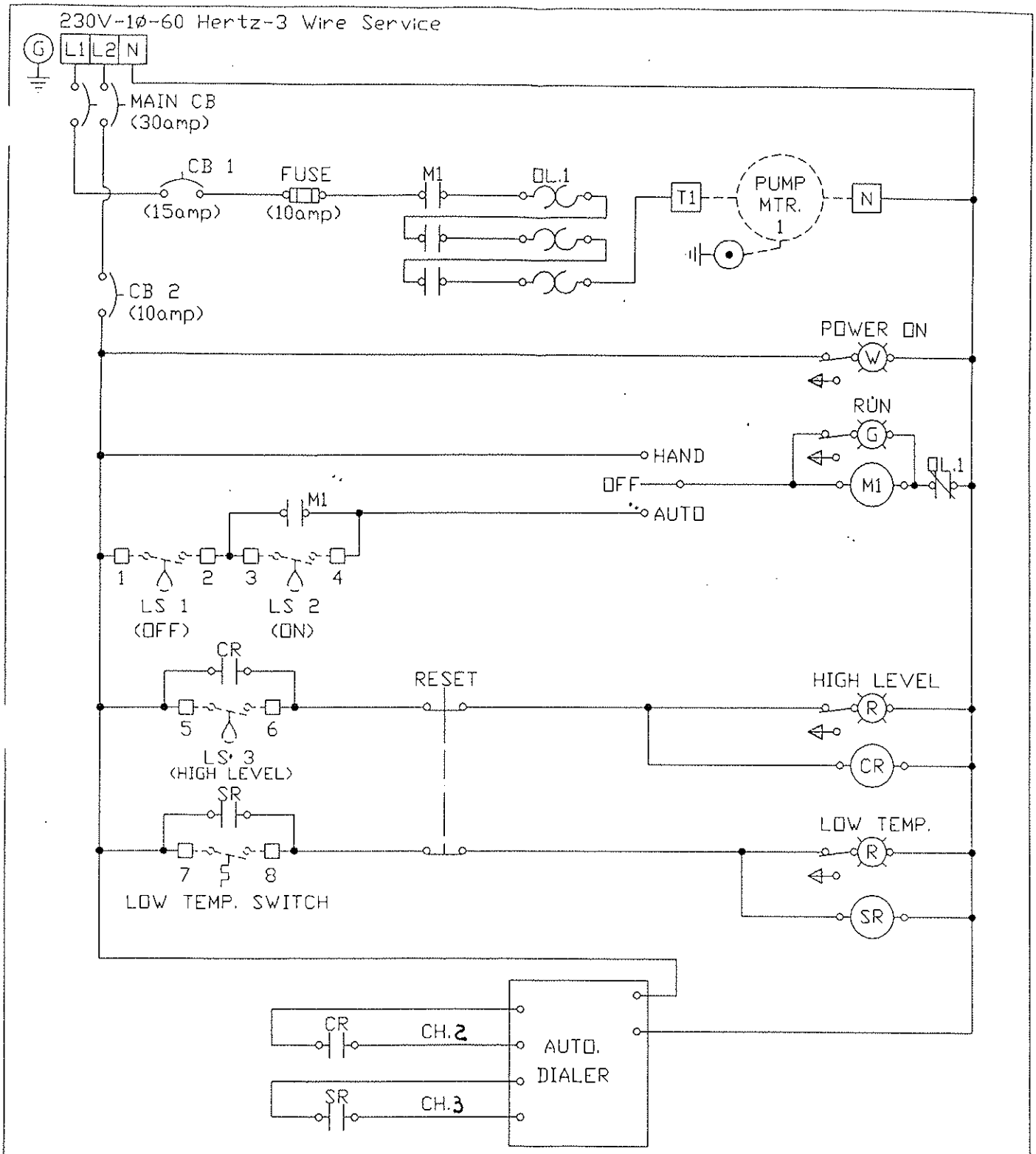
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2. Circuit Breaker
3. Pump Motor Starter
4. Control Relay
5. Pushbutton Operators
6. Pilot Light Operators

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BISCO
Environmental



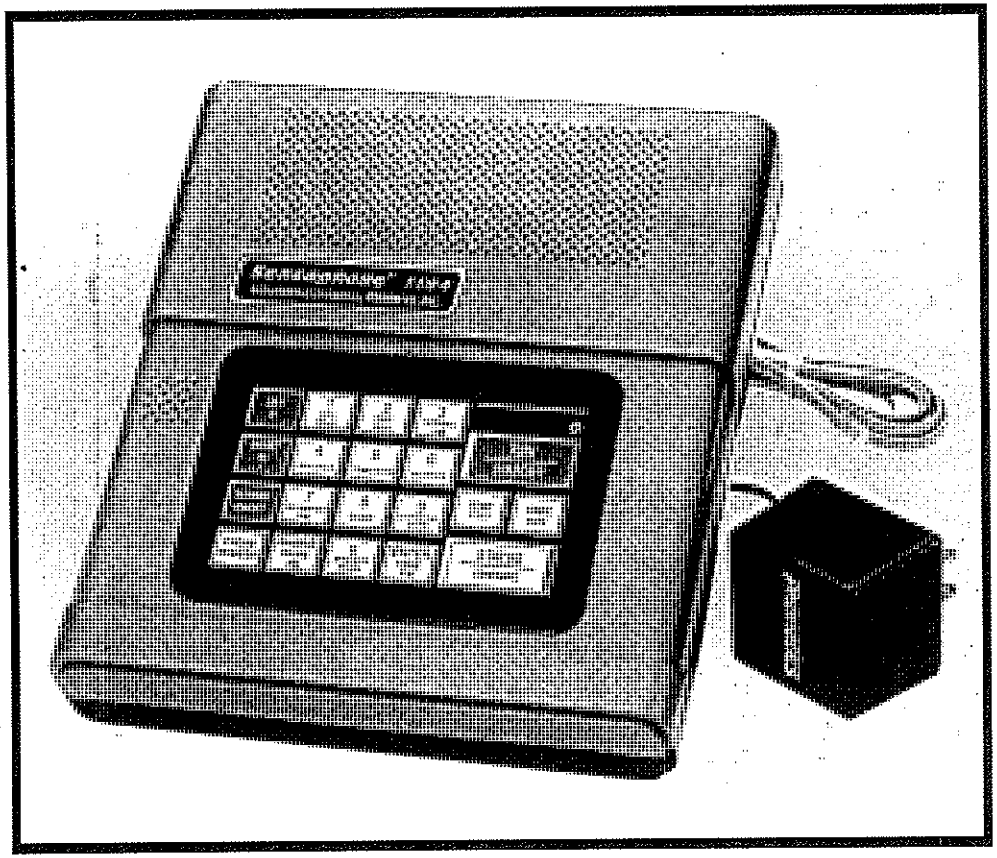
tes:
Level Switches Must Be Rated a Minimum of 2 Amps at 120 Volts
2) Torque all white field wiring terminals to 8 In.Lbs.
3) Field Wiring Must Be 60°C Copper Wire Minimum.
4) - - - - - - = Items Not Supplied In Control Panel.

DRWN.	DATE	BISCO Environmental 60 Stergis Way Dedham, MA 02026	
SDK	3/31/98		
CHKD.	DATE	SCALE	DRWG. NO.
		NONE	A-847509

Sensaphone®

Model 1104

User's Manual



Stay informed and in control of vital environmental conditions and processes with the fully-programmable Sensaphone® Model 1104.

Phonetics, Inc.

901 Tryens Road
Aston, PA 19014

Model 1104

User's Manual

Version 1.01

Phonetics, Inc.

Every effort has been made to ensure that the information in this document is complete, accurate and up-to-date. Phonetics, Inc. assumes no responsibility for the results of errors beyond its control. Phonetics, Inc. also cannot guarantee that changes in equipment made by other manufacturers, and referred to in this manual, will not affect the applicability of the information in this manual.

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Revised Edition, version 1.01, January 1998.

Written and produced by Phonetics, Inc. Please address all comments on this publication to:

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901 Tryens Road
Aston, PA 19014
www.sensaphone.com

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Touch-Tone™ is a registered trademark of AT&T.

IMPORTANT SAFETY INSTRUCTIONS

Your Model 1104 has been carefully designed to give you years of safe, reliable performance. As with all electrical equipment, however, there are a few basic precautions you should take to avoid hurting yourself or damaging the unit:

- Read the installation and operating instructions in this manual carefully. Be sure to save it for future reference.
- Read and follow all warning and instruction labels on the product itself.
- To protect the Model 1104 from overheating, make sure all openings on the unit are not blocked. Do not place on or near a heat source, such as a radiator or heat register.
- Do not use your Model 1104 near water, or spill liquid of any kind into it.
- Be certain that your power source matches the rating listed on the AC power transformer. If you're not sure of the type of power supply to your facility, consult your dealer or local power company.
- Do not allow anything to rest on the power cord. Do not locate this product where the cord will be abused by persons walking on it.
- Do not overload wall outlets and extension cords, as this can result in the risk of fire or electric shock.
- Never push objects of any kind into this product through ventilation holes as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electric shock.
- To reduce the risk of electric shock, do not disassemble this product, but return it to Phonetics Customer Service, or other approved repair facility, when any service or repair work is required. Opening or removing covers may expose you to dangerous voltages or other risks. Incorrect reassembly can cause electric shock when the unit is subsequently used.

- If anything happens that indicates that your Model 1104 is not working properly or has been damaged, unplug it immediately and follow the procedures in Appendix C for having it serviced. Return the unit for servicing under the following conditions:
  1. The power cord or plug is frayed or damaged.
  2. Liquid has been spilled into the product or it has been exposed to water.
  3. The unit has been dropped, or the cabinet is damaged.
  4. The unit doesn't function normally when you're following the operating instructions.
- Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.
- Do not use the telephone to report a gas leak in the vicinity of the leak.

CAUTION

To Reduce the Risk of Fire or Injury to Persons, Read and Follow these Instructions:

1. Use only the following type and size batteries: Alkaline, size D.
2. Do not dispose of the batteries in a fire. The cell may explode. Check with local codes for possible special disposal instructions.
3. Do not open or mutilate the batteries. Released electrolyte is corrosive and may cause damage to the eyes or skin. It may be toxic if swallowed.
4. Exercise care in handling batteries in order not to short the battery with conducting materials such as rings, bracelets, and keys. The battery or conductor may overheat and cause burns.
5. Do not mix old and new batteries in this product.

FCC Requirements

Part 68: The Sensaphone® Model 1104 complies with Part 68 of the FCC rules. On the back of the unit there is a label that contains, among other information, the FCC Registration Number and the Ringer Equivalence Number (REN) for this equipment. You must, upon request, provide this information to your local telephone company.

The REN is useful to determine the quantity of devices that you may connect to your telephone line and still have all of those devices ring when your telephone number is called. In most, but not all areas, the sum of the REN's of all devices connected to one line should not exceed five (5.0). To be certain of the number of devices that you may connect to your line, you may want to contact your local telephone company to determine the maximum REN for your calling area.

This equipment may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs.

Should the Model 1104 cause harm to the telephone network, the telephone company may discontinue your service temporarily. If possible, they will notify you in advance. But if advance notice isn't practical, the telephone company may temporarily discontinue service without notice and you will be notified as soon as possible. You will be informed of your right to file a complaint with the FCC. The telephone company may make changes in its facilities, equipment, operations, or procedures where such action is reasonably required in the operation of its business and is not inconsistent with the rules and regulations of the FCC that could affect the proper functioning of your equipment. If they do, you will be notified in advance to give you an opportunity to maintain uninterrupted telephone service.

If you experience trouble with this equipment, or you need information on obtaining service or repairs, please contact:

PHONETICS, INC.
901 Tryens Road, Aston, PA 19014
(610) 558-2700 Fax: (610) 558-0222

The telephone company may ask that you disconnect this equipment from the network until the problem has been corrected or until you are sure that the equipment is not malfunctioning.

Part 15: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/television

Canadian Department of Communications Statement

Notice: The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, where the company's inside wiring is associated with a single line, individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

CAUTION: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

The Load Number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device to prevent overloading. The termination on loop may consist of any combination of devices subject only to the requirement that the total of the Load Numbers of all the devices does not exceed 100. For the Sensaphone® Model 1104, the Load Number is 8.

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Chapter 1: Introduction

The Sensaphone® Model 1104 is a fully-programmable, environmental monitoring system that offers extensive on-site and remote monitoring capability to small businesses, private homes, farms, greenhouses, computer rooms, and remote facilities. Designed for desktop or wall mounting, the Model 1104 is simple to install, program and operate; no changes to standard electrical or telephone service are required. Connected to a telephone line, it will respond to an alarm by dialing up to four separate telephone numbers. When the call is answered, an *"Alert Condition"* message is delivered in digitized speech.

The Model 1104 features built-in sensors to monitor a variety of conditions:

- High sound level
- AC electric power failure
- Battery backup
- Temperature*

*Note: While technically not a "built-in" sensor, temperature is factory installed on input 1, and if left installed will limit your additional inputs as listed below to 3.

1104 is equipped with 4 alert inputs. Additional sensors* can be added to extend monitoring capabilities to include:

- Intrusion or unauthorized entry
- Water leaks and seepage
- Temperature
- Humidity
- Equipment operation
- Many other conditions that may require unique monitoring solutions

* Refer to Appendix B for information on additional sensors (available separately from Phonetics) best suited to your application.

The status of each monitored condition is readily obtained at the unit's installation site, or remotely by telephone. At the close of every Status Report, time is provided for listening to on-site sounds.

To ensure reliable operation, the Model 1104 features power backup capability; in the event of AC power failure, six D-cell batteries (not included) will continue to power the unit for approximately 24 hours.

This manual comprises the instructions and commands for installing and operating the Model 1104. The Quick Start chapter is included to speed understanding of programming and operation. Communication and Alarm Programming chapters demonstrate step-by-step methods for utilizing the full range of available features. The Troubleshooting chapter provides assistance in the event that problems are encountered.

Technical Support

If any questions arise upon installation or operation of the Model 1104, please contact Phonetics Customer Service Department, at the number shown below, and have the following information:

- Date of Purchase _____
- Serial number of your Model 1104 _____

Technical Support is available from 8:00 AM to 5:00 PM EST.

Phonetics, Inc.

901 Tryens Road

Aston, PA 19014

(610)558-2700

Fax: (610)558-0222

www.sensaphone.com

Chapter 2: Installation

Correctly installing the Model 1104 will ensure proper functioning of the unit. Please read the entire chapter before starting the installation process.

Within the packaging will be a Warranty Registration Card. Please take the time to fill this out and mail. The One Year Limited Warranty is explained in the back of this manual.

2.1 Operating Environment

The Model 1104 should be installed and operated in an area that provides space for wiring sensors to the screw terminals, near an AC power source and telephone line. Operating temperature ranges from 32° Fahrenheit (0° Celsius) to +120° Fahrenheit (+49° Celsius).

NOTE

The Model 1104 is a sensitive electronic device. Do not install the Model 1104 near strong electrostatic, electromagnetic or radioactive fields. Do not expose to fumes or corrosive vapors.

2.2 Mounting

Flat Mount: Place the Model 1104 on top of a desk or other horizontal surface. Wall Mount: Mount on a wall with two screws using the keyholes on the back panel of the unit. Place the screws or bolts $3^{13}/_{16}$" apart at the desired height from the floor. Hook the unit over the screws and toward the floor. Refer to Figure 2-1.

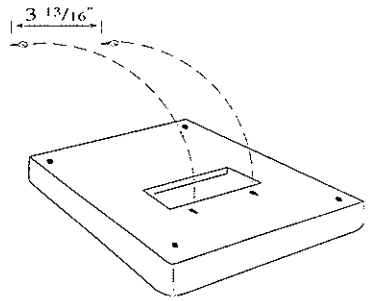


Figure 2-1. Wall Mount

2.3 Power Surge Protection

The Model 1104 can be damaged by power surges and lightning through the telephone line and the 120 VAC power supply. Although the Model 1104 has built-in surge protection, **we recommend that additional protection be obtained for the unit and for any electronic equipment that is attached to your power supply and telephone lines. Power surge protection is especially important if you live in a lightning-prone area.** The ISOTEL Surge Protector Model IB-4 is available through Phonetics. See Appendix B.

2.4 Power Supply and Battery Backup

The Model 1104 is provided with an AC power transformer that will plug into any standard 120 VAC outlet and a battery backup (batteries not included) that enables the unit to continue functioning if AC power is removed (due to electric power disruption or failure). The Model 1104 uses six, D-cell alkaline batteries. Do not use rechargeable nicad batteries.

NOTE

Be sure that the AC transformer is plugged into an outlet before installing batteries.

To install the batteries, open the battery compartment hatch located underneath the unit, align batteries according to the diagram shown in Figure 2-2, and replace the hatch.

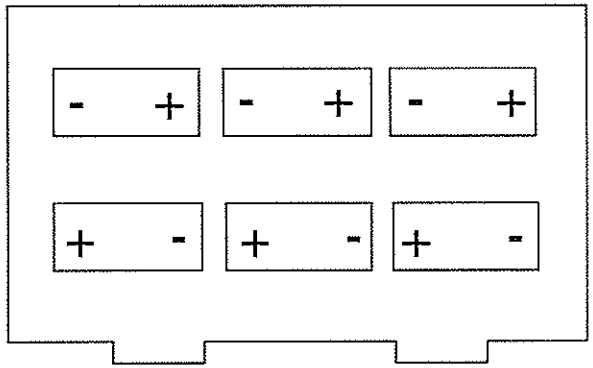


Figure 2-2. Battery Installation

2.5 Starting the Model 1104

When the AC power transformer is first plugged into the electrical outlet, the Model 1104 automatically starts in RUN mode. The red LED light will begin to glow. The unit will respond with, *"Hello, this is Sensaphone® 1104."*

2.6 Run Mode and Standby Mode

Pressing the RUN/STANDBY key on the Model 1104 keypad will alternately activate or deactivate the unit. If the unit is activated and in RUN mode, the red LED (small red light on the upper right of the unit's front panel) glows steadily. In STANDBY mode, the red LED goes out, but will blink every few seconds to indicate that power is still supplied to the unit.

In RUN mode, the Model 1104 is able to receive incoming calls and to automatically dial out in the event of an alarm on one of the monitored conditions. To enter STANDBY mode, press RUN/STANDBY.

As soon as the Model 1104 enters STANDBY mode, it responds with *"Have a good day."* The red light immediately goes out and then resumes with a blink every few seconds. While in STANDBY mode, all functions are disabled, but programmed memory is preserved. Upon exiting STANDBY mode, any currently existing alert conditions will be announced.

NOTE

STANDBY mode is not equivalent to "power off"—an electrical source, such as the 120 VAC, or the battery backup, continues to provide full power to the unit. If the unit is placed in STANDBY mode, unplugged from the 120 VAC outlet, and placed in storage, the batteries will continue to power the Model 1104, discharging until they fail. Consequently, batteries should always be removed from the unit following disconnection from any 120 VAC outlet, prior to storage.

Press the RUN/STANDBY key again to return to RUN mode.



Figure 2-3. The RUN/STANDBY Key

2.7 Telephone Line

The Model 1104 will operate with all standard telephone systems that accept pulse or tone dialing. The Model 1104 cannot be used on an extension line to dial its own telephone number. Also, it may not be installed on a party line or pay telephone line.

Certain private telephone systems and public switching equipment may not accept the Model 1104 dialing or may generate an unacceptable ring signal. In those cases, a dedicated line may be required. Consult the supplier of your telephone system if you encounter problems.

If you do not have a modular telephone extension at the Model 1104's location, you must contact your local telephone company to have one installed (there is a charge for this service). If you have four-pin jacks, adapters are available to convert them to the modular plugs. Contact your local telephone company or electronics parts store.

CAUTION

Never install telephone wiring during a lightning storm. Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations. Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface. Use caution when installing or modifying telephone lines.

To install the telephone line, plug the modular telephone jack provided into any standard RJ11 phone outlet. Refer to Figure 2-4.

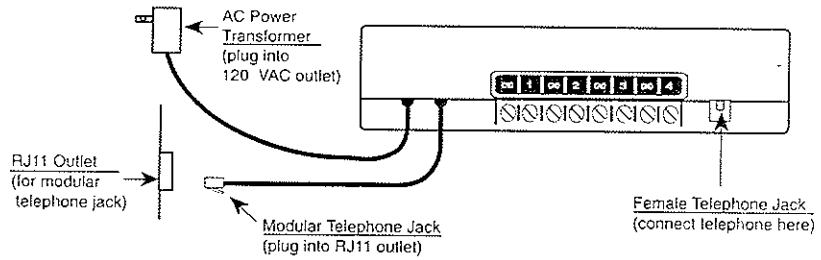


Figure 2-4. Installing the Telephone Line

On the back of the Model 1104 is a female telephone jack. This is provided so that a telephone or other answering device may be used on the same line as the unit. It is not necessary to hook up a telephone for the Model 1104 to operate.

2.8 The Microphone

The Model 1104 is provided with a built-in microphone which is used to monitor high sound levels produced near the installation site. The sensitivity of the microphone is configurable and will detect a continuous as well as a beeping alarm.

Other programming options that apply to the microphone include setting the length of time before a high sound causes an alarm.

If this sound level exists for 8 consecutive seconds (default) or for the programmed length of time, the Model 1104 will dial out with an alarm message.

NOTE

The proximity of the audible alarm to the microphone is extremely important. Normally, the Model 1104 and the audible alarm must be in the same room. The maximum distance can vary considerably depending on the alarm, the acoustics, and the size of the room.

During an alarm dial-out, the microphone allows four-second intervals to listen-in to sounds at the Model 1104's location.

When calling for a Status Report, the microphone permits listening to on-site sounds for a programmed time interval.

2.9 Alert Inputs

The Model 1104 can monitor up to 4 inputs (represented by the numbered terminal screws shown in Figure 2-5, below).

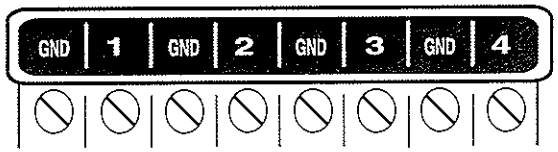


Figure 2-5. Alert Inputs

Inputs are configured as either dry contact or temperature. An input configured as dry contact can be used with any normally open (N.O.) or normally closed (N.C.) device. "Open" refers to an opened circuit path; if conditions cause the circuit to close, an alert condition occurs. "Closed" refers to a continuous circuit path; if a closed circuit is opened, an alert condition occurs. The Model 1104 determines the way inputs are configured by the type of sensor connected to each alert input (refer to Chapter 5, Section 5.1).

An input configured as "temperature" is designed to evaluate a range of settings. The Model 1104 will read the temperature at the sensor's location and compare that value to programmed high and low temperature limits. Temperature inputs *must* be used with Phonetics Remote Temperature Sensor.

NOTE

Before wiring, it is advisable to disable the inputs to prevent accidentally tripping an alarm. See Chapter 5, Section 5.2.

2.10 Installing the Sensor

After you have selected the sensor, loosen the screw of the alert input and its corresponding ground. Two wire leads are used to connect any monitoring sensor. Fasten one lead to the numbered screw and the other lead to GND. Tighten both screws. If the input was not disabled, the Model 1104 may recite its *"Alert Condition Exists"* message as you connect the sensor. If it does, just press any key to stop it. Re-enable the input after wiring. Refer to Figures 2-6 and 2-7 for connecting a sensor to an alert input.

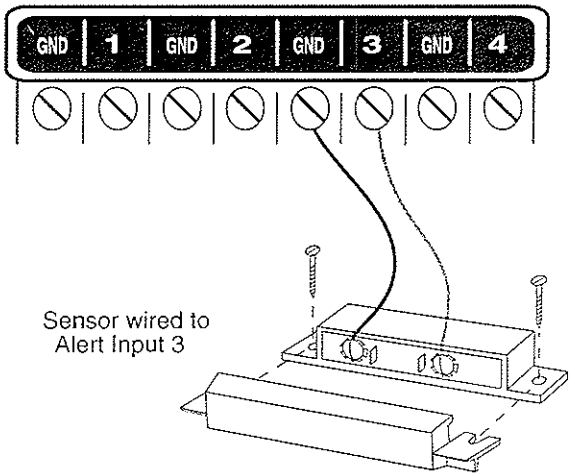


Figure 2-6. Sensor Connected to an Alert Input

Any sensor can be attached to the Model 1104 using 22-gauge wire. The sensor can be several hundred feet from the unit, as long as the total resistance of the circuit is not greater than 50 ohms. Use wire appropriate for the application.

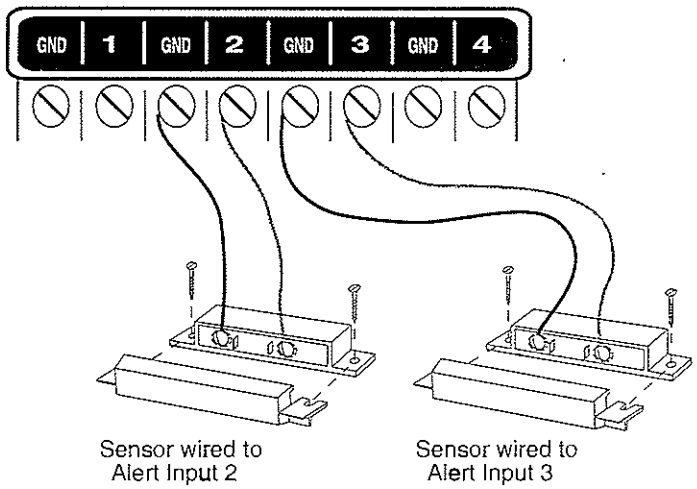


Figure 2-7. Two Sensors Wired to Adjacent Inputs

NOTE

Do not use sensors, switches, or relays that supply any voltage or current to the Model 1104. Be aware of proximity to other electrical wires or components when placing wires that lead from the sensors to the unit. Avoid running the wires near electrical devices that use high voltage or current, such as motors, heavy machinery, etc. This voltage may be inductively coupled into the sensor wiring and could result in damage to the the Model 1104's circuitry. Try to place wires at least 6 inches from other electrical wiring or devices.

2.11 Multiple Sensors

The Model 1104 may have more than one sensor connected to the same alert input, as long as the normal condition for each sensor on the same alert input is identical (either all N.O. or all N.C.). However, only one remote temperature sensor can be used on each input.

When wiring several normally closed sensors on one input, they must be connected in series. Connect one lead from the first sensor to the numbered screw of the alert input. Next, take the other lead from the first sensor and connect it to one lead from the next sensor. Continue connecting sensors end-to-end until you have connected all of your sensors. Take the second lead from the last sensor and connect it to the ground screw on the Model 1104. See Figure 2-8. Multiple N.C. sensors are typically magnetic reed switches to monitor the security of windows and doors.

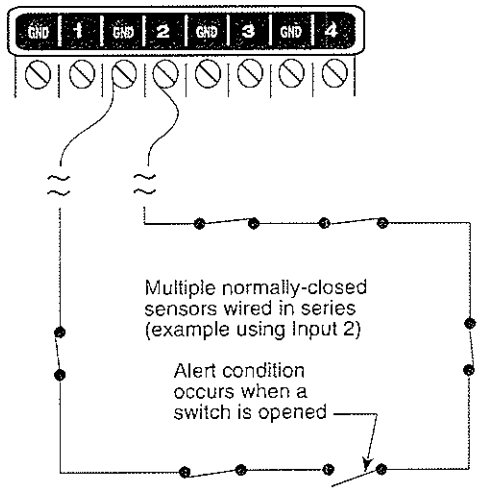


Figure 2-8. Multiple Normally Closed Sensors

To wire several normally open sensors to one alert input, connect them in parallel. To do this, take one lead from each sensor and attach it to the numbered terminal. Then, take the second lead from each sensor and attach each to the corresponding ground screw. Refer to Figure 2-9.

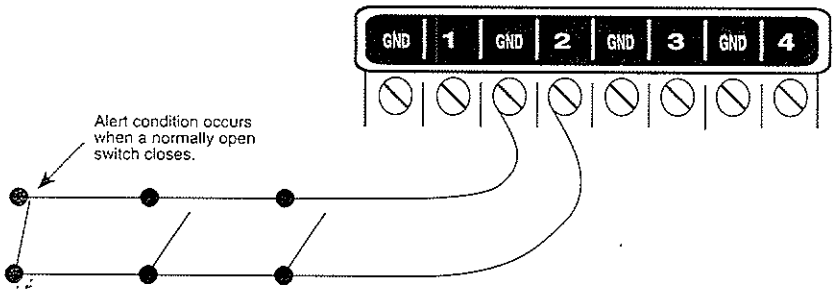


Figure 2-9. Multiple Normally Open Sensors

2.12 Outdoor Wiring

When wiring sensors outdoors, **DO NOT** allow exposed wires to run freely in open air; under such conditions, the Model 1104 is susceptible to serious damage during a lightning storm. Depending upon the distance outdoor wiring must travel, consideration should be given to use of shielded wire inside a metal conduit. Both shield and conduit should be connected to earth ground. This prevents stray voltage from entering the unit.

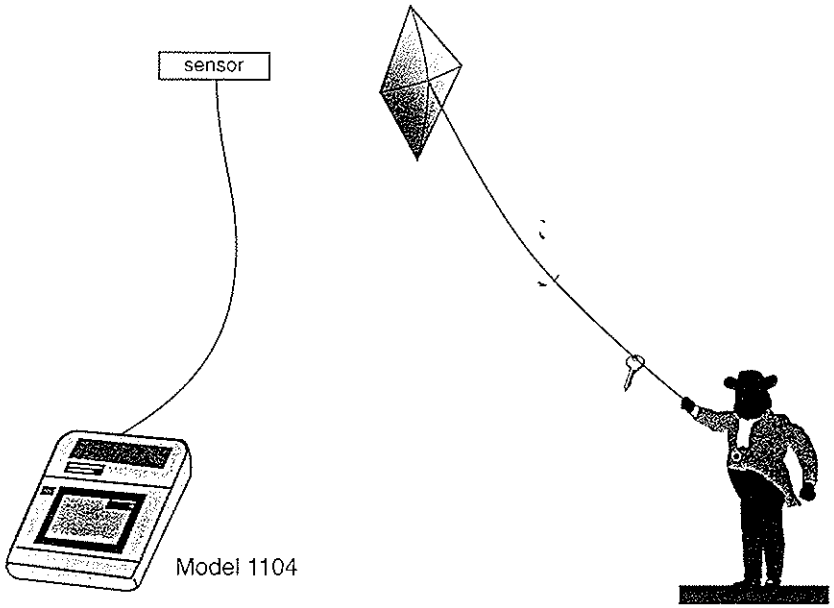


Figure 2-10. Potential Sensor Damage from Stray Electrical Noise

2.13 Disconnecting the Model 1104 for Storage or Seasonal Use.

If you plan to employ the Model 1104 as a seasonal "watchdog" for a few months during the year, **you must disconnect all wires from the unit completely to avoid damage to the circuitry when the unit is not in use.** If the unit is unplugged but left in place with all the sensors still connected, the wires act as antennae that draw in any stray "electrical noise" from such devices as fans, blowers, microwaves, etc.

Additionally, it is important to remove the batteries, or they will discharge until they fail.

Preserve your Model 1104 during the off-season, or when not in use:

- Remove the sensor wires at the screw terminals
- Remove the batteries
- Unplug the unit and store in a safe place

NOTES

Chapter 3: Quick Start

This section presents a useful guide for first-time programming of the Model 1104. Follow instructions for installation before attempting to program the Model 1104. Refer to Chapter 2: Installation.

3.1 The Local Keypad

Programming is accomplished using the local keypad (shown below, Figure 3-1). Notice that a single key has several functions assigned to it; ***programming results are determined by the order in which keys are pressed.***

Individual keystrokes are illustrated to show programming steps in the correct order. If you make a mistake by entering the wrong key, do not press another key until you hear the message, *"Error 1."* Then, start over with the first key in the programming sequence.

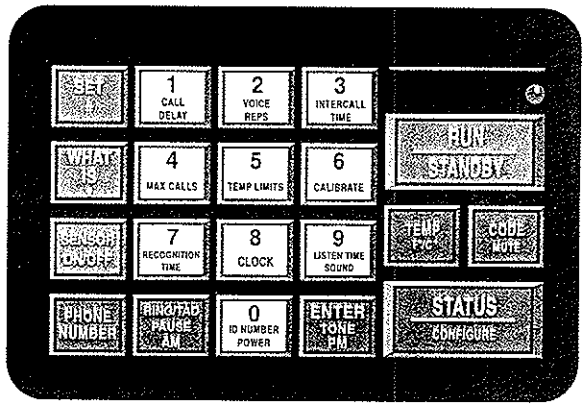


Figure 3-1. The Model 1104 Keypad

3.2 Preparation for Programming

Read complete instructions in Chapter 2: Installation, and make sure to follow these steps first:

1. Plug the AC adaptor into the 120 VAC outlet.
2. Install the batteries.
3. Connect the Model 1104 to a telephone line.

When these steps are completed, the Model 1104 is fully operational and able to monitor temperature, high sound, AC power failure and battery backup condition; it can also be called on the telephone for a Status Report or used for listening to on-site sounds from any remote location. Now, the unit is ready for programming.

3.3 Quick-Start Programming Steps

Step 1: Set Configuration of Inputs

The Model 1104 will scan the 4 external inputs and determine if they are N.O. (normally open), N.C. (normally closed), or Temperature. If external sensors are added, make sure they are in their ***normal*** positions before proceeding—refer to Chapter 5, Section 5.1.

1. Press STANDBY to place the Model 1104 in Standby mode.



2. If you have external sensors available, wire the sensors to the inputs on the back of the Model 1104 (see Chapter 2, Section 2.10). Otherwise, skip this step and move to step 3.
3. Press RUN. The red light glows when the Model 1104 returns to Run mode.



4. Press SET.



5. Press CONFIGURE.



6. The Model 1104 will audibly recite the new configuration for each of the four inputs, responding with *"OK,"* if it detects N.O. (normally open), *"beep-OK,"* if it detects N.C (normally closed) or *"Temperature,"* if it detects temperature (regardless of whether all the inputs have attached sensors or not). If an input is unused, it is treated as normally open.

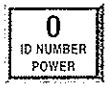
Step 2: Set the ID Number

It is recommended that you set the ID number to reflect the telephone number on which the Model 1104 is installed.

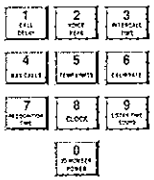
1. Press SET.



2. Press ID NUMBER.



3. Using the number keys, enter the digits (up to 16 are permitted) for the ID number. The Model 1104 will recite the digits as they are pressed.



4. Press ENTER. The 1104 will respond: *"Enter."*



Step 3: Set Dial-Out Telephone Numbers

To program dial-out telephone numbers:

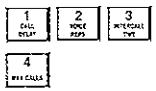
1. Press SET.



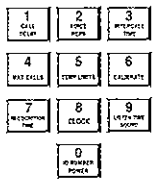
2. Press PHONE NUMBER.



3. Select which telephone number to program. Press any unassigned number key (from 1 to 4) to represent the new telephone number entry. Model 1104 will respond: *"Enter number."*



4. Enter the complete telephone number using the number keys. The Model 1104 will recite the digits as they are pressed.



5. Press ENTER. The unit will respond: *"Enter."*



6. Repeat above procedure to program up to four separate telephone numbers.

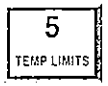
Step 4: Set Temperature Limits

High and low temperature limits can be separately programmed for each input that is configured as temperature. Limits can range from –20° to +150° Fahrenheit, or from –30° to 65° Celsius. Default settings are: 10° F for low temperature and 100° F for high temperature. Do not set temperature limits too close to normal room temperature, since minor fluctuations could result in frequent and unnecessary alarm dialouts.

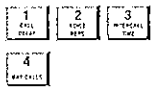
1. Press SET.



2. Press TEMP LIMITS.

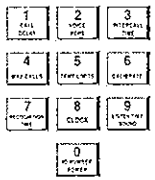


3. From the number keys, press a number (from 1 to 4) that corresponds to the temperature input being programmed.



The Model 1104 responds: *"Enter low temperature limit."*

4. Using the number keys, enter a value for low temperature limit. The Model 1104 will recite the digits as they are pressed. If a negative number is required, first press PAUSE, then enter the number.

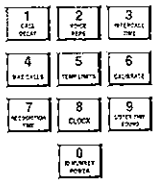


5. Press ENTER.



The Model 1104 responds: *"Enter high temperature limit."*

6. Using the number keys, enter the value for high temperature limit. The Model 1104 will recite the digits as they are pressed.



7. Press ENTER. The Model 1104 responds: *"Enter."*



This concludes minimum programming to achieve normal operation of the Model 1104. In additon to the programming just accomplished, default settings for many more features take effect when the unit is first powered. You will be able to reprogram most of these factory-set defaults to suit your application.

For a complete explanation of each feature (with illustrations of keystrokes), refer to Chapter 4: Communications Programming and Chapter 5: Alarm Programming.

To gain a basic understanding of how the alarm dial-out feature works, refer to this chapter, Section 3-4. For extended information regarding dial-out and related programmable parameters, refer to Chapter 7: Operation.

3.4 Summary of the Alarm Dial-Out Process

Action—Response	Programmable Feature
1. THE MODEL 1104 DETECTS AN ALERT CONDITION An alert condition is not the same as a valid alarm—the condition must continue for the programmed time period, or ***Recognition Time***, before it is recognized as a valid alarm.	• **Recognition Time** This is the programmed waiting period to determine if an alert condition has persisted long enough to be considered a valid alarm. If the sensor returns to normal within recognition time, then no alarm will occur.
2. A VALID ALARM IS CONFIRMED An audible, on-site alarm message begins and continues until the alarm is acknowledged. (If the Mute feature is turned on, there is no on-site message.) ***Call Delay*** is activated.	• **Call Delay** This is the programmed waiting period, before the first telephone number is called, to report an alarm.
3. DIAL-OUT BEGINS Dial-out begins by calling telephone number 1 to report an alarm. If there is no acknowledgment, the Model 1104 waits the programmed ***Intercall Time*** before dialing subsequent telephone numbers. Dial-out continues in this manner, cycling through the remaining telephone numbers, for the programmed ***Max Calls.***	• **Intercall Time** This is the programmed waiting period, in between sequential dialing of telephone numbers, to report an alarm. • **Max Calls** This is the total number of telephone calls that will be dialed in response to any valid alarm. Telephone numbers are dialed sequentially, and continue to cycle until the maximum number of calls is reached. If no acknowledgment occurs, then at the completion of Max Calls, all alarms are automatically acknowledged.
4. THE ALARM IS ACKNOWLEDGED When the alarm is acknowledged, the dial-out process is cancelled and the audible, on-site alarm message stops.	

NOTES

Chapter 4: Communications Programming

This chapter explains the keypad commands for communications programming of the Model 1104, including interrogation and resetting of the following:

- The Unit ID Number
- Dial-out Telephone Numbers
- Tone or Pulse Dialing
- Special Dialing with Pagers, Beepers and Access Numbers.
- Rings Until Answer and Telephone Answering Device Compatibility
- Listen-in Time
- Call Delay
- Local Voice Mute
- Voice Repetitions
- Intercall Time
- Maximum Number of Calls
- The Clock
- Security Code

4.1 The Unit ID Number

The Unit ID Number is the identification number of the Model 1104. This number may be the same as the telephone number where the unit is installed, or it may be designated using any number that best suits your application.

The purpose of the Unit ID Number is to immediately provide the source of any alarm, especially when using multiple Model 1104 units in a complex monitoring system. When the Model 1104 is called from a remote location, it always begins its message with the identification number: *"Hello, this is telephone number (Unit ID Number)."*

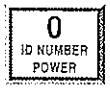
4.1.1 Programming the ID Number

To program the ID Number:

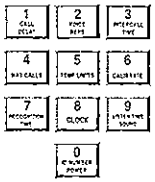
1. Press SET.



2. Press ID NUMBER.



3. Using the number keys, enter up to 16 digits for the ID number. The Model 1104 will recite the digits as they are pressed.



4. Press ENTER. The Model 1104 will respond: *"Enter."*



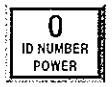
4.1.2 Interrogating the ID Number

To interrogate the ID numbers:

1. Press WHAT IS.



2. Press ID NUMBER. The Model 1104 will recite the Unit ID Number programmed.



4.2 Dial-out Telephone Numbers

The Model 1104 can store up to four 32-digit phone numbers. These are the numbers that will be called during dial-out. In the event of an alarm, the numbers are dialed sequentially, 1 through 4. Begin programming the first telephone number by assigning it to the key labeled with the number 1 on the keypad, and continue to assign any other telephone numbers in numerical order. ***A pause, pound or asterisk can be added*** to an individual phone number to access different phone and beeper systems. See Special Dialing, Section 4.4.

4.2.1 Programming Dial-out Telephone Numbers

To program dial-out telephone numbers:

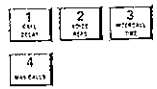
1. Press SET.



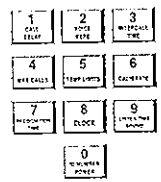
2. Press PHONE NUMBER.



3. Select which telephone number to program. Press any unassigned number key (from 1 to 4) to represent the new telephone number entry. The Model 1104 will respond: *"Enter number."*



4. Enter the complete telephone number using the number keys.



5. Press ENTER. The unit will respond with *"Enter."*



6. Repeat above procedure to program up to four separate telephone numbers.

4.2.2 Interrogating a Dial-out Telephone Number

To interrogate dial-out telephone numbers:

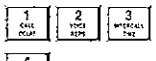
1. Press WHAT IS.



2. Press PHONE NUMBER.



3. Press a number key (from 1 to 4).



Model 1104 will recite the corresponding telephone number. If there is no number programmed for a particular key, the unit will respond: *"No number."*

4.2.3 Erasing a Telephone Number

To erase a telephone number:

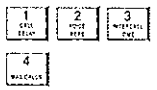
1. Press SET.



2. Press PHONE NUMBER.



3. Press the number key (from 1 to 4) representing the telephone number you want to erase.



4. Press ENTER. The Model 1104 will say *"Enter."*



4.3 Tone or Pulse Dialing

The Model 1104 can dial out in pulse or Touch Tone™. Select the type of dialing, in either pulse or tone, depending upon the type of service provided by your telephone company. The default is tone.

To program for either pulse or tone:

1. Press the SENSOR ON/OFF key.



2. Press TONE.



The Model 1104 will respond: *"Off"* to indicate that tone dialing is off and pulse is enabled, or *"On"* to indicate that tone dialing is on and pulse is disabled.

3. Repeat key sequence to switch between settings.

4.4 Special Dialing

The Model 1104 has provisions for special dialing sequences. Special dialing sequences allow:

- Dialing that requires an access number to connect with an outside line.

- Dialing that requires the pound (#) or asterisk (*).
- Dialing to a beeper or pager.

4.4.1 Special Dialing Keys

The following designated keys represent special functions when used with PHONE NUMBER entries:

1. *Pause*



PAUSE represents a four second pause in dialing. It can be used when an access number is required before dialing to an outside line. (For example, in some cases a "9" or other number, must be dialed first, in order to get a dial tone for an outside line.) When interrogating telephone numbers, PAUSE is audibly represented by a *"beep."*

2. *Pound (#)*



A pound may be required when calling some phone or beeper systems. When interrogating telephone numbers, pound (#) is audibly represented by the word "twelve."

3. *Asterisk (*)*



An asterisk may be required when calling some phone or beeper systems. When interrogating telephone numbers, asterisk (*) is audibly represented by the word "eleven."

4. *Code*



CODE instructs the Model 1104 to wait until the call is answered before continuing. When interrogating telephone numbers, CODE is audibly represented by the word "fourteen."

NOTE

Each time a pause, pound (#) or asterisk (*) is incorporated in a programming sequence, it is counted as one digit toward the total of 32 digits allowed.

4.4.2 Incorporating a Pause

Incorporate PAUSE to access an outside telephone line:

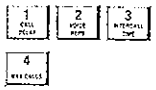
1. Press SET.



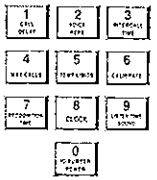
2. Press PHONE NUMBER.



3. Press any unassigned number key (from 1 to 4) to represent the new telephone number entry. Model 1104 will respond: *"Enter number."*



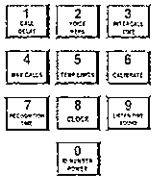
4. From the number keys, enter the access digit (i.e., 9). The Model 1104 will recite the digit.



5. Press PAUSE. The Model 1104 will *"beep."*



6. Enter the complete telephone number (1 + area code) using the number keys. The Model 1104 will recite the digits as they are pressed.



7. Press ENTER. The Model 1104 will say *"Enter."*



4.4.3 Incorporating a Pound (#) or Asterisk (*)

Incorporate a pound or asterisk if it is normally included in telephone number:

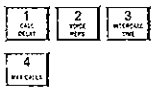
1. Press SET.



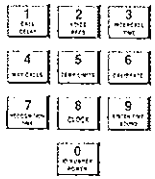
2. Press PHONE NUMBER.



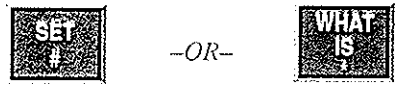
3. Press any unassigned number key (from 1 to 4) to represent the new telephone number entry. Model 1104 will respond: *"Enter number."*



4. Enter the telephone number using the number keys. The Model 1104 will recite the digits as they are pressed.



5. Position the pound (#) or asterisk (*) within the telephone number where required by pressing SET (where the pound is located) or WHAT IS (where the asterisk is located). The Model 1104 will *beep* each time pound or asterisk is pressed.



6. Enter any remaining digits of the telephone number.
7. Press ENTER. The Model 1104 will say *"Enter."*



4.4.4 Special Dialing to a Beeper or Pager

The following example demonstrates just one solution to programming the Model 1104 for dialing to a beeper or pager. Many other key sequences will also work. Start with steps 1–3 below; next, enter special dialing keys where required for your beeper or pager service.

To incorporate a pound or asterisk:

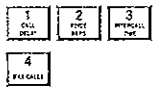
1. Press SET.



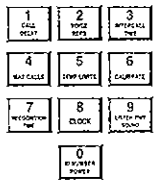
2. Press PHONE NUMBER.



3. Press any unassigned number key (from 1 to 4) to represent the new telephone number entry.



4. Enter the complete telephone number using the number keys. The Model 1104 will recite the digits as they are pressed.



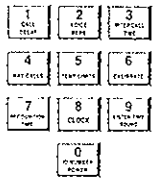
5. Press CODE. This instructs the Model 1104 to wait for the telephone call to be answered by the beeper or pager service. (A voice message will not occur—only digital tones are used.) Note that CODE may not work with beepers where there is no ring before the beeper connects. If that proves to be the case for your particular beeper, skip the CODE step and proceed from Step 4 to Step 6.



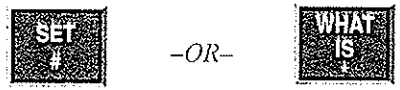
6. Now press PAUSE once to activate a four second delay. This assumes the call is answered by a beeper/pager service that immediately delivers a prerecorded voice message. PAUSE may be pressed more than once to program more time for the beeper/pager service to finish its message. Each press of PAUSE allocates four additional seconds. The Model 1104 will *"beep"* with each press.



7. Enter a telephone number or custom code number that will identify the Model 1104 as the caller to your beeper or pager. A code may consist of any number(s) you designate. Many users find it convenient to use the telephone number to which the Model 1104 is connected.



8. A pound or asterisk may be required in some dialing situations. If required, position the pound (#) or asterisk (*) within the telephone number where required by pressing SET (where the pound is located) or WHAT IS (where the asterisk is located). The Model 1104 will *"beep"* each time pound or asterisk is pressed. Enter any remaining digits of the telephone number.



9. Press ENTER. The Model 1104 will say *"Enter."*



4.5 Rings Until Answer

Rings Until Answer is the programmed number of times the telephone rings before the Model 1104 will answer an incoming call. This can be set from 1 to 15 rings. The default value is 4.

4.5.1 Programming Rings Until Answer

To program Rings Until Answer:

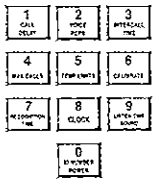
1. Press SET.



2. Press RING/TAD. The Model 1104 will respond: *"Enter number."*



3. Using the number keys, enter a value.



4. Press ENTER. The Model 1104 will respond: *"Enter."*



4.5.2 Interrogating Rings Until Answer

To interrogate Rings Until Answer:

1. Press WHAT IS.



2. Press RING/TAD.



4.6 TAD (Telephone Answering Device)

The TAD feature is especially useful because it integrates the operation of the Model 1104 with your telephone answering device in a way that retains the full flexibility of each system. This allows you to have on-demand telephone access to the Model 1104, for obtaining a Status Report, or for issuing call-in

commands, while your telephone answering device is set to receive outside calls. Programming for use with a telephone answering device (TAD) is always used in conjunction with Rings Until Answer, detailed in section 4.5.

NOTE

The TAD feature only applies to answering devices connected to the same telephone line as the Model 1104.

4.6.1 TAD Enable/Disable

To enable/disable the TAD feature:

1. Press SENSOR ON/OFF.



2. Press RING/TAD.



The Model 1104 will respond: *"On."* (If the Model 1104 says *"Off,"* repeat steps 1 and 2 to reactivate TAD.)

4.6.2 Using the TAD Feature

1. Make sure the TAD feature is ***enabled*** on the Model 1104. (The default setting is *disabled,* so you must enable it first.)
2. Determine the number of rings your telephone answering device uses to answer the telephone. (Most answering devices require 4 rings; others are selectable.)
3. On the Model 1104, program Rings Until Answer to a greater number than the number of rings set on your answering machine.

   Example:

   Telephone answering device, rings = 4

   Model 1104, Rings Until Answer = 6

Using the procedure just outlined, all incoming calls will be answered by the telephone answering device, allowing it to operate normally. With the programming just accomplished, the Model 1104 can be accessed remotely, by telephone, to obtain the Status Report.

1. Dial the telephone number of the Model 1104.
2. Let the telephone ring once and then hang up.
3. Wait approximately ten seconds
4. Call the Model 1104 back.
   It will answer the telephone on the first ring.

Explanation: The pattern of one ring, followed by a second call (within 30 seconds), signals the Model 1104 to answer your incoming call, excluding the telephone answering device.

NOTE

Special Case: If the Model 1104 shares the same line with a telephone answering device, and during certain time periods, frequent, incoming calls are expected on that line, then you may want to temporarily disable the TAD feature. If you leave the TAD enabled, it will not adversely affect normal operation, but if two outside telephone calls are received within the same 30-second time window, the Model 1104 will interpret this pattern as a signal to answer the telephone. If this occurs, press any key on the Model 1104 to hang up.

4.6.3 No TAD In Use

If a telephone answering device is not used on the same telephone line as the Model 1104, make sure that the TAD feature is disabled, or turned off. Only Rings Until Answer programming will determine how incoming calls are answered. For example, if you program Rings Until Answer to 3, incoming calls will be answered in 3 rings.

4.7 Listen-in Time

The Listen-in Time is the amount of time you can listen to sounds from the Model 1104's built-in microphone at its installation site. When you call in for a Status Report, the Model 1104 announces Listen-in Time at the end of its first round of status readings, saying, *"Listen to the sound level for (programmed time entered)."* The programmable range is from 0 to 255 seconds (or up to 4.17 minutes). The default value is 15 seconds.

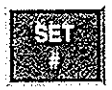
NOTE

The microphone is also used to monitor high sound level. See Chapter 5, Section 5.10 through Section 5.11.1.

4.7.1 Programming the Listen-in Time

To program the Listen-in Time:

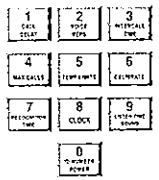
1. Press SET.



2. Press LISTEN TIME. The Model 1104 will respond: *"Enter seconds."*



3. Using the number keys, enter the seconds. The Model 1104 will recite the digits as they are pressed.



4. Press ENTER. The Model 1104 will respond: *"Enter."*



4.7.2 Interrogating the Listen-in Time

To interrogate the Listen-in Time:

1. Press WHAT IS.



2. Press LISTEN TIME. The Model 1104 will recite the listen time in seconds programmed.



4.8 Call Delay

Call Delay is the programmed length of time the Model 1104 waits, following detection of an alarm, before it begins the dial-out sequence. *This applies only to the first call.* (Delay time between calls is also programmable: refer to Intercall Time, Section 4-11.)

The purpose for Call Delay is to allow time for personnel at the Model 1104's installation site to respond to and cancel an alarm before dial-out begins. During this time, the Model 1104 will audibly repeat its "alert condition" message (unless the Local Voice Mute feature has been activated—refer to Section 4.9). The default for Call Delay is 30 seconds. Call Delay can be programmed from 0 seconds to 60 minutes (1 hour).

4.8.1 Programming the Call Delay

To program the Call Delay:

1. Press SET.

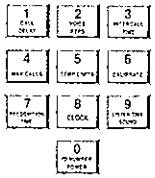


2. Press CALL DELAY.



The Model 1104 will respond: *"Enter minutes."*

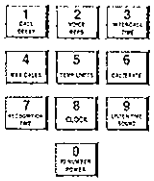
3. Using the number keys, enter the minutes. The Model 1104 recites the digits as they are pressed.



4. Press ENTER. The Model 1104 responds: *"Enter seconds."*



5. Using the number keys, enter the seconds. The Model 1104 recites the digits as you press them.



6. Press ENTER. The Model 1104 responds: *"Enter."*



4.8.2 Interrogating Call Delay

To interrogate Call Delay:

1. Press WHAT IS.



2. Press CALL DELAY.



The Model 1104 will recite the programmed Call Delay.

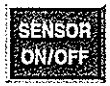
4.9 Local Voice Mute

When the Model 1104 dials out to report an alarm, it also audibly recites the alarm message at its installation site. The Local Voice Mute command allows you to turn off the voice at the Model 1104's site during alarm dialouts and status call-ins. This feature is used to prevent intruders or unauthorized persons from hearing the alarm dial-out message or from hearing the Status Report during an off-site call.

4.9.1 Enable/Disable Local Voice Mute

To enable/disable Local Voice Mute:

1. Press SENSOR ON/OFF.



2. Press MUTE.



The Model 1104 will say *"On,"* to indicate that Local Voice Mute is enabled, or *"Off,"* to indicate that it is disabled.

3. Repeat key sequence to switch between enabled or disabled Local Voice Mute.

4.10 Voice Repetitions

The Voice Repetitions feature allows programming of the number of times the alarm message is delivered *per phone call* during alarm dial-out.

The maximum repetitions may be set to 10; the default is 3 repetitions.

4.10.1 Programming Voice Repetitions

To program Voice Repetitions:

1. Press SET.

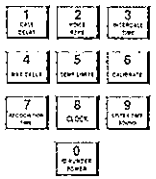


2. Press VOICE REPS.



The Model 1104 will respond: *"Enter number."*

3. Using the number keys, enter a value from 0 to 10.



4. Press ENTER. The Model 1104 will respond: *"Enter."*



4.10.2 Interrogating Voice Repetitions

To interrogate Voice Repetitions:

1. Press WHAT IS.



2. Press VOICE REPS.



The Model 1104 will recite the number programmed.

4.11 Intercall Time

The Intercall Time is the programmable period of time the Model 1104 waits in calling subsequent telephone numbers. Intercall Time is activated ***only after alarm dial-out to the first telephone number fails to be acknowledged.*** This period can be programmed from 10 seconds to 60 minutes. The default intercall time is 1 minute.

If an incoming telephone call is made to the Model 1104 during Intercall Time (in between its dialing of subsequent telephone numbers to report an alarm), it will answer the incoming call and immediately report any existing alarms. The manner in which the incoming call is answered depends upon whether or not TAD is enabled or disabled:

- If TAD (Telephone Answering Device) is enabled, Rings Until Answer will be 1.
- If TAD is disabled, Rings Until Answer will be 10.

Refer to Section 4.5, Rings Until Answer, and Section 4.6, TAD (Telephone Answering Device).

4.11.1 Programming Intercall Time

To program Intercall Time:

1. Press SET.

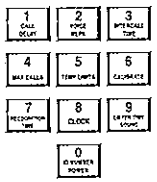


2. Press INTERCALL TIME.



The Model 1104 will respond: *"Enter minutes."*

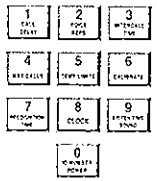
3. Using the number keys, enter the minutes.
The Model 1104 recites the digits as you press them.



4. Press ENTER. The Model 1104 will respond: *"Enter seconds."*



6. Using the number keys, enter the seconds. The Model 1104 recites the digits as you press them.



7. Press ENTER. The Model 1104 responds: *"Enter."*



4.11.2 Interrogating Intercall Time

To interrogate Intercall Time:

1. Press WHAT IS.



2. Press INTERCALL TIME.



The Model 1104 will recite the programmed Intercall Time.

4.12 Maximum Number of Calls (Max Calls)

The Max Calls feature controls the total number of repeated calling attempts by the Model 1104 in the event of an alarm. When an alarm occurs, the dial-out process begins, and continues to cycle through your programmed telephone

numbers until a maximum number of calls is reached. The Max Calls setting regulates the number of calls that will be made as a result of any alarms; if more than one alarm is detected at once, or if a second alarm occurs during dial-out on the first alarm, the Max Calls setting will start the calling process from zero, until the programmed number of calling attempts are completed.

The default setting for Max Calls is 16, but it may be programmed from 0 to 255 calls. Max Calls is cancelled when an alarm is acknowledged. If the maximum number of calls is completed and no alarm acknowledgement has occurred, the Model 1104 will automatically acknowledge any alarm and stop the dial-out.

NOTE

If only one telephone number is programmed, the Model 1104 will dial out a maximum of 15 times to report an alarm.

4.12.1 Programming Max Calls

To program Max Calls:

1. Press SET.

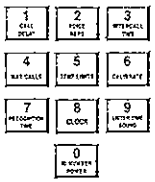


2. Press MAX CALLS.



The Model 1104 will respond: *"Enter number."*

3. Using the number keys, enter a value. The Model 1104 will recite the digits as you press them.



5. Press ENTER. The Model 1104 responds: *"Enter."*



4.12.2 Interrogating Max Calls

To interrogate Max Calls programmed:

1. Press WHAT IS.



2. Press MAX CALLS.



The Model 1104 will recite the value set for Max Calls.

4.13 The Clock

The Model 1104 has a built-in clock. The power-up time is 12 AM. The clock will keep time from 12 AM until you program the current time. It will then keep time from your programmed time. If the AC power fails, the clock will continue to keep time until the battery back-up fails. It will then reset to 12 AM when power is restored. ***An incorrect time is a good indication that the power has failed and the batteries have been expended.***

4.13.1 Setting the Clock

To set the clock:

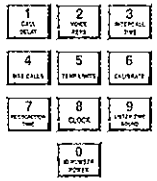
1. Press SET.



2. Press CLOCK.



3. Using the number keys, enter the correct time. The Model 1104 will recite the digits as they are pressed.



4. If the time is AM, press the AM key. The Model 1104 will *"beep."* (If the time is PM , there is no key to press—the clock will be automatically set to PM if AM is not set.)



5. Press ENTER. The Model 1104 will say *"Enter."*



Example: You want to set the clock to 12:45 AM. Press the following keys in the order shown:

SET...CLOCK...1...2...4...5...AM...ENTER.

4.13.2 Interrogating for the Current Time

To interrogate the Model 1104 for the current time:

1. Press WHAT IS.



2. Press CLOCK. The Model 1104 will recite the programmed time.



4.14 The Security Code

The Security Code is the last step after setting all other programming parameters for the Model 1104. The code consists of a 4-digit number you select and will effectively prevent unauthorized changes to the Model 1104's programming. When the Security Code is activated, all keyboard programming is inaccessible. The Model 1104 may be interrogated using the WHAT IS key, but the keyboard must be unlocked, via the Security Code, before any additional programming is possible.

4.14.1 Locking the Keypad

To program the Security Code:

1. Press SET.

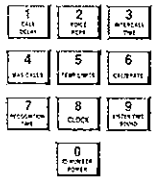


2. Press CODE.



The Model 1104 will say *"Enter security code."*

3. Using the number keys, enter 4 digits. The Model 1104 says, *"OK."* The keyboard is now locked.



If unauthorized persons attempt to set a parameter, an error message, *"Error 2,"* is returned. Whenever any operation except WHAT IS takes place without entering the security code first, this error message occurs.

4.14.2 Unlocking the Keypad

To unlock the keyboard:

1. Press WHAT IS.

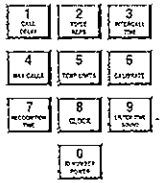


2. Press CODE.



The Model 1104 will say *"Enter Security Code."*

3. Using the number keys, enter the digits for the code.



If the correct code is entered, the Model 1104 will say "OK." If the wrong code is entered, the Model 1104 will *say "Error 2."*

Chapter 5: Alarm Programming

This chapter explains the alarm programming and monitoring capabilities of the Model 1104, with specific instructions for the following features:

- Configure inputs as dry contact or temperature
- Enable/disable inputs
- Program alarm Recognition Time for each input
- Program high and low temperature limits
- Disable alarm response to high or low temperature
- Program temperature in Fahrenheit or Celsius scale
- Calibrate temperature
- Obtain current temperature
- Program AC power-failure Recognition Time
- Enable/disable AC power monitoring
- Program sound level sensitivity
- Program high sound Recognition Time
- Disable alarm response to high sound
- Use Exit Delay via Status Report

5.1 Input Configuration

In preparing the Model 1104 to sense an alert condition, the inputs must be configured as dry contact (either open or closed) or as temperature inputs. The default setting for input 1 is temperature; for inputs 2-4, the default is dry contact and open. To configure input normality, sensors are first wired to the terminal strip at the back of the unit. (Refer to Chapter 2, Section 2.9–2.12, for an explanation on wiring inputs.)

The configuration process directs the Model 1104 to initialize the 4 inputs and establish normal settings. Any change in the status of an input (for example, from a normally open contact to a suddenly closed contact) is recognized as an ***alert condition.*** In the case of a temperature input, an alert condition is recognized when established temperature limits are exceeded.

NOTE

Before starting keyboard commands to configure input normality on the Model 1104, ***it is very important to check that the sensors you have wired to the unit are set in their normal, non-alarm positions.*** For example, if a magnetic reed switch (a normally-closed sensor used to detect unauthorized entry) has been wired to the Model 1104, make sure that the door or window to be monitored is shut before configuring the input. If a motion-detector is wired to the unit, it is advisable to block all sources of motion from the sensor before and during configuration.

5.1.1 Programming Input Configuration

1. Press STANDBY to place the Model 1104 in Standby mode.



2. Wire sensors to the inputs to the back of the Model 1104 (see Chapter 2, Section 2.10).
3. Press RUN. The red light glows when the Model 1104 returns to Run mode.



4. Press SET.



5. Press CONFIGURE.



6. The Model 1104 audibly recites the configuration for each of the four inputs:
   - If the input is normally open, the Model 1104 recites the number of the input and says *"OK."*
   - If the input is normally closed, the Model 1104 recites the number of the input, followed by a *"beep"* and *"OK."*
   - If the input is configured as temperature, the Model 1104 recites the number of the input, followed by *"Temperature."*

5.1.2 Verifying Input Configuration

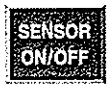
Input configuration can be verified when interrogating the Model 1104 for a complete Status Report. Refer to Chapter 6 for a more detailed description of the Status Report.

5.2 Enable/Disable Inputs

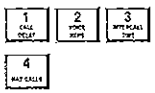
This function allows you to enable or disable an input's response to an alert condition. An enabled input will respond to an alert condition and allow dial-out. A disabled input will cause dial-out to be suppressed, but any existing alert conditions will be revealed during the Status Report. Enable/disable programming is useful during wiring of inputs (see Chapter 2) or when a condition needs to be monitored, but is not critical enough to be programmed for dial-out reporting. It is important to verify input status after performing any task that requires disabling. The default setting for all inputs is enabled (ON). If an alert condition exists when inputs are re-enabled, Recognition Time will restart—refer to Section 5.3.

5.2.1 Changing Enabled/Disabled Input Status

1. Press SENSOR ON/OFF.



2. Press the number (1 to 4) of the selected input to enable/disable. The Model 1104 says *"Off"* to indicate disabled or *"On"* to indicate enabled.



5.2.2 Verifying Enabled/Disabled Input Status

1. Press WHAT IS.



2. Press STATUS.



The Model 1104 audibly recites the current status of every input. In a Status Report, each input is first identified by its input number, followed by a report that specifies parameters currently affecting that input. ***If an input is disabled, the word "Off" immediately follows the number recited for that input.***

For example, input 3 is configured as a normally open, dry contact input. During the Status Report:

- ***If disabled,*** the Model 1104 recites: *"Number 3—Off—OK,"* for input 3.
- ***If enabled,*** the Model 1104 recites: *"Number 3—OK,"* for input 3.

In another example, input 2 is configured as a temperature input. The current temperature is 76 degrees. During a Status Report:

- ***If disabled,*** the Model 1104 recites *"Number 2—Off—76 degrees—OK"*.
- ***If enabled,*** the Model 1104 recites *"Number 2—76 degrees—OK"*.

5.3 Input Recognition Time

The Input Recognition Time is the length of time an alert condition must be present before a valid alarm exists and dial-out is activated. This time period is programmable, from 0 minutes, 0 seconds (for immediate response) up to a period of 272 minutes, 0 seconds. If an alert condition begins and then clears within the established Recognition Time, no dial-out will occur. When an alert condition continues beyond the programmed Recognition Time, the Model 1104 initiates dial-out. The default setting for Input Recognition Time is 0 minutes, 3 seconds.

5.3.1 Programming Input Recognition Time

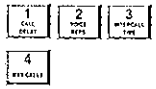
1. Press SET.



2. Press RECOGNITION TIME.

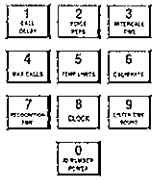


3. Press the number (1 to 4) of the selected input to be programmed.



The Model 1104 responds: *"Enter minutes."*

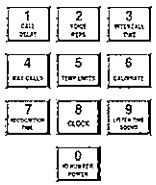
4. Using the number keys, enter the minutes. For example, to set a Recognition Time of five minutes, simply press "5" on the keypad. The Model 1104 recites the digits as they are pressed.



5. Press ENTER. The Model 1104 responds: *"Enter seconds."*



6. Using the number keys, enter the seconds. The Model 1104 recites the digits as they are pressed.



7. Press ENTER. The Model 1104 responds: *"Enter."*



5.3.2 Interrogating Input Recognition Time

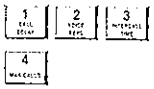
1. Press WHAT IS.



2. Press RECOGNITION TIME.



3. Press the corresponding input key (1 to 4).



The Model 1104 recites the programmed Recognition Time for that input.

5.4 Establishing High and Low Temperature Limits

High and low temperature limits can be separately programmed for each input configured as temperature. Limits can range from –20° to +150° Fahrenheit, or from –30° to 65° Celsius.

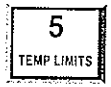
When temperature limits exceed high or low settings, the Model 1104 will dial out with an alarm message. Default settings are: 10° F for low temperature and 100° F for high temperature.

5.4.1 Programming Temperature Limits for a Selected Input

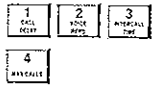
1. Press SET.



2. Press TEMP LIMITS.

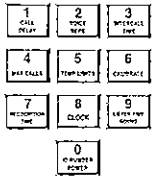


3. From the number keys, press a number (from 1 to 4) that corresponds to the temperature input being programmed.



The Model 1104 responds: *"Enter low temperature limit."*

4. Using the number keys, enter a value for low temperature limit. The Model 1104 will recite the digits as they are pressed. If a negative number is required, first press PAUSE, then enter the number.

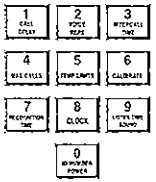


5. Press ENTER.



The Model 1104 responds: *"Enter high temperature limit."*

6. Using the number keys, enter the value for high temperature limit. The Model 1104 recites the digits as they are pressed.



7. Press ENTER. The Model 1104 responds: *"Enter."*



NOTE

Do not set temperature limits too close to normal room temperature. Minor temperature fluctuations could result in frequent and unnecessary alarm dialouts.

5.4.2 Disabling Alarm Response to High or Low Temperature

To disable alarm response to either high or low temperature settings exclusively, enter the maximum temperature limit when programming the selected input. (The Model 1104 will not

respond to temperatures encountered at maximum settings or beyond.) Begin by following the key sequence shown in Section 5.4.1, and when prompted to enter the high or low temperature value:

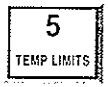
- Set high temperature to either +150° F or +65° C (high temperature limit) to prevent the Model 1104 from responding to a high temperature alarm.
- Set low temperature to either -20° F or -30° C to prevent the Model 1104 from responding to a low temperature alarm.

5.4.3 Interrogating High and Low Temperature Limits

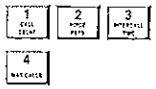
1. Press WHAT IS.



2. Press TEMP LIMITS.



3. Press the number key corresponding to the selected temperature input.



5.5 Temperature Scale

Temperature inputs may be set in either Fahrenheit or Celsius degrees. The default temperature scale is Fahrenheit. To change to Celsius:

1. Press SENSOR ON/OFF.



2. Press TEMP. The Model 1104 responds: *"Off,"* indicating Celsius scale has replaced Fahrenheit scale.



3. To return to Fahrenheit scale, repeat the key sequence. The Model 1104 responds: "On," indicating Fahrenheit scale is in effect.

NOTE

When switching from Fahrenheit to Celsius, or vice versa, the change applies to all inputs configured to read temperature. When switching temperature scales it is important to reset high and low temperature limits on all temperature inputs. Refer to Section 5.4.1 to reset temperature limits.

5.6 Temperature Calibration

To compensate for minor variances in sensor accuracy, an offset may be programmed for each temperature input. The amount of offset is measured in degrees Fahrenheit or degrees Celsius. Adjustments are possible within a range from -10 degrees to +10 degrees. For example, if input 3 is sensing temperature and is reading 1 degree too high, then the calibration for input 3 is set at -1 to obtain an accurate reading.

5.6.1 Programming Temperature Calibration

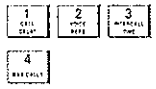
1. Press SET.



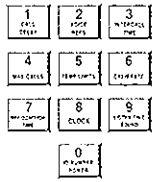
2. Press CALIBRATE.



3. Press the number (1 to 4) of the selected temperature input to be calibrated.



4. Enter the number required to offset the current temperature reading so a correct reading is obtained.



- To program a positive offset number (up to +10 degrees), enter the number on the keypad. The Model 1104 recites the digits as they are pressed.
- To program a negative offset number (up to –10 degrees), first press PAUSE. The unit responds with *a "beep."* Next, enter the number on the keypad. The unit recites the digits as they are pressed.

5. Press ENTER. The Model 1104 responds: *"Enter."*



NOTE

If you find that your calibration offset exceeds more than + 5 or – 5 degrees, other complicating factors could be affecting normal operation of the Model 1104. Call Phonetics for technical assistance.

5.6.2 Interrogating Temperature Calibration

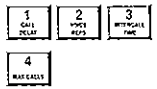
1. Press WHAT IS.



2. Press CALIBRATE.



3. Press the number key corresponding to the selected temperature input.



If a *"beep"* precedes the number as it is recited, then a **negative** offset is indicated.

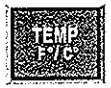
5.7 Obtaining Current Temperature

Current temperature readings for each temperature input may be accessed at any time. The Model 1104 recites the input number, and the actual temperature detected by the attached sensor, for all inputs configured as temperature. To obtain current temperature:

1. Press WHAT IS.



2. Press TEMP.

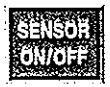


5.8 AC Power Monitoring Enable/Disable

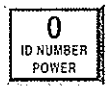
The Model 1104 monitors AC power failure. This command enables or disables the power failure detection feature.When enabled, the Model 1104 will monitor power and dial out when AC power failure exceeds a programmable span of time (refer to AC Power Failure Recognition Time, Section 5.9).
The default setting for AC power monitoring is enabled (on). When disabled, the Model 1104 will not dial-out to report power failure.

5.8.1 Enabling/Disabling the AC Power Alarm

1. Press SENSOR ON/OFF.



2. Press POWER.



   - The Model 1104 will say *"Off"* to indicate that the power alarm is disabled, or
   - The Model 1104 will say *"On"* to indicate that the power alarm is enabled.

3. Repeat key sequence to change settings.

5.9 AC Power Failure Recognition Time

The AC Power Failure Recognition Time is the length of time that AC electric power is off before a valid alarm is recognized and dial-out begins. The default setting is 5 minutes, 0 seconds, but is programmable from 0 seconds to a maximum of 272 minutes.

When AC power failure occurs, and throughout the programmed Recognition Time, the Model 1104 steadily repeats the message, *"the electricity is off,"* at the unit's installation site. There is no Call Delay programming available for AC power failure. Immediately following Recognition Time, the Model 1104 begins the dial-out process to report power failure.

To cancel the power-failure message locally at the keypad (during or after Recognition Time) press any key on the Model 1104 keypad. This action also cancels the dial-out process. The AC power failure alarm may also be cancelled remotely, by telephone acknowledgment (see Chapter 6, Section 6.1).

5.9.1 Programming Power Failure Recognition Time

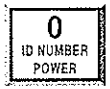
1. Press SET.



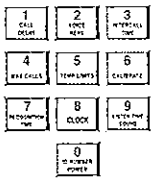
2. Press RECOGNITION TIME.



3. Press POWER. The Model 1104 responds: *"Enter minutes."*



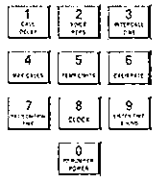
4. Using the number keys, enter the number of minutes. The Model 1104 will recite the digits as they are pressed.



5. Press ENTER. The Model 1104 responds: *"Enter seconds."*



6. Using the number keys, enter the number of seconds. The Model 1104 will recite the digits as they are pressed.



7. Press ENTER. The Model 1104 responds: *"OK."*



5.9.2 Interrogating Power Failure Recognition Time

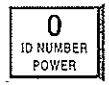
1. Press WHAT IS.



2. Press RECOGNITION TIME.



3. Press POWER.
The Model 1104 will recite the power Recognition Time.



5.10 Sound Alarm Monitoring

This feature allows you to program the level and duration of sound that will cause the Model 1104 to respond to an alarm and dial-out. It may be useful to desensitize the Model 1104 to sound if it is installed in an area with a relatively high noise level, or where a loud noise occurs frequently but is not associated with an alarm. In some applications, it may be desirable to increase sound sensitivity to low sound levels.

5.10.1 Programming Sound Alarm Sensitivity

The sensitivity setting for sound alarm monitoring ranges from 1 to 255. A value of 1 makes the microphone the MOST sensitive to changes in sound. The value 255 makes the microphone the LEAST sensitive to sound. The default value is 32.

1. Press SET.



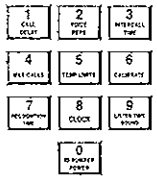
2. Press CALIBRATE.



3. Press SOUND. The Model 1104 responds: *"Enter number."*



4. Using the number keys, enter a value for sound sensitivity. The Model 1104 recites the digits as you press them.



5. Press ENTER. The Model 1104 responds: *"Enter."*



5.10.2 Interrogating Sound Sensitivity

1. Press WHAT IS.



2. Press CALIBRATE.



3. Press SOUND. The Model 1104 recites the programmed sound sensitivity level.



5.10.3 Programming High Sound Alarm Recognition Time

The Recognition Time for sound alarm monitoring ranges from 2 seconds to 59 seconds. The default value is 8 seconds.

1. Press SET.



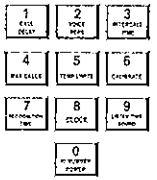
2. Press RECOGNITION TIME.



3. Press SOUND. The Model 1104 responds: *"Enter seconds."*



4. Using the number keys, enter the number of seconds. The Model 1104 will recite the digits as they are pressed.



5. Press ENTER. The Model 1104 responds: *"OK."*



5.11 High Sound Alarm Enable/Disable

The Model 1104 monitors sound through the built-in microphone. When the sound level suddenly exceeds the programmed high sound limit, the Model 1104 will respond to an alert condition. The increased sound level must continue throughout the programmed recognition time. The default for high sound alarm is enabled (on).

NOTE

The microphone is also used for listening to on-site sounds. Refer to Chapter 4, Section 4.7. Disabling the sound alarm does not affect listen-in capability.

5.11.1 Changing Enabled/Disabled High Sound Alarm

1. Press SENSOR ON/OFF.



2. Press SOUND. The Model 1104 will say *"Off"* to indicate disabled or *"On"* to indicate enabled.



3. Repeat key sequence to change settings.

5.12 Exit Delay

When tripping an alarm is unavoidable, yet a true alert condition has not actually occurred, the alarm response, including dial-out, can be temporarily suppressed.

The Model 1104 is able to suppress and then reset its dial-out function automatically through use of the Status Report. This is especially convenient when an alert condition is created upon exiting a monitored door, and there is no way to cancel from the local keypad.

Example: You are planning to exit through a monitored door. Prior to exiting, you initiate a Status Report recitation at the Model 1104 keypad by pressing WHAT IS, followed by STATUS, (key sequence shown below). This allows you approximately 30 seconds to exit without activating the Model 1104's programmed response to an alarm. At the conclusion of the status report, normal alarm response is reactivated.

To use exit delay, initiate the Status Report.

1. Press WHAT IS.



2. Press STATUS. The Model 1104 recites the full Status Report; during this time, you are able to exit the monitored area without tripping an alarm.



NOTES

Chapter 6: Acknowledgment, Status Report, and Remote Access

In addition to communication and alarm monitoring capabilities, the Model 1104 will also respond to your instructions and provide you with access to information on monitored conditions at all times.

By issuing commands to the unit, either at the installation site or over standard telephone lines, the following features may be activated:

- Acknowledgment of existing alarms
- The Status Report on all monitored conditions.

6.1 Alarm Acknowledgment

When the Model 1104 dials out with an alarm message, it will request acknowledgment before hanging up. Acknowledgment indicates to the unit that the alarm message has been received. Upon acknowledgment, the Model 1104 will cancel the dial-out sequence.

There are three ways* that an alarm is acknowledged directly:

- Local Acknowledgment
- Touch-Tone™ Acknowledgment
- Callback Acknowledgment

* A fourth method of alarm acknowledgment is indirect. Refer to Max Calls, Chapter 4, Section 4.12 for an example of automatic alarm acknowledgment.

6.1.1 Local Acknowledgment

To acknowledge an alarm locally (directly at the installation site of the Model 1104), press any key.

6.1.2 Touch-Tone™ Acknowledgment

This method of remote alarm acknowledgment works with a Touch-Tone™ telephone.

Example: You receive a call from the Model 1104, reporting that an alarm exists. The message concludes: "Indicate you have received warning message." Now, or at any time during this call, you may acknowledge the alarm with the code "555" if you are using a Touch-Tone™ telephone.

- To enter "555," press the number (5) key on the Touch-Tone™ phone keypad three times. The Model 1104 will respond: * ***"Warning message received by telephone number (last number dialed)."*** The Model 1104 will hang up and the dial-out sequence, including any further response to the alarm, will be cancelled.
- If you enter the wrong code or do not enter it within 10 seconds following the conclusion of the message, the Model 1104 will respond: ***"Dial telephone number (the programmed unit phone number) within (Intercall Time)."*** Then, the Model 1104 will hang up. The alarm is still not acknowledged until you call back. You have a period equal to the programmed Intercall Time to call the unit back in order to acknowledge the alarm. Refer to Callback Acknowledgment, Section 6.1.3, below.

6.1.3 Callback Acknowledgment

This method of remote alarm acknowledgment works with ***any telephone:*** pulse, rotary, or Touch-Tone™.

Example: The Model 1104 calls you with an alarm message. You answer the call with a rotary or pulse telephone, and do the following:

- You listen to the message and hang up.
- Then you call the Model 1104 back on any telephone. You must wait for 10 rings—this signals the Model 1104 to answer your telephone call. (Make sure to call back within the programmed setting for Intercall Time—refer to Chapter 4, Section 4.11.)

When the Model 1104 answers your return call, it gives a Status Report (refer to Section 6.2). Then it says: *"Warning message received by ..."* and recites the telephone number last dialed. This indicates that the alarm has been acknowledged.

NOTE

If you have the TAD feature (telephone answering device) enabled, the Model 1104 will answer the telephone on the first ring. If it is disabled, the telephone must be allowed to ring 10 times. This serves as a precaution against a random alarm acknowledgment. Refer to Chapter 4, Section 4.6, for complete information on using the TAD feature.

6.2 Status Report

The Status Report allows access to complete information on all monitored conditions either locally, from the keypad, or by telephone, from any location. The Model 1104 will answer an incoming telephone call following the programmed Rings Until Answer (refer to Chapter 4, Section 4.5). Included with the Status Report are messages related to alarm conditions, AC power, battery backup and sound level. It also provides an opportunity for listening to on-site sounds (refer to Listen-in Time, Chapter 4, Section 4.7).

To initiate the Status Report:

1. Press WHAT IS.



2. Press STATUS.



Sections 6.2.1, 6.2.2, and 6.2.3 demonstrate two different Status Report recitations. The Status Report starts with:

"Hello. This is telephone number 555-1234 (or the programmed ID)."

"The time is 12:15 PM (or the current time)."

The Model 1104 proceeds with a separate report for each input. Each input identifies itself by reciting the input number.

6.2.1 Example: Status Report, No Alarms

Inputs 2, 3, and 4 are configured as dry contact and input 1 is configured as temperature. No alarms exist. The Status Report begins by saying, *"Hello, this is telephone number 555-1234; the time is 12:15 PM."* Following this introduction, the report continues:

"Number 1, 74 degrees, OK."

"Number 2, OK."

"Number 3, OK."

"Number 4, OK."

"The electricity is ON." This refers to AC power.

"Battery condition, OK." Other responses: *"Battery condition low"* or *"Replace batteries."* (Refer to Section 6.2.4 for additional information regarding battery condition.)

"Sound level, OK."

"Listen to the sound level for 10 seconds." In this case, the programmed Listen-in Time is set at 10 seconds. (This feature is not available when obtaining the Status Report on-site, directly at the keypad.)

The Status Report repeats once more and the Model 1104 concludes the call, saying: *"Have a good day."* (The Status Report will not repeat if obtained at the keypad; *"Have a good day,"* is also not recited.)

The phrase *"no number"* at the end of a Status Report indicates that no dial-out phone numbers have been programmed.

6.2.2 Example: Status Report, Existing Alarms

Inputs 2, 3,and 4 are configured as dry contact and input 1 is configured as temperature. An emergency situation is at hand: a fire in a greenhouse has tripped a smoke alarm and electrical power has been disrupted. In addition to high sound and AC power alarms, separate alarms exist on inputs 1, 2, 3, and 4. You happen to call in for the Status Report, which begins with, *"Hello, this is telephone number 555-1234; the time is 12:15 PM."* Following this introduction, the report continues:

"Number 1, 110 degrees, HIGH."

"Number 2, EXISTS."

"Number 3, EXISTS."

"Number 4, EXISTS."

"The electricity is OFF."

"Battery condition, OK."

"Sound level, HIGH."

"Warning message received by ...(last telephone number dialed)."*

"Listen to the sound level for 10 seconds."

The Status Report repeats once more and the Model 1104 concludes the call, saying: *"Have a good day."*

* The "last telephone number dialed" refers to any one of the programmed, dial-out telephone numbers through which the Model 1104 was able to receive alarm acknowledgment, prior to your call for a Status Report; this could also refer to the Model 1104's I.D. Number (identification number), if the alarms are acknowledged at the keypad by someone present at the site.

6.2.3 Example: Status Report, Disabled Inputs

If an input is ***disabled,*** the dial-out feature for that input is deactivated, but all other programmed parameters remain in effect. In the example below, all 4 inputs are disabled, although inputs 1 and 3 are detecting alarms. AC power and Sound Level is also disabled for dial-out. (Note that to indicate disabled status, only AC power will return two audible *"beeps,"* rather than the word *"OFF.")* When you call the Model 1104 for a Status Report, you hear the following:

"Hello, this is telephone number 555-1234.

"The time is 12:15 PM."

"Number 1, OFF, 96 degrees, HIGH."

"Number 2, OFF, 74 degrees, OK."

"Number 3, OFF, EXISTS."

"Number 4, OFF, OK."

"The electricity is (beep, beep), ON." If the electricity is off, or the AC adaptor is disconnected, you will hear: *"The electricity is (beep, beep), OFF."*

"Battery condition, OK."

"Sound level, OFF, OK." If the sound level is high you will hear: *"Sound level, OFF, HIGH."*

"Listen to the sound level for 10 seconds."

The Status Report repeats once more and the Model 1104 concludes the call, saying: *"Have a good day."*

6.2.4 Battery Condition

During a Status Report, you may hear one of three possible messages regarding battery power. The Model 1104 determines the appropriate message by measuring battery voltage. Depending upon the remaining voltage, it may respond:

- *"Battery Condition, OK,"* if over 8.2 Volts.
- *"Battery Condition, low,"* if between 7.2 and 8.2 Volts.
- *"Replace batteries,"* if below 7.2 Volts.

6.2.5 Remote Access by Touch-Tone™ Telephone

Calling the Model 1104 for a Status Report provides the opportunity to access other functions, using Touch Tone™ push-button commands. Remote telephone commands include:

- Disabling/enabling any input.
- Disabling/enabling High Sound Alarm monitoring.
- Disabling/enabling AC Power monitoring.
- Activation of Listen-In Time.
- Activation of the Status Report.

To issue commands by telephone, first dial the number of the Model 1104 to access the Status Report. The Status Report will be followed by the programmed Listen-In Time. If you remain on the telephone, the Status Report will be repeated, followed by a 10 second waiting period and hang-up. During this 10 second waiting period, or ***at any time during the call, other commands may by accessed by pressing any push button on the telephone.***

If a Security Code is in effect, the Model 1104 will prompt you with: *"Enter Security Code."* If no Security Code is set, then it will say *"O.K."*

- Enter your Security Code (4 digits) with the telephone push buttons. If the code you enter is correct, the Model 1104 will respond: *"OK."*
- If you enter the wrong Security Code, the Model 1104 says, *"Error. Have a good day,"* and hangs up.

Disabling/enabling inputs – If an input is set to detect an alert condition, it can be disabled to prevent the Model 1104 from dialing out, or re-enabled at any time.

This feature allows the convenience of disabling an input, even if you are away from the site of the Model 1104. One such application may involve an input programmed to detect unauthorized entry. You are in another locale, but must allow someone else temporary access to the area monitored by the Model 1104. Using a Touch Tone™ telephone, you can disable the appropriate input (thereby disabling any alarm dial-out response). The input remains disabled until you issue the same command, which effectively returns it to its former, enabled state.

Press the following push-buttons on the Touch Tone™ telephone to execute the desired command:

*** (asterisk), 1**

...equal to Sensor On/Off, for input 1. To re-enable the input, repeat the same Touch-Tone™ button sequence used for disabling.

*** (asterisk), 2**

...equal to Sensor On/Off for input 2, and so on, for inputs up to 4. To re-enable the input, repeat the same Touch-Tone™ button sequence used for disabling.

Disabling/enabling High Sound Monitoring –

*** (asterisk), 9**

...equal to SENSOR ON/OFF for High Sound Alarm monitoring. To re-enable High Sound Alarm, repeat the command.

Disabling/enabling AC Power –

*** (asterisk), 0**

...equal to Sensor On/Off for AC Power monitoring. To re-enable AC Power monitoring , repeat the command.

Activating Listen-In Time –

 # (pound), 1

...initiates Listen-In Time for listening to on-site sounds for the programmed time available.

Activating Status Report –

 # (pound), 2

...initiates a full recitation of the Status Report.

Exiting –

 # (pound), # (pound)

...forces exit. The 1104 says, *"Have a good day,"* and hangs up.

NOTES

Chapter 7: Operation

After installation and programming is completed, the Model 1104 is fully operational. This chapter explains the sequence of events that occur during an alarm dialout to illustrate how the Model 1104 operates.

7.1 Alarm Detection, Dial-out and Acknowledgment

Generally, an alarm event is structured in the following manner:

I. The Model 1104 detects an alert condition due to a change at the sensor.

II. A valid alarm is recognized.

III. Dial-out begins.

IV. The alarm is acknowledged.

Often, an alarm does not proceed through all stages: either an alert condition does not persist long enough to be considered valid, or a valid alarm is cancelled.

The table on the following page explains the alarm detection, dial-out and acknowledgment features and lists important variable factors affecting their operation.

I. Model 1104 Detects a Change at the Sensor	Variable Factors
• Model 1104 detects a change in the monitored condition (from the sensor wired to one of the inputs). This is considered an *alert condition*, and does not qualify as a valid alarm at this point. • The condition continues throughout the programmed Recognition Time. If the condition (or sensor) reverts to its normal state before the Recognition Time is reached, no alarm will occur.	*Input Type: (1) An open circuit closes, (2) a closed circuit opens, or (3) temperature limits are exceeded.* *Recognition Time: Activated*

II. A Valid Alarm Is Recognized	Variable Factors
• The condition must persist long enough to meet or exceed the programmed Recognition Time. When Recognition Time has expired, but the alert condition continues, the Model 1104 will determine that a valid alarm exists. • When a valid alarm is determined, Call Delay is activated, forcing the Model 1104 to wait for a programmed period of time before starting the dial-out process. Call Delay applies to the period just prior to dial-out, before the first telephone call is made. • Call Delay provides the opportunity to cancel a valid alarm at the Model 1104's installation site, before dial-out occurs. An audible voice message indicates which of the inputs is in alarm. If on-site personnel acknowledge the alarm within the Call Delay time, the Model 1104 will not dial out. (Local Voice Mute is disabled, so that alarm messages can be heard at the site.)	*Recognition Time: Expired* *Valid Alarm: Exists* *Call Delay: Activated* *Alarm Message: Audible, On-site Activated* *Local Voice Mute: Disabled*

III. Dial-out Begins	Variable Factors
• The dial-out process is activated as soon as the Call Delay time expires (if the alarm has not been cancelled at the Model 1104's installation site.) The dial-out begins with telephone number 1 and proceeds sequentially, through the remaining telephone numbers. • If the alarm is not acknowledged with the first dial-out telephone call, the Model 1104 waits the duration of Intercall Time before dialing the next telephone number. Intercall Time is the programmed waiting period in between each dial-out telephone call. • When the telephone is answered, the programmed Voice Repetitions determine the number of times per call the Model 1104 recites the alarm message. • Call Progress, an automatic feature, enables the Model 1104 to detect whether or not the telephone call is answered. After 8 rings, or if a busy signal is encountered, the Model 1104 will hang up, wait the programmed Intercall Time, and proceed to dial the next telephone number. • If no telephone calls are answered, the Model 1104 dials out sequentially, through the remaining telephone numbers and continues to cycle until the programmed Maximum Number of Calls is reached. • When the telephone is answered, the Model 1104 will immediately begin reciting a message that indicates which of the inputs is in alarm. At the same time, the alarm message is repeating at the Model 1104's installation site. The Model 1104 will request acknowledgment, if it has not yet occurred.	*Call Delay: Expired* *Intercall Time: Activated* *Voice Repetitions: Activated* *Call Progress: Activated* *Max Calls: Activated* *Alarm Messages: By Telephone and On-site*

IV. The Alarm is Acknowledged	Variable Factors
• At any time after a valid alarm is determined, the alarm may be acknowledged at the Model 1104's installation site, by pressing any key.	*Local, On-site Acknowledgment*
• When the Model 1104 dials out and the call is answered via Touch-Tone telephone, any alarm may be instantly acknowledged by pressing "555."	*Touch-Tone Acknowledgment: Fast Code 555*
• If the alarm message repeats for the number of programmed Voice Repetitions, and "555" has not been entered, the Model 1104 will say:	
"Indicate that you have received warning message."	
The Model 1104 waits 10 seconds for the Touch-Tone code "555" to be entered. If the code is entered within 10 seconds, it responds:	*Touch-Tone Acknowledgment: Normal Code 555*
"Warning message received by telephone number...(the Unit ID Number)."	
The alarm is considered acknowledged and the dialout concludes.	
• If the Model 1104 does not receive the Touch-Tone code within 10 seconds, it recites the following and then hangs up:	*Tone or Pulse Callback Acknowledgment: Within Intercall Time*
"Dial telephone number (gives the Unit ID Number) within...(the programmed Intercall Time.)"	
The recipient of this message must call the Model 1104 back within the period programmed for Intercall Time, in order to acknowledge the alarm. If Local Voice Mute is off, the unit will beep at the installation site while waiting for this call.	
• Callback: The Model 1104 waits 10 rings before answering to guard against random acknowledgment. If an answering device is connected to the	

IV. The Alarm is Acknowledged	Variable Factors
same line as the Model 1104 (and TAD is enabled), the Model 1104 will answer on the first ring. First, it recites the Status Report, followed by:	*Tone or Pulse Callback Acknowledgment: TAD Enabled*
"Warning message received by telephone number...(the number of your present location)." *"Have a good day."*	
When the Model 1104 hangs up, the alarm is acknowledged and dial-out stops.	
• If calls remain unanswered, or if they are received by an answering machine or FAX, the Model 1104 continues the dialout sequence; it waits the Intercall Time and proceeds to dial the next telephone number. Telephone numbers are dialed sequentially, and this cycle continues for the number of Max Calls programmed. If no acknowledgment occurs, then at the completion of Max Calls, the alarm is automatically acknowledged and the dial-out process is terminated.	*Max Calls Acknowledgment*

NOTE

Acknowledging the alarm does not correct the situation! The alarm condition will still exist until the sensor is restored to its normal state.

7.2 Example: A Dial-out Telephone Call

The following parameters are selected for demonstration purposes:

- Model 1104 Unit ID Number is set to 555-5674. It is currently installed at your place of business.
- Dial-out Telephone Number 1 is programmed to 555-1234, your home telephone number.
- Voice Repetitions are set to 4.

The Model 1104 is detecting an alarm on input 2.
The telephone rings at 555-1234, your home number.
You answer the telephone and hear the following message:

"Hello, this is telephone number 555-5674. The time is 8.30 p.m. Alert condition two exists."
(4-seconds to hear on-site sound from unit's microphone.)

"Hello, this is telephone number 555-5674. The time is 8.30 p.m. Alert condition two exists."
(4-seconds to hear on-site sound from unit's microphone.)

"Hello, this is telephone number 555-5674. The time is 8.30 p.m. Alert condition two exists."
(4-seconds to hear on-site sound from unit's microphone.)

"Hello, this is telephone number 555-5674. The time is 8.30 p.m. Alert condition two exists."
(4-seconds to hear on-site sound from unit's microphone.)

"Indicate you have received warning message."

NOTE

It is important that your dial-out telephone numbers be answered by you or other authorized personnel in order to ensure adequate response to an alarm.

Appendix A: Troubleshooting

In the event that a problem is encountered, this section will assist you in determining the cause, so you can return the unit to its usual monitoring routine with minimal interruption.

Most problems with the Model 1104 are easy to identify and quickly corrected, and are found under the following general headings:

- Communications/dial-out functions
- Temperature monitoring
- Sound level monitoring
- Other monitoring functions

If you have tried the solutions outlined in this section and are not satisfied with the results, call Customer Service, (610) 558-2700, or follow the guidelines for shipping the Model 1104 to Phonetics for repair (see Appendix C).

Communications / Dial-out:

Problem	Cause	Solution
1. The Model 1104 fails to dial out.	a) The telephone number may be incorrectly programmed.	Recheck programming steps, Refer to Chapter 4, Section 4.2.1.
	b) Tone or pulse (the current dialing method) is not compatible with the telephone line on which the Model 1104 is installed.	Switch from the current setting: from tone to pulse, or from pulse to tone. Refer to Chapter 4, Section 4.3.
	c) Recognition Time is too long. An alert condition does not remain in effect long enough to become a valid alarm.	Reprogram Recognition Time. Set the Recognition Time to the minimum duration required to create a valid alarm. If possible, test the new setting by deliberately creating an alert condition. Refer to Chapter 5, Section 5.3.
	d) Max Calls is set to zero.	Reprogram Max Calls. It is a good idea to set your Max Calls to at least equal the number of dial-out telephone numbers programmed. Refer to Chapter 4, Section 4.12.1.
	e) The Model 1104 is connected to an incompatible telephone line.	The Model 1104 must be connected to a standard (2-wire analog) telephone line, ***not a digital extension*** to a phone system. If the unit will not dial out and the factors previously listed have been ruled out, try connecting the unit to a standard residential telephone line.
2. The Model 1104 will not answer the telephone when called for a Status Report or alarm acknowledgment.	a) Rings Until Answer is incorrectly programmed.	Recheck programming of Rings Until Answer. Refer to Chapter 4, Section 4.5.1.
	b) The Model 1104 is connected to an incompatible telephone line.	Some telephone systems will not allow the telephone to ring beyond 4 rings. If your Model 1104's Rings Until Answer is set at more than 4 rings, you may not be able to access the unit. Try setting the Rings Until Answer to less than 4 rings. If this does not correct the problem, it may indicate telephone line incompatibility. In this case, try connecting the Model 1104 to a standard, residential telephone line.

Communications / Dial-out:

Problem	Cause	Solution
(Continued from previous page) 3. The Model 1104 will not answer the telephone for Callback Acknowledgement.	You did not allow the telephone to ring 10 times. **Note:** If the TAD (telephone answering device) is disabled, the telephone rings ten times before the Model 1104 answers. If the TAD is enabled, the telephone rings once before the Model 1104 answers the call.	When calling the Model 1104, and the TAD is disabled, allow the telephone to ring 10 times. Refer to Chapter 6, Section 6.1.3, and Chapter 4, Section 4.6.3.
4. The Model 1104 recites the alarm message or Status Report over the telephone, but is silent at the installation site.	The local voice mute feature is in effect.	Deactivate local voice mute. Refer to the programming steps in Chapter 4, Section 4.9.
5. The Model 1104 dials out correctly but fails to audibly recite its alarm message when you answer the call.	Voice Reps is set to zero.	Reprogram Voice Reps to 1 or greater. Refer to Chapter 4, Section 4.10.
6. The Model 1104 and telephone answering device (sharing the same line) answer incoming calls simultaneously.	The Model 1104's number of Rings Until Answer is set to equal the number of rings set for the telephone answering device.	Change the number of Rings Until Answer for the Model 1104. Refer to Chapter 4, Section 4.5.

Temperature Monitoring:

Problem	Cause	Solution
1. Can't program temperature limits; or the unit won't read the temperature sensor.	The input isn't configured to read a temperature sensor.	Press SET and CONFIGURE to program the input. (See Section 5.1.1 for more information on configuring inputs.)
2. The temperature reading is -20° F or -30° C.	The temperature sensor has been disconnected or has broken wires.	Examine the wires to temperature sensor and connect or replace wiring.
3. Temperature reads 150° F or 65° C.	Temperature sensor wires are touching or have shorted.	Verify and correct wiring.
4. Temperature reading is inaccurate.	a) Temperature sensing may be affected by a source of ambient heat (ie., direct sunlight, or heat duct proximity).	Try moving the unit to a different location.
	b) Temperature may require calibration.	After moving or placing the unit away from ambient heat sources, the temperature may be calibrated to offset inaccurate normal reading by several degrees. Refer to Chapter 5, Section 5.6.

Sound Level Monitoring:

Problem	Cause	Solution
1. False high sound alarms occur frequently.	The programmed sound sensitivity results in over-sensitivity to non-alarm sound as well as alarm sound.	Reprogram the sound sensitivity. Refer to Chapter 5, Section 5.10.
	Sound Recognition Time is too short.	Lengthen the sound Recognition Time. Refer to Chapter 5, Section 5.10.
2. High sound does not cause an alarm.	The unit is not close enough to the high sound source, or the programmed sound setting results in a lack of sensitivity to high sound.	Move the unit closer or reprogram the sound sensitivity. Refer to Chapter 5, Section 5.10.

Other Monitoring:

Problem	Cause	Solution
1. Alarm status of an alert input is incorrect.	Incorrect input normality.	Reconfigure the input. See Chapter 5,Section 5.1.
2. False power out alarms	Programmed Recognition Time is too short.	AC power is often subject to brief interruptions. To avoid frequent, false alarms, increase the power Recognition Time. Refer to Chapter 5, Section 5.9.
3. The Model 1104 does not recognize power failure.	a) Batteries are either incorrectly installed or drained.	To verify proper battery function, unplug the unit and verify continued operation using batteries only. If unit ceases to function, first try reinstalling the batteries. If this is not successful, replace the batteries. Refer to Chapter 2, Section 2.4 for complete instructions.
	b) Recognition time setting is too long.	Reprogram Recognition Time. Set the Recognition Time to the minimum required before a valid alarm occurs. If possible, test the condition by deliberately creating an alert condition. Refer to Chapter 5, Section 5.9.
4. The Model 1104 does not recognize any alarm.	a) Inputs for alarm are disabled.	Enable the inputs for alarm. Refer to Chapter 5, Section 5.2.
	b) Programmed Recognition Time is too long.	Reprogram Recognition Time. Set the Recognition Time to the minimum required for a monitored condition to become a valid alarm. If possible, test the condition by deliberately creating an alert condition. Refer to Chapter 5, Section 5.3.

Other Monitoring:

Problem	Cause	Solution
1. The batteries drain prematurely.	The unit's AC transformer is unplugged or for some other reason, full AC power is not available to the unit.	The batteries will take over powering the unit when the AC transformer is unplugged from the 120 VAC outlet. When storing the unit, be sure to remove the batteries. Refer to Chapter 2, Section 2.4. Be sure to use alkaline batteries—do not use rechargeable nicad batteries.

If the solutions offered above do not appear to correct the problem, apply the following steps, in the order shown.

- Remove the batteries.
- Unplug the unit.
- Wait one minute for the Model 1104 to completely power down.
- Plug in the unit's AC adaptor into a standard 120 VAC outlet.
- Replace the batteries.
- Reconfigure the inputs. Refer to Chapter 5, Section 5.1.

Refer to Chapter 2, Installation, for additional information on batteries and installation procedures.

Appendix B

Accessories

The sensors listed below are available from Phonetics, and represent the most commonly used input devices. Other dry contact sensors, designed for more specialized applications, may also be used. Commercial or industrial electrical supply houses can provide devices to monitor virtually any condition. For further information, contact Phonetics Customer Service at (610) 558-2700.

MODEL NUMBER	SENSOR / SWITCH
FGD-0005	Remote Temperature Sensor
FGD-0006	Magnetic Reed Switch
FGD-0007	Passive Infra-Red Detector
FGD-0013	Water Detection Sensor
FGD-0022	Temp° Alert
FGD-0023	ISOTEL Surge Protector
FGD-0027	Humidistat

NOTES

Appendix C: Returning the Unit for Repair

In the event that the Model 1104 does not function properly, we suggest that you do the following:

1. Record your observations regarding the Model 1104's malfunction.
2. We recommend that you call the Customer Service Department at (610) 558-2700 prior to sending the unit to Phonetics for repair.

If the unit must be sent to Phonetics for servicing, please do the following:

1. Unplug the AC power supply from the wall outlet, remove the batteries, and disconnect all sensors from the alert inputs.
2. Carefully pack the unit to avoid damage in transit. Use the original container (if available) or a sturdy shipping box.
3. **You must include the following information to avoid processing delays:**
   a) **Your name, address, and telephone number.**
   b) **A note explaining the problem.**
4. Ship your package to the address below:

   SERVICE DEPARTMENT
   PHONETICS, INC.
   901 TRYENS ROAD
   ASTON, PA 19014

5. Ship prepaid and insured via UPS or US Mail to ensure a traceable shipment with recourse for damage or replacement.

1 YEAR LIMITED WARRANTY

1. **WARRANTOR:** Dealer, Distributor, Manufacturer

2. **ELEMENTS OF WARRANTY:** This Product is warranted to be free from defects in materials and craftsmanship with only the limitations and exclusions set out below.

3. **WARRANTY AND REMEDY:**

One-Year Warranty — In the event that the Product does not conform to this warranty at any time during the time of one year from original purchase, warrantor will repair the defect and return it to you at no charge

This warranty shall terminate and be of no further effect at the time the Product is (1) damaged by extraneous cause such as fire, water, lightning, etc. or not maintained as reasonable and necessary; (2) modified; (3) improperly installed; (4) repaired by someone other than warrantor; (5) used in a manner or purpose for which the Product was not intended; or (6) sold by original purchaser.

WARRANTORS' OBLIGATION UNDER THIS WARRANTY IS LIMITED TO REPAIR OR REPLACEMENT OF THE PRODUCT. THIS WARRANTY DOES NOT COVER PAYMENT OR PROVIDE FOR THE REIMBURSEMENT OF PAYMENT OF INCIDENTAL OR CONSEQUENTIAL DAMAGES.

It must be clear that the warrantors are not insuring your premises or guaranteeing that there will not be damage to your person or property if you use this Product. The warrantors shall not be liable under any circumstances for damage to your person or property or some other person or that person's property by reason of the sale of this product or its failure to operate in the manner in which it is designed. The warrantors' liability, if any, shall be limited to the original cost of the Product. The warrantors assume no liability for installation of the Product and/or interruptions of the service due to strikes, riots, floods, fire, and/or any cause beyond Seller's control.

4. **PROCEDURE FOR OBTAINING PERFORMANCE OF WARRANTY:** In the event that the Product does not conform to this warranty, the Product should be shipped or delivered freight prepaid to a warrantor with evidence of original purchase.

5. **LEGAL REMEDIES:** This warranty gives you specific legal rights, and you may also have other rights which vary from state to state to the extent allowed by law expressly in lieu of any other express or implied warranty, condition, or guarantee.

Effective date 7/01/90

PHONETICS, INC.
901 Tryens Road
Aston, PA 19014
(610) 558-2700
Fax (610) 558-0222

CLASS 9422
BRACKET MOUNTED OPERATING MECHANISMS

GENERAL

These Class 9422 Mechanisms are 30, 60 and 100 Amp Disconnect Switches and FA, KA, and LA Circuit Breakers with flange mounted operators. (See Table 1.)

ENCLOSURE CONSTRUCTION

Construct enclosure maintaining minimum dimensions shown in Figure 1.

INSTALLATION DISCONNECT SWITCH

1. Mounting
   Weld or rivet Interlock Blade Mounting Bracket to enclosure door. (See Figure 1). Attach Blade to Bracket with (2) 8-32x5/16 screws.
   Drill four holes in flange necessary to mount device. Cut out operator handle opening in enclosure flange. Mount Class 9422 Disconnect Switch to flange with (2) 1/4-20 x ½ screws from outside of flange. Place Trimplate over operator handle and attach to flange with (2) 8-32 x 1/2 screws from inside of flange.
2. Adjustment
   30, 60, 100 Amp Disconnect Switch Operating Mechanisms require no adjustment for proper operation.

CIRCUIT BREAKER

Assemble and adjust Circuit Breakers as shown on reverse side. Install Circuit Breakers using the same procedure as used for Disconnect Switches.

TABLE 1

CLASS 9422 TYPE Right Hand Mounted	DESCRIPTION
BC-1	30A. Disc. Sw. Non-Fusible
BD-1	60A. Disc. Sw. Non-Fusible
BE-1	100A. Disc. Sw. Non-Fusible
BN-1	FA (100A.) Circuit Breaker
BP-1	KA (225A.) Circuit Breaker
BR-1	LA (400A.) Circuit Breaker
CC-2	30A. Disc. Sw. w/30A. 250V. Fuse Clips
CC-3	30A. Disc. Sw. w/60A. 250V. Fuse Clips
CC-4	30A. Disc. Sw. w/60A. 600V. Fuse Clips
CC-6	30A. Disc. Sw. w/30A. 600V. Fuse Clips
CD-2	60A. Disc. Sw. w/60A. 250V. Fuse Clips
CD-3	60A. Disc. Sw. w/60A. 600V. Fuse Clips
GD-4	60A. Disc. Sw. w/100A. 250V. Fuse Clips
CD-6	60A. Disc. Sw. w/30A. 600V. Fuse Clips
CD-7	60A. Disc. Sw. w/100A. 600V. Fuse Clips
CE-2	100A. Disc. Sw. w/100A. 250V. Fuse Clips
CE-5	100A. Disc. Sw. w/100A. 600V. Fuse Clips

TABLE 2

DISCONNECT MEANS	DIMENSION A	B	C	D	MIN. ENCLOSURE DEPTH
30, 60, 100A Non-fusible	2 1/8	1 1/2	5 3/32	8 3/4	8
30, 60, 100A Fusible	2 1/8	1 1/2	5 3/32	8 3/4	10
FA	2 25/32	3/4	5 27/32	8	8
KA	3 17/32	3/4	6 3/32	8 3/8	8
LA	8 1/2	2 3/8	8 27/32	10 1/2	10

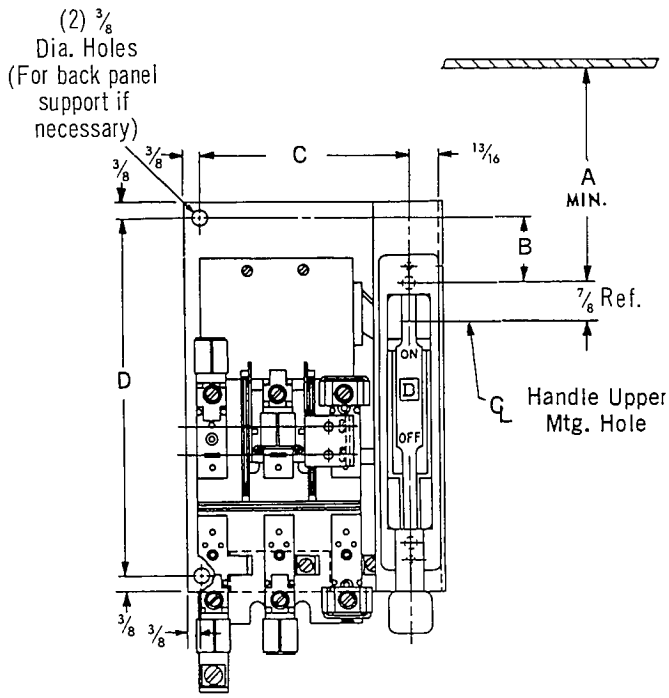
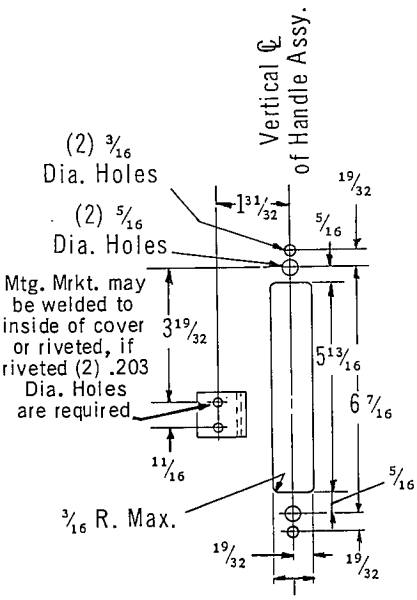
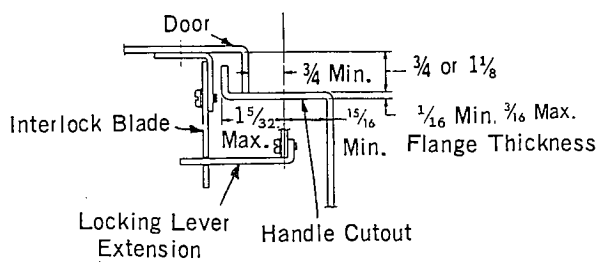


Figure 1





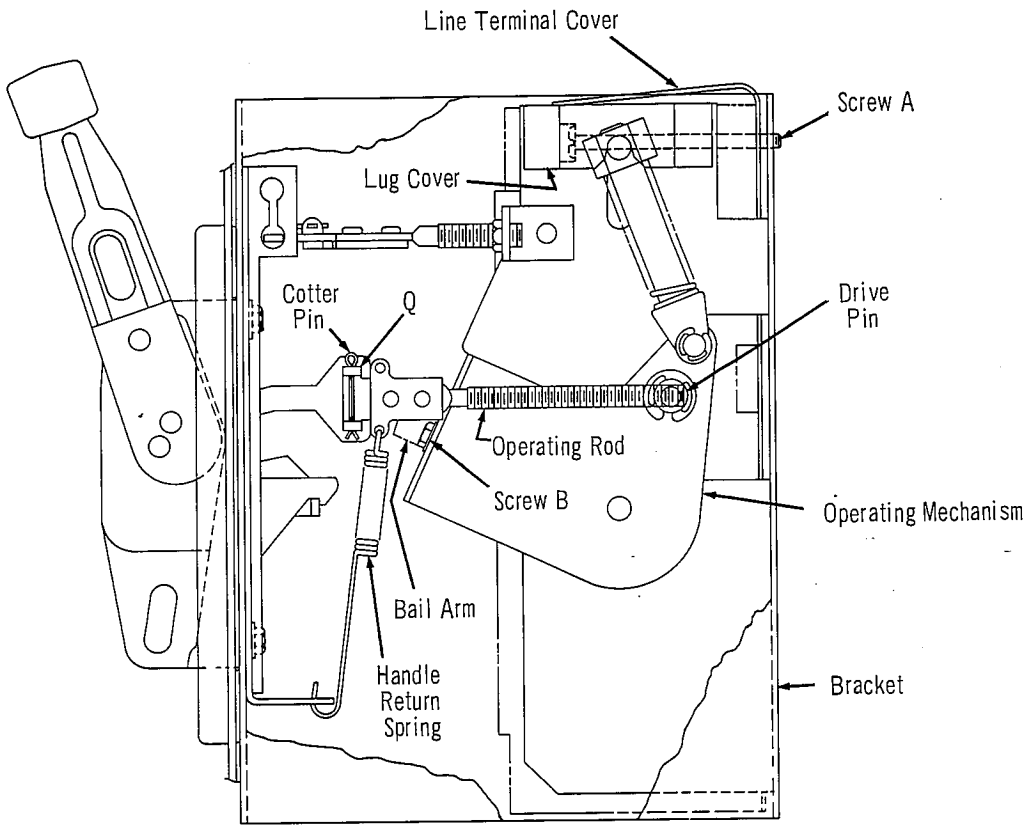


Figure 2

1. FA and KA Circuit Breaker Assembly
   Remove operating mechanism from bracket.
   Thread operating rod into drive pin:
   8 full turns for FA Circuit Breaker,
   10 full turns for KA Circuit Breaker.

   Mount line terminal cover, circuit breaker, and operating mechanism to bracket with (4) screws (A) as shown in Figure 2.

2. Adjustment FA and KA
   Place operating handle in ON position and connect operating rod to handle linkage with cotter pin, at point Q. Do not bend cotter pin.

   Push insulated recessed Push-To-Trip button on front of circuit breaker with a pencil or other small tool. This will cause breaker to trip.

   Attempt to reset breaker by moving operating handle to OFF position. When reset, breaker will turn ON and OFF with an audible snap. NOTE: If breaker does not reset, place handle in OFF position, disconnect linkage at Q, thread operating rod into drive pin one additional turn, reconnect linkage at Q and reset. Repeat this procedure until breaker resets. Bend cotter pin and attach handle return spring as shown in Figure 2.

3. For Class 9422–Type BR-1 and BRL-1 LA Circuit Breaker Mechanism Adjustment. (See Instruction Sheet 30072-303-50.)

   Install Circuit Breakers using the same procedure as used for Disconnect Switches.

SQUARE D
Instruction Bulletin

Bulletin No. 50006-354-01
November, 1992
Raleigh, NC, U.S.A.
Replaces 30072-303-02F dated 8/90

Variable Depth Operating Mechanism Class 9422 Type RN1 Series B

For use with Type FAL, FHL100 Ampere Frame Circuit Breaker

INTRODUCTION

This instruction bulletin contains installation instructions for the variable depth operating mechanism, Class 9422 Type RN1 Series B used with FAL, FHL 100 Ampere Frame Circuit Breakers.

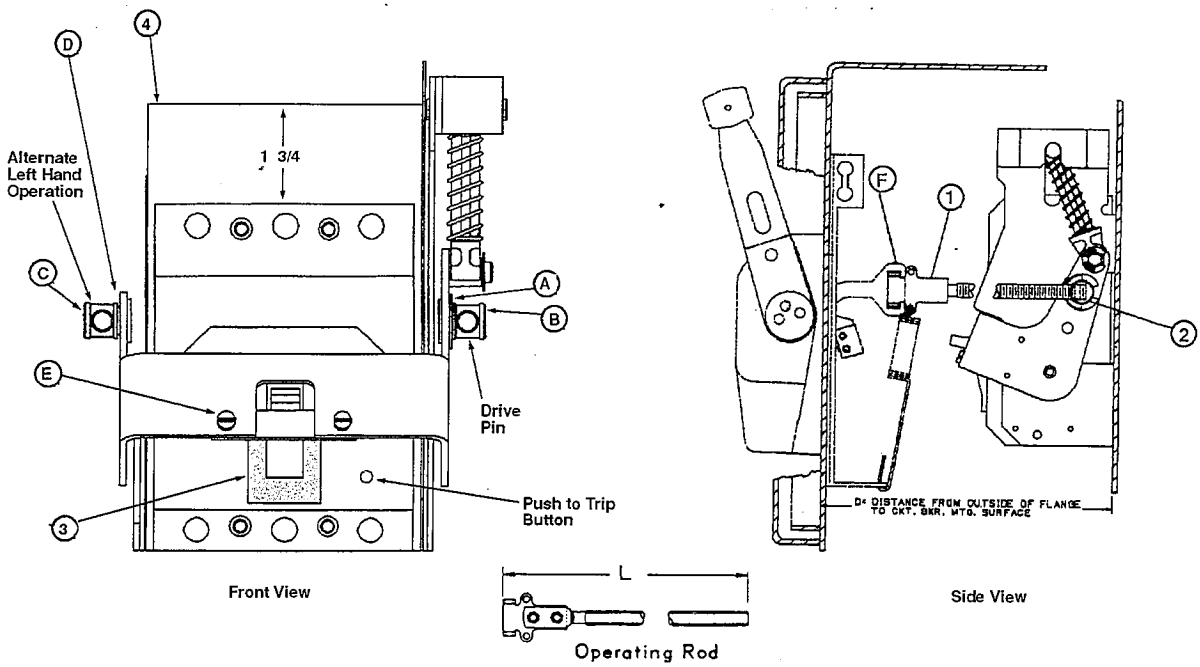


Figure 1 Variable Depth Operating Mechanism

CONTENTS OF KIT

Each variable depth operating mechanism kit contains the following:

Description	Quantity
Operating Mechanism Assembly	1
Screw Assembly (8-32 x 3 1/4")	4
Cotter Pin	1
Adhesive Backed Vinyl Mask	1
Operating Rod	1
Liner	1

⚠ DANGER

HAZARDOUS VOLTAGE.

Disconnect all power before working on equipment.

Electrical shock will cause severe injury or death.

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INSTALLATION

To install the operating mechanism (refer to Figure 1 for item locations):

1. Operating mechanism is assembled for right hand operation. For left hand flange mounting continue with the following conversion:
   - ❑ Remove E Ring at point A.
   - ❑ Move drive pin from position B to position C.
   - ❑ Reassemble E Ring at point D.
2. Location and drilling of panel mounting holes are shown in Figure 2.
3. Cut operating rod (item 1) to length (L = D-2 1/4).
4. Thread operating rod into drive pin (item 2) TEN full turns.
5. Attach adhesive backed vinyl mask (item 3) over "ON-OFF" markings on circuit breaker.
6. Slide liner (item 4) into the operating mechanism so it aligns with the mounting holes. **Check to see if the liner overhangs the top of the operating mechanism 1 3/4", if not, the liner is upside down and must be repositioned.** The liner is designed to wrap around the circuit breaker.
7. Before mounting the breaker, make sure the circuit breaker toggle and the operating mechanism are both in the ON position. Loosen both adjustment plate screws (item E), removing one so that the adjustment plate can be moved aside for breaker placement.
8. Slide the circuit breaker into the operating mechanism so it fits down over the two bottom extruded mounting holes.
9. Push the adjustment plate back into place.
10. Replace the adjustment plate screws (item E), secure and tighten.
11. After securing the adjustment plate screws, secure breaker and operating mechanism to the mounting surface with four screw assemblies (8- 32 x 3 1/4")
12. Install handle per handle instruction sheet.

⚠ CAUTION

HAZARD OF SPRING LOADED MOVING PARTS

• Keep hands free of mechanism during operation of device.

Failure to observe this precaution could result in personal injury.

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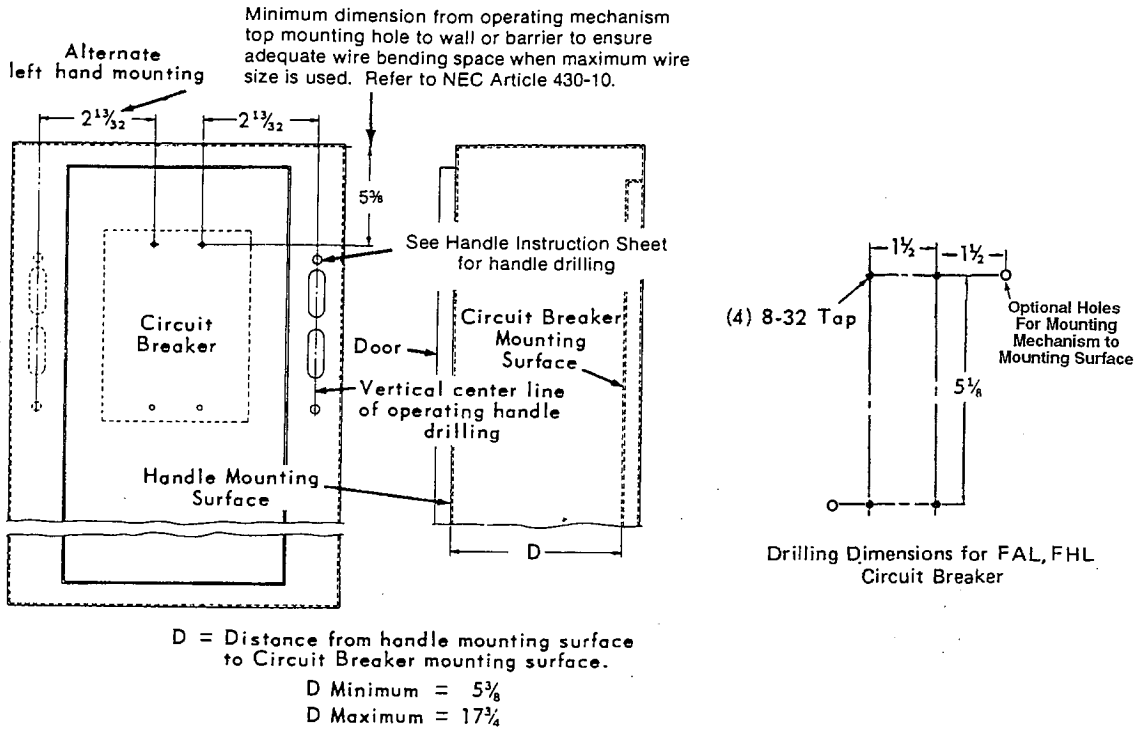


Figure 2 Location and Drilling of panel mounting holes

ADJUSTMENT

1. Place operating handle in ON position and connect operating rod to handle linkage with cotter pin at point F. Do not bend cotter pin.
2. Push the Push-To-Trip button on front of the circuit breaker with a small tool. This will cause the circuit breaker to trip.
3. Reset the circuit breaker by moving operating handle to the OFF position. When reset properly, the circuit breaker will turn ON and OFF with an audible snap.

NOTE

If the circuit breaker does not reset, place handle in the ON position, disconnect linkage at point F, thread the operating rod into the drive pin one additional turn, reconnect linkage at F and reset. Repeat this procedure until the circuit breaker resets.

4. When adjustment is attained, bend the cotter pin and attach handle return spring from operating handle kit.

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Replacement Parts List

Description	Part Number	Qty
Parts Kit	S31004-579-62	
Screw Assembly (8-32 x 3 1/4)		4
Cotter Pin (1/8 x 1 1/4)		1
Adhesive Backed Vinyl Mask		1
Operating Rod	Class 9422 Type R1	1
Liner	30002-032-01	1

PLEASE NOTE:

Electrical equipment should be serviced only by qualified electrical maintenance personnel, and this document should not be viewed as sufficient instruction for those who are not otherwise qualified to operate, service or maintain the equipment discussed. Although reasonable care has been taken to provide accurate and authoritative information in this document, no responsibility is assumed by Square D for any consequences arising out of the use of this material.

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SQUARE D
Instruction Bulletin

Bulletin No. 48940-158-03
June 1996
Cedar Rapids, IA, USA
ECN H591

FA, FC, FH, AND SFH CIRCUIT BREAKERS

I-LINE® CIRCUIT BREAKER INSTALLATION

NOTE: Install main circuit breaker adjacent to main lugs.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN OR EXPLOSION

- This equipment must be installed and serviced only by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors, and covers before turning on power to this equipment.

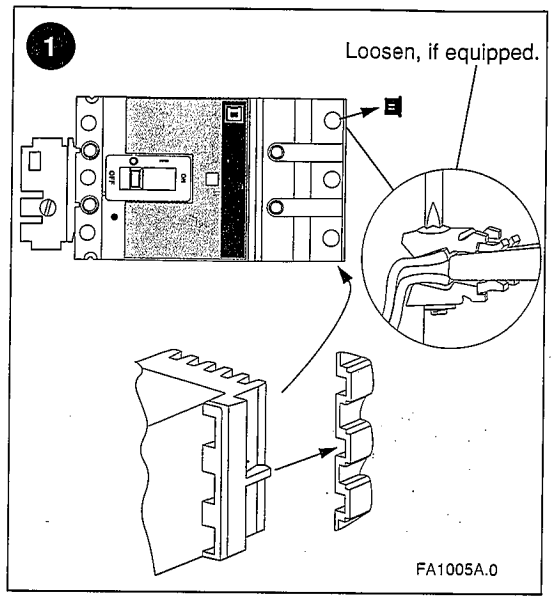
Failure to follow these instructions will result in death or serious injury.

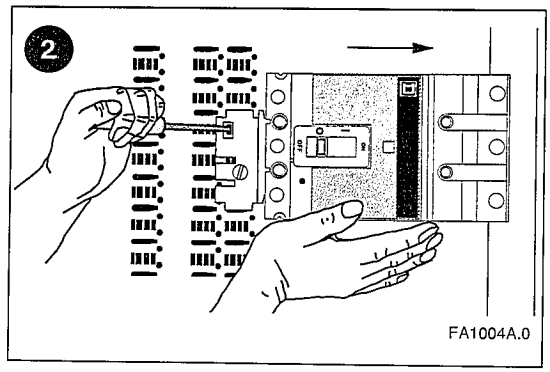
⚠ CAUTION

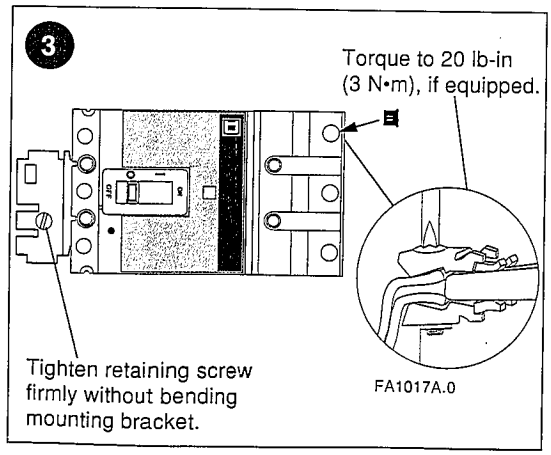
HAZARD OF OVERHEATING.

- Do not adjust plug-on jaws or remove joint compound from them.
- If necessary to replace lubricant, use Square D joint compound PJC7201.

Failure to follow these instructions can result in equipment damage.







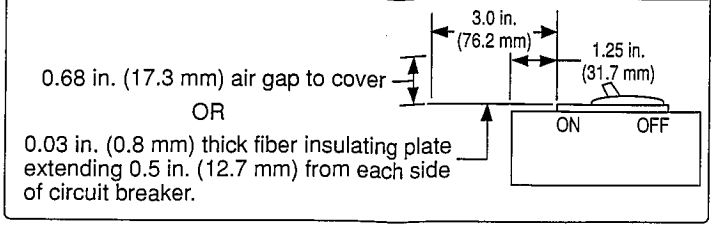
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INDIVIDUALLY-MOUNTED CIRCUIT BREAKER INSTALLATION

See last page for mounting dimensions.

⚠ CAUTION

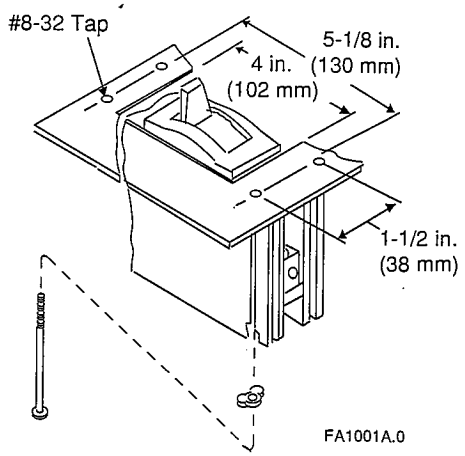
Hazard of equipment damage.
When mounted in metal box, cover must be insulated as shown.



FA1008A.1

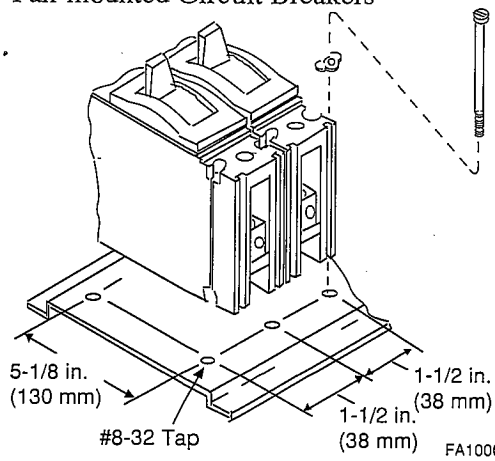
One-pole FA and FH Circuit Breakers

Front-mounted Circuit Breakers



FA1001A.0

Pan-mounted Circuit Breakers



FA1000A.0

FC, FH and SFH Circuit Breakers

⚠ DANGER

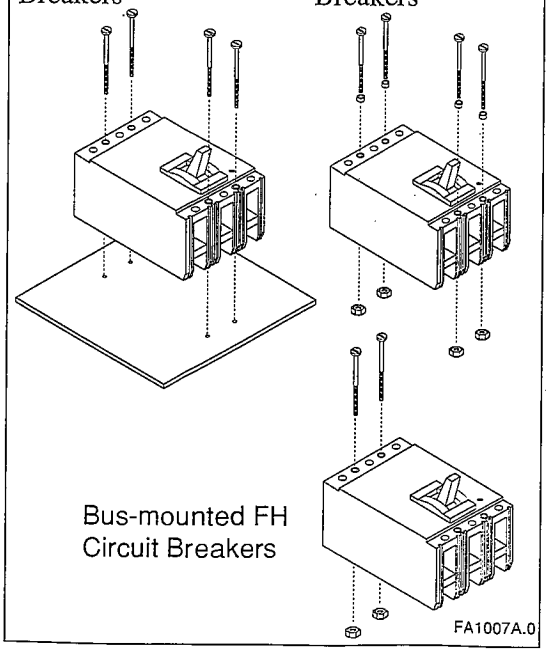
HAZARD OF ELECTRIC SHOCK OR BURN.

Mount circuit breaker as shown in these instructions to prevent cover separation under short-circuit conditions.

Failure to follow these instructions will result in death or serious injury.

Pan-mounted FC, FH and SFH Circuit Breakers

Bus-mounted FC and SFH Circuit Breakers



Bus-mounted FH Circuit Breakers

FA1007A.0

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WIRE INSTALLATION – ALL CIRCUIT BREAKERS

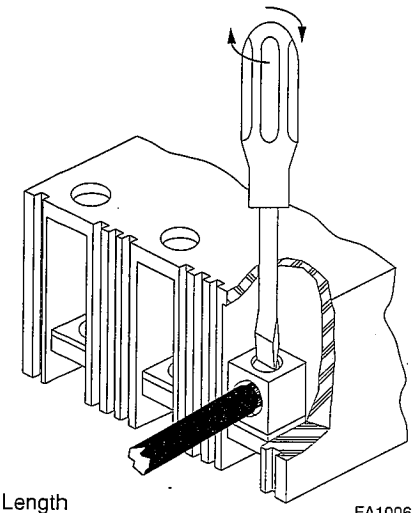
⚠ CAUTION

HAZARD OF FALSE TORQUE INDICATION.

Do not allow wire strands to interfere with threads of wire binding screw.

Failure to follow these instructions can result in equipment damage.

See circuit breaker faceplate label or optional lug instructions for wire size and torque.



Strip Length

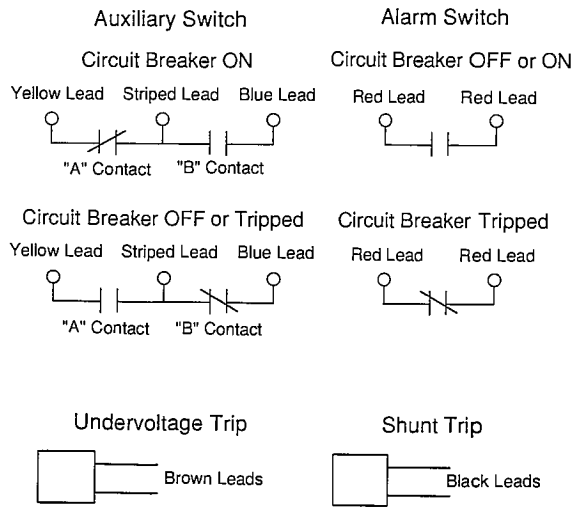


FA1006A.0

5/8 in. (16 mm)
3/4 in. (19 mm) for top feed lugs

FACTORY-INSTALLED ACCESSORIES

If circuit breaker has factory-installed accessories, refer to label on circuit breaker for electrical specifications and lead colors.



MS1172A.3

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PADLOCK CESSORY

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN OR EXPLOSION

When circuit breaker handle is padlocked OFF, always use a properly rated voltage sensing device to confirm power is off before working on equipment.

Failure to follow these instructions will result in death or serious injury.

With padlock accessory installed, circuit breaker does not comply with IEC 947 positive contact indication requirement for isolation.

CIRCUIT BREAKER REMOVAL

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN OR EXPLOSION

- This equipment must be installed and serviced only by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors, and covers before turning on power to this equipment.

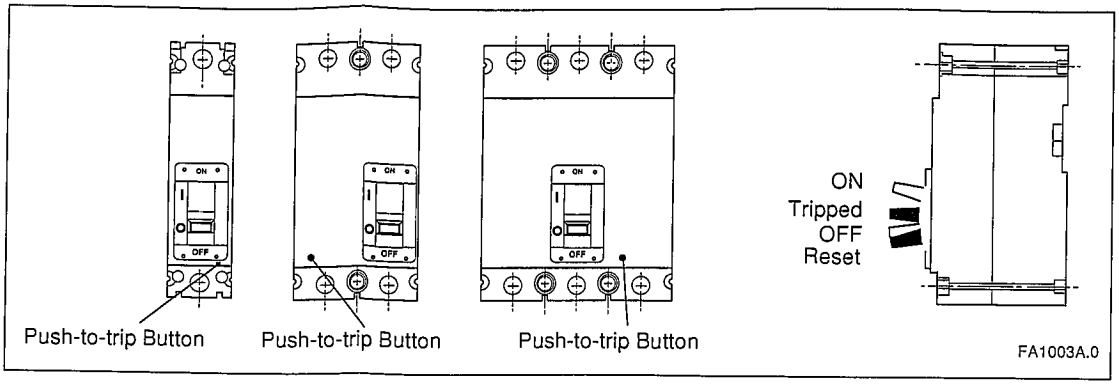
Failure to follow these instructions will result in death or serious injury.

Remove circuit breaker in reverse order of installation.

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CIRCUIT BREAKER OPERATION

Press push-to-trip button once a year to exercise circuit breaker.



TROUBLE-SHOOTING

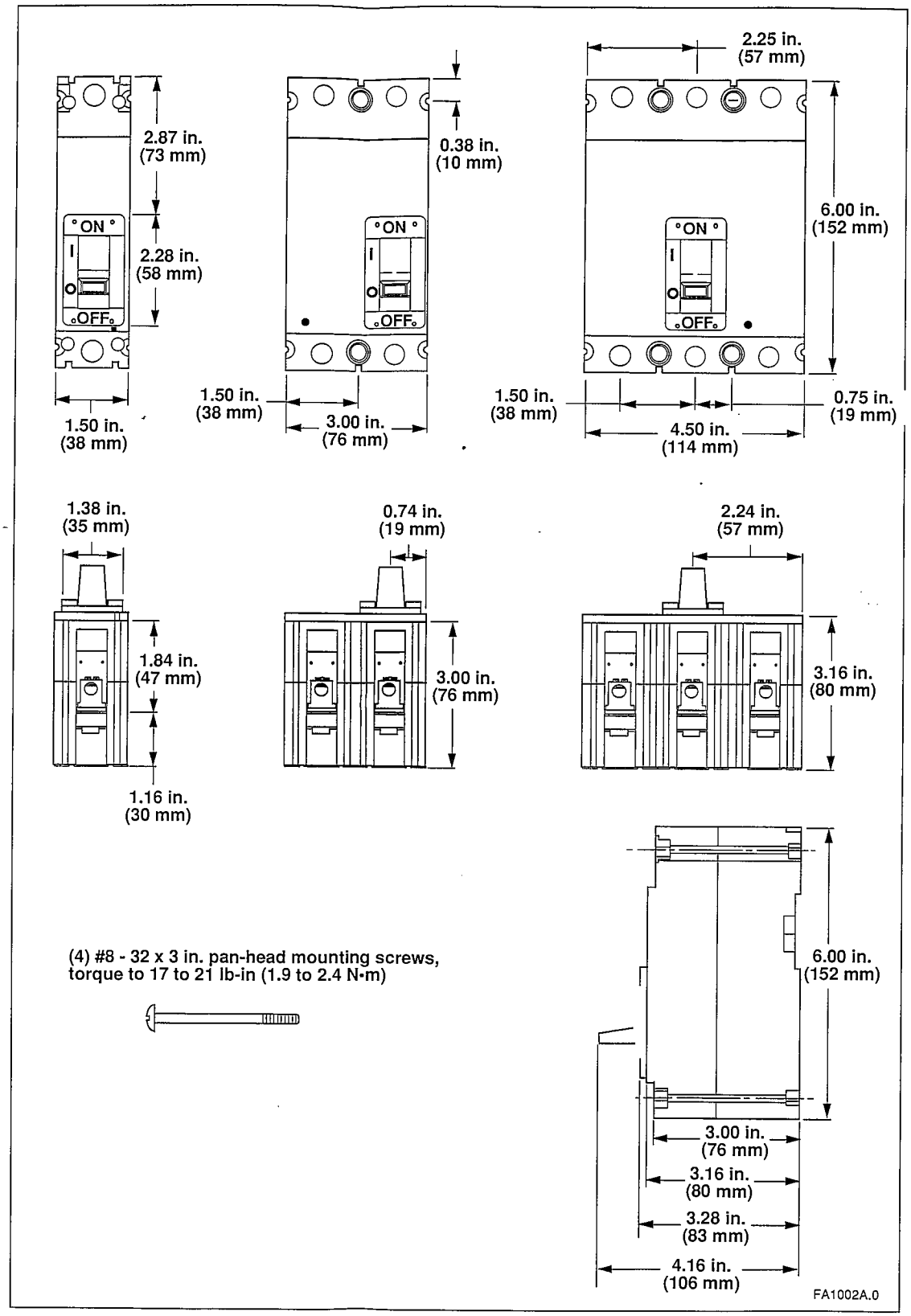
If problems occur during installation, refer to the following guide. If trouble persists, contact the local Square D Field Office.

CONDITION	POSSIBLE CAUSES	SOLUTION
Circuit breaker fails to stay closed.	1. Undervoltage trip not energized. 2. Shunt trip energized. 3. Short circuit or overload on system.	1. Energize undervoltage trip. 2. De-energize shunt trip. 3. Check system for short circuit or overload.
Circuit breaker trips, but no short circuit or overload is evident.	1. System voltage below under-voltage trip setting.	1. Check system for low voltage.
Push-to-trip button will not trip circuit breaker.	1. Circuit breaker already tripped or in the OFF position.	1. Move circuit breaker handle to reset then to ON position. Press push-to-trip button.

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DIMENSIONS

NOTE: Two-pole FC circuit breakers have the same dimensions as three-pole FC circuit breakers.



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PO Box 3069, 3700 Sixth St SW
Cedar Rapids IA 52406-3069 USA
Technical Services: 1-800-634-2003

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SQUARE D

Instruction Bulletin | Directives d'utilisation | Boletín de instrucciones

Ref. / réf. 278AS
30072-013-10C
Raleigh, NC, USA 12/95

AC Magnetic Contactors and Starters
Contacteurs et démarreurs magnétiques CA
Contactores y arrancadores magnéticos de ca

Class Classe Clase	Type Tipo	Series Série Serie	Sizes Tailles Tamaños	Poles Pôles Polos
8502 / 8536	SC	A / B	1 & 1P	2 & 3

INTRODUCTION

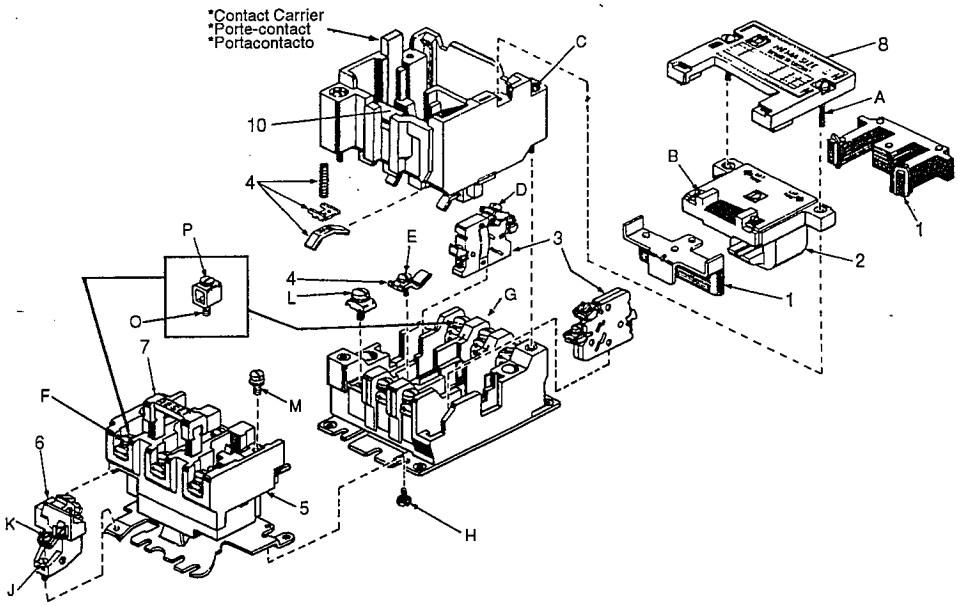
This bulletin provides assembly, modification and parts ordering instructions.

INTRODUCTION

Ce bulletin contient les directives pour assembler, modifier et commander des pièces.

INTRODUCCION

Este boletín incluye instrucciones de montaje, modificación y solicitud de piezas.



*Note: To ensure contacts are in the open position when the device is deenergized, the white portion of contact carrier must be flush with device cover (item 8).

*Remarque : Pour assurer que les contacts sont en position ouverte lorsque le dispositif est hors tension, la partie blanche du porte-contact doit être contre le couvercle du dispositif (article 8).

*Nota: Para asegurar que los contactos se encuentren en la posición abierta cuando el dispositivo está desenergizado, la parte blanca del portacontacto debe estar alineada con la cubierta del dispositivo (artículo 8).

Figure / Figura 1 Contactor and Starter Assembly / Assemblage de contacteur et de démarreur / Montaje de contactores y arrancadores

⚠ DANGER / PELIGRO

HAZARDOUS VOLTAGE.

Disconnect all power before working on equipment.

Electrical shock will cause death or severe injury.

TENSION DANGEREUSE.

Coupez l'alimentation avant de travailler sur cet appareil.

Une électrocution entraînera la mort ou des blessures graves.

TENSION PELIGROSA.

Desconecte toda la alimentación antes de efectuar cualquier trabajo en el equipo.

Las descargas eléctricas podrán causar la muerte o lesiones personales serias.

SERIES

Series B applies only to the Type S Starter Form B (3 ambient-compensated overloads). All parts of Form B Series A and B starters are interchangeable; only the overload relay block differs. If replacing the overload relay block of a Form B Series A starter with a Series B block, the overload relay thermal units must be selected from the Series B tables for proper motor protection.

SÉRIE

La série B n'est destinée qu'aux démarreurs type S, forme B (3 surcharges stabilisées en température). Toutes les pièces des démarreurs de forme B sont interchangeables pour les séries A et B ; seul le bloc-relais de surcharge est différent. Si on remplace le bloc-relais de surcharge d'un démarreur de forme B série A par un bloc-relais de série B, les unités thermiques du relais de surcharge doivent être sélectionnées dans les tableaux de sélection des unités

SERIE

La serie B se aplica solamente a los arrancadores tipo S, forma B (3 sobrecargas compensadas por temperatura). Todas las piezas de los arrancadores forma B series A y B son intercambiables; solamente el bloque del relevador de sobrecarga es diferente. Si reemplaza el bloque del relevador de sobrecarga de un arrancador forma B serie A con un bloque de la serie B, deberá seleccionar los elementos térmicos del relevador de sobrecarga de

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Replaces/Remplace/Reemplaza
30072-013-10B (2/94)

AUXILIARY CONTACTS

All contactors and starters feature a normally-open (N.O.) holding circuit contact. N.O. or normally-closed (N.C.) auxiliary contacts can be added in the field. Table 5 lists Class and Type. Bulletin 9999-287 and the Square D Digest contain application information.

COVER-MOUNTED CONTROL UNITS

NEMA Type 1 general purpose enclosures with slip-on or hinged covers contain knockouts for field addition of the kits listed in Table 1.

CONTACTS AUXILIAIRES

Tous les contacteurs et démarreurs sont dotés d'un contact de circuit de retenue normalement ouvert (N.O.). Des contacts auxiliaires N.O. ou des contacts normalement fermés (N.F.) peuvent être ajoutés sur place. Le tableau 5 dresse la liste des classes et des types autorisés. Le bulletin 9999-287 et l'aide-mémoire de Square D Digest contiennent des renseignements relatifs aux applications.

UNITÉS DE COMMANDE MONTÉES SUR COUVERCLE

Les armoires à usage général NEMA type 1 avec des couvercles à glissières ou à charnières contiennent des débouchures permettant l'ajout sur place des kits figurant au tableau 1.

CONTACTOS AUXILIARES

Todos los contactores y arrancadores contienen un contacto de circuito de sostén normalmente abierto (N.A.). Los contactos auxiliares normalmente cerrados (N.C.) o N.A. se pueden instalar en el local del cliente. La tabla 5 enumera su clase y tipo. El boletín 9999-287 y el Digest de Square D contienen información sobre su aplicación.

UNIDADES DE CONTROL PARA MONTAJE EN LA CUBIERTA

Los gabinetes NEMA tipo 1 para uso general con cubiertas deslizantes o abisagradas contienen agujeros ciegos para la adición de los accesorios enumerados en la tabla 1 los cuales pueden ser instalados en el local del cliente.

Table/Tableau/Tabla 1 Field Modification Kits, Class 9999/Kits de modification sur place, classe 9999 / Accesorios para la modificación en el local del cliente, clase 9999

Kit / Kits / Accesorio	Slip-On Cover Couvercle à glissières Cubierta deslizante	Hinged Cover Couvercle à charnières Cubierta abisagrada	Form (Factory Mod.) Forme (mod. d'usine) Forma (modelo de fábrica)
Push button, Start-Stop / Bouton-poussoir, Démarrage-Arrêt Botón pulsador, arranque-parada	SA2	SA3	A
Push button, On-Off / Bouton-poussoir, Marche-Arrêt Botón pulsador, encendido-apagado	SA10	SA3	A3
Selector switch, Hand-Off-Auto / Interrupteur de sélection, Manuel-Arrêt-Auto / Interuptor selector, manual-apagado-auto	SC2	SC8	C
Selector switch, On-Off / Interrupteur de sélection, Marche-Arrêt / Interruptor selector, encendido-apagado	SC22	...	C6
Red pilot light / Lumière témoin rouge / Lámpara piloto roja	SP15R	SP28R [1]	P1

[1] For 120 V only. For other voltages, use Class 9001 Type KP units.
[1] Pour 120 V seulement. Autres tensions : utiliser les unités de classe 9001 type KP.
[1] Para 120 V solamente. Para otras tensiones, utilice las unidades clase 9001 tipo KP.

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OVERLOAD RELAYS

Standard: Melting alloy overload relay: incorporates one or three thermal units. Its contact unit (item 6 in Figure 1) is available with a N.O. or N.C. isolated alarm contact, in addition to the standard N.C. contact. The contact unit with alarm circuit contacts is field-installable (see Table 5).

Optional: Non-temperature compensated bimetallic overload relay: Form B1 incorporates two thermal units; Form B2 incorporates three thermal units.

Ambient-temperature compensated bimetallic overload relay (Form B): incorporates three thermal units.

SPDT contact (all Type S bimetallic overload relays): The N.O. contact can be used in an alarm circuit, and its wiring polarity must match that of the N.C. contact. Contacts are not replaceable. Use Table 5 to order replacement bimetallic overload relays.

Overload relays are not field-repairable. Do not disassemble.

TERMINALS

Use **only copper wire** on device power and control terminals. Pressure wire power terminals are suitable for wire sizes 14-8 AWG (2.5-6 mm^2), solid or stranded. Pressure wire control terminals are suitable for wire sizes 16-12 AWG (1.5-4 mm^2), solid or stranded.

CONTACT INSPECTION AND REPLACEMENT

Discoloration and slight pitting do not harm contacts. **Do not file contacts;** this wastes contact material. Replace contacts (item 4 in Table 5) only when worn thin.

To inspect or replace contacts, disconnect all power. Do not remove any wiring. Loosen the two captive screws (C) holding the contact actuator to the contact block. Lift the contact actuator to expose the contacts.

RELAIS DE SURCHARGE

Standard : Relais de surcharge à fusion d'alliage : incorpore une ou trois unités thermiques. Son unité de contact (article 6, Figure 1) est disponible avec un contact d'alarme isolé N.O. ou N.F. en plus du contact N.F. standard. L'unité de contact avec les contacts de circuit d'alarme peut être installée sur place (voir le tableau 5).

En option : Relais de surcharge bimétallique non stabilisé en température : La forme B1 incorpore deux unités thermiques, la forme B2 incorpore trois unités thermiques.

Relais de surcharge bimétallique stabilisé en température (forme B) : incorpore trois unités thermiques.

Contact UPBD (tous les relais de surcharge bimétalliques de type S) : Le contact N.O. peut être utilisé dans un circuit d'alarme et la polarité de son câblage doit correspondre à celle du contact N.F. Les contacts ne peuvent pas être remplacés. Utiliser le tableau 5 pour commander des relais de surcharge bimétalliques de rechange.

Les relais de surcharge ne peuvent pas être réparés sur place. Ne pas les démonter.

BORNES

Utiliser uniquement des fils de cuivre sur les bornes d'alimentation et de commande du dispositif. Les bornes d'alimentation des fils à pression conviennent pour des fils conducteurs de calibre 14-8 AWG (2,5 - 6 mm^2), à un ou plusieurs brins. Les bornes de commande des fils à pression conviennent pour des fils conducteurs de calibre 16-12 AWG (1,5 - 4 mm^2), à un ou plusieurs brins.

INSPECTION ET REMPLACEMENT DES CONTACTS

La décoloration ou de légères piqûres de surface n'altèrent en rien les contacts. Ne **pas limer les contacts;** ceci abîme le matériau du contact. Ne remplacer les contacts que lorsqu'ils sont usés (article 4, tableau 5).

Pour inspecter ou remplacer les contacts, mettre l'ensemble hors tension. Ne pas retirer le câblage. Desserrer les deux vis prisonnières (C) en maintenant l'actionneur de contact contre le bloc à

RELEVADORES DE SOBRECARGA

Estándar: Relevador de sobrecarga de aleación fusible: incorpora uno o tres elementos térmicos. Su unidad de contacto (artículo 6 en la figura 1) se encuentra disponible con un contacto de alarma aislado N.A. o N.C., además del contacto estándar N.C. La unidad de contacto con los contactos de circuito de alarma se puede instalar en el local del cliente (vea la tabla 5).

Opcional: Relevador de sobrecarga bimetálico no compensado por temperatura: La forma B1 incorpora dos elementos térmicos; la forma B2 incorpora tres elementos térmicos.

Relevador de sobrecarga compensado por la temperatura ambiente (forma B): incorpora tres elementos térmicos.

Contacto 1P2T (todos los relevadores de sobrecarga bimetálicos tipo S): El contacto N.A. puede ser usado en un circuito de alarma y su polaridad de cableado debe corresponder con la polaridad del contacto N.C. Los contactos no se pueden reemplazar. Utilice la tabla 5 para solicitar repuestos de los relevadores de sobrecarga bimetálicos.

Los relevadores de sobrecarga no se pueden reparar en el local del cliente. No los desmonte.

TERMINALES

Utilice sólo conductores de cobre en las terminales de alimentación y control del dispositivo. Las terminales de alimentación de los conductores a presión son adecuadas para tamaños de cable calibre 14 - 8 (2.5 - 6 mm^2), sencillo o múltiple. Las terminales de control de los conductores a presión son adecuadas para tamaños de cable calibre 16 - 12 (1.5 - 4 mm^2), sencillo o múltiple.

INSPECCION Y REEMPLAZO DE CONTACTOS

La descoloración y picadura liviana no dañan los contactos. **No lime los contactos;** esto desperdicia el material del contacto. Reemplace los contactos (artículo 4 en la tabla 5) sólo cuando estén desgastados.

Para inspeccionar o reemplazar los contactos, desconecte toda la alimentación. No retire el cableado. Desatornille los dos tornillos imperdibles (C) sosteniendo el actuador de contacto

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The Class 9998 Type SL22 kit contains replacement contacts and springs for **power pole kits** only. Each N.O. or N.C. contact requires one kit.

MANUAL OPERATION

contacts. Soulever l'actionneur des contacts pour faire apparaître ces derniers.

Le kit de classe 9998 type SL22 contient des contacts et des ressorts de rechange uniquement pour des **kits de pôles d'alimentation.** Chaque contact N.O. ou N.F requiert un kit.

FONCTIONNEMENT MANUEL

al bloque de contactos. Levante el actuador de contacto para exponer los contactos.

El accesorio clase 9998 tipo SL22 contiene contactos y resortes de repuesto solamente para los **accesorios de los polos de potencia.** Cada contacto N.A. o N.C. requiere un accesorio.

FUNCIONAMIENTO MANUAL

⚠ WARNING/AVERTISSEMENT/ADVERTENCIA

HAZARDOUS VOLTAGE.

Disconnect all power before manually operating equipment.

Manual operation with power on can cause contact arcing and unexpected load energization, resulting in personal injury or equipment damage.

TENSION DANGEREUSE.

Coupez l'alimentation avant d'actionner manuellement cet appareil.

Le fonctionnement manuel de l'appareil sous tension peut provoquer un arc électrique de contact ou une alimentation inattendue de la charge, entraînant des blessures ou des dommages matériels.

TENSION PELIGROSA.

Desconecte toda la alimentación antes de hacer funcionar manualmente el equipo.

El funcionamiento manual con la alimentación conectada puede causar la formación de arcos y la energización inesperada de carga, lo cual puede resultar en lesiones personales serias o daño al equipo.

Manually operate the contactor/starter with a screwdriver by pushing down the contact carrier. The coil cover has a slot for this use.

Actionner manuellement le contacteur et le démarreur en poussant le porte-contact vers le bas avec un tournevis. Le couvercle de la bobine possède une fente réservée à cet usage.

Haga funcionar manualmente el contactor/arrancador con un desarmador oprimiendo el portacontacto hacia abajo. La cubierta de la bobina tiene una ranura para este uso.

COIL REPLACEMENT

To remove the coil, loosen the two captive cover screws (item A, Figure 1). Disconnect the wires from the coil terminals and remove the cover. Remove and disassemble the magnet, coil and armature.

To replace the coil, first assemble the magnet, replacement coil and armature. Manually operate the contact carrier (described in "Manual Operation") and insert the complete unit. Before installing the cover, manually operate the device to ensure that all parts function properly. Use the tightening torques listed in Table 2 when reassembling the device.

REMPLACEMENT DE LA BOBINE

Pour retirer la bobine, desserrer les deux vis prisonnières du couvercle (article A, figure 1). Débrancher les fils des bornes de la bobine et ôter le couvercle. Enlever et démonter l'aimant, la bobine et l'armature.

Pour remplacer la bobine, assembler l'aimant, la bobine de rechange et l'armature. Actionner manuellement le porte-contact (comme décrit dans «Fonctionnement manuel») et insérer l'unité complète. Avant d'installer le couvercle, actionner manuellement le dispositif pour s'assurer que toutes les pièces fonctionnent correctement. Pour remonter le dispositif, utiliser les couples de serrage figurant au tableau 2.

REEMPLAZO DE LA BOBINA

Para retirar la bobina, desatornille los dos tornillos imperdibles de la cubierta (artículo A en la figura 1). Desconecte los cables de las terminales de la bobina y quite la cubierta. Retire y desmonte la bobina, el imán y la armadura.

Para reemplazar la bobina, ensamble el imán, la bobina de repuesto y la armadura. Haga funcionar manualmente el portacontacto (descrito en "Funcionamiento manual") y coloque la unidad completa. Antes de instalar la cubierta, haga funcionar manualmente el dispositivo y asegúrese de que todos sus componentes estén funcionando adecuadamente. Utilice los pares de apriete enumerados en la tabla 2 cuando vuelva a montar el dispositivo.

ASSEMBLY

Figure 1 illustrates the contactor and starter assembly. Table 2 and the device instructions list factory recommended torques for mechanical, electrical and pressure wire connections. Use these torques to ensure proper device operation.

ASSEMBLAGE

La figure 1 représente l'assemblage contacteur-démarreur. Le tableau 2 et les directives du dispositif donnent la liste des couples de serrage recommandés par l'usine pour des connexions mécaniques, électriques et des fils à pression. Utiliser ces couples pour assurer un fonctionnement correct du dispositif.

MONTAJE

La figura 1 ilustra el montaje del arrancador y contactor. La tabla 2 y las instrucciones del dispositivo proporcionan los pares de apriete recomendados por el fabricante para las conexiones mecánicas, eléctricas y de los conductores a presión. Utilice estos pares de apriete para asegurar el funcionamiento correcto del dispositivo.

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Table / Tableau / Tabla 2 Factory Recommended Tightening Torques / Couples de serrage recommandés par l'usine / Pares de apriete recomendados de fábrica

Item Art.	Description / Descripción	Tightening Torque Couple de serrage Par de apriete	
		lb-in / lb-po lb-pulg	N•m
A	Cover screw (2 per cover) / Vis de couvercle (2 par couvercle) / Tornillo de la cubierta (2 por cubierta)	18 - 21	2.0 - 2.3 2,0 - 2,3
B	Coil terminal pressure wire connector (2 per coil) / Connecteur des fils à pression aux bornes de la bobine (2 par bobine) / Conector de los conductores a presión de la terminal de la bobina (2 por bobina)	9 - 12	1.0 - 1.3 1,0 - 1,3
C	Power plant screws (4 per device) / Vis du groupe électrogène (4 par dispositif) / Tornillo de la planta de alimentación (4 por dispositivo)	18 - 21	2.0 - 2.3 2,0 - 2,3
D	Internal auxiliary contact pressure wire connector (2 per contact) / Connecteur des fils à pression du contact auxiliaire interne (2 par contact) / Conector de los conductores a presión del contacto auxiliar interno (2 por contacto)	9 - 12	1.0 - 1.3 1,0 - 1,3
E	Stationary contact fastener (2 per pole) / Attache du contact stationnaire(2 par pôle) / Sujetador del contacto estacionario (2 por polo)	6 - 9	0.68 - 1.0 0,68 - 1,0
F	Lug screw (2 per pole) / Vis de cosse (2 par pôle) / Tornillo de la zapata (2 por polo)	[1]	[1]
G	Auxiliary wire binding screw / Vis de fixation du fil auxiliaire / Tornillo de sujeción de los conductores auxiliar	18 - 21	2.0 - 2.3 2,0 - 2,3
H	Overload relay fastening screw (2 per overload block) / Vis de fixation du relais de surcharge (2 par bloc de surcharge) / Tornillo sujetador del relevador de sobrecarga (2 por bloque de sobrecarga)	18 - 21	2.0 - 2.3 2,0 - 2,3
J	Overload switch module fastening screw (1 per module) / Vis de fixation du module d'interrupteur de surcharge (1 par module) / Tornillo sujetador del módulo del interruptor de sobrecarga (1 por módulo)	9 - 12	1.0 - 1.3 1,0 - 1,3
K	Switch module pressure wire connector (2 per module standard; 4 per module w/ alarm circuit contact) Connecteur des fils à pression du module d'interrupteur (2 par module en standard ; 4 par module avec contact de circuit d'alarme) / Conector de los conductores a presión del módulo del interruptor (2 por módulo estándar; 4 por módulo con contacto de circuito de alarma)	9 - 12	1.0 - 1.3 1,0 - 1,3
L	Overload-to-contactor fastener (1 per pole) / Dispositif de fixation unité de surcharge-contacteur (1 par pôle) / Sujetador de sobrecarga a contactor (1 por polo)	18 - 21 [2]	2.0 - 2.3[2] 2,0 - 2,3[2]
M	Overload thermal unit fastening screw (2 per pole) / Vis de fixation de l'unité thermique de surcharge (2 par pôle) / Tornillo sujetador del elemento térmico de sobrecarga (2 por polo)	18 - 21	2.0 - 2.3 2,0 - 2,3[2]
O	Lug retaining screw - Size 1P only (1 per pole) / Vis de retenue de cosse - Taille 1P seulement (1 par pôle) / Tornillo sostenedor de la zapata- Tamaño 1P solamente (1 por polo)	18 - 21	2.0 - 2.3 2,0 - 2,3[2]

[1] See instructions supplied with the device.
[1] Voir les directives accompagnant le dispositif.
[1] Siga las instrucciones que vienen incluidas con el dispositivo.

[2] For contactor, see instructions supplied with the device.
[2] Pour le contacteur, voir les directives accompagnant le dispositif.
[2] Para el contactor, siga las instrucciones que vienen incluidas con el dispositivo.

SHORT-CIRCUIT PROTECTION

Provide branch-circuit overcurrent protection for starters, referring to instructions supplied with the thermal unit selection table. Provide branch-circuit overcurrent protection for contactors (Class 8502 or 8702) in accordance with the National Electrical Code. Do not exceed the maximum protective device ratings listed in Table 3.

PROTECTION CONTRE LES COURTS-CIRCUITS

Fournir un dispositif de protection d'artère pour démarreurs, conformément aux directives figurant dans le tableau de sélection de l'unité thermique. Fournir un dispositif de protection d'artère pour contacteurs (classe 8502 ou 8702) conformément au Code national de l'électricité (National Electrical Code). Ne pas dépasser l'intensité nominale maximale du dispositif de protection figurant au tableau 3.

PROTECCION CONTRA CORTOCIRCUITO

Proporcione protección contra sobrecorriente de circuito de derivación a los arrancadores, consultando las instrucciones incluidas con la tabla de selección del elemento térmico. Proporcione protección contra sobrecorriente de circuito de derivación a los contactores (clase 8502 ó 8702) de acuerdo con los reglamentos de instalaciones eléctricas nacionales. No exceda las capacidades máximas del dispositivo protector que se enumeran en la tabla 3.

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Table / Tableau / Tabla 3 Maximum Ampere Ratings / Intensités de courant nominales maximales / Capacidades máximas en amperes

Maximum Voltage Tension maximal Tensión máxima (V)	Class K5, RK5 or RK1 Fuse Fusible de classe K5, RK5 ou RK1 Fusible clase K5, RK5 o RK1 (A)	Class J or T Fuse Fusible de classe J ou T Fusible clase J o T (A)	Inverse-Time Circuit Breaker Disjoncteur à retardement Interruptor automático de retardo dependiente (A)
600	30	60	40
250	40	60	60

DISTANT CONTROL

Depending upon the voltage, wire size and number of control wires used, series impedance or shunt capacitance may limit the maximum distance of the wire run for remotely-operated contactors and starters. If distances to start or stop stations exceed those listed in Table 4, analyze the wire-run configuration and materials. For further information, request Product Data Bulletin M379 from your local Square D sales office.

COMMANDE À DISTANCE

Selon la tension, le calibre du fil et le nombre de fils de commande utilisés, l'impédance de série ou la capacité shunt peut limiter la longeur maximale du câblage des contacteurs et des démarreurs commandés à distance. Si les distances aux postes de départ ou d'arrêt dépassent celles figurant dans le tableau 4, analyser la configuration et les matériaux du câblage des conducteurs. Pour de plus amples informations, consulter le bulletin M379 sur les données des produits, auprès du bureau local de ventes de Square D.

CONTROL A DISTANCIA

Dependiendo de la tensión, del calibre del conductor y de la cantidad de conductores de control que se usan, la impedancia en serie o la capacitancia en derivación puede limitar la distancia máxima del tendido de cables de contactores y arrancadores que se hacen funcionar remotamente. Si las distancias a las estaciones de arranque o parada exceden aquéllas enumeradas en la tabla 4, analice la configuración del tendido de cables y los materiales. Para obtener más información, solicite el boletín de datos del producto M379 de su oficina local de ventas de Square D.

Table / Tableau / Tabla 4 Maximum Control Distance for Copper Wire / Distance de commande maximale pour fil de cuivre / Distancia máxima de control del conductor de cobre

Coil Voltage @ 60 Hz Tension de bobine à 60 Hz Tensión de la bobina @ 60 Hz (V)	Maximum Control Distance / Distance maximale de commande / Distancia máxima de control			
	14 AWG (2.5 mm²) / 14 AWG (2,5 mm²) Calibre 14 (2.5 mm²)		12 AWG (4 mm²) / 12 AWG (4 mm²) Calibre 12 (4 mm²)	
	ft / pieds / pies	m	ft / pieds / pies	m
120	845	258	1300	396
240	595	181	495	151
480	145	44	120	36

PARTS ORDERING

Specify quantity, part number or Class and Type and part description, giving complete nameplate data of the device (e.g., one armature and magnet kit 31041-605-50 for a Class 8536 Type SCO3 Series A starter).

COMMANDE DE PIÈCES

Spécifier la quantité, le numéro de pièce ou la classe et le type, ainsi que la description de la pièce, en donnant tous les renseignements figurant sur la plaque signalétique du dispositif (par ex., kit d'armature et d'aimant 31041-605-50 pour un démarreur de classe 8536 type SCO3 série A).

SOLICITUD DE PIEZAS

Especifique la cantidad, el número de pieza o clase y tipo, y descripción de la pieza, proporcionando los datos completos de la placa de identificación del dispositivo (p.ej., un accesorio de imán y armadura 31041-605-50 para un arrancador serie A, clase 8536 tipo SCO3).

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Table / Tableau / Tabla 5 Parts List / Liste de pièces / Lista de piezas

Item Art.	Description / Descripción	Part Number Nº de pièce Número de pieza	Quantity / Quantité / Contenido 1-Pole 1 pôle 1 polo	2-Pole 2 pôles 2 polos	3-Pole 3 pôles 3 polos	4-Pole 4 pôles 4 polos	5-Pole 5 pôles 5 polos
1	Armature and magnet kit / Kit d'armature et d'aimant / Accesorio de imán y armadura	31041-605-50	1	1	1	1	1
2	Coil / Bobine / Bobina	See Table 6 Voir le tableau 6 Vea la tabla 6	1	1	1	1	1
3	Internal auxiliary contact / Contact auxiliaire interne / Contacto auxiliar interno N.O. N.O. N.A. N.C. N.F. N.C.	Class / Classe / Clase 9999: Type / tipo SX11 Type / tipo SX12	[3] ...	[3] ...	1 ...	1 ...	1 ...
4	Contact kit / Kit de contact / Accesorio de contacto	Class / Classe / Clase 9998: Type / tipo SL3 Type / tipo SL13 Type / tipo SL13 & SL22	1	1	1	... 1 ...	 1
5	Melting alloy overload relay assembly / Assemblage de relais de surcharge à fusion d'alliage / Ensamblaje del relevador de sobrecarga de aleación fusible 1 Element / 1 élément / 1 elemento 2 or 3 Element / 2 ou 3 éléments / 2 ó 3 elementos	Class / Classe / Clase 9065: Type / tipo SDO4 Type / tipo SDO5	1 ...	1 ...	... 1	... 1	... 1
[1] 5	Bimetallic overload relay / Relais de surcharge bimétallique / Relevador de sobrecarga bimetálico Non-compensated / Non stabilisé en température / No compensado 2 Element (Form B1) / 2 éléments (forme B1) / 2 elementos (forma B1) 3 Element (Form B2) / 3 éléments (forme B2) / 3 elementos (forma B2) Compensated / Stabilisé en température / Compensado 3 Element (Form B) / 3 éléments (forme B) / 3 elementos (forma B)	Class / Classe / Clase 9065: Type / tipo SDO5B1 Type / tipo SDO6B2 Class / Classe / Clase 9065: Type / tipo SDO6B	... ...	... ...	... ...	... ...	... ...
6	Melting alloy overload contact unit / Unité de contact de surcharge à fusion d'alliage Unidad de contacto de sobrecarga de aleación fusible	Class / Classe / Clase 9998: Type / tipo SO1	1	1	1	1	1
[1] 6	Melting alloy overload contact unit w/ alarm circuit / Unité de contact de surcharge à fusion d'alliage avec circuit d'alarme / Unidad de contacto de sobrecarga de aleación fusible con circuito de alarma N.O. alarm contact / Contact d'alarme N.O. / Contacto de alarma N.A. N.C. alarm contact / Contact d'alarme N.F. / Contacto de alarma N.C.	Class / Classe / Clase 9999: Type / tipo SO4 Type / tipo SO5	... ...	... ...	... ...	... ...	... ...
7	Reset bar / Barre de réarmement / Barra de restablecimiento	31034-042-01	1	1	1	1	1
8	Cover only (nameplate not included) / Couvercle seulement (plaque signalétique non incluse) / Cubierta solamente (placa de identificación no incluida)	31127-013-01	1	1	1	1	1
[1]	External auxiliary contact / Contact auxiliaire externe / Contacto auxiliar externo 1 N.O. / 1 N.A. 1 N.C. / 1 N.F. / 1 N.C. 1 N.O. and 1 N.C. / 1 N.O. et 1 N.F. / 1 N.A. y 1 N.C. 1 N.O., overlapping / 1 N.O., chevauchement / 1 N.A., con recubrimiento 1 N.C., overlapping / 1 N.F., chevauchement / 1 N.C., con recubrimiento	Class / Classe / Clase 9999: Type / tipo SX6 Type / tipo SX7 Type / tipo SX8 Type / tipo SX9 Type / tipo SX10	... ...	... ...	... ...	... ...	... ...
[1]	Power pole kit / Kit de pôle d'alimentation / Accesorio del polo de potencia 1 N.O. / 1 N.A. 2 N.O. / 2 N.A.	Class / Classe / Clase 9999: Type / tipo SB6 Type / tipo SB9	... ...	... ...	... ...	1 ...	... 1
[2] 10	Lever bearing / Galet du levier / Cojinete de la palanca	31041-032-01	1	1	1	1	1
A	Cover screw / Vis de couvercle / Tornillo de la cubierta	21937-14341	2	2	2	2	2
B	Coil terminal pressure wire connector / Connecteur des fils à pression aux bornes de la bobine / Conector de los conductores a presión de la terminal de la bobina	31051-007-50	2	2	2	2	2
C	Power plant screw / Vis du groupe électrogène / Tornillo de la planta de alimentación	21916-14501	2	2	2	2	2
F	Wire clamp and screw / Vis de fixation et serre-fil / Pinza y tornillo del conductor Size 1 contactor / contacteur de taille 1 / contactor tamaño 1 Size 1 starter / démarreur de taille 1 / arrancador de tamaño 1	30018-018-50 30018-018-50	... ...	... 2	... 3	2 5	4 7
G	Auxiliary wire binding screw / Vis de fixation du fil auxiliaire / Tornillo de sujeción del conductor auxiliar	21819-25081	2	2	2	2	2
L	Wire clamp and screw / Vis de fixation et serre-fil / Pinza y tornillo del conductor Size 1 contactor / contacteur de taille 1 / contactor de tamaño 1 Size 1 starter / démarreur de taille 1 / arrancador de tamaño 1	30018-070-50 30018-070-50	2 ...	4 4	6 6	6 6	6 6
M	Overload thermal unit fastening screw / Vis de fixation de l'unité thermique de surcharge Tornillo sujetador del elemento térmico de sobrecarga	21920-16160	...	4	6	6	6
O	Screw assembly (Size 1P only) / Assemblage des vis (Taille 1P seulement) Ensamble del tornillo (Tamaño 1P solamente)	30018-066-50	...	4	...	...	...
P	Lug screw (Size 1P only) / Vis de cosse (Taille 1P seulement) Tornillo de la zapata (Tamaño 1P solamente)	25054-13600	...	4	...	...	...

[1] Not shown.
[2] To ensure proper device operation: when installing the lever bearing onto the lever, the oval concavity on the inside surface of one leg of the bearing must mate with the corresponding oval convexity on the bottom of the lever.
[3] Furnished on 2-pole starters; however 1- and 2-pole contactors are furnished with a holding circuit contact rated the same as a power pole.

[1] Non montré.
[2] Pour assurer un fonctionnement correct du dispositif ; lors de l'installation du galet du levier sur ce dernier, veiller à faire correspondre la cavité ovale située sur la surface interne d'un pied du galet avec la forme convexe située au bas du levier.
[3] Fourni sur les démarreurs à 2 pôles ; toutefois, les contacteurs à 1 et 2 pôles sont fournis avec un contact de circuit de retenue de la même valeur nominale qu'un pôle d'alimentation.

[1] No se muestra.
[2] Para asegurarse de que el dispositivo está funcionando adecuadamente al instalar el cojinete de la palanca en la misma; la concavidad ovalada en la superficie interior de uno de los pies del cojinete debe corresponder con la convexidad ovalada correspondiente en la parte inferior de la palanca.
[3] Incluida con los arrancadores de 2 polos; sin embargo, los contactores de 1 y 2 polos incluyen un contacto de circuito de sostén con la misma capacidad de un polo de potencia.

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Table / Tableau / Tabla 6 Magnet Coil Part Numbers [1] / Numéros de pièces des bobines d'excitation [1] / Números de piezas de la bobina de electroimán [1]

Coil Prefix Préfixe de bobine Prefijo de la bobina	Hz	Coil Suffix / Suffixe de bobine / Sufijo de la bobina													
		24 V	110 V	120 V	120/240 V	208 V	220 V	240 V	240/480 V	277 V	380 V	440 V	480 V	550 V	600 V
31041-400	60	20	Use 120 V Utiliser 120 V Utilice 120V	42	[2]	48	Use 240 V Utiliser 240 V Utilice 240V	51	[2]	52	56	Use 480 V Utiliser 480 V Utilice 480V	60	Use 600 V Utiliser 600 V Utilice 600V	62
	50	22	42	43	...	...	51	53	...	...	57	60	...	62	64

[1] Complete coil part number contains a prefix and a suffix (e.g., for 120 V 60 Hz coil, select 31041-400-42). When ordering replacement coils, give part number, voltage and frequency of coil being replaced.

[2] Dual voltage coil. Order 120/240 V 60 Hz as 31041-402-02. Order 240/480 V 60 Hz as 31041-402-04.

[1] Le numéro complet de la pièce de la bobine contient un préfixe et un suffixe (par ex., pour une bobine 120 V 60 Hz, sélectionner 31041-400-42). Pour commander des bobines de rechange, indiquer le numéro de pièce, la tension et la fréquence de la bobine à remplacer.

[2] Bobine à deux tensions. Commander 31041-402-02 pour les modèles à 120/240 V, 60 Hz. Commander 31041-402-04 pour les modèles à 240/480 V, 60 Hz.

[1] El número de pieza completo de la bobina contiene un prefijo y un sufijo (es decir, una bobina de 120 V 60 Hz, el número de pieza es 31041-400-42). Cuando solicite las bobinas de repuesto, proporcione el número de pieza, la tensión y la frecuencia de la bobina que se está reemplazando.

[2] Bobina de tensión doble. Solicite 31041-402-02 para los modelos de 120/240 V, 60 Hz. Solicite 31041-402-04 para los modelos de 240/480 V 60 Hz.

[1] El número de pieza completo de la bobina contiene un prefijo y un sufijo (es decir, una bobina de 120 V 60 Hz, el número de pieza es 31041-400-42). Cuando solicite las bobinas de repuesto, proporcione el número de pieza, la tensión y la frecuencia de la bobina que se está reemplazando.

[2] Bobina de tensión doble. Solicite 31041-402-02 para los modelos de 120/240 V 60 Hz. Solicite 31041-402-04 para los modelos de 240/480 V 60 Hz.

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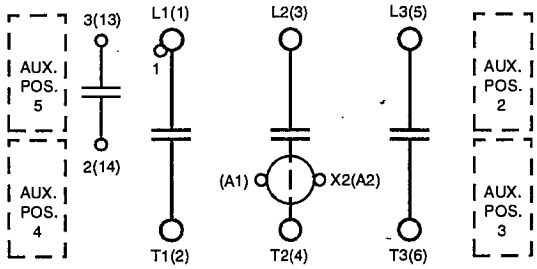
Bulletin No. 30072-007-85
August 1997
Raleigh, NC, USA

Instruction Bulletin

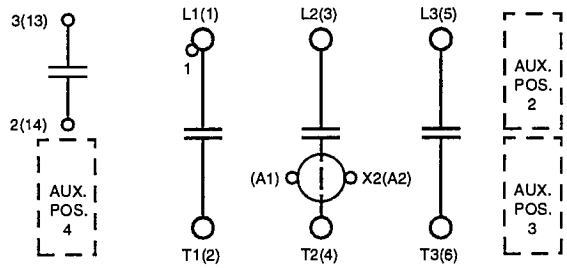
Device Terminal Identification
for Contactors and Starters

CONTACTORS

Size 00 to 2 Contactors



Size 3 to 5 Contactors

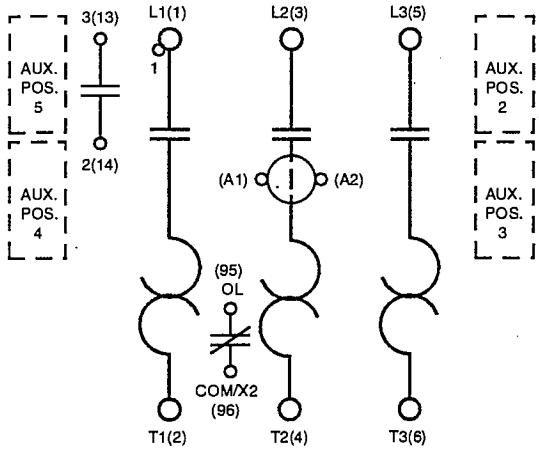


OPTIONAL AUXILIARY CONTACT TERMINAL IDENTIFICATION

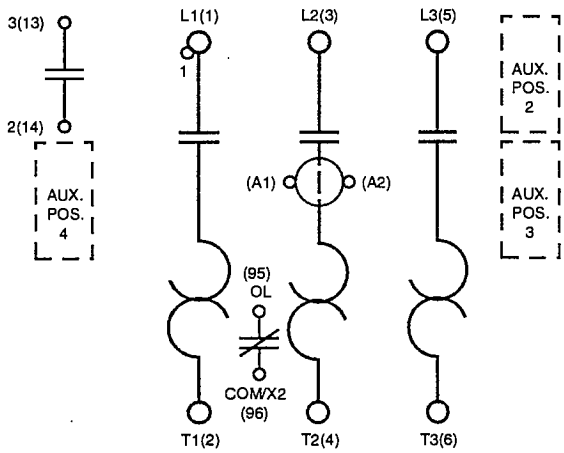
AUXILIARY POSITION	AUX. POS. 2	AUX. POS. 3	AUX. POS. 4	AUX. POS. 5
N/O AUXILIARY	23 / 24	33 / 34	43 / 44	53 / 54
N/C AUXILIARY	21 / 22	31 / 32	41 / 42	51 / 52

STARTERS with MELTING ALLOY OVERLOAD RELAY (MAOLR)

Size 00 to 2 Starters with MAOLR



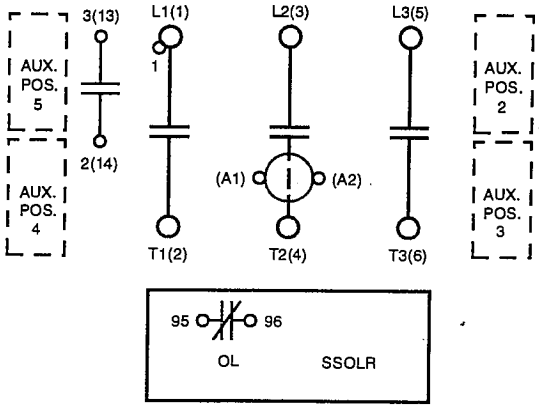
Size 3 to 5 Starters with MAOLR



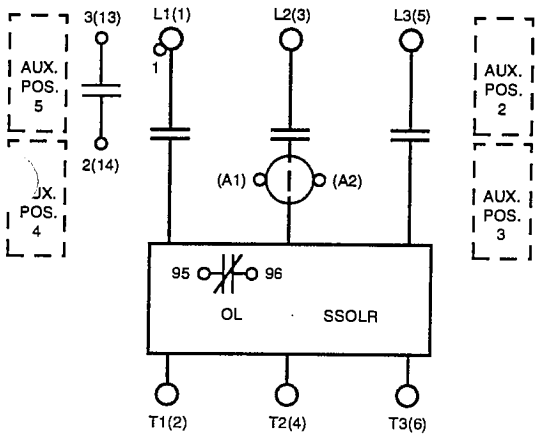
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STARTERS with SOLID-STATE OVERLOAD RELAY (SSOLR)

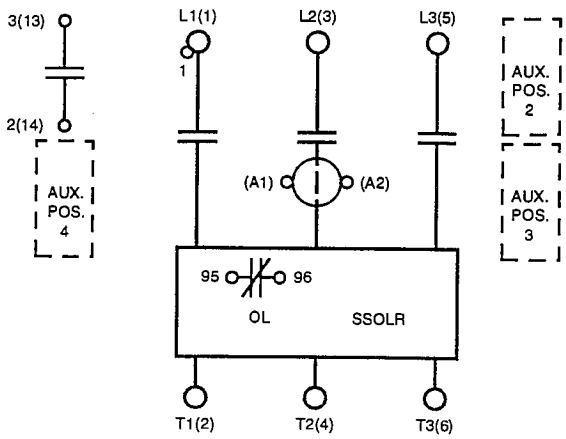
Size 00 to 1 Starters with SSOLR



Size 2 Starters with SSOLR



Size 3 to 5 Starters with SSOLR



OPTIONAL AUXILIARY CONTACT TERMINAL IDENTIFICATION

AUXILIARY POSITION	AUX. POS. 2	AUX. POS. 3	AUX. POS. 4	AUX. POS. 5
N/O AUXILIARY	23 / 24	33 / 34	43 / 44	53 / 54
N/C AUXILIARY	21 / 22	31 / 32	41 / 42	51 / 52

are D
8001 Hwy 64 East
Knightdale, NC 27545 USA
(919) 266-3671

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531 AS
SERVICE BULLETIN

Class 8501 Type X Control Relay

GENERAL

The Class 8501 Type X relay is a 600 volt ac, 300 volt dc, industrial control relay. It is available in 2 to 12 poles (ac operated), with a maximum of 8 of those N.C., and 2-8 poles (dc operated). All contacts are easily convertible.

The Type X relay with standard cartridges (black cases) is designed to have a significant degree of non-overlap between the N.O. and N.C. contacts during normal operation. In addition, all cartridges are linked togther by a common mechanical tie.

The Type X relay family includes a number of accessory kits (Table 1). See catalog for further description of accessory kits.

TABLE 1 — ACCESSORY KITS

Kit Description	Class 8501 Type
Mechanical Latch Attachment (ac)	XL
Mechanical Latch Attachment (dc)	XDL
• Pneumatic Timer Attachment (On Delay, 0.2 to 60 sec.)	XTE1
• Pneumatic Timer Attachment (Off Delay, 0.2 to 60 sec.)	XTD1
Pneumatic Timer Attachment (On Delay, 5 to 180 sec.)	XTE2
Pneumatic Timer Attachment (Off Delay, 5 to 180 sec.)	XTD2
Standard Contact Cartridge	XC-1
Overlapping Contact Cartridge	XC-2
Master Contact Cartridge*	XC-4
Manual Test Tool	XA-1
Transient Suppressor	XS-1
Mounting Track (for 4 relays)	XM-4
Mounting Track (for 8 relays)	XM-8
Mounting Track (for 12 relays)	XM-12
Mounting Track (for 16 relays)	XM-16
Mounting Track (for 32 relays)	XM-32
Universal Adder Deck (with 2 N.O. convertible contacts)	XB-20
Universal Adder Deck (with 4 N.O. convertible contacts)	XB-40
Logic Reed Adder Deck (with 2 N.O. fixed logic reed contacts)	XBR-20
Logic Reed Adder Deck (with 1 N.O. and 1 N.C. fixed logic reed contacts)	XBR-11
Logic Reed Adder Deck (with 1 N.O. fixed logic reed contact)	XBR-10
Logic Reed Adder Deck (with 1 N.C. fixed logic reed contact)	XBR-01
Logic Reed Adder Deck (with 2 N.C. fixed logic reed contacts)	XBR-02

CONTACTS

All contacts are color coded. When the conventional symbol ⊣⊢ for N.O. contacts on a green background is visible between the cover and the terminal, the contact is in the N.O. mode. When the conventional symbol ⊣/⊢ for N.C. on a yellow background is visible, it is in the N.C. mode.

Three types of contact cartridges are available for use with the Type X relay: standard, overlapping, and master. Each is color coded to indicate the type of cartridge (Table 2). In addition, the N.O. or N.C. contact symbol appearing through the green or yellow background will be the same color as the contact cartridge.

TABLE 2 — CONTACT CARTRIDGES

Description	Class 8501 Type	Cartridge Color
Standard	XC-1	Black
Overlapping	XC-2	Red
Master*	XC-4	Blue

• INSTALLATION AND WIRING OF RELAY

Type X relays are designed for two-point mounting on a vertical panel with coil terminals upward. However, the relay can be mounted with the coil terminals down if required.

Mounting track, which simplifies installation, is available as an accessory kit (Table 1). These tracks are designed to accommodate 4, 8, 12, 16 or 32 relays. They can easily be cut to any length. Mount each track horizontally using #8 screws with 2 screws at each end position and with screws at spacings of 4½" in alternate upper and lower horizontal slots. Torque relay mounting screws to 18-21 in-lbs.

Wiring on the Type X relay is straight through. The terminals are self-lifting pressure wire connectors.

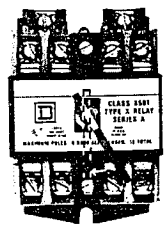
A minimum of 7 in-lbs tightening torque should be used on all control circuit terminals.

MANUAL OPERATION

WARNING: Manual operation should be performed only by *QUALIFIED* personnel. Manual operation with the power turned on is dangerous because of possible electric arcing, burn or shock — REMAIN ALERT!

Type X relays can be manually operated by depressing the red T-bar actuator visible in the center of the nameplate with an insulated tool. This red T-bar actuator also gives a visual indication of relay operation. It is flush with the nameplate when the relay is de-energized and recessed when the relay is energized. A manual test tool is available (Table 1) that simplifies the checking of control circuits without power on the coil. To use manual test tool, insert end marked "RELAY" diagonally on the red T-bar actuator, push down and rotate 1/8 turn (Figure 1).

Manual test tool must be removed before normal operation of the relay.



• Figure 1

APPLICATION DATA
MAXIMUM ELECTRICAL CONTACT RATINGS

Type of Cartridge	AC Ratings								DC Ratings			
			Inductive 35% Power Factor					Resistive 75% Power Factor		Inductive		
	Volts	NEMA Rating	Make Amps.	Make VA	Break Amps.	Break VA	Continuous Amperes	Make, Break and Continuous Amperes	Volts	NEMA Rating	Make and Break Amperes 138VA Max.	Continuous Amperes
Standard	120	A600	60	7200	6	720	10	10	125	P300	1.1	5
	240		30	7200	3	720	10	10	250		0.55	5
Overlapping	480		15	7200	1.5	720	10	10	125	P150	1.1	5
	600		12	7200	1.2	720	10	10				
Master*	—	A600	Same as standard cartridge above except substitute 20 ampere for the continuous ampere rating						125	P300	1.1	5
									250		0.55	5
Logic Reed**	—	—	150 VAC, 150 MA, 8 VA Maximum Resistive Only						—	—	30 VDC, 60 MA Resistive Only	

* Maximum of 6 Class 8501 Type XC-4 Master Contact Cartridges may be used on any 7 or 8 pole ac-operated devices. Do not use any master cartridges on 9-12 pole ac or any dc-operated relays.

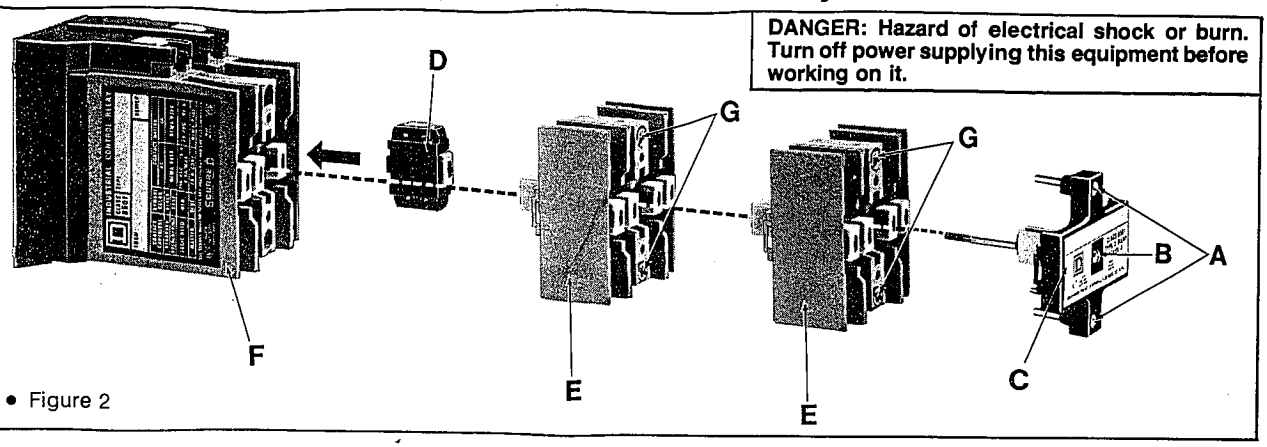
** The operation of the reed switch may be affected by the presence of magnetic fields. Provide series resistance to protect the contacts against inrush currents exceeding 350 MA, such as those caused by the distributed capacitance of long wire runs and by incandescent lamp continuity checkers.

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Class 8501 Type X — AC Control Relay — Series A
Class 8501 Type XM — AC Master Relay — Series A

DANGER: Hazard of electrical shock or burn. Turn off power supplying this equipment before working on it.



• Figure 2

ADDER DECK INSTALLATION

The standard Type X 4 pole relay can be easily converted to an 8 pole or 12 pole standard relay (Figure 2) by installing one or two standard adder decks (Table 1). Logic reed adder decks (Table 1) can also be installed to standard 0-8 pole relays. The same Type XB standard adder deck and Type XBR logic reed adder deck is used for both the middle and upper decks. See Table 3 for factory recommended tightening torques.

Adding A Deck To A Basic 4 Pole Relay

To convert a 4 pole relay into a 6-8 pole relay:

1. Loosen and remove T-bar actuator screw (B) from cover assembly (C) and discard.
2. Loosen 2 captive cover screws (A) and remove cover assembly (C).
3. Place the adder deck (E) on the basic 4 pole relay (F). The adder deck is keyed for proper orientation. Tighten 2 deck mounting screws (G).
4. Place the cover assembly on the adder deck. Tighten 2 cover screws (A).
5. Thread shorter screw (2.50 inches) from adder deck kit through the red T-bar actuator in the cover assembly and tighten. Longer screw (3.75 inches) is not used.

Adding A Deck To An 8 Pole Relay

To convert an 8 pole relay into a 10-12 pole relay:

1. Loosen and remove T-bar actuator screw (B) from cover assembly (C) and discard.
2. Loosen 2 captive cover screws (A) and remove cover assembly (C).
3. Place the adder deck (E) on the 8 pole relay. The adder deck is keyed for proper orientation. Tighten 2 deck mounting screws (G).
4. Place the cover assembly on the adder deck. Tighten 2 cover screws (A).
5. Thread longer screw (3.75 inches) from adder deck kit through the red T-bar actuator in the cover assembly and tighten. Shorter screw (2.50 inches) is not used.

Adding Two Decks to Basic 4 Pole Relay

To convert a 4 pole relay into a 10-12 pole relay:

1. Loosen and remove T-bar actuator screw (B) from cover assembly (C) and discard.
2. Loosen 2 captive cover screws (A) and remove cover assembly (C).
3. Place the first adder deck (E) on the 4 pole relay. The adder deck is keyed for proper orientation. Tighten 2 deck mounting screws (G).
4. Place the second adder deck (E) on the first adder deck. The adder deck is keyed for proper orientation. Tighten 2 deck mounting screws (G).
5. Place the cover assembly on the upper deck. Tighten 2 cover screws (A).
6. Thread longer screw (3.75 inches) from either adder deck kit through the red T-bar actuator in the cover assembly and tighten. Shorter screw (2.50 inches) is not used.

CONTACT CONVERSION/REPLACEMENT

Contact conversion from N.O. to N.C. or vice versa, can be done without removing any wires or terminal screws (Figure 2). **A maximum of 8 N.C. contacts are allowed on 9-12 pole relays. Gray logic reed cartridges are non-convertible.** See Table 3 for factory recommended tightening torques.

Basic 4 Pole Relay Or Upper Deck Of An 8 Or 12 Pole Relay

1. Loosen 2 captive cover screws (A) and captive T-bar actuator screw (B), and remove cover assembly (C).
2. Remove cartridge (D), invert to opposite color and re-insert.
3. Replace cover assembly (C) and tighten 2 cover screws (A) and T-bar actuator screw (B).

Lower Deck Of An 8 Pole Relay Or Middle Deck Of A 12 Pole Relay

1. Loosen 2 captive cover screws (A) and captive T-bar actuator screw (B), and remove cover assembly (C).
2. Loosen 2 captive deck mounting screws (G) and lift off upper deck (E).
3. Remove cartridge (D), invert to opposite color and re-insert.
4. Replace upper deck (E) and tighten 2 deck mounting screws (G).
5. Replace cover assembly (C) and tighten 2 cover screws (A) and T-bar actuator screw (B).

Lower Deck of a 12 Pole Relay

1. Loosen 2 captive cover screws (A) and captive T-bar actuator screw (B), and remove cover assembly (C).
2. Loosen 2 deck captive mounting screws (G) and lift off upper deck (E). Remove middle deck (E) in similar manner.
3. Remove cartridge (D), invert to opposite color and re-insert.
4. Replace middle deck (E) and tighten 2 deck mounting screws (G). Replace upper deck (E) in similar manner.
5. Replace cover assembly (C) and tighten 2 cover screws (A) and T-bar actuator screw (B).

To replace a contact, follow the procedure for conversion except remove the cartridge and insert replacement. **Gray logic reed cartridges are non-replaceable. The logic reed adder deck (Table 1) must be replaced. Note: Maximum of 6 master contact cartridges may be used on 7 or 8 pole relays. Do not use any master cartridges on 9-12 pole relays.**

• TABLE 3 —
FACTORY RECOMMENDED TIGHTENING TORQUES

Item	Description	Driving Torque (in-lb)
A	Cover screw	9-12
B	T-bar actuator screw	6-10
G	Deck mounting screws	9-12
H	Baseplate screws	12-15
—	Relay mounting screws	18-21

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Class 8501 Type X — AC Control Relay — Series A
Class 8501 Type XM — AC Master Relay — Series A

COIL REPLACEMENT

DANGER: Hazard of electrical shock or burn. Turn off power supplying this equipment before working on it.

The coil on the Type X relay is easy to replace from the back of the device without having to remove the contact block assembly from the basic relay (Figure 3). To replace the coil:

1. Loosen 4 captive baseplate screws (H).
2. Lift off baseplate (J) and lower housing assembly (K).
3. Lift out coil (L) and slide out magnet (M). Re-install magnet (M) (note orientation in Figure 3) in new coil and replace coil in relay.
4. When replacing baseplate and lower housing assembly, make sure the coil terminals (N) slide into the lower housing slots before the assembly is re-installed on the relay (Figure 3).
5. Tighten the 4 baseplate screws (H). See Table 3 for factory recommended tightening torques.

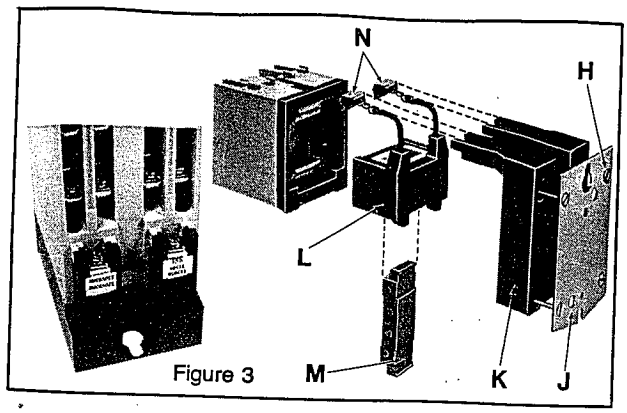


Figure 3

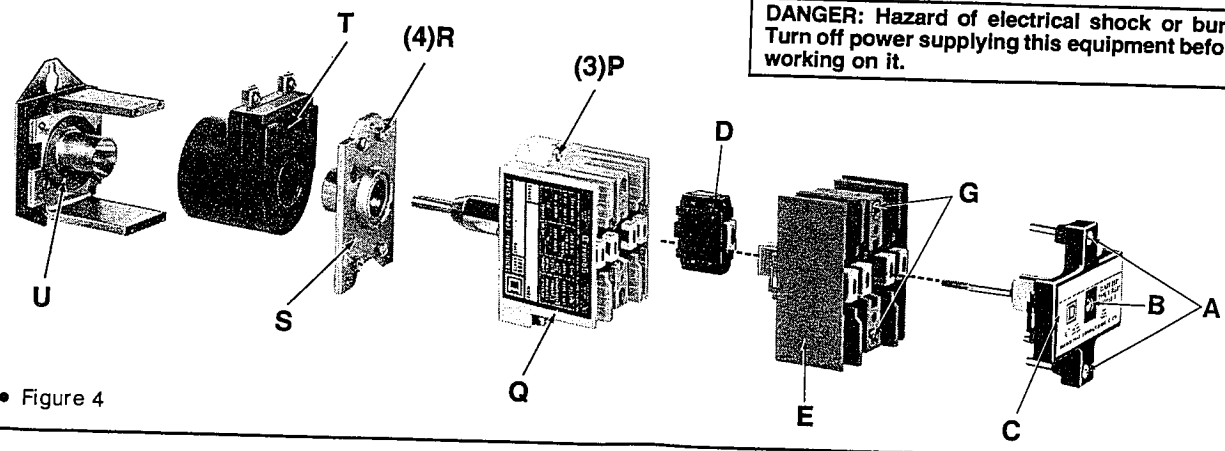
TABLE 4 — AC MAGNET COILS

Heavy-duty, molded coils are used. These coils are designed to operate on line-voltage fluctuations as much as 15% below and 10% above nominal voltage.

Coil Prefix	Hertz	SUFFIX NUMBERS (Coil part numbers consist of coil prefix followed by suffix number)												Coil Volt-Amperes	
		12 Volts	24 Volts	48 Volts	110 Volts	120 Volts	208 Volts	220 Volts	240 Volts	277 Volts	440 Volts	480 Volts	550 Volts	600 Volts	Inrush	Sealed
Class 9998 Type X	60	14	23	32	...	44	51	...	53	55	...	62	...	65	148	30
	50	15	24	33	44	...	...	53	...	...	62	...	65	...	143	32

Class 8501 Type XD — DC Control Relay — Series A
Class 8501 Type XUD — Utility Auxiliary Relay — Series A

DANGER: Hazard of electrical shock or burn. Turn off power supplying this equipment before working on it.



• Figure 4

DC COIL REPLACEMENT

The coil on a dc-operated Type XD or XUD relay is easy to replace from the front of the device (Figure 4). See Table 6 for factory recommended tightening torques. To replace the dc coil:

1. Loosen three captive housing screws (P). Lift off housing assembly (Q).
2. Remove four magnet plate screws (R) and lift off magnet plate (S).
3. Lift out coil (T) and replace with new coil. See Figure 4 for proper orientation. Be sure not to remove spring washer (U).
4. Replace magnet plate (S) and tighten four screws (R).
5. Replace housing assembly (Q) and tighten three housing screws (P).

NOTE: Do not use Class 9998 Type XD coils (Table 5) on Class 8501 Type XUD Utility Auxiliary Relays. Class 9998 Type XUD coils (Table 5) are designed specifically for the Utility Auxiliary Relay and must be used to assure proper operation.

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Class 8501 Type XD — DC Control Relay — Series A
Class 8501 Type XUD — Utility Auxiliary Relay — Series A

TABLE 5 — DC Control Relay and Utility Auxiliary Relay Coils

Heavy-duty, molded coils are used. When ordering replacement magnet coil give Class and Type Number and voltage of coil being replaced.

Coil Prefix	SUFFIX NUMBERS (Coil part numbers consist of coil prefix followed by suffix number)											• Coil Watts
	6 Volts	12 Volts	18 Volts	24 Volts	32 Volts	48 Volts	64 Volts	72 Volts	90 Volts	115/125 Volts	230/250 Volts	
Class 9998 Type XD	19	28	34	37	40	46	49	52	55	58	67	11
Class 9998 Type XUD	19	28	—	37	—	46	—	—	—	58	67	11

CONTACT CONVERSION/REPLACEMENT

Contact conversion from N.O. to N.C., or vice versa, can be done without removing any wires or terminal screws (Figure 4). **Gray logic reed cartridges are non-convertible.** See Table 6 for factory recommended tightening torques.

4 Pole Relay or Upper Deck of an 8 Pole Relay

1. Loosen 2 captive cover screws (A) and captive T-bar actuator screw (B), and remove cover assembly (C).
2. Remove cartridge (D), invert to opposite color and re-insert.
3. Replace cover assembly (C) and tighten two cover screws (A) and T-bar actuator screw (B).

Lower Deck Of An 8 Pole Relay or Middle Deck Of A 12 Pole Type XUD Relay

1. Loosen 2 captive cover screws (A) and captive T-bar actuator screw (B), and remove cover assembly (C).
2. Loosen 2 captive deck mounting screws (G) and lift off upper deck (E).
3. Remove cartridge (D), invert to opposite color and re-insert.
4. Replace upper deck (E) and tighten two deck mounting screws (G).
5. Replace cover assembly (C) and tighten two cover screws (A) and T-bar actuator screw (B).

Lower Deck of A 12 Pole Type XUD Relay

1. Loosen 2 captive cover screws (A) and captive T-bar actuator screw (B), and remove cover assembly (C).
2. Loosen 2 captive deck mounting screws (G) and life off upper deck (E). Remove middle deck (E) in similar manner.
3. Remove cartridge (D), invert to opposite color and re-insert.
4. Replace middle deck (E) and tighten 2 deck-mounting screws (G). Replace upper deck (E) in similar manner.
5. Replace cover assembly (C) and tighten 2 cover screws (A) and T-bar actuator screw (B).

To replace a contact, follow the procedure for conversion except remove the cartridge and insert replacement. **Gray logic reed cartridges are non-replaceable. The logic reed adder deck (Table 1) must be replaced. Note: Do not use any master contact cartridges on dc-operated relays.**

• TABLE 6 — FACTORY-RECOMMENDED TIGHTENING TORQUES

Item	Description	Driving Torque (in-lb)
A	Cover screw	9-12
B	T-bar actuator screw	6-10
G	Deck mounting screws	9-12
P	Housing screws	9-12
R	Magnet plate screws	9-12

ADDER DECK INSTALLATION — Figure 4

The basic dc-operated Type XD 4-pole relay can be easily converted to a 6 or 8 pole relay by installing one adder deck kit (Table 1). **Do not add a second deck — dc-operated Type XD relay restricted to 8 poles.** Type XUD 4-pole relays can be easily converted to an 8 pole or 12 pole relay by installing one or two adder deck kits (Table 1). Logic reed adder decks (Table 1) can also be installed on standard 0-4 pole dc-operated Type XD relays and 4-8 pole dc-operated Type XUD relays. See Table 6 for factory recommended tightening torques.

Adding A Deck To A Basic 4 Pole Relay

To convert a 4 pole relay into a 6-8 pole relay:

1. Loosen and remove T-bar actuator screw (B) from cover assembly (C) and discard.
2. Loosen 2 captive cover screws (A) and remove cover assembly (C).
3. Place the adder deck (E) on the basic 4 pole relay (F). The adder deck is keyed for proper orientation. Tighten 2 deck mounting screws (G).
4. Place the cover assembly on the adder deck. Tighten 2 cover screws (A).
5. Thread shorter screw (2.50 inches) from adder deck kit through the red T-bar actuator in the cover assembly and tighten. Longer screw (3.75 inches) is not used.

Adding A Deck To An 8 Pole Type XUD Relay

To convert an 8 pole Type XUD relay into a 10-12 pole relay:

1. Loosen and remove T-bar actuator screw (B) from cover assembly (C) and discard.
2. Loosen 2 captive cover screws (A) and remove cover assembly (C).
3. Place the adder deck (E) on the 8 pole relay. The adder deck is keyed for proper orientation. Tighten 2 deck mounting screws (G).
4. Place the cover assembly on the adder deck. Tighten 2 cover screws (A).
5. Thread longer screw (3.75 inches) from adder deck kit through the red T-bar actuator in the cover assembly and tighten. Shorter screw (2.50 inches) is not used.

Adding Two Decks To Basic 4 Pole Type XUD Relay

To convert a 4 pole Type XUD relay into a 10-12 pole relay:

1. Loosen and remove T-bar actuator screw (B) from cover assembly (C) and discard.
2. Loosen 2 captive cover screws (A) and remove cover assembly (C).
3. Place the first adder deck (E) on the 4 pole relay. The adder deck is keyed for proper orientation. Tighten 2 deck mounting screws (G).
4. Place the second adder deck (E) on the first adder deck. The adder deck is keyed for proper orientation. Tighten 2 deck mounting screws (G).
5. Place the cover assembly on the upper deck. Tighten 2 cover screws (A).
6. Thread longer screw (3.75 inches) from either adder deck kit through the red T-bar actuator in the cover assembly and tighten. Shorter screw (2.50 inches) is not used.

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Class 8501 Types XTE and XTD — Pneumatic Timer Attachments — Series A

DANGER: Hazard of electrical shock or burn. Turn off power supplying this equipment before working on it.

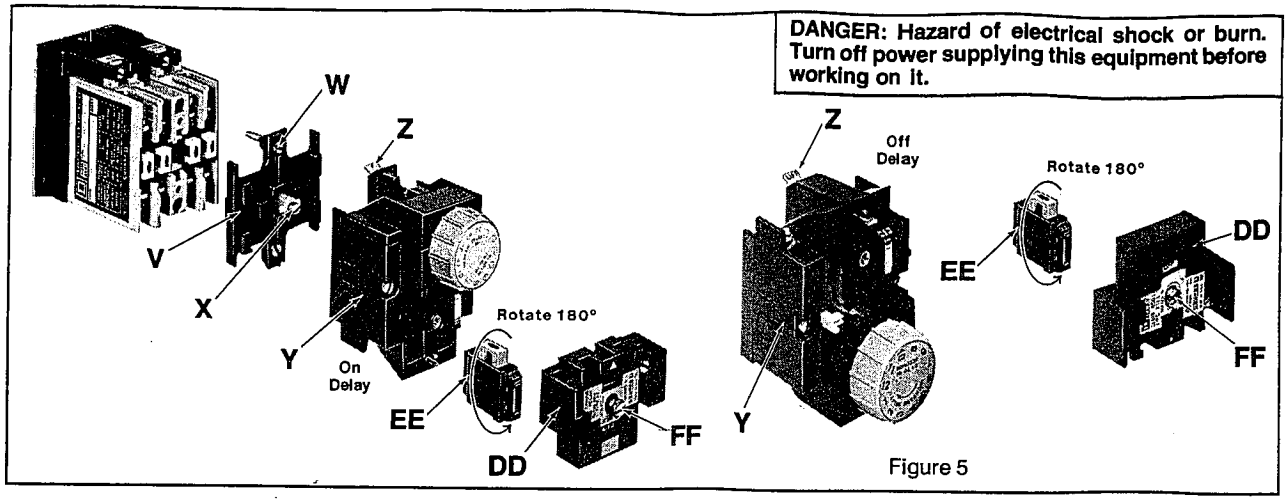


Figure 5

INSTALLATION

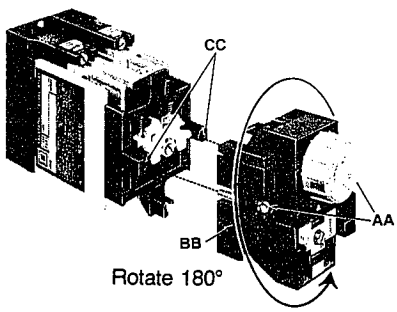
To add a timer attachment to a 0-4 pole relay:

1. Loosen 2 captive cover screws (A) and captive T-bar actuator screw (B) (Figure 2). Remove cover assembly (C) and discard.
2. Install adapter assembly (V) on relay (Figure 5). Adapter assembly is keyed for proper orientation. Tighten 2 captive screws (W) and T-bar actuator screw (X). Refer to Table 7 for factory-recommended tightening torques.
3. Orient timer attachment (Y) with "LIFT" tab (Z) on top as shown in Figure 5. Place timer attachment on relay and slide down. Timer attachment will lock in place.

To remove timer attachment, lift up on "LIFT" tab (Z), slide attachment up and lift off.

TIMING-MODE CONVERSION (Figure 6)

1. Loosen 2 captive screws (AA).
2. Remove timing head (BB) and rotate 180°.
3. Carefully replace timing head (BB). Make sure that the 2 screws (AA) are lined up with D-shaped posts (CC). Tighten 2 screws (AA).
4. Check timing-mode (On Delay or Off Delay) visible through a window in the cover (DD Figure 5) to insure that the desired timing-mode is indicated.
5. With timer attachment installed on relay, check contact symbols which are visible through windows in the cover (DD Figure 5) to insure that the desired function is indicated.



• Figure 6

• TABLE 7 — FACTORY RECOMMENDED TIGHTENING TORQUES

Item	Description	Driving Torque (in-lb)
W	Adapter assembly screw	9-12
X	T-bar actuator screw	6-10
AA	Timing head screw	6-9
FF	Contact cover screw	9-12

TIMED-CONTACT CONVERSION (Figure 5)

1. Loosen captive cover screw (FF) and remove cover (DD).
2. Remove cartridge (EE), rotate so that the contact symbols and colors are reversed from their original positions, and reinsert.
3. Replace cover (DD) and tighten cover screw (FF). Refer to Table 7 for factory-recommended tightening torques.
4. With the timer attachment installed on relay, check contact symbols which are visible through windows in the cover (DD) to insure that the desired function is indicated.
5. Must have 2 cartridges in any combination of N.O. or N.C. installed in timer attachment for proper operation.

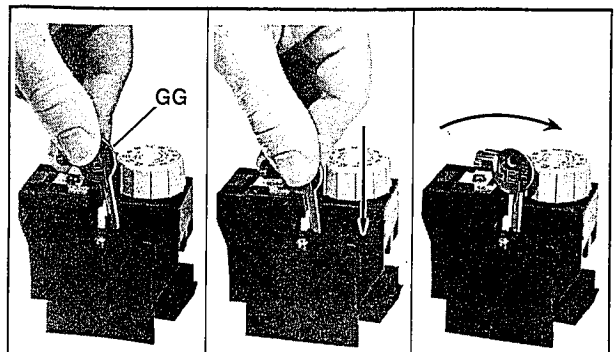
MANUAL OPERATION (Figure 7)

WARNING: Manual operation should be performed only by *QUALIFIED* personnel. Manual operation with the power turned on is dangerous because of possible electric arcing, burn or shock — REMAIN ALERT!

Type XT timing relays can be manually operated by depressing the red manual operator (GG) with an insulated tool. A manual test tool is available (Table 1) that simplifies the checking of control circuits without power on the coil. To use, follow steps shown in Figure 7.

Note — when used with the Type XT timing relay, the manual test tool is **not** twisted like a key.

Manual test tool must be removed before normal operation of the timing relay.



Engage test tool on manual operator (GG). Figure 7a

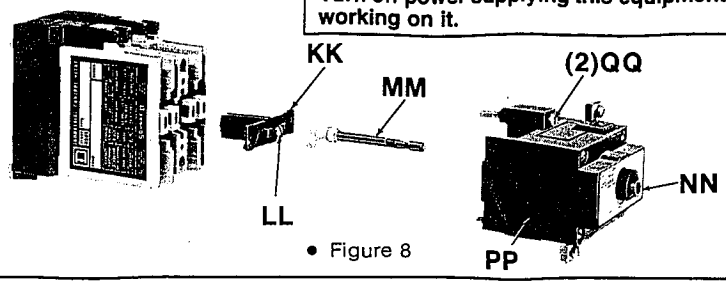
Push down on manual operator. Figure 7b

Rotate test tool to hook in place. Figure 7c

531 AS
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• Class 8501 Type XL — AC Latch Attachment — Series B
• Class 8501 Type XDL — DC Latch Attachment — Series B

DANGER: Hazard of electrical shock or burn. Turn off power supplying this equipment before working on it.



• Figure 8

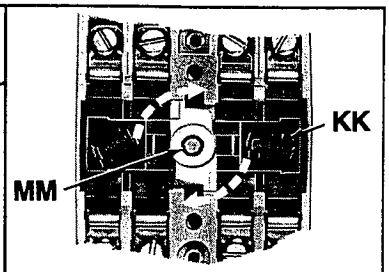


Figure 9

INSTALLATION

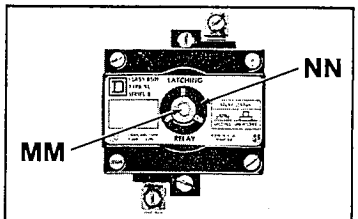
To add a latch attachment to any 2-8 pole Type X or XD relay:

1. See Figure 2. Loosen 2 captive cover screws (A) and captive T-bar actuator screw (B). Remove cover assembly (C) and discard.
2. **If adding latch attachment to 2-4 pole relay, proceed to Step 3. If adding latch attachment to a 6-8 pole relay,** remove short screw (1.25 inches) from black T-bar actuator (KK Figure 8), discard and replace with longer screw (2.50 inches) supplied separately with latch attachment.
3. Install black T-bar actuator (KK) from latch attachment on relay (Figure 8). T-bar actuator is keyed for proper orientation. Tighten T-bar actuator screw (LL). Refer to Table 8 for factory recommended tightening torques.
4. Place latch rod assembly (MM) on T-bar actuator (Figure 9) and rotate 90° clockwise to lock under mounting feet on T-bar actuator.
5. Push down on latch armature ring (NN) and hold (Figure 8). Slide latch attachment (PP) on to latch rod assembly (MM) and relay. Latch attachment is keyed for proper orientation. Release latch armature ring (NN).
6. Tighten 2 mounting screws (QQ).
7. Manually operate (see below) to check operation.

WARNING: Manual operation should be performed only by *QUALIFIED* personnel. Manual operation with the power turned on is dangerous because of possible electric arcing, burn or shock — REMAIN ALERT!

MANUAL OPERATION OF LATCHING RELAY (FIGURE 10)

1. To manually latch relay, depress latch rod (MM) with small insulated tool.
2. To manually unlatch relay, depress latch armature ring (NN) with small insulated tool.

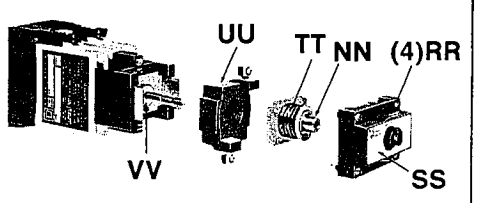


• Figure 10

NOTE: Do not use ac unlatch coils on dc latch attachments or dc unlatch coils on ac latch attachments. Class 8501 Type XL and XDL latch attachments cannot be converted from ac to dc operation or vice versa.

UNLATCH COIL REPLACEMENT

1. Remove latch attachment by loosening 2 mounting screws (QQ, Figure 8), and lifting off attachment.
2. Loosen 4 captive screws (RR) and remove cover (SS) (Figure 11).
3. Remove latch mechanism (TT).
4. Lift out unlatch coil (UU) and replace. **Do not** remove magnet frame (VV).
5. Push down and hold latch armature ring (NN) and replace latch mechanism (TT). Release latch armature ring.
6. Replace cover and tighten 4 screws (RR).
7. Manually operate (see left) to check operation.
8. Replace latch attachment (see steps 5-7 "Installation" at left).



• Figure 11

TABLE 8 — FACTORY-RECOMMENDED TIGHTENING TORQUES

Item	Description	Driving Torque (in-lb)
LL	T-bar Actuator Screw	6-9
• QQ	Latch Attachment Mounting Screws	9-12
RR	Cover Screws	6-9

• TABLE 9 — AC UNLATCH COILS — SERIES B*

Coil Prefix	Hertz	SUFFIX NUMBERS (Coil part numbers consist of coil prefix followed by suffix number) 12 Volts	24 Volts	48 Volts	110 Volts	120 Volts	208 Volts	220 Volts	240 Volts	277 Volts	440 Volts	480 Volts	550 Volts	600 Volts	Coil Volt-Amperes Inrush	Sealed
Class 9998 Type XL	60	14B	23B	32B	...	44B	51B	...	53B	55B	...	62B	...	65B	25	12
	50	15B	24B	33B	44B	...	...	53B	...	...	62B	...	65B	...	24	11

• TABLE 10 — DC UNLATCH COILS — SERIES B*

Coil Prefix	SUFFIX NUMBERS (Coil part numbers consist of coil prefix followed by suffix number) 6 Volts	12 Volts	18 Volts	24 Volts	32 Volts	48 Volts	64 Volts	72 Volts	90 Volts	115/125 Volts	230/250 Volts	Coil Watts
Class 9998 Type XDL	19B	28B	34B	37B	40B	46B	49B	52B	55B	58B	67B	36

Heavy-duty, molded coils are used. These coils are designed to operate on line voltage fluctuations as much as 15% (20% for dc) below and 10% above nominal voltage.

When ordering replacement magnet coil give Class and Type Number, voltage and frequency of coil being replaced.

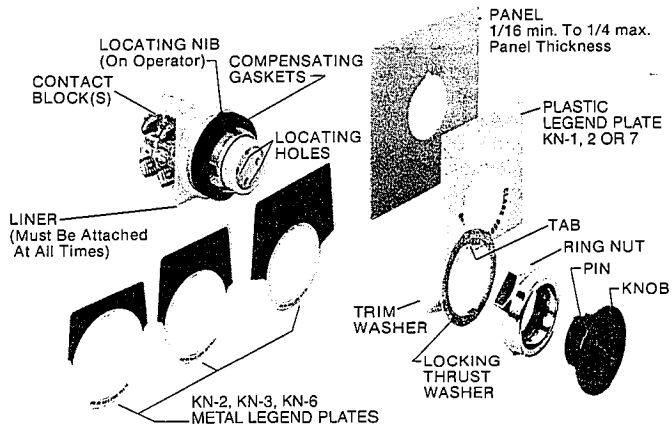
Series B unlatch coils are not interchangeable with Series A unlatch coils which are no longer available. If a Series A unlatch coil is desired, it will be necessary to replace the entire Series A latch with a Series B latch.

INSTRUCTION SHEET

JUNE, 1995

CLASS 9001
TYPE KR MOMENTARY NON-ILLUMINATED PUSH BUTTON OPERATORS**
TYPES KR4* AND KR5* MOMENTARY NON-ILLUMINATED PUSH BUTTON OPERATORS WITH MUSHROOM BUTTONS
UNDERWRITERS LABORATORIES LISTED FOR USE ON A FLAT SURFACE OF TYPES 1, 2, 3, 3R, 4, 6, 12 AND 13 ENCLOSURES

TYPES SKR MOMENTARY NON-ILLUMINATED PUSH BUTTON OPERATORS**
TYPE SKR4* AND SKR5* MOMENTARY NON-ILLUMINATED PUSH BUTTON OPERATORS WITH MUSHROOM BUTTONS
UNDERWRITERS LABORATORIES LISTED FOR USE ON A FLAT SURFACE OF TYPES 1; 2, 3, 3R, 4, 4X, 6, 12 AND 13 ENCLOSURES



A. Installation of Operator to Panel Using Class 9001 Type KN-2, KN-3 or KN-6 Legend Plates.
   1. Mount only Class 9001 Type KA Contact Block (maximum of 3 Contact Blocks mounted in tandem, total of 6) to the operator. Tighten Mounting Screws to 5-8 lb.-in.
   2. Remove the ring nut, locking thrust washer and trim washer from the operator.
   3. Discard the locking thrust washer and trim washer.
   4. Retain the required number of compensating gaskets (determined from Figure 2) on the operator.
   5. Insert the operator into the panel from the rear with the locating nib at the top.
   6. Install the required Legend Plate on the operator by aligning the tab with the slots in the operator and panel.
   7. Install the ring nut on the operator and tighten with a Class 9001 Type K-95 ring nut wrench. Recommended tightening torque: 6-8 lb.-ft.

   FOR KR4, KR5, SKR4 AND SKR5:
   8. Install the mushroom button on the operator by aligning the pin on the mushroom button with the locating hole provided in the operator stem.
   9. Snap the button into the stem using palm of your hand.

   NOTE: Do not attempt to install the mushroom button with a sharp blow. To do so may cause serious damage to the operator and mushroom button.

B. Installation of Operator to Panel Using Class 9001 Type KN-1, KN-2 and KN-7 Legend Plates. Follow steps A1, A2, A4 and A5 above.
   6. Install the Legend Plate on the operator.

30072-100-06K

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MADE IN USA

80

30072-100-06K

7. Install the locking thrust washer on the operator by aligning the tab with the slots in the operator, Legend Plate and panel.
8. Install the ring nut on the operator and tighten with a Class 9001 Type K-95 ring nut wrench. Recommended tightening torque: 6-8 lb.-ft.
9. Then follow steps A8 and A9 above.

C. Installation of Operator to Panel Without Legend Plate.
Follow steps A1, A2, A4 and A5 above.
6. Install the trim washer on the operator.
7. Install the locking thrust washer on the operator by aligning the tab with the slots in the operator, trim washer and panel, then follow step A7.
8. Follow steps A8 and A9..

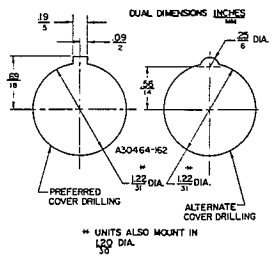
D. Installation of Class 9001 Type K16— and K17— Mushroom Button Kits.
1. Remove the color insert from the operator stem with a knife blade or other sharp instrument.
2. Remove the ring nut supplied with the operator.
3. Install the operator in the panel following the instructions listed above.
4. Install the ring nut supplied with the mushroom button kit on the operator and tighten using a Class 9001 Type K-95 ring nut wrench.
Recommended tightening torque: 6-8 lb.-ft.
5. Then follow steps A8 and A9 above.

E. Installation of the Color Insert to the Operator.
1. Select the required color insert and place in the insert recess provided in the operator stem.
2. Push the insert until the insert lip is securely held under the insert recess.

If it becomes necessary to replace an existing color insert, use a knife or thin blade screwdriver to pry out the existing insert from the insert recess.

Replace the new insert following steps C1 and C2 above.

Mounting Hole for All Type SK Control Units



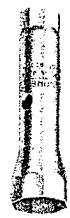
HOLE PUNCH

The 1.22" diameter hole required to mount Type SK operators may be cut with Greenlee knockout punch No. 730-S. The notch may be cut with Greenlee punch No. 730-K. Both punches are available through electrical wholesalers.

Figure 1

GASKET SELECTION CHART	
Panel Thk.	**No. of Gaskets**
1/16	4
1/8	3
3/16	2
1/4	1

Figure 2



CLASS 9001 TYPE K-95 RING NUT WRENCH

Figure 3

MINIMUM CENTERLINE SPACINGS

	Vertical	Horizontal
Without Legend Plate	1.56	2.25
With Type SKN-700 Legend Plate	2.25	2.25

30072-100-06K

65013-002-51L
12/97
Raleigh, NC, USA

Replaces / Reemplaza / Remplace 65013-002-51K (2/97)

Pilot Light Operators

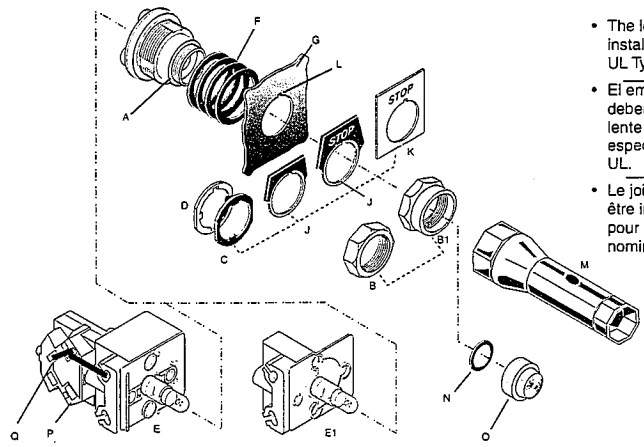
Operadores con lámpara piloto

Opérateurs à lampe témoin

Applications / Aplicaciones / Applications

9001 Class/Type Clase/Tipo/ Classe/Type	Application Aplicación Application	Operators / Operadores / Opérateurs: Standard pilot light Lámpara piloto estándar Lampe témoin standard	Push to test pilot light Lámpara piloto de prueba Lampe témoin d'essai	Remote test Prueba a distancia Essai à distance	UL listed for use on a flat surface of enclosure types: Registrado por UL para utilizar sobre una superficie plana de gabinetes tipo: Homologué par UL pour utilisation sur une surface plate d'une armoire de type :
KP	Heavy Duty Uso pesado Fort calibre	X			1, 2, 3, 3R, 4, 6, 12 & 13
KT			X		
KTR				X	
SKP	Corrosion Resistant Resistente a la corrosión Résistant à la corrosion	X			1, 2, 3, 3R, 4, 4X, 6, 12 & 13
SKT			X		
SKTR				X	

Full View / Vista completa / Vue complète



- The lens gasket (N) must be installed in the lens to retain UL Type 4 & 6 ratings.
- El empaque del lente (N) deberá ser instalado en el lente para conservar las especificaciones tipo 4 y 6 de UL.
- Le joint de la lentille (N) doit être installé dans la lentille pour préserver les valeurs nominales UL de type 4 et 6.

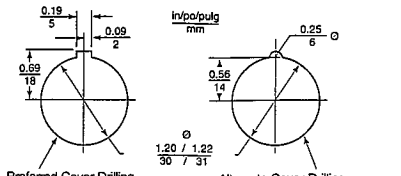
Legend	Leyenda	Légende
A. - operator	A. - operador	A. - opérateur
B. - ring nut (KP, SKP, KTR, SKTR)	B. - tuerca arillo (KP, SKP, KTR, SKTR)	B. - écrou de blocage (KP, SKP, KTR, SKTR)
B1.- ring nut (KT, SKT)	B1.- tuerca arillo (KT, SKT)	B1. - écrou de blocage (KT, SKT)
C. - locking thrust washer	C. - roldana de seguridad de bloqueo	C. - rondelle de butée de verouillage
D. - trim washer	D. - roldana collarín	D. - rondelle de garniture
E. - standard light module	E. - módulo de luz estándar	E. - module lumineux standard
E1.- shallow depth light module (KP, SKP)	E1.- módulo de luz de poca profundidad (KP, SKP)	E1.- module lumineux de faible profondeur (KP, SKP)
F. - compensating gaskets	F. - empaques de compensación	F. - joints de compensation
G. - panel	G. - panel	G. - panneau
J. - metal legend plate	J. - placa leyenda metálica	J. - plaque de légende en métal
K. - plastic legend plate	K. - placa leyenda de plástico	K. - plaque de légende en plastique
L. - alignment tab	L. - lengüeta de alineamiento	L. - languette d'alignement
M. - ring nut wrench (K-95)	M. - llave para tuercas (K-95)	M. - clé pour écrou de blocage (K-95)
N. - lens gasket	N. - empaque del lente	N. - joint de la lentille
O. - lens	O. - lente	O. - lentille
P. - contact block (KT, SKT, KTR,SKTR)	P. - bloque de contactos (KT, SKT, KTR, SKTR)	P. - bloc de contacts (KT, SKT, KTR,SKTR)
Q. - jumpers (KT, SKT, KTR,SKTR)	Q. - puentes (KT, SKT, KTR,SKTR)	Q. - cavaliers (KT, SKT, KTR,SKTR)

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SQUARE D

Mounting / Montaje / Montage



Preferred Cover Drilling
Perforación de la cubierta preferida
Perçage du couvercle préféré

Alternate Cover Drilling
Perforación de la cubierta alterna
Perçage du couvercle alternatif

(Dim.: in/pulg/po (mm))

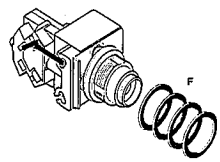
Hole Punch	Punzonado	Poinçon
Ø 31mm: Greenlee knockout punch 730-S	Ø 31mm: Punzonado de discos removibles Greenlee 730-S	Ø 31 mm : Emporte-pièce Greenlee 730-S
Notch: Greenlee punch 730-K	Muesca: Punzonado Greenlee 730-K	Encoche : poinçon Greenlee 730-K
Push buttons also mount in 1.20 (30.5) hole	Estos operadores también se pueden montar en un agujero de 1,20 (30,5)	Ces opérateurs se montent aussi dans un trou.

Min. Centerline Spacing / Espacio min. al eje / Espacement min. à l'axe

	Vertical	Horizontal
Without legend plate	1,56 (40)	2.25 (57)
Sin placa	1,56 (40)	2,25 (57)
Sans plaque de légende	1,56 (40)	2,25 (57)
With legend plate	*Consult Square D Digest*	
Con placa	*Consultar el Compendiado Square D*	
Avec plaque de légende	*Consulter le Digest Square D*	

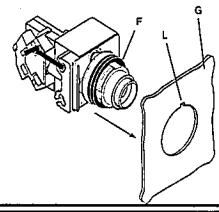
Installation / Instalación / Installation

① - Select number of gaskets (F) per table
- Seleccionar el número de empaques (F) según la tabla
- Choisir le nombre de joints (F) suivant le tableau

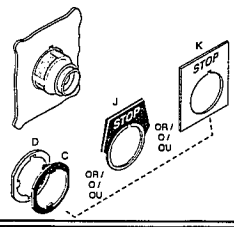


Panel thickness in. (mm) Espesor del panel pulg (mm) Épaisseur du panneau po (mm)	No. of gaskets No. de empaques N° de joints
1/16 (1,6)	4
1/8 (3,2)	3
3/16 (4,8)	2
1/4 (6,4)	1

② - Mount onto panel (G)
- Montar sobre el panel (G)
- Monter sur le panneau (G)

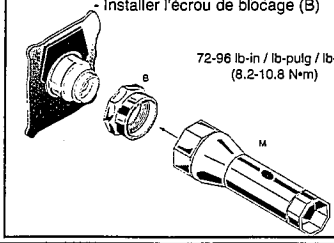


③ - Install legend plate (J or K) and/or washer (C,D)
- Instalar la placa (J o K) y/o roldana (C,D)
- Installer la plaque de légende (J ou K) et/ou rondelle (C,D)

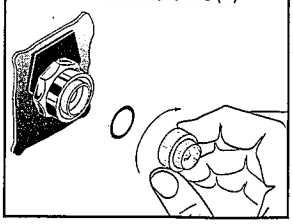


Legend Plate	Washer
Metal (J) Plastic (K) None	no D or C C only D and C
Placa	Roldana
De metal (J) De plástico (K) Ninguna	ni D ni C C solamente D y C
Plaque de légende	Rondelle
En métal (J) En plastique (K) Aucune	ni D ni C C seulement D et C

④ - Install ring nut (B)
- Instalar la tuerca arillo (B)
- Installer l'écrou de blocage (B)



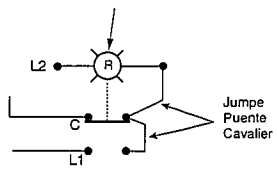
⑤ - Install lens (O)
- Instalar el lente (O)
- Installer la lentille (O)



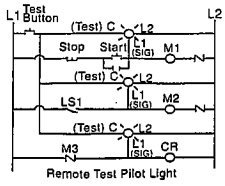
- Pressing lens moves contact from C to L1 to test bulb. (KT, SKT)
- Al oprimir el lente, el contacto móvil cambia de C a L1 para probar el bulbo (KT, SKT)
- Si on pousse sur la lentille, le contact mobile passe de C à L1 pour vérifier l'ampoule. (KT, SKT)

Typical Wiring Diagrams

Type KT, SKT / tipo KT, SKT



Type/Tipo KTR, SKTR



Remote Test Pilot Light

Electrical equipment should be serviced only by qualified electrical maintenance personnel. No responsibility is assumed by Square D for any consequences arising out of the use of this material.

Square D
8001 Hwy 64 East
Knightdale, NC 27545 USA
(919) 266-3671

Solamente el personal de mantenimiento eléctrico especializado deberá prestar servicios de mantenimiento al equipo eléctrico. La Compañía no asume responsabilidad alguna por las consecuencias emergentes de la utilización de este material.

Importado en México por:
Schneider Electric México, S.A. de C.V.
Calz. J. Rojo Gómez 1121
Col. Gpe. del Moral 09300 México, D.F.
Tel. 686-30-00

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Schneider Canada Inc.
19 Waterman Avenue, M4B 1 Y2
Toronto, Ontario
(416) 752-8020

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HYDROMATIC

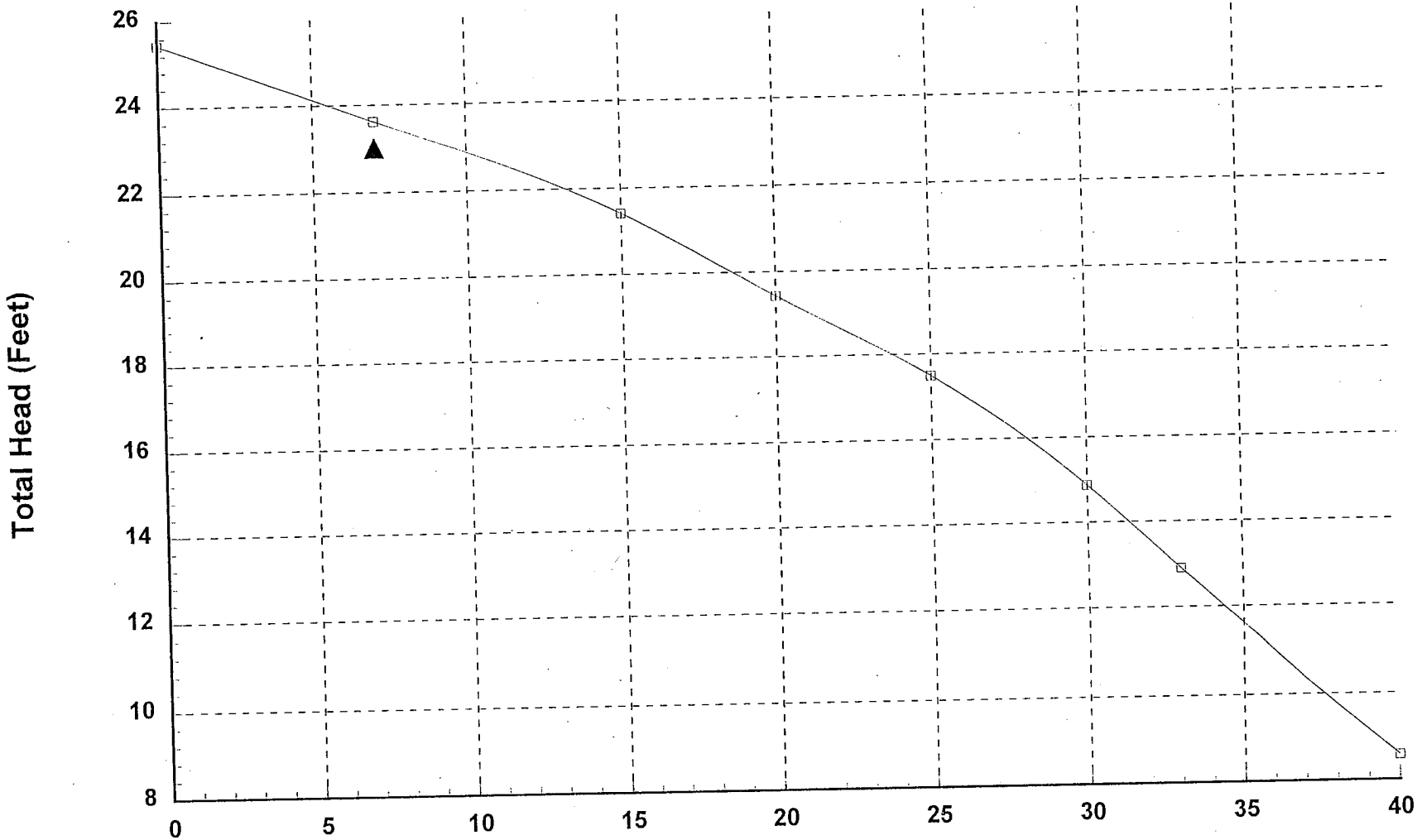
AURORA/HYDROMATIC PUMPS, INC.

Ashland, Ohio

Customer	BISCO.				
Order #	5775	HPC #	31090		
Voltage	115	Phase	1	Imp. Dia.	STD.
Watts	540	Amps	7.3	Speed	

Pump SW25M-1 S/N 0

Condition of Service 7 GPM @ 23 Ft.



Certified Test SW25M-1/T1

Test Date 7-14-98 Certified Date 7-14-98

Authorized Signature Brandon Gant

Test Voltage 115 Test Frequency 60

Notes: 0

8 6 5 4 3 2

5 4 3 2 1

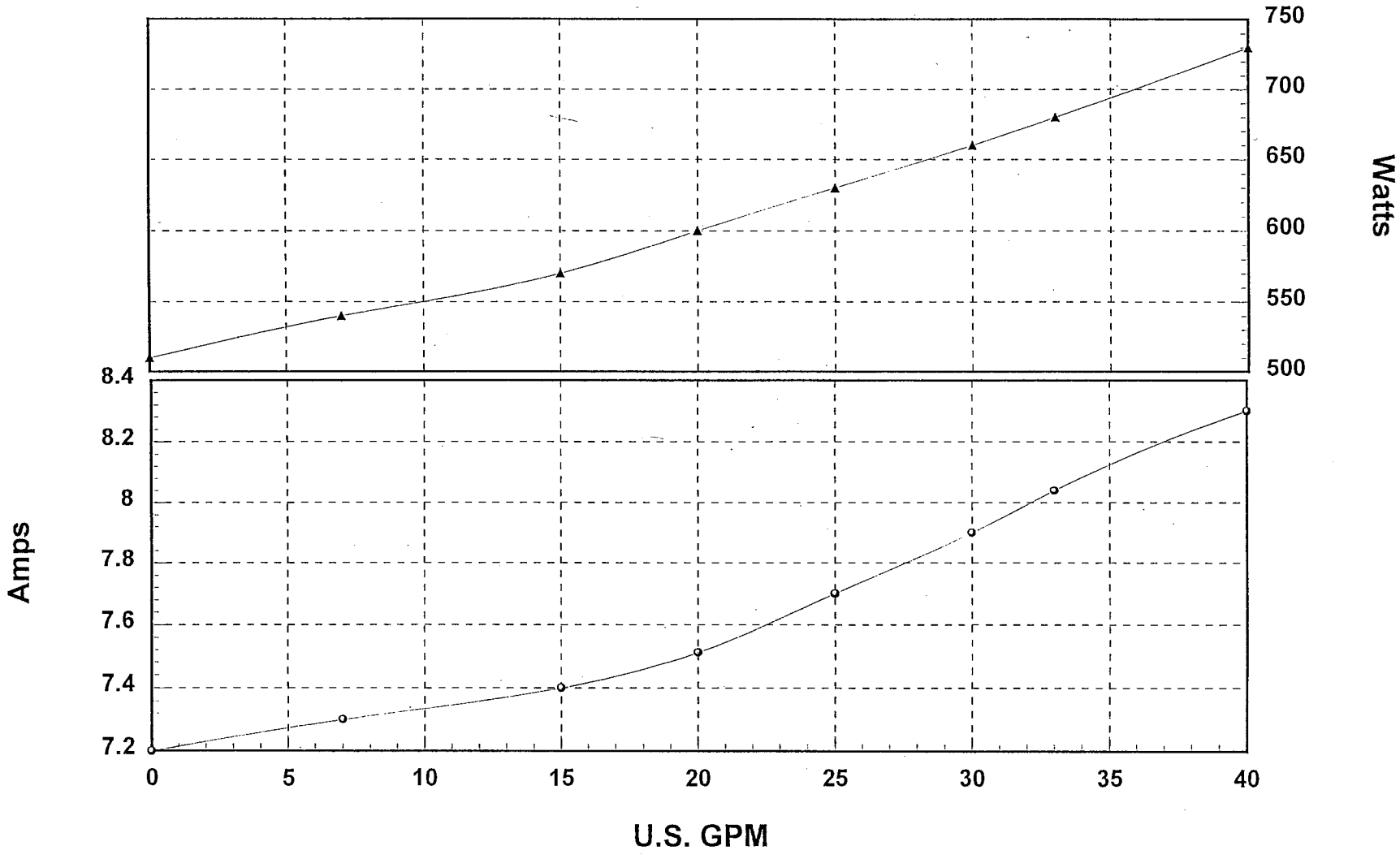
HYDROMATIC

AURORA/HYDROMATIC PUMPS, INC.

Ashland, Ohio

Pump SW25M-1 S/N 0

Condition of Service 7 GPM @ 23 Ft.



Certified Test SW25M-1/T1

HYDROMATIC

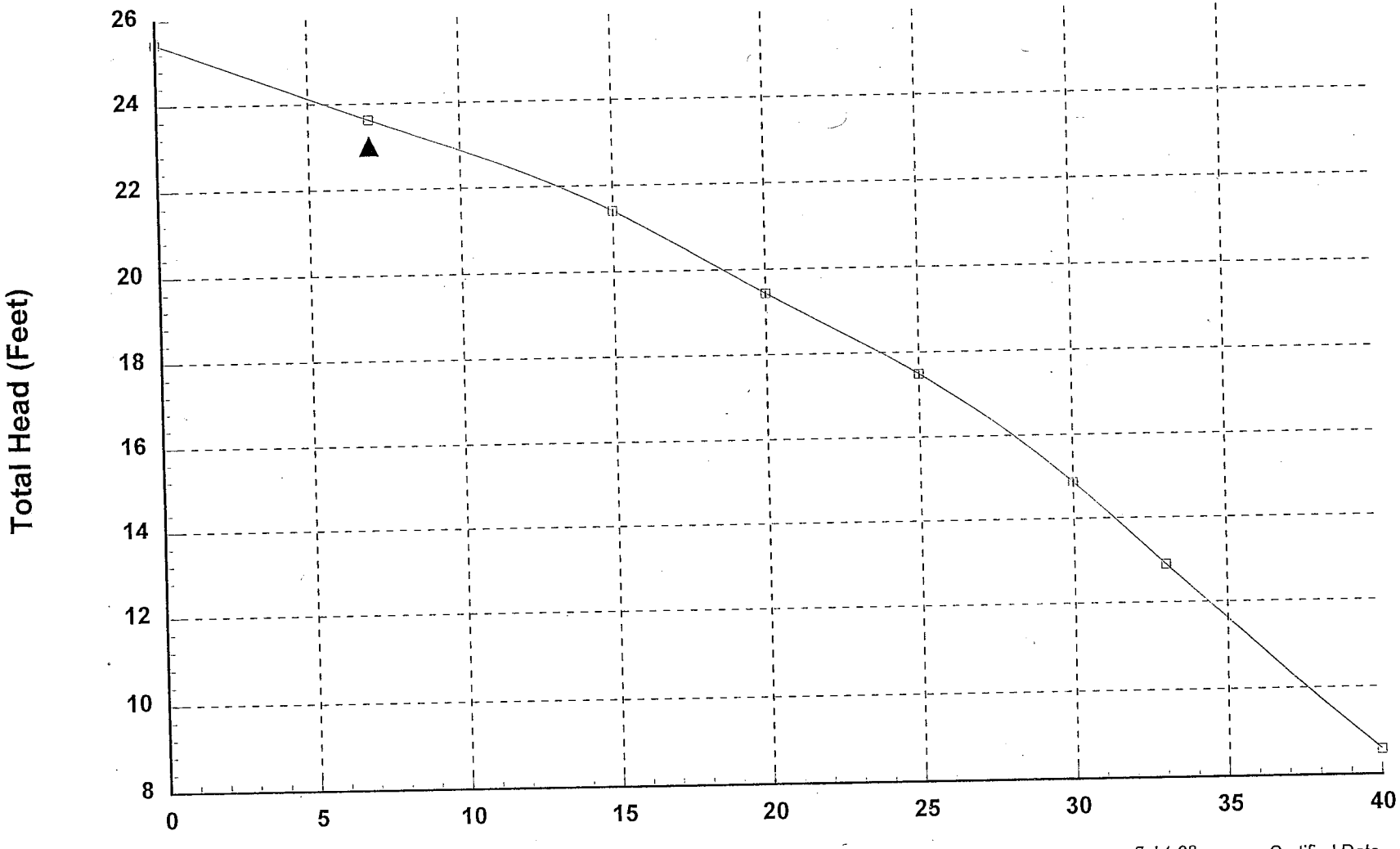
AURORA/HYDROMATIC PUMPS, INC.

Ashland, Ohio

Customer	*BISCO.*				
Order #	*5775*	HPC #	*31090*		
Voltage	*115* Phase	*1*	Imp. Dia.	*STD.*	
Watts	*540* Amps	*7.3*	Speed		

Pump SW25M-1 S/N 0

Condition of Service 7 GPM @ 23 Ft.



Test Date *7-14-98* Certified Date *7-14-98*

Authorized Signature *Brandon Faust*

Test Voltage *115* Test Frequency *60*

Notes: *0*

Certified Test SW25M-1/T1

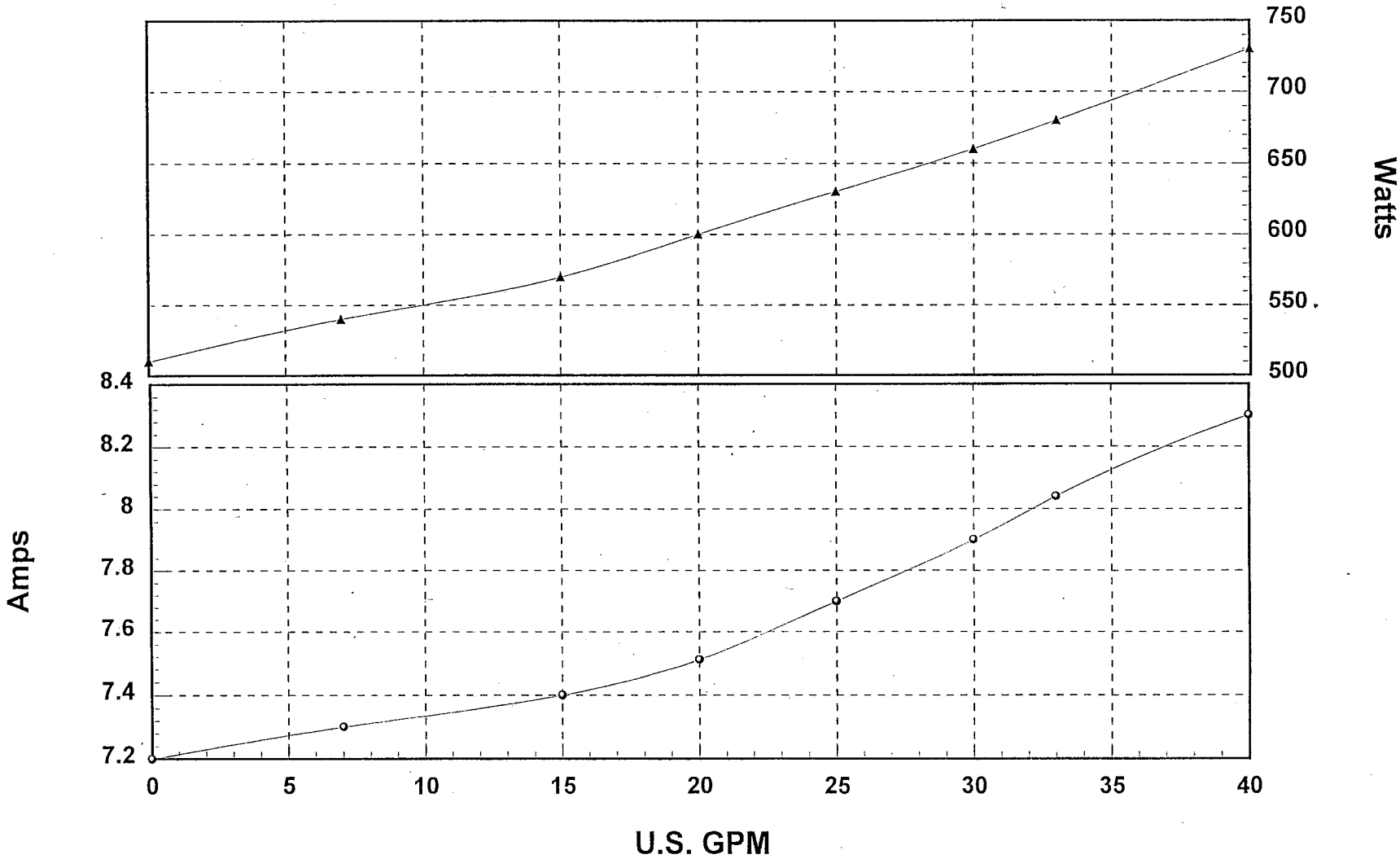
HYDROMATIC

AURORA/HYDROMATIC PUMPS, INC.

Ashland, Ohio

Pump SW25M-1 S/N 0

Condition of Service 7 GPM @ 23 Ft.



Certified Test SW25M-1/T1

APPENDIX G

AS-BUILT DRAWINGS

AS BUILT BY O.S.C.

CONTRACT DRAWINGS FOR

PRIMOSHIELD REMEDIAL DESIGN & CONSTRUCTION

1212 ST. VINCENT STREET
UTICA, NEW YORK 13501

COUNTY OF ONEIDA NYSDEC REGION 6 SITE CODE 6-33-027 STATE OF NEW YORK

DRAWING INDEX:

G1 ----- EXISTING SITE PLAN

G2 ----- PROPOSED SITE PLAN

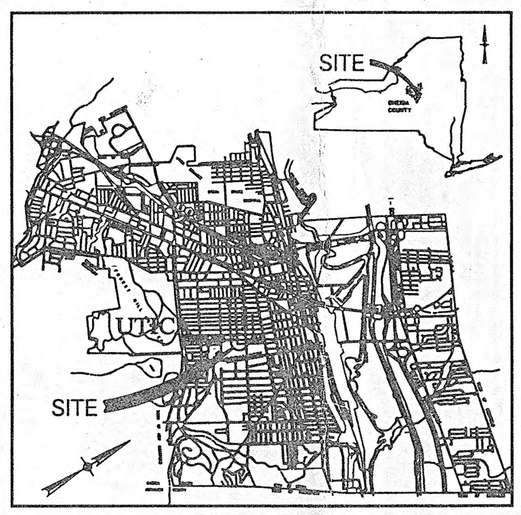
G3 ----- COLLECTION TRENCH PLAN AND PROFILES

G4 ----- COLLECTION TRENCH DETAILS

G5 ----- GROUND WATER TREATMENT SYSTEM ENCLOSURE DETAILS

M1 ----- MECHANICAL DETAILS

E1 ----- ELECTRICAL DETAILS



STATE /CITY LOCATION PLAN
NOT TO SCALE



LOCAL LOCATION PLAN
NOT TO SCALE

DAVID G. VAN HOOSE, P.E. LICENSED PROFESSIONAL ENGINEER STATE OF NEW YORK No. 064454

O'BRIEN & GERE ENGINEERS, INC.

STATE OF NEW YORK MICHAEL HOPKINS, P.E. LICENSED PROFESSIONAL ENGINEER No. 075

2/2/96

HARZA NORTHEAST
Architects, Engineers, and Construction Managers
181 Genesee St., Utica, NY 13501-2188 / Tel: (315)797-5600 / Fax: (315)797-5143

CHECKED BY: Thomas Higginbotham Feb. 2, 1999

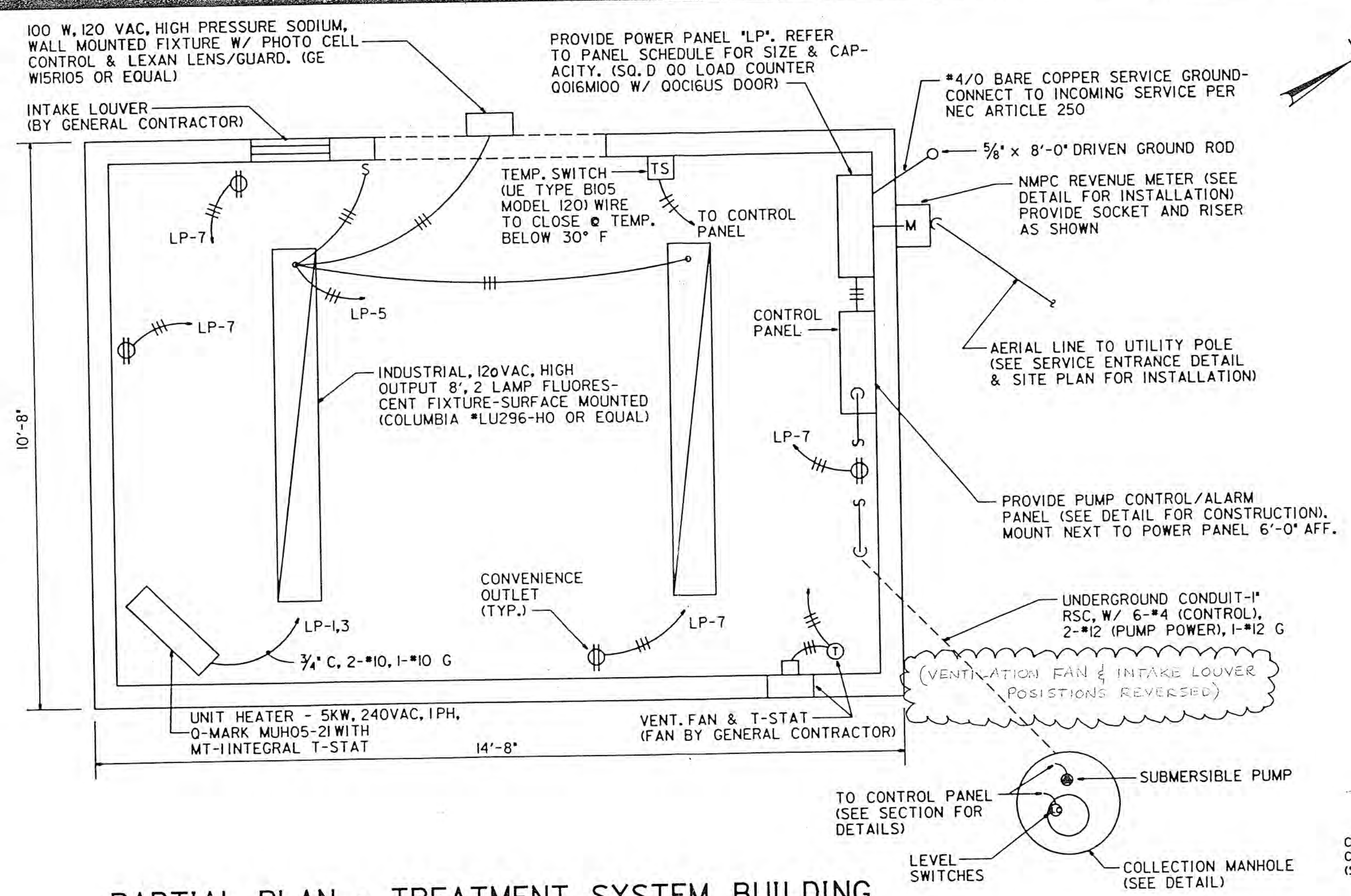
CHECKED BY: Craig M. Lapsinski 2-2-99

STATE OF NEW YORK DAVID G. VAN HOOSE LICENSED PROFESSIONAL ENGINEER 064454

APPROVED BY: James D. Van Hoose 2-3-99

NOTE: THE ABOVE APPROVAL APPLIES TO MARKED-UP AS-BUILT SHEETS G1, G2, G3, G4, G5, M1 AND E1 WHICH FOLLOW

450.052-08F



PARTIAL PLAN - TREATMENT SYSTEM BUILDING

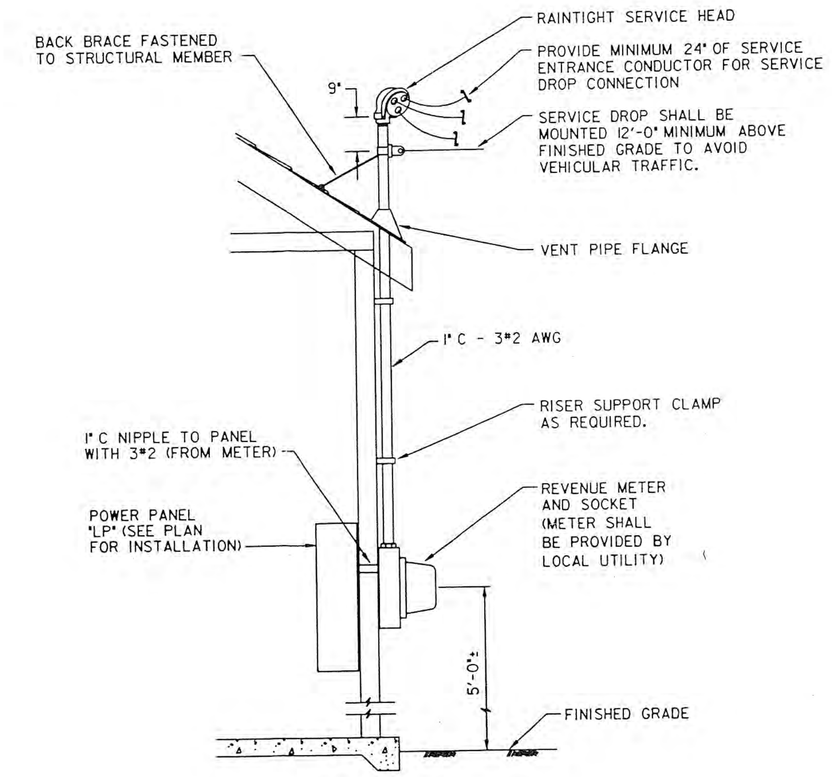
NOT TO SCALE

PANEL SCHEDULE

PANELBOARD LP LOCATION GRD. WTR. TREATMENT BLDG. INSTALLATION SURFACE
RATINGS 100 AMPS, 120/240 VOLTS, 1 PH, 3 WIRE, 60 HZ, GRD BAR X
MAIN LUGS - MCB INTERRUPTING RATING 10,000 RMS, SYMM. AMPS
MAIN CIRCUIT BREAKER 100 AMPS, CONNECTED LOAD - KW, PANEL SIZE 16 SPACES

DESCRIPTION	LOAD W=VA=AMP	BRK AMPS	CKT	L1	L2	CKT	BRK AMPS	LOAD W=VA=AMP	DESCRIPTION
UNIT HEATER		30 / 2	1 / 3			2 / 4	20 / 2		PUMP CONTROL/ALARM PANEL
LIGHTS		20	5			6	15		VENTILATION FAN
RECEPTACLES		20	7			8	20		SPARE
SPARE		20	9			10	20		SPARE
SPARE		20	11			12	20		SPARE
			13			14			
			15			16			

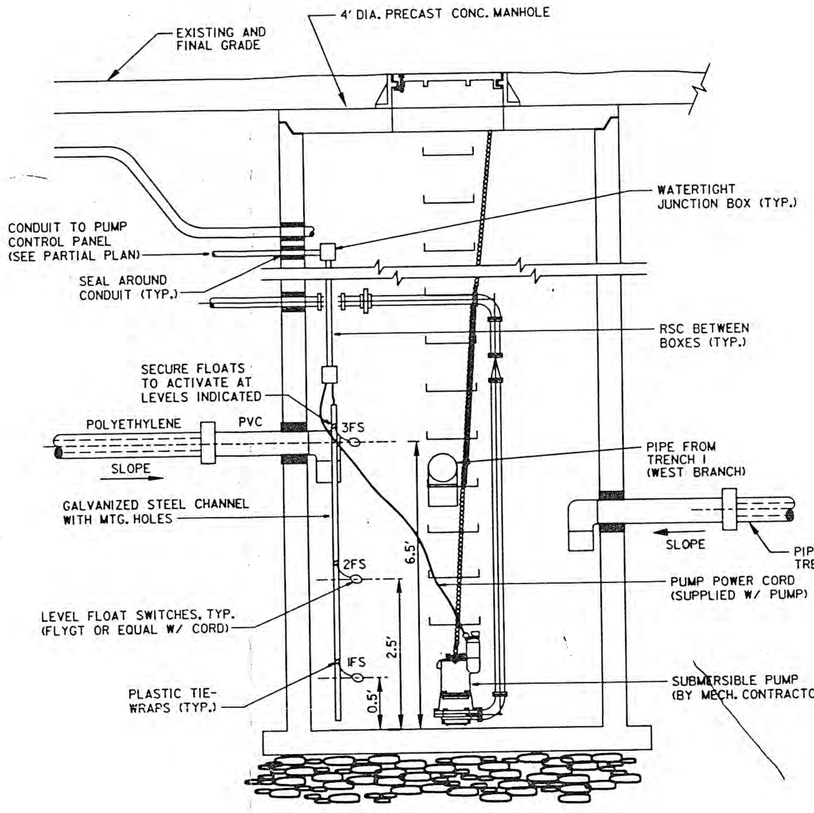
SQUARE D MODEL QB1624B8 WITH QBCIGUS COVER DOOR



SERVICE ENTRANCE DETAIL

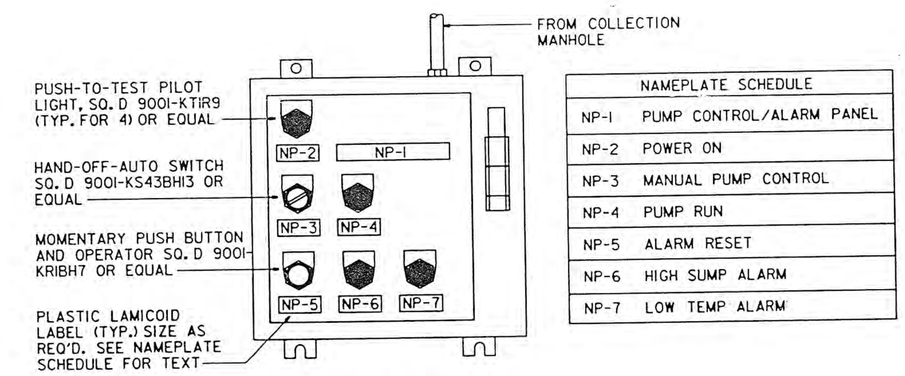
NOT TO SCALE

NOTE:
SERVICE ENTRANCE SHALL BE IN CONFORMANCE WITH LATEST EDITION OF LOCAL UTILITY SPECIFICATIONS FOR ELECTRICAL INSTALLATIONS.



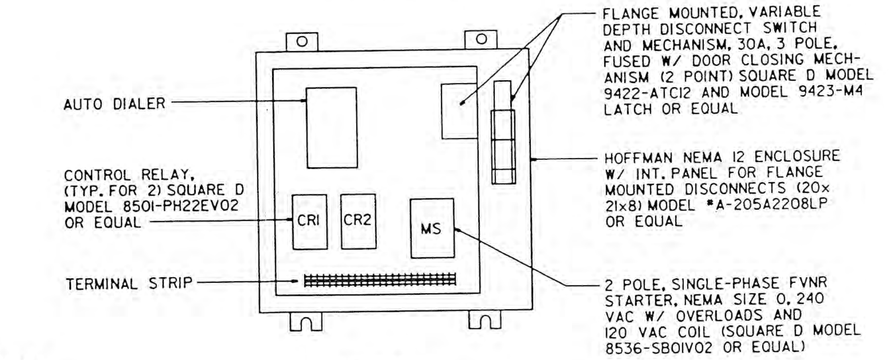
SECTION-COLLECTION MANHOLE

NOT TO SCALE



NAMEPLATE SCHEDULE	
NP-1	PUMP CONTROL/ALARM PANEL
NP-2	POWER ON
NP-3	MANUAL PUMP CONTROL
NP-4	PUMP RUN
NP-5	ALARM RESET
NP-6	HIGH SUMP ALARM
NP-7	LOW TEMP ALARM

EXTERIOR VIEW



INTERIOR VIEW

PUMP CONTROL/ALARM PANEL

NOT TO SCALE

PUMP CONTROL/ALARM PANEL ELEMENTARY

NOT TO SCALE

SITE PLAN

NOT TO SCALE

IT IS A VIOLATION OF THE LAW FOR ANY PERSON UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER TO ALTER THIS DRAWING IN ANY WAY. IF THIS DRAWING IS ALTERED, THE ALTERING ENGINEER SHALL AFFIX TO THE DRAWING HIS SEAL AFFIXED ALONG WITH A DESCRIPTION OF THE ALTERATION, THE SIGNATURE AND DATE. COPYRIGHT

O'BRIEN & GERE ENGINEERS, INC.

CITY OF UTICA - TITLE 3 PROJECT
PRIMOSHIELD REMEDIAL DESIGN & CONSTRUCTION
1212 ST. VINCENT STREET
UTICA, NEW YORK 13501
COUNTY OF ONEIDA NYSDEC REGION 6 SITE CODE 6-33-027 STATE OF NEW YORK

REVISION	DATE	BY
DATE	2-1-96	
DRAWN BY	EJL	
CHECKED BY	RJC	
APPROVED	MS	
SCALE	AS SHOWN	

PROJECT NO. 6057

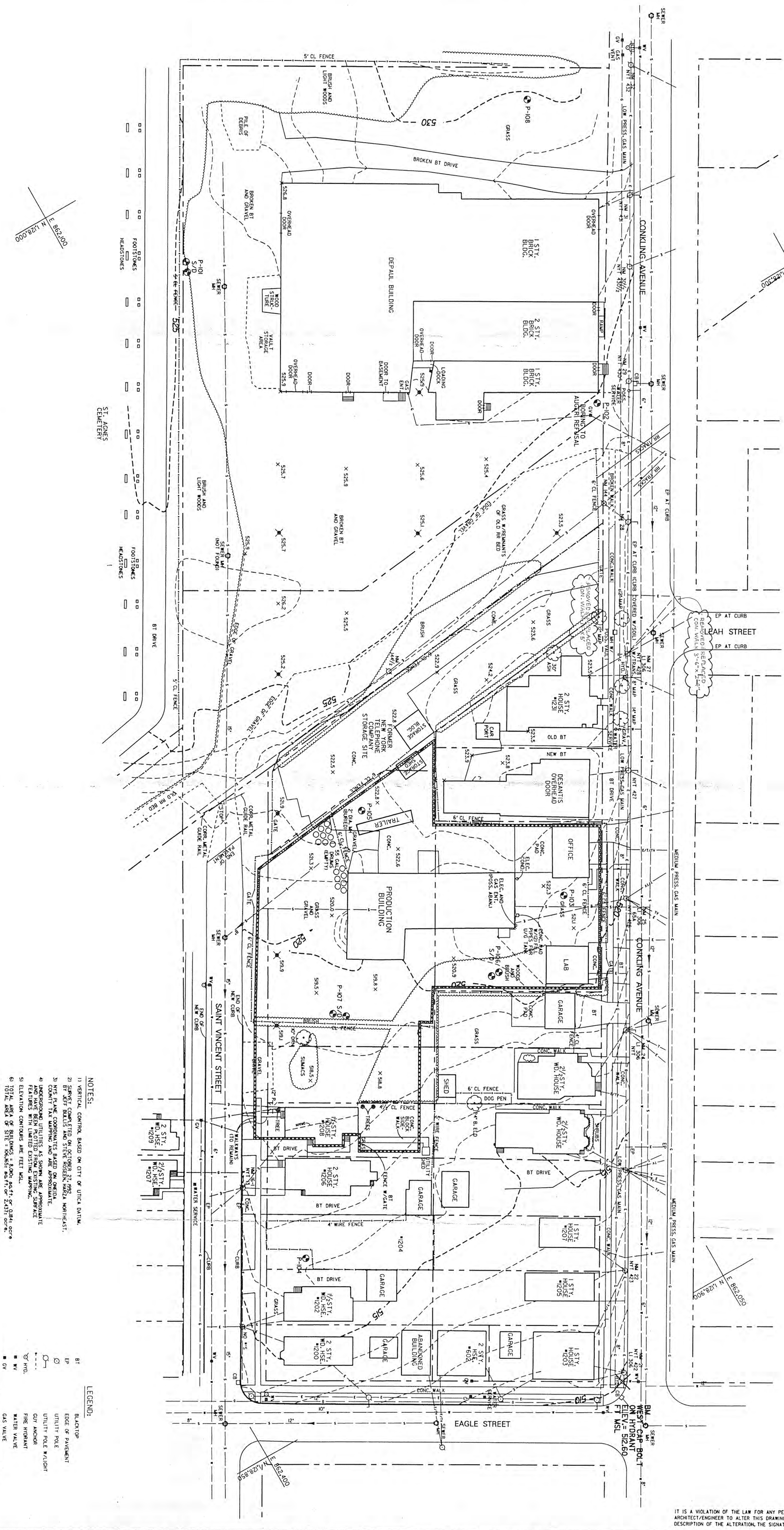
SHEET TITLE
ELECTRICAL DETAILS

SHEET NO.
E-1

450.052-07F

ISSUE DATE: REVISION* REVISION DATE:
OVERLAY KEY SHEET
SCREEN EACH OVERLAY*

ISSUE DATE:_____ REVISION#____ REVISION DATE:_____



NOTES:

1) VERTICAL CONTROL BASED ON CITY OF UTICA DATUM.
2) SURVEY COMPLETED ON OCTOBER 27, 1992 BY JEFF BULLIS AND STEVE ROSEEN, HARZA NORTHEAST.
3) NYS PLANE COORDINATES BASED ON ONEIDA COUNTY TAX MAPPING AND ARE APPROXIMATE.
4) UNDERGROUND UTILITIES AS SHOWN ARE APPROXIMATE AND HAVE BEEN PLOTTED FROM EXISTING SURFACE FEATURES WITH LIMITED EXISTING MAPPING.
5) ELEVATION CONTOURS ARE FEET MSL.
6) TOTAL AREA OF BUILDINGS = 8,000± sq.ft. or 0.184± acre
TOTAL AREA OF SITE = 106,650± sq.ft. or 2.447± acre.
7) ALL SEWERS RECEIVE COMBINED SANITARY AND STORM WATER FLOWS THAT ARE TREATED AT THE ONEIDA COUNTY POLLUTION CONTROL FACILITY ON LELAND AVE, UTICA, NY.
8) SURFACE DRAINAGE FLOW PATTERNS AT THE PRIMOSHIELD SITE (1212 ST. VINCENT) GENERALLY TRAVEL FROM WEST TO THE EAST-NORTHEAST UNDER LOW HYDRAULIC GRADIENTS AS A RESULT OF THE RELATIVELY FLAT SURFACE TOPOGRAPHY IN THIS AREA OF THE CITY OF UTICA.
9) DRAINAGE FROM THE SURROUNDING PROPERTIES RUNS FROM THE PROPERTIES TO THE ADJOINING STREETS AND THEN INTO THE COMBINED SEWER SYSTEMS.
10) THE SITE BOUNDARY FOR CONSTRUCTION AT THE 1208 ST. VINCENT STREET RESIDENCE INCLUDES THE YARD AND BASEMENT ONLY.

LEGEND:

- BT — BLACKTOP
- EP — EDGE OF PAVEMENT
- ∅ — UTILITY POLE
- ∅— — UTILITY POLE W/LIGHT
- ---- — GUY ANCHOR
- HYD. — FIRE HYDRANT
- WV — WATER VALVE
- GV — GAS VALVE
- G — UNDERGROUND GAS LINE
- 515 — CONTOUR LINE
- PROPERTY LINE (APPROX.)
- GRID LOCATIONS (WITH STAKES)
- TV — OVERHEAD CABLE TELEVISION
- T — OVERHEAD TELEPHONE LINE
- E — OVERHEAD ELECTRIC LINE
- S — COMBINED STORM & SANITARY SEWER
- SITE BOUNDARY FOR CONSTRUCTION
- EXISTING MONITORING WELL LOCATION

30' 0 30' 60'

450.052-01F

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PROJECT NO. 6057

REVISION	DATE	BY

DATE 3-6-96
DRAWN BY EJL
CHECKED BY
APPROVED
SCALE 1"=30'

SHEET TITLE: *EXISTING SITE PLAN*

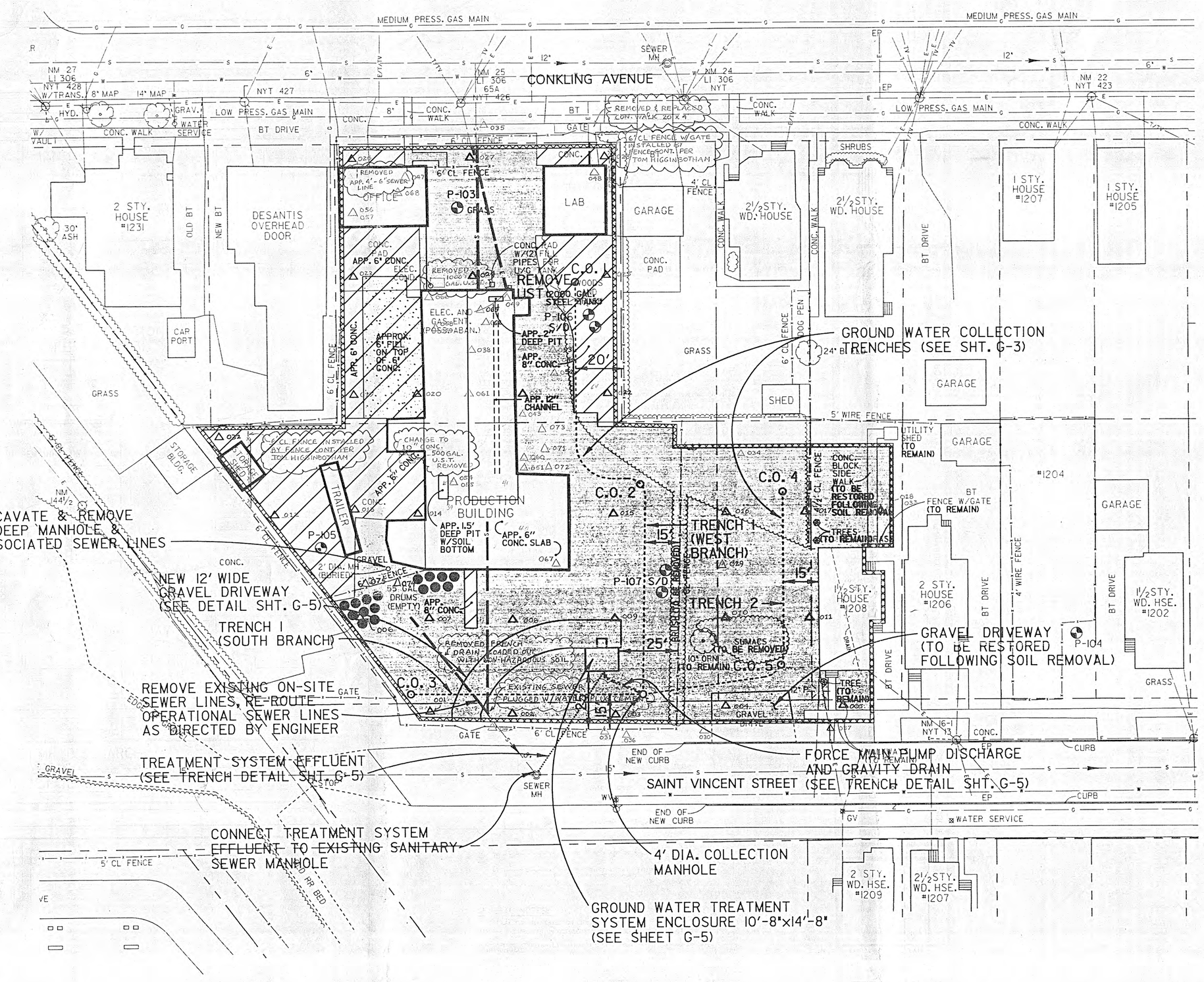
SHEET NO. G-1

CITY OF UTICA – TITLE 3 PROJECT
PRIMOSHIELD REMEDIAL DESIGN & CONSTRUCTION
1212 ST. VINCENT STREET
UTICA, NEW YORK 13501

COUNTY OF ONEIDA NYSDEC REGION 6 SITE CODE 6-33-027 STATE OF NEW YORK

STATE OF NEW YORK · DAVID G. VAN ANTWERP · LICENSED PROFESSIONAL ENGINEER · No. 56795

O'BRIEN & GERE ENGINEERS, INC.



SCHEDULE OF IDENTIFIED ASBESTOS-CONTAINING MATERIALS

BUILDING	ASBESTOS-CONTAINING MATERIAL	ESTIMATED QUANTITY
MAIN PRIMOSHIELD BUILDING	KILN/FURNACE DOOR GASKET	4 SF
	WINDOW GLAZING COMPOUND	100 SF
	BLACK ASPHALT ROLLED ROOFING WITH TAR PAPER UNDERLAYMENT	5400 SF
	GRAY ASPHALT ROLLED ROOFING WITH TAR PAPER UNDERLAYMENT	80 SF
	GREEN ASPHALT ROLLED ROOFING WITH TAR PAPER UNDERLAYMENT	375 SF
OFFICE BUILDING	12" WHITE FLOOR TILE	18 SF
	WINDOW GLAZING COMPOUND	90 SF
	DUCT SEAM TAPE	80 SF
	BLACK ASPHALT ROLLED ROOFING WITH TAR PAPER UNDERLAYMENT	500 SF
	GRAY ASPHALT ROLLED ROOFING WITH TAR PAPER UNDERLAYMENT	500 SF
LAB BUILDING	TRANSITE FUME HOOD LINING	80 SF
	WINDOW GLAZING COMPOUND	52 SF
STORAGE BUILDING	BLACK ROLLED ROOFING WITH TAR PAPER UNDERLAYMENT	220 SF

ASBESTOS REMOVAL NOTES:

1) REMOVE ALL ASBESTOS-CONTAINING MATERIALS (ACM) FROM EACH BUILDING PRIOR TO BUILDING DEMOLITION IN ACCORDANCE WITH THE REQUIREMENTS OF THIS DRAWING, THE CONTRACT DOCUMENTS AND ALL APPLICABLE LAWS, RULES AND REGULATIONS.

2) A SCHEDULE OF IDENTIFIED ASBESTOS-CONTAINING MATERIALS IS PROVIDED ON THIS SHEET. QUANTITIES LISTED ARE ESTIMATES ONLY. THIS INFORMATION IS PROVIDED FOR GUIDANCE ONLY. THE CONTRACTOR SHALL VERIFY QUANTITIES, LOCATIONS AND TYPES OF ACM PRESENT.

LEGEND:

BT	BLACKTOP
EP	EDGE OF PAVEMENT
	UTILITY POLE
	UTILITY POLE W/LIGHT
	GUY ANCHOR
HYD.	FIRE HYDRANT
WV	WATER VALVE
GV	GAS VALVE
G	UNDERGROUND GAS LINE
	PROPERTY LINE (APPROX.)
	GRID LOCATIONS (WITH STAKE)
TV	OVERHEAD CABLE TELEVISION
T	OVERHEAD TELEPHONE LINE
E	OVERHEAD ELECTRIC LINE
S	COMBINED STORM & SANITARY SEWER
	SITE BOUNDARY FOR CONSTRUCTION
	LIMITS OF SOIL REMOVAL TO 1 FT. BELOW EXISTING GRADE
	GROUND WATER COLLECTION TRENCH W/6" DIA. PERF. PIPE
	EXISTING MONITORING WELL
	LIMITS OF CONCRETE REMOVAL (DEPTH AS NOTED)
	1½" DIA. SDR 26 PVC COLLECTION PUMP DISCHARGE
	2" DIA. SDR 26 PVC TREATMENT SYSTEM EFFLUENT
	BUILDING/DEBRIS/UTILITIES FOR REMOVAL
	PROPOSED POST-EXCAVATION SOIL SAMPLE
	2" DIA. SDR 26 SUMP DRAIN
S	EXISTING ON-SITE UTILITIES / SEWER LINES TO BE REMOVED

GENERAL NOTES:

1) VERTICAL CONTROL BASED ON CITY OF UTICA DATUM.
2) SURVEY COMPLETED ON OCTOBER 27, 1992 BY JEFF BULLIS AND STEVE ROSEEN, HARZA NORTHEAST.
3) NYS PLANE COORDINATES BASED ON ONEIDA COUNTY TAX MAPPING AND ARE APPROXIMATE.
4) UNDERGROUND UTILITIES AS SHOWN ARE APPROXIMATE AND HAVE BEEN PLOTTED FROM EXISTING SURFACE FEATURES WITH LIMITED EXISTING MAPPING. THE CONTRACTOR SHALL DISCONNECT AND REMOVE ALL ABANDONED ON-SITE EXISTING UTILITIES AND TERMINATE THE UTILITIES AT THE PROPERTY LINE. ANY UTILITIES FOUND TO BE FUNCTIONAL OR OPERATIONAL SHALL BE REROUTED AS DIRECTED BY THE ENGINEER.
5) THE FOLLOWING REMEDIAL ACTIONS ARE REQUIRED AT 1208 ST. VINCENT STREET IN ACCORDANCE WITH SECTION 17200:
   - LOW PRESSURE WASH AND RINSE THE WALLS AND FLOOR OF THE RESIDENCE BASEMENT
   - SEAL THE SOUTH WALL OF THE BASEMENT WITH TWO COATS OF A CONCRETE SEALER
   - CLEAN SUMPS AND REMOVE SEDIMENTS
   - REROUTE ROOF DRAINAGE AWAY FROM THE BASEMENT SUMP TO THE FRONT AND SIDE YARD
6) UPON DIRECTION BY THE ENGINEER, THE CONTRACTOR SHALL BACKFILL AND COMPACT ALL EXCAVATED AREAS WITH CERTIFIED CLEAN FILL AND 4" OF TOPSOIL WITH SEED, INSTALLED IN ACCORDANCE WITH SECTIONS 02230 & 02580, UNLESS OTHERWISE NOTED.
7) THE CONTRACTOR SHALL UNDERTAKE ALL REASONABLE EFFORTS TO PROTECT AND PRESERVE EXISTING SITE MONITORING WELLS AND NEIGHBORING PROPERTIES DURING CONSTRUCTION. ITEMS LOCATED IN THE BACKYARD OF 1208 ST. VINCENT STREET SHALL BE RELOCATED FOLLOWING SOIL REMOVAL; ALL LARGE TREES AND SHRUBS SHALL BE PROTECTED AND PRESERVED TO THE MAXIMUM EXTENT POSSIBLE.
8) THE CONTRACTOR SHALL DEMOLISH AND REMOVE ALL SITE BUILDINGS. THE DEMOLITION AND REMOVAL OF SITE BUILDINGS SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 02023. REFER TO SECTION 02023 FOR A DESCRIPTION OF BUILDING SIZE AND CONSTRUCTION.
9) THE CONTRACTOR SHALL REMOVE ALL MISCELLANEOUS DEBRIS FROM THE SITE IN ACCORDANCE WITH SECTION 02049.
10) POST-EXCAVATION SAMPLES ARE TO BE COLLECTED AND ANALYZED IN ACCORDANCE WITH SECTIONS 02043 AND 02220.
11) THE CONTRACTOR SHALL RESTORE ALL CHAIN LINK FENCING DAMAGED AND/OR REMOVED TO PERFORM THE WORK.
12) SEE SHEET E-1 FOR ELECTRICAL SITE PLAN.

20' 0 20' 40'

405.052-02F

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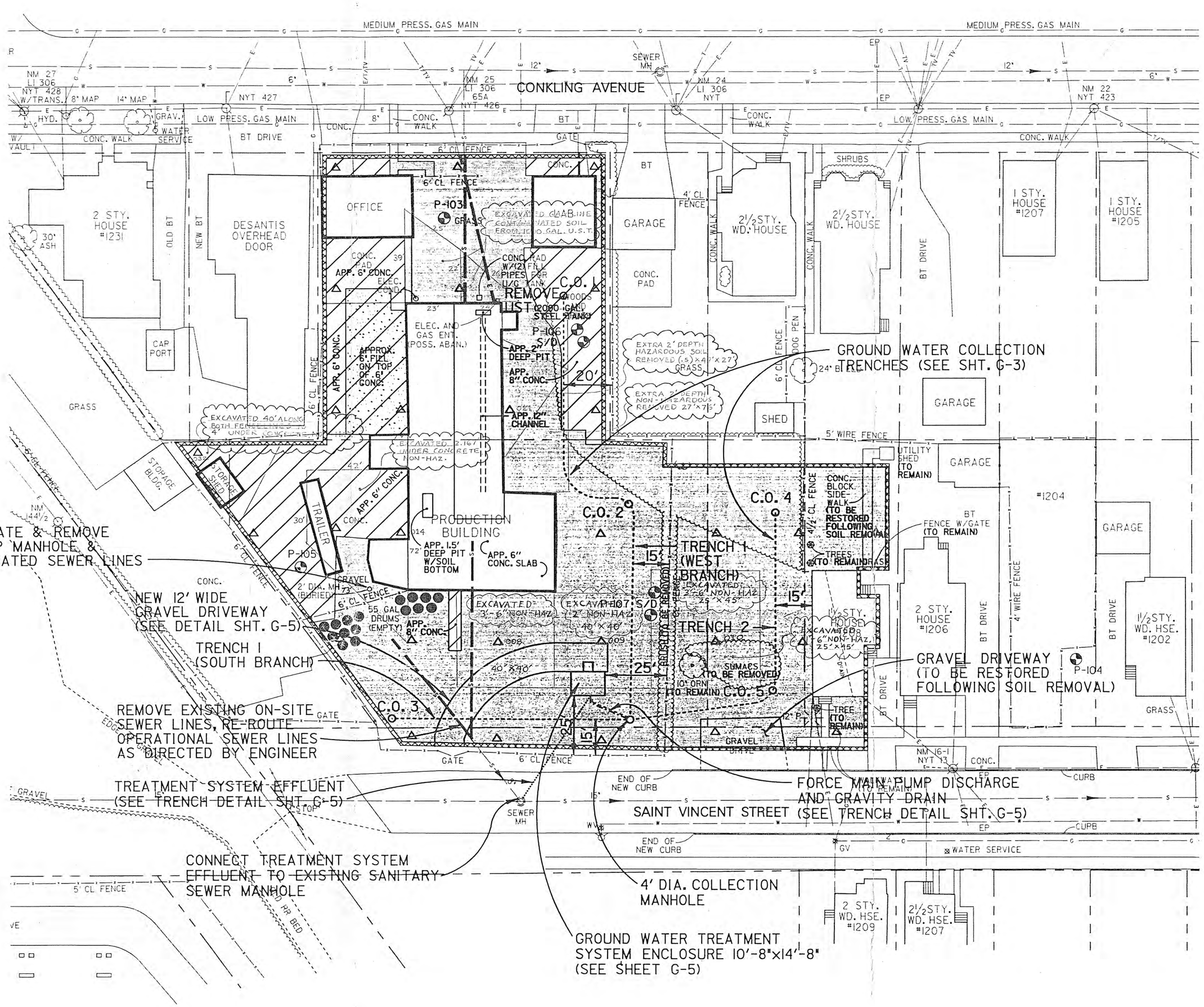
CITY OF UTICA – TITLE 3 PROJECT
PRIMOSHIELD REMEDIAL DESIGN & CONSTRUCTION
1212 ST. VINCENT STREET
UTICA, NEW YORK 13501
COUNTY OF ONEIDA NYSDEC REGION 6 SITE CODE 6-33-027 STATE OF NEW YORK

PROJECT NO.	6057.01
REVISION	DATE / BY
DATE	3-6-96
DRAWN BY	EJL
CHECKED BY	RSW
APPROVED	
SCALE	1" = 20'

SHEET TITLE
PROPOSED SITE PLAN

SHEET NO.
G-2 A

ISSUE DATE: ____ REVISION* ____ REVISION DATE: ____
SHEET* OVE
OVERLAY REF
SCREEN
EACH OVERLAY*



SCHEDULE OF IDENTIFIED ASBESTOS-CONTAINING MATERIALS

BUILDING	ASBESTOS-CONTAINING MATERIAL	ESTIMATED QUANTITY
MAIN PRIMOSHIELD BUILDING	KILN/FURNACE DOOR GASKET	4 SF
	WINDOW GLAZING COMPOUND	100 SF
	BLACK ASPHALT ROLLED ROOFING WITH TAR PAPER UNDERLAYMENT	5400 SF
	GRAY ASPHALT ROLLED ROOFING WITH TAR PAPER UNDERLAYMENT	80 SF
	GREEN ASPHALT ROLLED ROOFING WITH TAR PAPER UNDERLAYMENT	375 SF
OFFICE BUILDING	12" WHITE FLOOR TILE	18 SF
	WINDOW GLAZING COMPOUND	90 SF
	DUCT SEAM TAPE	80 SF
	BLACK ASPHALT ROLLED ROOFING WITH TAR PAPER UNDERLAYMENT	500 SF
	GRAY ASPHALT ROLLED ROOFING WITH TAR PAPER UNDERLAYMENT	500 SF
LAB BUILDING	TRANSITE FUME HOOD LINING	80 SF
	WINDOW GLAZING COMPOUND	52 SF
STORAGE BUILDING	BLACK ROLLED ROOFING WITH TAR PAPER UNDERLAYMENT	220 SF

ASBESTOS REMOVAL NOTES:

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LEGEND:

BT	BLACKTOP
EP	EDGE OF PAVEMENT
	UTILITY POLE
	UTILITY POLE W/LIGHT
	GUY ANCHOR
HYD.	FIRE HYDRANT
WV	WATER VALVE
GV	GAS VALVE
G	UNDERGROUND GAS LINE
	PROPERTY LINE (APPROX.)
	GRID LOCATIONS (WITH STAKE)
TV	OVERHEAD CABLE TELEVISION
T	OVERHEAD TELEPHONE LINE
E	OVERHEAD ELECTRIC LINE
S	COMBINED STORM & SANITARY SEWER
	SITE BOUNDARY FOR CONSTRUCTION
	LIMITS OF SOIL REMOVAL TO 1 FT. BELOW EXISTING GRADE
	GROUND WATER COLLECTION TRENCH W/6" DIA. PERF. PIPE
	EXISTING MONITORING WELL
	LIMITS OF CONCRETE REMOVAL (DEPTH AS NOTED)
	1½" DIA. SDR 26 PVC COLLECTION PUMP DISCHARGE
	2" DIA. SDR 26 PVC TREATMENT SYSTEM EFFLUENT
	BUILDING/DEBRIS/UTILITIES FOR REMOVAL
	PROPOSED POST-EXCAVATION SOIL SAMPLE
	2" DIA. SDR 26 SUMP DRAIN
S	EXISTING ON-SITE UTILITIES / SEWER LINES TO BE REMOVED

GENERAL NOTES:

1) VERTICAL CONTROL BASED ON CITY OF UTICA DATUM.
2) SURVEY COMPLETED ON OCTOBER 27, 1992 BY JEFF BULLIS AND STEVE ROSEEN, HARZA NORTHEAST.
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5) THE FOLLOWING REMEDIAL ACTIONS ARE REQUIRED AT 1208 ST. VINCENT STREET IN ACCORDANCE WITH SECTION 17206:
   - LOW PRESSURE WASH AND RINSE THE WALLS AND FLOOR OF THE RESIDENCE BASEMENT
   - SEAL THE SOUTH WALL OF THE BASEMENT WITH TWO COATS OF A CONCRETE SEALER
   - CLEAN SUMPS AND REMOVE SEDIMENTS
   - REROUTE ROOF DRAINAGE AWAY FROM THE BASEMENT SUMP TO THE FRONT AND SIDE YARD
6) UPON DIRECTION BY THE ENGINEER, THE CONTRACTOR SHALL BACKFILL AND COMPACT ALL EXCAVATED AREAS WITH CERTIFIED CLEAN FILL AND 4" OF TOPSOIL WITH SEED, INSTALLED IN ACCORDANCE WITH SECTIONS 02238 & 02986, UNLESS OTHERWISE NOTED.
7) THE CONTRACTOR SHALL UNDERTAKE ALL REASONABLE EFFORTS TO PROTECT AND PRESERVE EXISTING SITE MONITORING WELLS AND NEIGHBORING PROPERTIES DURING CONSTRUCTION. ITEMS LOCATED IN THE BACKYARD OF 1208 ST. VINCENT STREET SHALL BE RELOCATED FOLLOWING SOIL REMOVAL. ALL LARGE TREES AND SHRUBS SHALL BE PROTECTED AND PRESERVED TO THE MAXIMUM EXTENT POSSIBLE.
8) THE CONTRACTOR SHALL DEMOLISH AND REMOVE ALL SITE BUILDINGS. THE DEMOLITION AND REMOVAL OF SITE BUILDINGS SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 02023. REFER TO SECTION 02023 FOR A DESCRIPTION OF BUILDING SIZE AND CONSTRUCTION.
9) THE CONTRACTOR SHALL REMOVE ALL MISCELLANEOUS DEBRIS FROM THE SITE IN ACCORDANCE WITH SECTION 02019.
10) POST-EXCAVATION SAMPLES ARE TO BE COLLECTED AND ANALYZED IN ACCORDANCE WITH SECTIONS 02203 AND 02220.
11) THE CONTRACTOR SHALL RESTORE ALL CHAIN LINK FENCING DAMAGED AND/OR REMOVED TO PERFORM THE WORK.
12) SEE SHEET E-1 FOR ELECTRICAL SITE PLAN.

20' 0 20' 40'

405.052-02F

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STATE OF NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION LICENSED PROFESSIONAL ENGINEER

CITY OF UTICA - TITLE 3 PROJECT
PRIMOSHIELD REMEDIAL DESIGN & CONSTRUCTION
1212 ST. VINCENT STREET
UTICA, NEW YORK 13501

COUNTY OF ONEIDA NYSDEC REGION 6 SITE CODE 6-33-027 STATE OF NEW YORK

PROJECT NO.	6057.01
REVISION	DATE / BY
DATE	3-6-96
DRAWN BY	EJL
CHECKED BY	RSW
APPROVED	MJD
SCALE	1" = 20'

SHEET TITLE

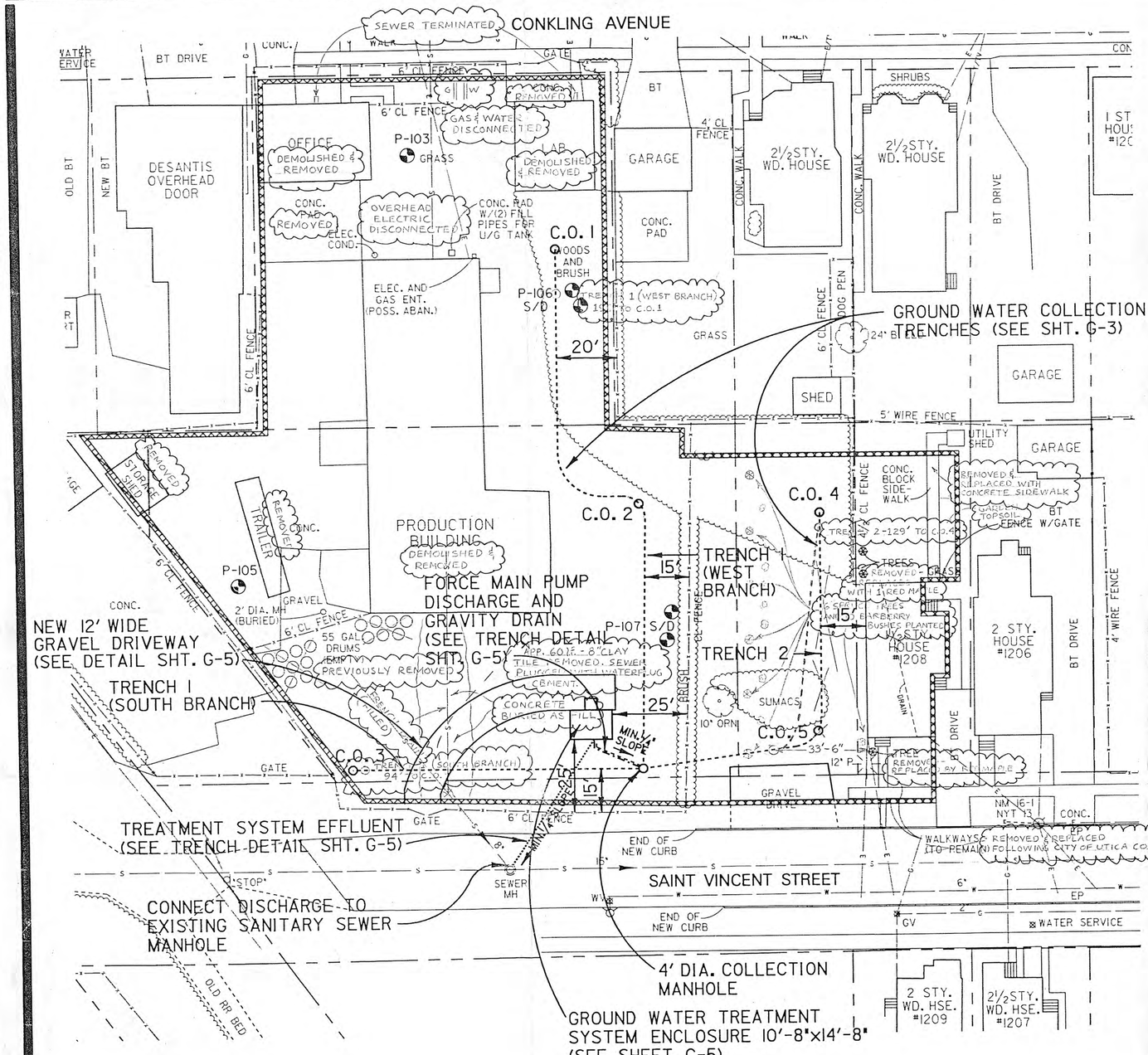
PROPOSED SITE PLAN

SHEET NO.

G-2 B

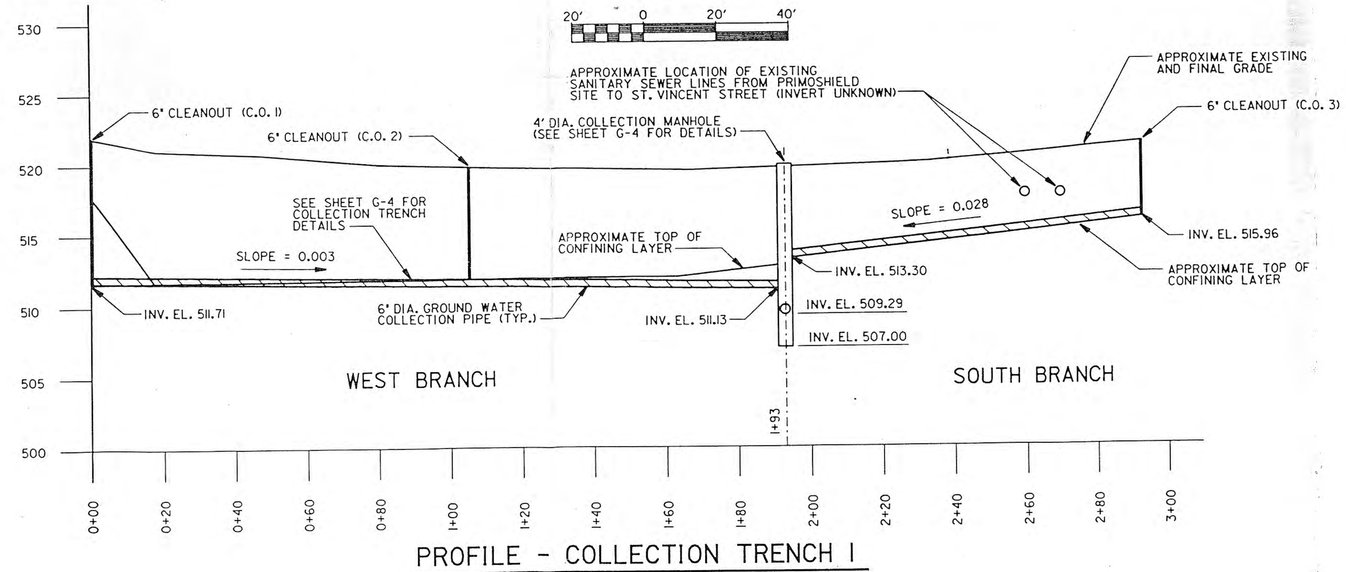
ISSUE DATE: ____ REVISION* ____ REVISION DATE:

SHEET* | OVERLAY KEY | SCREEN | EACH OVERLAY* | DWG



PLAN

20' 0 20' 40'



PROFILE - COLLECTION TRENCH 1

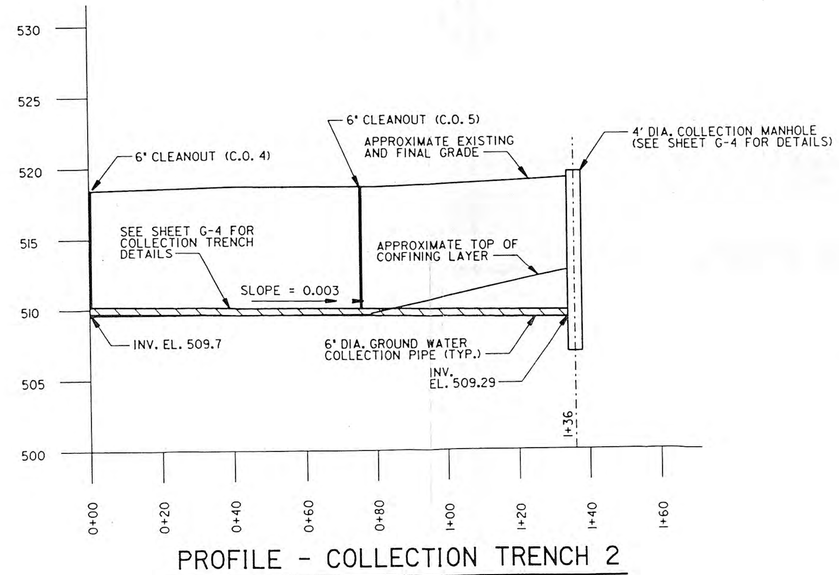
SCALE: 1" = 20' (HORIZ.)
1" = 5' (VERT.)

NOTES:

1. FOR CLEANOUT DETAILS SEE SHEET G-4.
2. SEE "OTHER INFORMATION" AND RI REPORT DATED SEPTEMBER 1994 FOR SOIL BORING, GEOLOGIC AND GROUND WATER TABLE INFORMATION.
3. INVERT FOR EXISTING SANITARY SEWER PIPING IS UNKNOWN. ALL PIPING TO TO BE FIELD VERIFIED BY CONTRACTOR PRIOR TO EXCAVATION OF GROUND WATER COLLECTION TRENCH.
4. A MINIMUM SLOPE OF 0.003 FT/FT SHALL BE MAINTAINED FOR ALL GROUND WATER COLLECTION TRENCHES AND 0.02 FT/FT FOR ALL EFFLUENT/DRAIN PIPING.
5. THE CONTRACTOR SHALL UNDERTAKE ALL REASONABLE EFFORTS TO PROTECT AND PRESERVE EXISTING SITE MONITORING WELLS AND NEIGHBORING PROPERTIES DURING CONSTRUCTION. ITEMS LOCATED IN THE BACKYARD OF #1208 ST. VINCENT STREET SHALL BE REMOVED DURING SOIL REMOVAL AND RETURNED TO THEIR ORIGINAL LOCATIONS AFTER RESTORATION OF THE LAWN. LARGE TREES AND SHRUBS SHALL BE PROTECTED AND PRESERVED TO THE MAXIMUM EXTENT PRACTICAL AT THE #1208 ST. VINCENT STREET PROPERTY.

LEGEND:

BT	BLACKTOP
EP	EDGE OF PAVEMENT
	UTILITY POLE
	UTILITY POLE W/LIGHT
	GUY ANCHOR
HYD.	FIRE HYDRANT
WV	WATER VALVE
GV	GAS VALVE
G	UNDERGROUND GAS LINE
5/5	CONTOUR LINE
	PROPERTY LINE (APPROX.)
	GRID LOCATIONS (WITH STAKE)
TV	OVERHEAD CABLE TELEVISION
T	OVERHEAD TELEPHONE LINE
E	OVERHEAD ELECTRIC LINE
S	COMBINED STORM & SANITARY SEWER
	SITE BOUNDARY FOR CONSTRUCTION
	GROUND WATER COLLECTION TRENCH W/ 6" DIA. PERF. PIPE
	EXISTING MONITORING WELL LOCATIONS
	1½" DIA. SDR 26 PVC COLLECTION PUMP DISCHARGE
	2" DIA. SDR 26 PVC TREATMENT SYSTEM EFFLUENT
	2" DIA. SDR 26 PVC SUMP DRAIN



PROFILE - COLLECTION TRENCH 2

SCALE: 1" = 20' (HORIZ.)
1" = 5' (VERT.)

450.052-03F

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UTICA, NEW YORK 13501

COUNTY OF ONEIDA NYSDEC REGION 6 SITE CODE 6-33-027 STATE OF NEW YORK

PROJECT NO.	6057
REVISION	DATE / BY
DATE	3-6-96
DRAWN BY	EJL
CHECKED BY	RLM
APPROVED	
SCALE	AS SHOWN

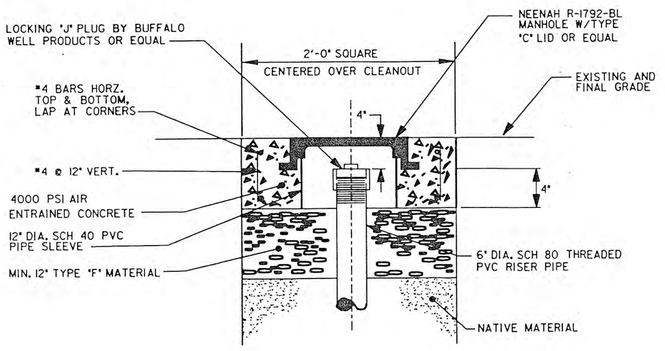
SHEET TITLE

COLLECTION TRENCH PLAN AND PROFILES

SHEET NO.

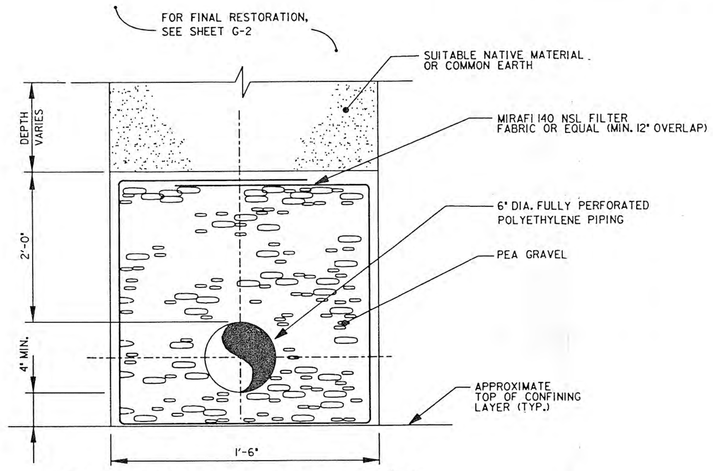
G-3

ISSUE DATE: REVISION# REVISION DATE:



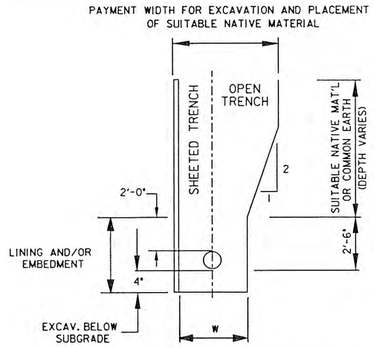
TYPICAL CLEANOUT COVER DETAIL

NOT TO SCALE



GROUND WATER COLLECTION TRENCH DETAIL

NOT TO SCALE



PAYMENT WIDTH FOR LINING AND/OR EMBEDMENT AND EXCAVATION BELOW SUBGRADE

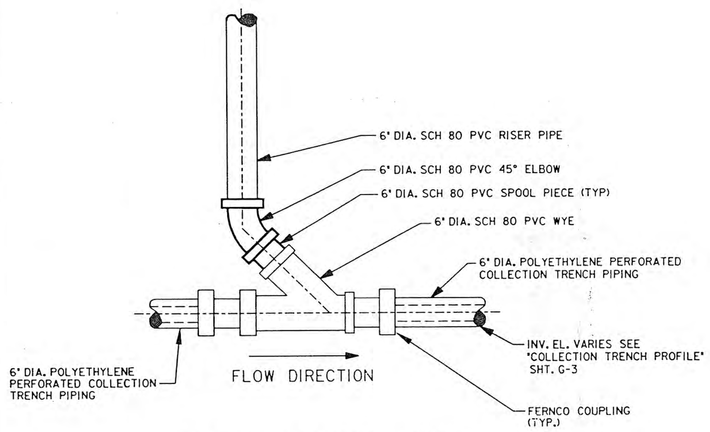
NOMINAL PIPE DIA. D (INCHES)	PAYMENT WIDTH W (FEET)
1" THROUGH 6"	1.5

PAYMENT LIMITS FOR GROUND WATER COLLECTION TRENCH EXCAVATION

NOT TO SCALE

NOTES:

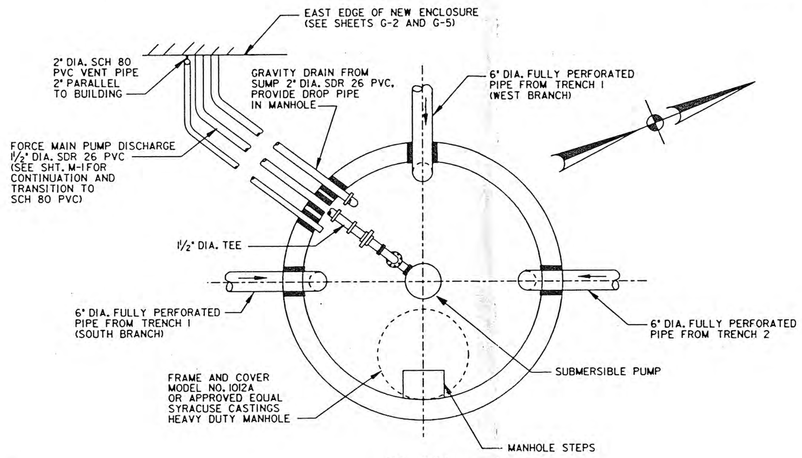
1. THE QUANTITY OF GRANULAR MATERIALS AND EXCAVATION BELOW SUBGRADE FOR WHICH PAYMENT WILL BE MADE WILL BE COMPUTED BY USING DEPTH AS DIRECTED AND THE PAYMENT WIDTH FOR THE PARTICULAR PIPE SIZE (NOMINAL) INSTALLED AS SHOWN ON THIS DETAIL WITHOUT REGARD TO ACTUAL DIMENSIONS AND QUANTITIES.
2. PAYMENT FOR EMBEDMENT WILL NOT INCLUDE THE VOLUME OCCUPIED BY THE PIPE. PIPE WILL BE CONSIDERED AT ITS NOMINAL DIAMETER WITH A WALL THICKNESS OF ZERO.
3. WHERE SPECIAL BACKFILL IS USED, IT WILL BE PLACED AT THE DEPTH AS SPECIFIED OR DIRECTED, PAYMENT WILL BE MADE TO THAT POINT.



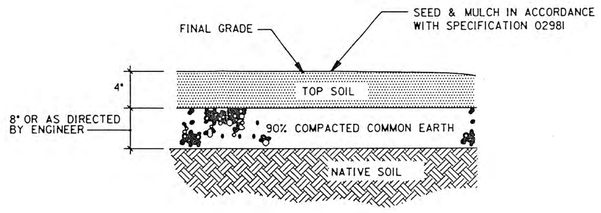
CLEANOUT WITH WYE

NOT TO SCALE

NOTE: TYPICAL FOR CLEANOUTS 2 & 5



PLAN



TOPSOIL & VEGETATION COVER DETAIL

NOT TO SCALE

CLEANOUT DETAIL - END CONNECTION

NOT TO SCALE

NOTE: TYPICAL FOR CLEANOUTS 1,3 & 4

GENERAL NOTES:

1. NEW FORCE MAINS SHALL BE INSTALLED WITH A MINIMUM OF 4' - 6" COVER OVER THE TOP OF PIPE.
2. NEW ELECTRICAL LINES AND VENT PIPING SHALL BE INSTALLED WITH A MINIMUM OF 1' - 6" COVER OVER TOP OF PIPE.
3. ALL PVC PIPE SHALL BE MADE FROM CLASS 12454-B MATERIALS OR BETTER IN ACCORDANCE WITH ANSI/ASTM D 1784 AND SHALL BE SCHEDULE 80 UNLESS OTHERWISE SPECIFIED.
4. REFER TO SHEET G-5 FOR CONCRETE NOTES.
5. REFER TO SECTION 02231 FOR SELECT FILL SPECIFICATIONS.

SECTION

COLLECTION MANHOLE

NOT TO SCALE

SECTION

EXISTING SANITARY SEWER MANHOLE

NOT TO SCALE

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COUNTY OF ONEIDA NYSDEC REGION 6 SITE CODE 6-33-027 STATE OF NEW YORK

PROJECT NO. 6057

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DATE	3-6-96	
DRAWN BY	EJL	
CHECKED BY	RSW	
APPROVED	AT	
SCALE	AS SHOWN	

SHEET TITLE

COLLECTION TRENCH DETAILS

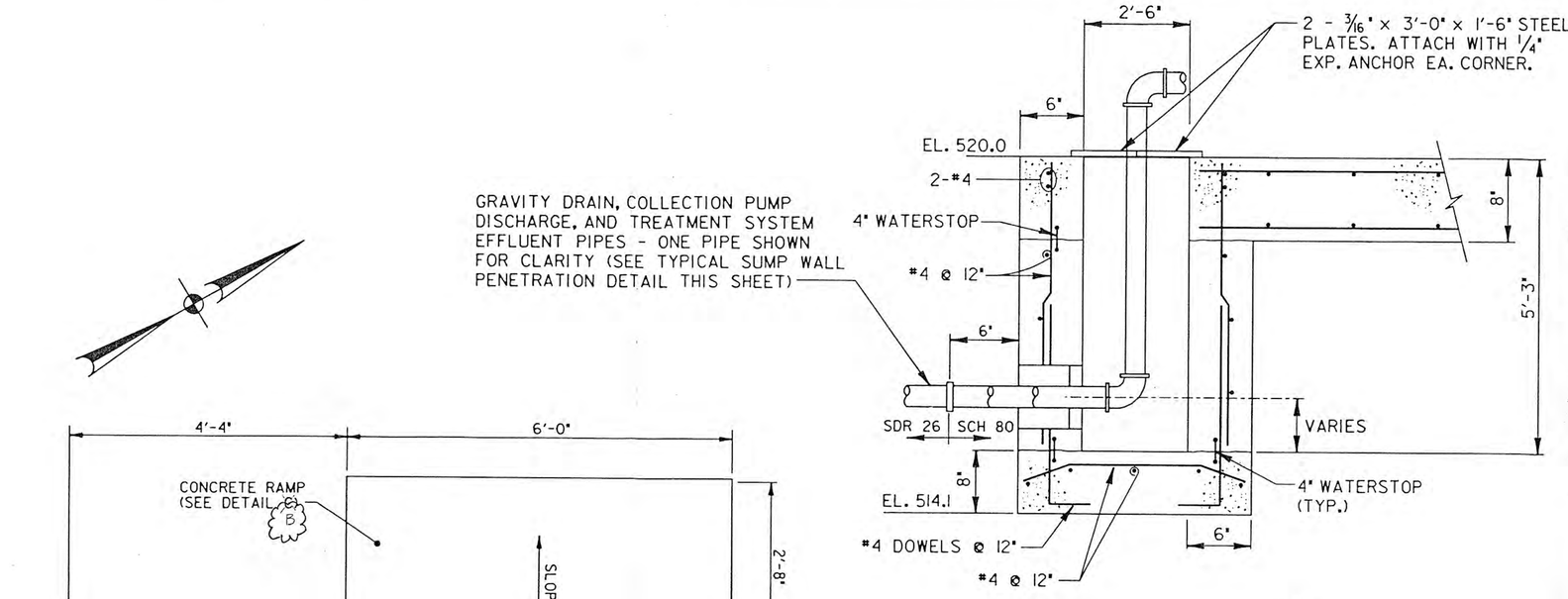
SHEET NO.

G-4

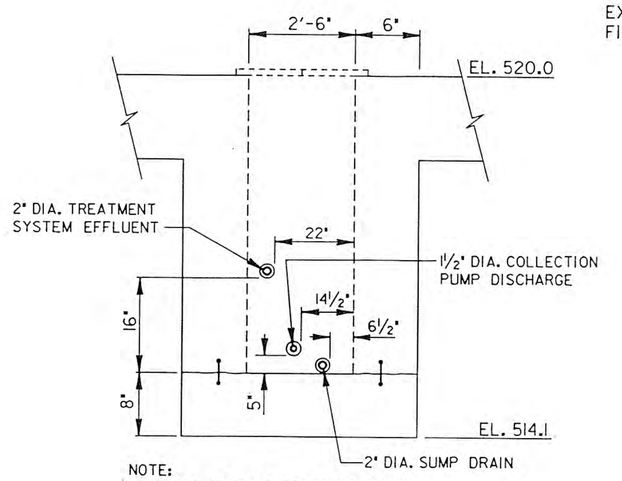
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ISSUE DATE: ____ REVISION* ____ REVISION DATE: ____

SHEET* | OVERLAY KEY* | SCREEN | EACH OVERLAY*

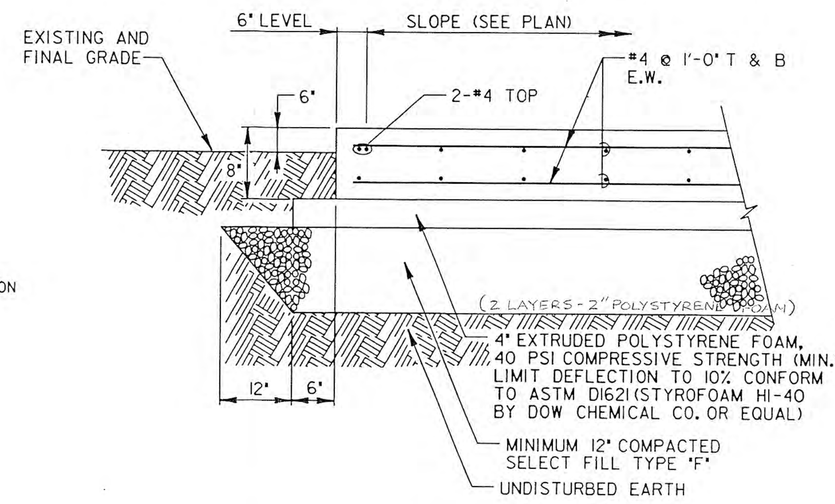


SECTION 1 / G-5
NOT TO SCALE

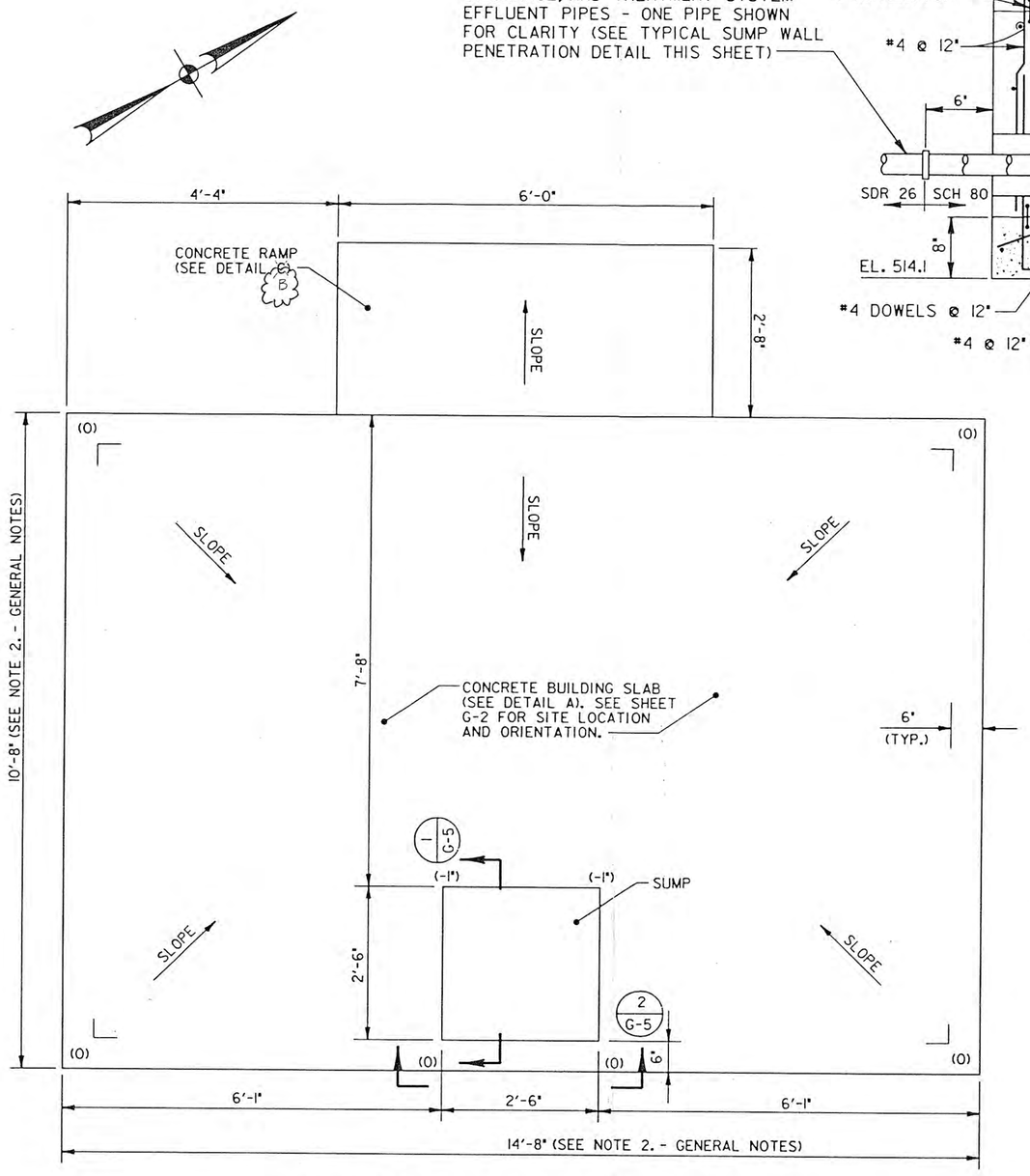


NOTE:
INSTALL 2" SUMP DRAIN AS CLOSE TO BOTTOM OF SUMP AS POSSIBLE.

SECTION 2 / G-5
NOT TO SCALE



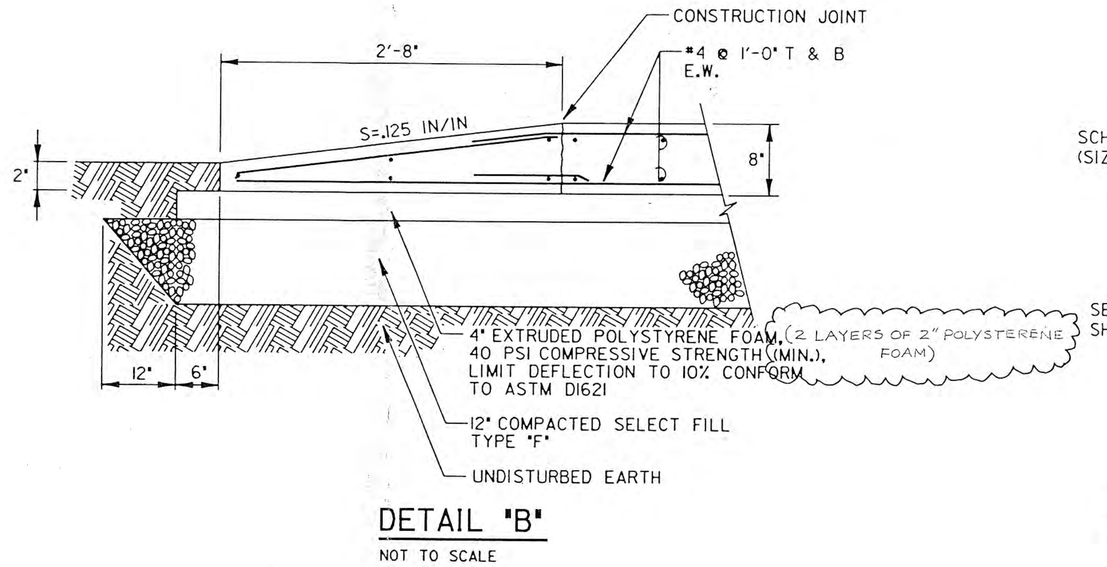
DETAIL "A"
NOT TO SCALE



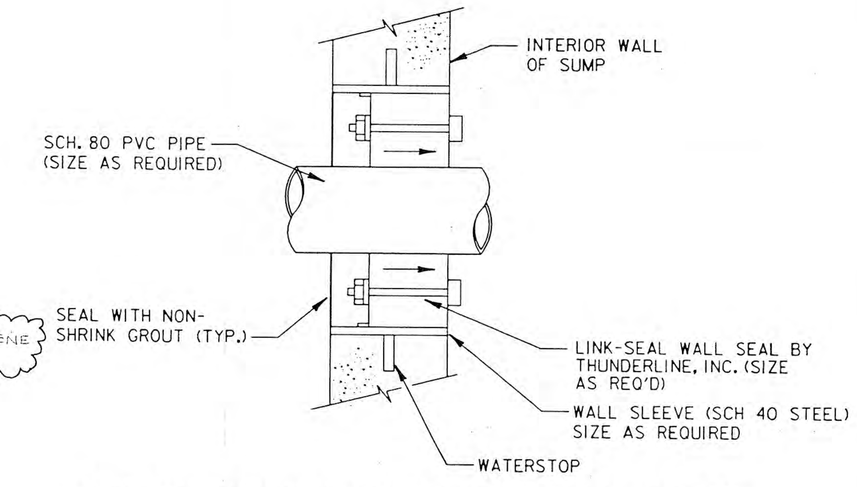
CONCRETE FLOOR SLAB PLAN
SCALE: 3/4" = 1'-0"

CONCRETE NOTES:

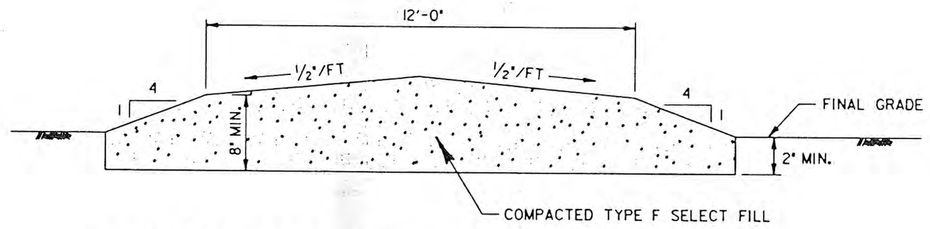
1. FOLLOW A.C.I. 301 FOR CONCRETE WORK.
   FOLLOW A.C.I. 315 FOR CONCRETE REINFORCING AND ACCESSORIES.
2. CONCRETE AGGREGATES: ASTM C33
   PORTLAND CEMENT: ASTM C150, TYPE I OR II
3. MINIMUM 28-DAY CONCRETE COMPRESSIVE STRENGTH: 4000 P.S.I.
   MAXIMUM SLUMP: 3 IN.
4. EXTERIOR CONCRETE SHALL BE AIR ENTRAINED 5% TO 7%.
5. CHAMFER EXPOSED CORNERS OF CONCRETE 3/4 IN.
6. CONCRETE REINFORCING: DEFORMED BARS, A.S.T.M. A-615, GRADE 60.
   WELDED WIRE MESH: A.N.S.I. / A.S.T.M. A185
7. CAST IN PLACE CONCRETE COVER FOR REINFORCING U.O.N. ON DETAILS.
   CONCRETE CAST AGAINST EARTH ----------3"
   CONCRETE EXPOSED TO EARTH OR WEATHER
   #6 BARS & LARGER----------2"
   #5 BARS & SMALLER----------1½"
8. HOLD REINFORCING BARS AT CORRECT DISTANCE FROM FORMS AND EARTH WITH CHAIRS, SPACERS, AND TIES. (PLASTIC TIP LEGS AT EXPOSED CONCRETE)
9. CONCRETE FINISHES:
   FLOOR SLAB: TROWEL / LIGHT BROOM FINISH
   RAMP: BROOM FINISH
10. CURING COMPOUND: ASTM C309. CURING COMPOUND SHALL BE COMPATIBLE WITH CONCRETE COATING.
11. APPLY 1 COAT OF CHEMPRUF VE PRIMER AND 3 COATS OF CHEMPRUF 130 AS MANUFACTURED BY ATLAS MINERALS & CHEMICALS, INC. OR EQUAL TO FLOOR AND INTERIOR WALLS OF SUMP. CONCRETE SURFACE TO BE PREPARED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATION.



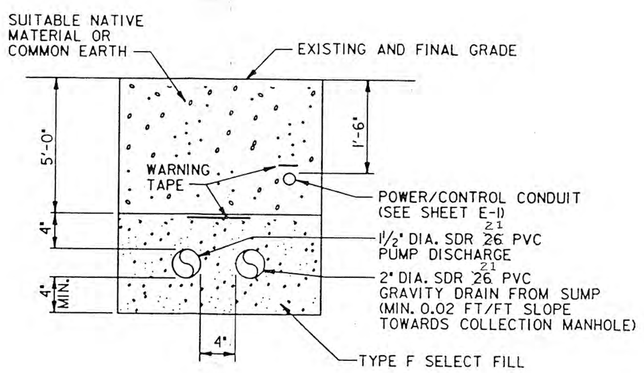
DETAIL "B"
NOT TO SCALE



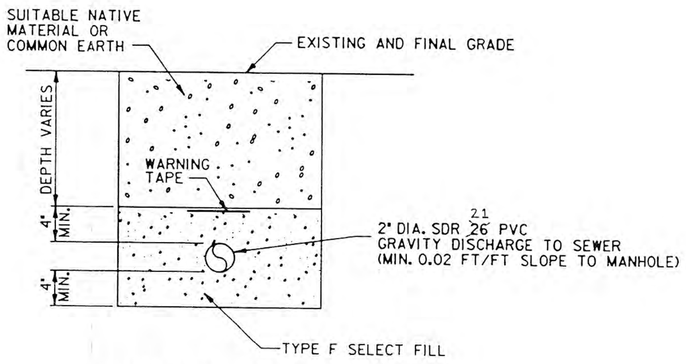
TYPICAL SUMP WALL PENETRATION DETAIL
NOT TO SCALE



TYPICAL SECTION - GRAVEL DRIVEWAY
NOT TO SCALE



FORCE MAIN TRENCH DETAIL
NOT TO SCALE



TRENCH DETAIL
NOT TO SCALE

GENERAL NOTES:

1. REFER TO SHEET G-2 FOR ENCLOSURE LOCATION AND ORIENTATION.
2. THE CONTRACTOR SHALL FURNISH AND INSTALL A PRE-ENGINEERED ENCLOSURE IN ACCORDANCE WITH SECTION 13123 OF THE SPECIFICATIONS AND COORDINATE SLAB SIZE WITH ENCLOSURE SIZE.

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COUNTY OF ONEIDA NYSDEC REGION 6 SITE CODE 6-33-027 STATE OF NEW YORK

PROJECT NO. 6057

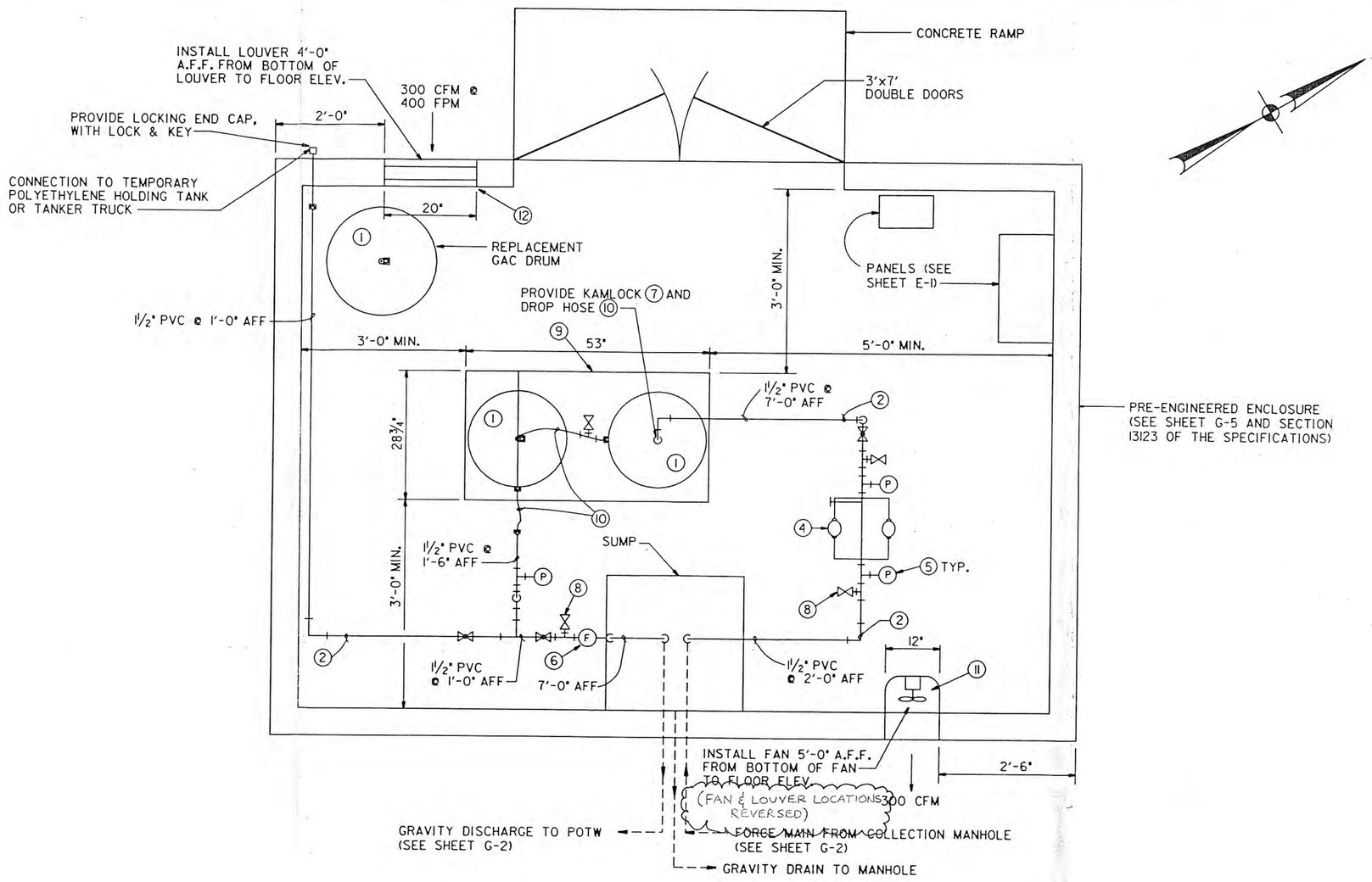
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DATE	3-6-96	
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CHECKED BY	RSC/RSW	
APPROVED	AWS/MS	
SCALE	AS SHOWN	

SHEET TITLE
GROUND WATER TREATMENT SYSTEM ENCLOSURE DETAILS

SHEET NO.
G-5

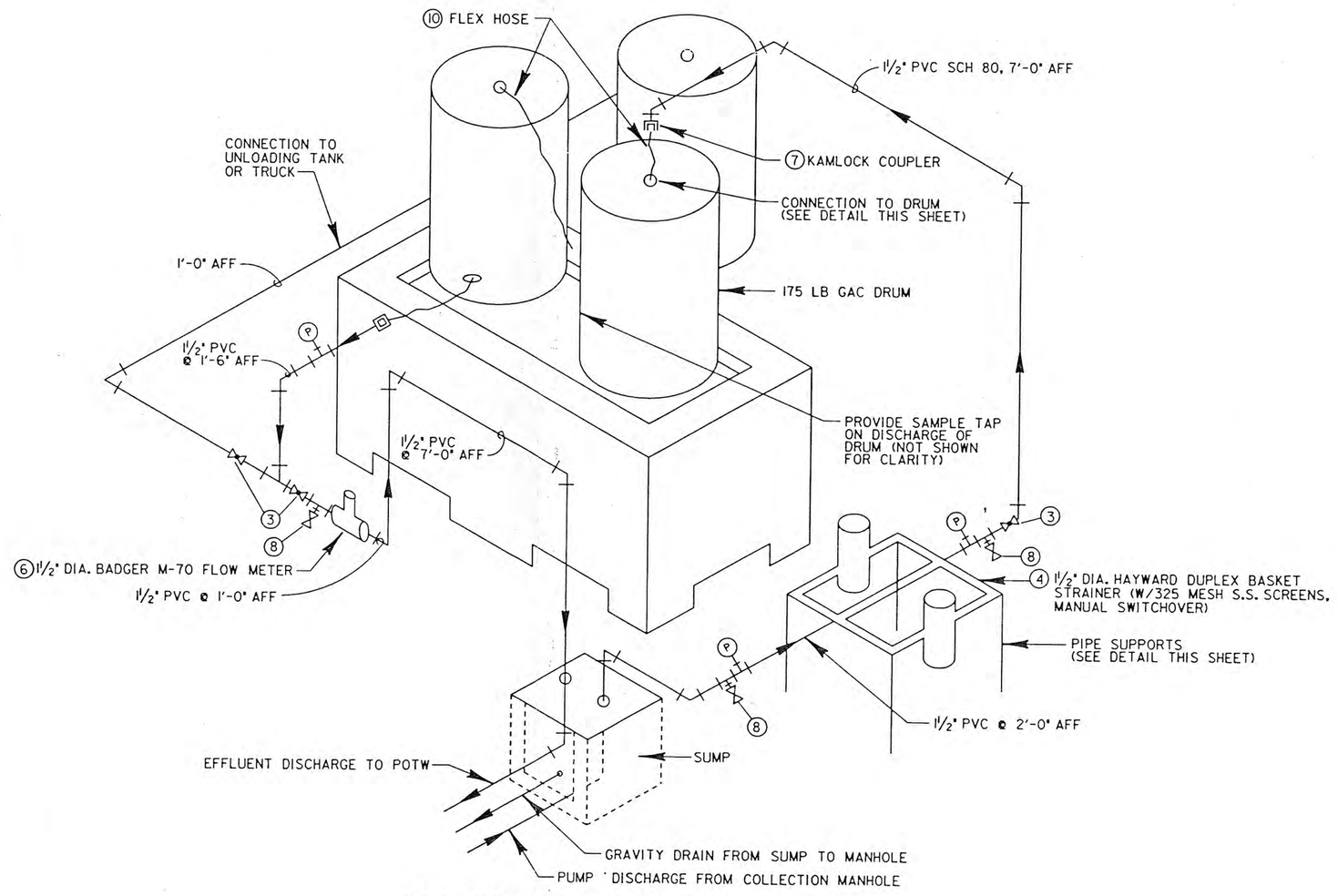
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TREATMENT SYSTEM PLAN

SCALE: ¾" = 1'-0"



TREATMENT SYSTEM SCHEMATIC

NOT TO SCALE

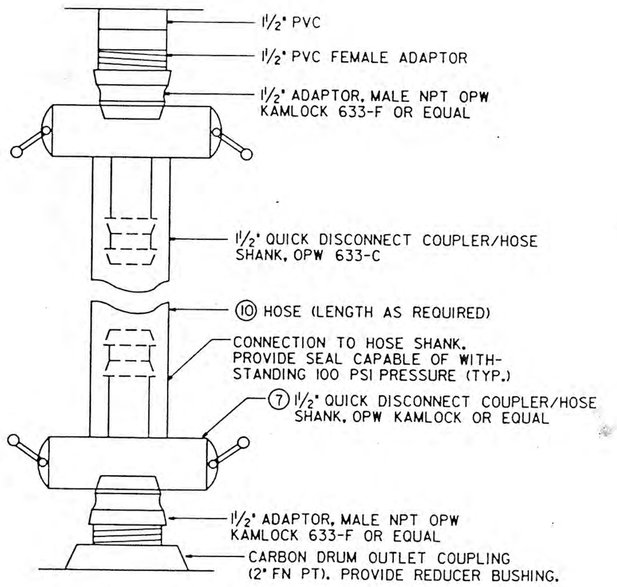
BILL OF MATERIALS		
ITEM	QTY.	DESCRIPTION
1	3	GRANULAR ACTIVATED CARBON CONTACTOR DRUM 175 LBS GAC (55 GAL) CAMERON-YAKIMA WSU-55 OR EQUAL
2	AS REQ'D	1½" PVC PIPE & FITTINGS, SCH. 80, ASTM D-1784 & D-1785 (SEE NOTE 3)
3	3	1½" BALL VALVE, PVC, SOLVENT WELDED JOINTS, TFE SEALS, CHEMTROL S45HV-V OR EQUAL
4	1	DUPLEX BASKET STRAINER (WITH CONTROL VALVE) PVC, 1½" DIA. SOCKET END CONNECTIONS, 325 MESH, 40 MICRON, S.S. SCREENS, HAYWARD OR EQUAL
5	3	PRESSURE GAUGE, 0-100 PSI RANGE WITH CHEMGUARD, 4½" DIA. FACE, TRERICE MODEL 450 S.S. OR EQUAL
6	1	1½" DIA. FACE BADGER MODEL M-70 FLOW METER WITH TOTALIZER OR EQUAL
7	6	1½" DIA. QUICK CONNECT KAMLOCK COUPLER AND ADAPTOR, OPW 633 C AND 633 F (WITH HOSE SHANK) OR EQUAL
8	4	SAMPLE PORT, PVC, ½" NPT × ½" HOSE, CHEMTROL CHEMCOCK VALVE OR EQUAL
9	1	2 DRUM POLYETHYLENE SPILL CONTAINMENT PALLET, NEW PIG MODEL PAK357J OR EQUAL
10	AS REQ'D	1½" CHEMICAL TRANSFER HOSE (TYP.), GOODYEAR XLPE WITH SYNTHETIC FABRIC REINFORCEMENT AND SYNTHETIC RUBBER COVER, OR EQUAL
11	1	PROPELLER WALL MOUNTED FAN, ACME DYNAMASTER FQ9, 300 CFM @ .125" STATIC PRESSURE, WALL COLLAR, BACKDRAFT DAMPER OR EQUAL
12	1	EXTRUDED ALUMINUM LOUVER, 20" x 20" DRAINABLE BLADE COMBINATION LOUVER, DOWCO C-DWE-46 WITH MANUAL OPERATOR OR EQUAL

NOTES:

1. ALL PIPE ELEVATIONS NOTED ARE DISTANCES FROM THE FINISHED FLOOR TO THE CENTERLINE OF THE PIPE.
2. QUANTITIES SHOWN IN THE BILL OF MATERIALS ARE FOR THIS DRAWING ONLY.
3. ALL PVC PIPE AND FITTINGS SHALL BE MADE FROM CLASS 12454-B MATERIALS OR BETTER IN ACCORDANCE WITH ANSI/ASTM D-1784/D-1785 AND SHALL BE SCHEDULE 80 UNLESS OTHERWISE SPECIFIED.
4. PROVIDE AND INSTALL GRINNELL FIG. 103 OR EQUAL OFFSET PIPE CLAMPS AND RELATED HARDWARE FOR WALL MOUNTED HORIZONTAL AND VERTICAL PIPE RUNS AT 5'-0" INTERVALS.
5. PROVIDE AND INSTALL GRINNELL FIG. 191 OR EQUAL PIPE STANCHIOINS WITH U-BOLT FOR FLOOR PIPE RUNS AT INLET AND OUTLET OF DUPLEX BASKET STRAINER AND FLOW METER.
6. THE CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ALL PIPING AND EQUIPMENT WITH THE INSTALLATION OF ELECTRICAL EQUIPMENT AS SHOWN ON SHEET E-1.

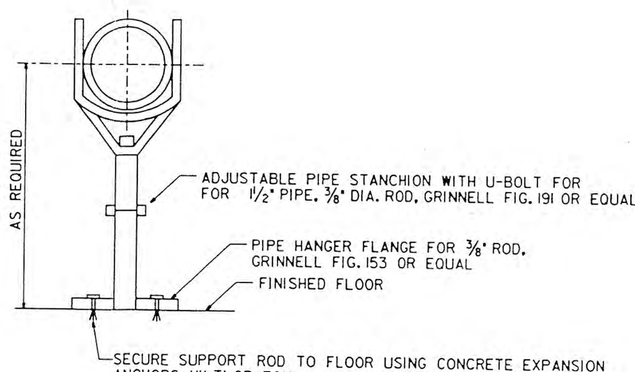
LEGEND

- (P) PRESSURE GAUGE
- (F) FLOW METER WITH TOTALIZER
- BALL VALVE
- QUICK CONNECT KAMLOCK COUPLER
- SAMPLE PORT



HOSE CONNECTION DETAIL

NOT TO SCALE



PIPE SUPPORT DETAIL

NOT TO SCALE

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CHECKED BY	RSW
APPROVED	MRC
SCALE	AS SHOWN

SHEET TITLE

MECHANICAL PLAN & DETAILS

SHEET NO.

M-1

450.052-06F

Appendix I

Site-Specific Health and Safety Plan

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Primo-shield, Inc.
Oneida County
Utica, New York

Site-Specific Health and Safety Plan
NYSDEC Site No. 633027

NYSDEC State Superfund Standby Contract
(Work Assignment No. 1602534)

Prepared for

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12207

Prepared by

EA Engineering and Geology, P.C.
333 West Washington Street, Suite 300
Syracuse, New York 1302
315-431-4610

May 2025

Revisions to Final Approved Health and Safety Plan

Revision Number	Date Submitted	Summary of Revision	New York State Department of Environmental Conservation Approval Date
0	6-18-2024	Baseline Document	

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Attachment F. Activity Hazardous Analysis

LIST OF ACRONYMS AND ABBREVIATIONS

°C	Degrees Celsius
°F	Degrees Fahrenheit
AHA	Activity Hazard Analysis
CFR	Code of Federal Regulation
CPR	Cardiopulmonary resuscitation
dBA	A-weighted decibel
DEET	Diethyltoluamide
EPA	U.S. Environmental Protection Agency
ft	Foot (feet)
HASP	Health and Safety Plan
kV	Kilovolt(s)
L	Liter(s)
NIOSH	National Institute for Occupational Health and Safety
NYSDEC	New York State Department of Environmental Conservation
OSHA	Occupational Safety and Health Administration
oz	Fluid ounce
PCE	Tetrachloroethylene
PFAS	Per- and polyfluoroalkyl substances
PID	Photoionization detector
PPE	Personal protective equipment
SDS	Safety data sheet
SHSO	Site Health and Safety Officer
VOC	Volatile organic compound

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1. INTRODUCTION

1.1 OBJECTIVE

The objective of this Site-Specific Health and Safety Plan (HASP) is to provide personnel with protection standards and mandatory safety practices, procedures, and contingencies to be followed while performing field activities for the Primo-shield, Inc. Site. The typical work activities addressed within this HASP include the following on-site field activities:

- Groundwater gauging and sampling (performed every fifteen quarters)
- Quarterly Site inspections

Each of these activities is summarized in the sections below.

1.1.1 Groundwater Gauging and Sampling (Performed Every Fifteen Quarters)

Groundwater samples will be collected from an existing network of seven on-site and off-site monitoring wells. Samples will be analyzed for volatile organic compounds (VOCs) by U.S. Environmental Protection Agency (EPA) Method 8260B and Target Analyte List Metals by EPA Method 6010B.

1.1.2 Quarterly Site Inspections

Quarterly site inspections of the Site will be conducted by EA personnel to ensure that all elements of the Site Management Plan are fully filled and/or remedial actions are still in-place.

The safety organization, procedures, and protective equipment for this HASP have been established based on an analysis of potential physical, chemical, and biological hazards. Specific hazard control methodologies have been evaluated and selected to minimize the potential for accident or injury. One copy of this HASP will be maintained for use during scheduled field activities. The copy will be made available for site use/employee review.

The HASP describes the procedures that must be followed during referenced site activities. Operational changes that could affect the health and safety of personnel, the community, or the environment will not be made without the prior approval of the Project Manager and the Program Health and Safety Officer. This document will be periodically reviewed to ensure that it is current and technically correct. Changes in site conditions and/or the Scope of Work will involve a review and modification to the HASP. Such changes will be completed in the form of a numbered revision.

The provisions of this HASP are mandatory for EA personnel working at the site. Visitors to the work site must also abide by the requirements of the HASP.

This Site-Specific HASP should be used in conjunction with EA's Generic Health and Safety Plan for Work Assignments, New York State Department of Environmental Conservation (NYSDEC) Standby Contract No. D009806, Revision 01, dated March 2023.

1.2 SITE AND FACILITY DESCRIPTION

The Site is located at 1212 Saint Vincent Street Utica, New York, 13501, in the Town of Utica, Oneida County, at coordinates 43.089483564, -75.227296184. The Site is approximately 2.4 acres within a mixed commercial/residential area. The Site consists of two properties situated between Conkling Avenue and St. Vincent Street in Utica. The parcels are located at 1223 Conkling Avenue (Tax Map Parcel No. 41) and 1212 St. Vincent Street (Tax Map Parcel No. 33). The remediated Site is a fenced, 0.82-acre lawn containing a small concrete block building. The Site is bounded by commercial property to the Southwest and residential properties to the Northeast. The Site is also bounded by Conkling Avenue to the west and St. Vincent Street to the east.

1.3 POLICY STATEMENT

The site management field crew will be familiar with the HASP for site management activities in which they are involved. Prior to entering a Site, this HASP will be reviewed; the agreement to comply with the requirements will be signed by field crew, subcontractors, and visitors; and this HASP will be maintained in the HASP Review Record (**Attachment A**).

Operational changes that could affect the health and safety of personnel, the community, or the environment will not be made without the prior approval from NYSDEC, the Project Manager, and the Health and Safety Representative. This document will be periodically reviewed to ensure that it is current and technically correct. Changes in site conditions and/or the Scope of Work will require a review and modification to the HASP. Such changes will be completed in the form of a revision of the HASP Addendum.

By signing a HASP Review Record, any visitors acknowledge their responsibility to comply with the occupational health and safety requirements defined in this HASP. Site management field crew or visitors on-site will be informed of site emergency response procedures and potential safety, or health hazards associated with the operations conducted in support of work assignments.

1.4 GUIDANCE AND REGULATION DOCUMENTS

This HASP is written in accordance with the following:

- Quick Selection Guide to Chemical Protective Clothing, K. Forsberg and S.Z. Mansdorf, 3rd Ed. (1997)

- Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, National Institute for Occupational Safety and Health (NOISH), Occupational Safety and Health Administration (OSHA), U.S. Coast Guard, U.S. Environmental Protection Agency (EPA) (86-116, October 1985)

- Occupational Safety and Health Administration Standards for General Industry, 29 Code of Federal Regulations (CFR) 1910

- OSHA Standards for Hazard Communication, 29 CFR 1910.1200/1926.59

- OSHA Standard for Respiratory Protection, 29 CFR 1910.134
- OSHA Standards for Construction Industry, 29 CFR 1926
- NIOSH for Pocket Guide to Chemical Hazards, Department of Health and Human Services, PHS, Center for Disease Control, NIOSH (2005)
- Threshold Limit Values, American Conference of Government Industrial Hygienists (2011)

1.5 DEFINITIONS

The following definitions are applicable to this HASP:

- ***Site*—**The area where field activities are to be performed.
- ***Project*—**On-site work performed under the scope of site management for the Primo-shield, Inc. Site.
- ***Project Manager*—**The individual(s) who will have overall responsibility for site management. The Project Manager will provide services associated with the implementation of the Site Management Plan
- ***On-site Personnel*—**All personnel involved with a work assignment.
- ***Visitor*—**Personnel, except the on-site personnel. Visitors must receive approval to enter the Site.

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2. ROLES AND RESPONSIBILITIES

2.1 PERSONNEL

Field crew employees are responsible for reading, understanding, and meeting the health and safety requirements contained in this HASP. A HASP Review Record sign-off sheet is provided as **Attachment A**. Employees are required to implement these procedures when carrying out daily operations and site-specific field activities. This will include receiving appropriate training and medical monitoring and using health and safety equipment (to include personal protective equipment [PPE]) to safely conduct site operations. This may include maintaining appropriate grooming standards (removal or proper trimming of beards, mustaches, and sideburns) to ensure the proper fit of respiratory protection. Employees will review each field activity prior to commencement to consider the potential health and safety hazards and the measures to be taken in the event of an emergency. Employees will know where safety data sheets (SDSs) (**Attachment B**), first aid supplies, and emergency equipment are maintained. The Site Manager or Program Health and Safety Officer will be notified of potential health and safety hazards, near-miss conditions, or incidents present on the job site or unusual effects believed to be related to hazardous chemical exposures. Failure to follow established health and safety procedures could result in immediate dismissal from the Site, and if repeated, a potential loss of employment.

2.1.1 Responsibilities

Clear lines-of-authority will be established for enforcing compliance with the safety, health, and contingency procedures consistent with industry policies and procedures. Designated personnel will be responsible for implementation of the HASP during field activities. This includes field supervision; implementing and directing emergency operations; coordinating with on-site and off-site emergency responders; enforcing safe work practices and decontamination procedures (if needed); ensuring proper use of PPE; communicating site safety program modifications and requirements to site personnel; proper reporting of injuries, illnesses, and incidents to the appropriate internal and external organizations; and containing and controlling the loss of potentially hazardous materials to soil, air, and surface/groundwater during field operations.

In the event of an on-site injury, occupational illness, near-miss, or environmental contamination incident, the following organizations/individuals will be notified as appropriate:

- Site Manager
- Site Health and Safety Officer (SHSO) and/or Field Team Leader
- Project Manager
- Program Health and Safety Officer
- Corporate Health and Safety Officer
- NYSDEC Representatives
- Other organizations or persons as appropriate

2.2 SITE HEALTH AND SAFETY OFFICER AND/OR FIELD TEAM LEADER

The SHSO/Field Team Leader is responsible for coordination of on-site contingency operations and the Site Health and Safety Program. The SHSO/Field Team Leader will be on-site at all times

during work assignment field activities and will be responsible for daily compliance with site health and safety requirements. The SHSO's/Field Team Leader's responsibilities include:

- Conducting visual inspections of the work site
- Stopping work when imminent safety or health risks exist or as outlined in this HASP
- Authorizing for personnel to perform field activities on-site (i.e., relative to medical examinations and training)
- Implementing the use of forms
- Implementing the guidance within this HASP, which includes review of HASP; project scope of work; and review/compliance of all Activity Hazard Analyses (AHAs); AHAs are provided in **Attachment F**
    - AHA's will also be updated in field if hazards not specified on current AHA are identified
- Providing an initial health and safety briefing to site workers and visitors
- Evaluating reported hazardous conditions and recommending corrective actions
- Conducting necessary health and safety monitoring
- Identifying, investigating, and preparing incident reports as necessary
- Consulting with the Program Health and Safety Officer or Project Manager for guidance on occupational health and safety and contingency issues affecting a specific work assignment
- Providing technical support and guidance in the modification of HASP requirements
- Evaluating on-site environmental monitoring results and providing reporting requirements to the Project Manager

During an emergency, the Site Manager (or the Alternate in the absence of the Site Manager) will be responsible for initiating and coordinating emergency responses/contingency operations.

The SHSO/Field Team Leader will have the authority to make on-the-spot corrections dealing with safety, health, and environmental pollution infractions. If it is determined that the infraction cannot be remedied immediately and is of such a nature that continuance of the field activity could result in significant illness, injury, environmental contamination, and violations, the SHSO/Field Team Leader will have the authority to order a cessation of the activity until such time as the problem can be remedied.

2.3 PROJECT MANAGER

The Project Manager will have overall responsibility for site field activities and will be the primary contact during the work assignment field activities. The primary responsibilities of the Project Manager include the following:

- Assuring compliance with this HASP
- Coordinating field activities with the Site Manager
- Approving HASP Addendums and revisions
- Reviewing individual training and medical records prior to work start
- Providing overall supervisory control for health and safety protocols in effect for a work assignment
- Assigning the Site Manager and SHSO/Field Team Leader
- Assuring adequate resources are available for carrying out this HASP
- Preparing and submitting project reports

2.4 SITE MANAGER

The Site Manager's responsibilities include but are not limited to the following:

- Providing technical support to the SHSO/Field Team Leader
- Evaluating on-site environmental monitoring results and reporting to the Project Manager and Program Health and Safety Officer
- Being responsible for initiating the evacuation of the work site when needed, communicating with off-site emergency responders, and coordinating activities of on-site and off-site emergency responders
- Determining if the abatement of hazardous conditions is sufficient prior to allowing resumption of field activities after an emergency

2.4.1 Subcontractors

No work activities involving subcontractors are anticipated at the Site.

2.5 VISITORS

Visitors entering the on-site work areas will be required to sign the Entry/Exit Log (**Attachment D**) and to read and verify their understanding and willingness to comply with this HASP. Visitors will be accompanied by the Project Manager and/or SHSO or Field Team Leader while on-site at all times.

3. RISK ANALYSIS

3.1 PROJECT SCOPE OF WORK

Based on the field activities detailed in the Site Management Plan and Section 1, the following potential hazard conditions may be anticipated:

- Personnel may be injured during physical lifting and handling of heavy equipment, construction materials, or containers. Additionally, personnel may encounter slip, trip, and fall hazards associated with sampling within the structures. Precautionary measures should be taken in accordance with this HASP.

- Field operations conducted during the winter months can impose excessive heat loss to personnel conducting strenuous activities during cold weather days and can impose cold-related illness symptoms during cold weather days or when the wind chill is high. In addition, heavy rains, electrical storms, and high winds may create extremely dangerous situations for employees.

- Field operations conducted during the summer months can impose heat stress on field personnel conducting strenuous activities during unseasonably hot weather days. Because wearing PPE can increase the risk of developing heat stress, workers must be capable of recognizing the signs and symptoms of heat-related illnesses and be able to recognize these signs and symptoms in both themselves and their co-workers.

- Entry into a confined space in support of this project is forbidden. However, it is not anticipated that confined space entry will be required during the completion of the field activities.

- Work around certain types of equipment often creates excessive noise. Noise can cause workers to be startled, annoyed, or distracted; can cause physical damage to the ear, pain, and temporary and/or permanent hearing loss; and can interfere with communication. If workers are subjected to noise exceeding an 8-hour time-weighted average sound level of 85 A-weighted decibels (dBA), hearing protection will be selected with an appropriate noise reduction rating to comply with 29 CFR 1910.95 and to reduce noise below levels of concern.

- Site management activities intended to monitor remaining contamination often require employees to be in direct proximity or contact with hazardous substances. Groundwater sampling presents low risk and can be minimized through the use of PPE (nitrile gloves). Air monitoring equipment will be used to monitor airborne organic vapors.

- Biological hazards—Potential hazards may be present at the Site due to bites from stray domestic and wild animals (to include rodents), spiders, bees, and other venomous anthropods. Potential hazards may also be present at the Site in the form of poisonous plant life, which can result in skin rashes or abrasions. In the case of an animal or insect bite that can be serious or fatal, workers must seek immediate medical attention and report the incident to the SHSO/Field Team Leader prior to leaving the Site. An employee known to

be allergic or sensitive to poisonous insects should alert the Site Manager and SHSO/Field Team Leader.

- SDSs for chemicals that may be used on-site are provided in **Attachment B**.

- Site inspections that can occur frequently or on a recurring basis often require employees to walk and focus on details about the Site. Distractions can cause loss of awareness of surroundings, which leaves workers susceptible to tripping hazards. Maintaining proper footwear and awareness to surroundings will minimize these hazards.

The potential chemicals of concern that may be present at the Site include, but are not limited to, VOCs including tetrachloroethylene (PCE) and potentially per- and polyfluoroalkyl substances (PFAS). SDSs for these chemicals are provided in **Attachment B**.

3.2 HAZARD COMMUNICATION

A written OSHA Hazard Communication Program for Construction (required by 29 CFR 1910.1200/1926.59) will be maintained on-site during field activities. Employees will be informed of the Hazard Communication Program's existence, contents, and location. This Program will be kept with the SDSs and contain a list of site-specific chemicals present. The list will be cross-referenced with the applicable SDS for ease in SDS accessibility.

An SDS for each chemical brought on-site during field activities will be maintained on-site by the SHSO/Field Team Leader. Site workers and visitors will be informed of the Hazard Communication Program, their legal rights under the Program, the location of the chemical inventory, and the location of the SDS.

Employee awareness of chemical identities, health and physical hazards, and characteristics is essential to safely handle chemicals and minimize potential hazards. The Hazard Communication Program must follow the OSHA requirements listed in 29 CFR 1910.1200/1926.59.

3.2.1 Hazard Communication Labeling

In-house containers will be properly labeled so that workers understand the contents of containers. Container labels will contain at least information on the name of the product or container, chemical(s) in the product, manufacturer's name and address, protective equipment required for the safe handling of the product, and first aid procedures in case of overexposure to product contents.

3.2.2 Hazard Communication Training

Site employees and visitors must be informed of the Hazard Communication Program, their legal rights under the program, and location of chemical inventory and SDS files. The employee's supervisor must describe hazardous substances used and provide information concerning the following:

- Nature of potential hazards

- Appropriate work practices
- Appropriate control programs
- Appropriate protective measures
- Methods to detect presence or release of hazardous substances
- Emergency procedures

3.3 CHEMICAL HAZARDS

Field operation precautions and preventive measures for site management activities are described in the following paragraphs:

- ***Groundwater Sampling***—VOCs including PCE may be encountered. Potential routes of worker exposure are through dermal contact and ingestion; wear PPE when in contact with groundwater (**Section 5** for specific PPE).

- ***Quarterly Site Inspections***—No contact with site contaminates are anticipated when performing annual site inspections. However, inspections should be performed in Level D PPE at a minimum (**Section 5** for specific PPE).

Dermal contact is a potential concern during the above tasks due to the possible presence of skin irritants such as VOCs and PCE that may be absorbed through the skin. This information is based upon a worst-case scenario. Dermal protection listed in **Section 5** must be worn during field activities involving contact with soil and groundwater.

A description of the requirements for the different levels of PPE, as well as upgrade/downgrade requirements, is provided in **Section 5**. Although ingestion of contaminants is also a primary source of exposure, vigilance by site health and safety personnel will ensure proper use of PPE and personal hygiene to practically eliminate this route of exposure.

3.3.1 Direct-Reading Instrumentation

A photoionization detector (PID), such as a MiniRAE 3000 or MultiRAE, equipped with a 10.6 electron volt lamp, will be used to screen the breathing zone of employees during groundwater sampling tasks.

All PID sampling will be conducted by SSHO/Field Team Leader or designee of the SSHO/Field Team Leader. Readings will be taken at regular intervals (i.e., at least once daily) from the breathing zone of employees during groundwater sampling activities, or more frequently when noticeable odors are present. Readings (and corrective action[s] if necessary) will be recorded on the groundwater sampling log form.

Out of all the contaminates of concern that exceeded NYSDEC Class GA groundwater criteria, trichloroethene had a correction factor of 0.54 and is the lowest PID measurement at exceedance; therefore, trichloroethene shall be used as the limiting chemical of concern and action limit for air monitoring. The action limit on the PID will therefore be 185.19 parts per million above background, with background determined by upwind perimeter PID reading(s).

If the action level is reached, then personnel shall step away from the source of the vapors until the site ambient conditions return to baseline. If the action limit will not abate within 30 seconds a total of five consecutive times, then site workers shall add engineering controls (work cross-gradient from source, add fans). If fans cannot abate the ambient vapors below action limits, then work will stop, and the SSHO/Field Team Leader shall contact the SHMs. If a resolution cannot be reached, then work shall cease, and the path forward shall be revised.

3.3.2 Chemicals for Equipment Calibrations and Operations

In addition to the potential compounds detected at a Site, the following chemicals are typically used during investigative, remedial, and monitoring field activities:

- Isopropyl alcohol
- Hydrochloric Acid
- Alconox
- Nitric acid

These chemicals will be used for decontamination of equipment and used as preservative for groundwater samples. The anticipated occupational exposures from these operations are considered negligible.

3.4 PHYSICAL HAZARDS

Physical hazards can potentially be present during field activities. These physical hazards may include, but not be limited to the following:

- Fire/explosion hazards
- Heat stress
- Equipment hazards
- Vehicle and pedestrian hazards
- Noise hazards
- Electrical hazards
- Utilities
- Weather hazards

Physical hazards are listed below for each field activity:

- ***Groundwater Sampling***—General physical hazards, cold/heat stress, biological, and noise hazards

- ***Quarterly Site Inspections—***General physical hazards, cold/heat stress, biological, and noise hazards

The Site will be visually inspected for the presence of general safety hazards (e.g., trip/slip hazards, unstable surfaces or steep grades, sharp objects) prior to beginning work. If hazards are present, these hazards will be recorded, and precautionary measures taken to prevent injury.

3.4.1 Fire/Explosion Hazards

The potential for fire and/or explosion emergencies is always present on a Site. Substances capable of creating fire and explosion at a Site include methane gas, petroleum-contaminated soil, and other flammable vapors. Workers must continuously monitor the work area for combustible or explosive gases when operations have the potential to generate sparks. Employees should always be alert for unexpected events, such as ignition of chemicals or sudden release of materials under pressure and be prepared to act in these emergencies.

Field vehicles will be equipped with a fire extinguisher. Employees must be trained in the proper use of fire suppression equipment. However, large fires that cannot be controlled with a fire extinguisher should be handled by professionals. The proper authorities should be notified in these instances.

3.4.2 Heat Stress and Heat-Related Illness

The use of protective equipment, if required, may create heat stress. Monitoring of personnel wearing impermeable personal protective clothing should commence when the ambient temperature is 70 degrees Fahrenheit (°F) or above. Monitoring frequency should increase as ambient temperature increases, or as slow recovery rates are observed. Heat stress monitoring will be performed by a person with a current first-aid certification who is trained to recognize heat stress symptoms. For monitoring the body's recuperative abilities to excess heat, one or more of the following techniques will be used. Other methods for determining heat stress monitoring, such as the wet bulb globe temperature index from the American Conference of Governmental Industrial Hygienist Threshold Limit Value Booklet (2011), can be used.

To monitor the worker, implement the following:

- Measure heart rate by counting the radial pulse during a 30-second period as early as possible in the rest period.
- If the heart rate exceeds 110 beats per minute at the beginning of the rest period, shorten the next work cycle by one-third and keep the rest period the same.
- If the heart rate still exceeds 110 beats per minute at the next rest period, shorten the following work cycle by one-third.
- Measure oral temperature using a clinical thermometer (3 minutes under the tongue) or similar device to measure the oral temperature at the end of the work period (before drinking).
- If oral temperature exceeds 99.6°F (37.6 Degrees Celsius [°C]), shorten the next work cycle by one-third without changing the rest period.

- If oral temperature still exceeds 99.6°F (37.6°C) at the beginning of the next rest period, shorten the following work cycle by one-third.

- Do not permit a worker to wear a semi-permeable or impermeable garment when oral temperature exceeds 100.6°F (38.1°C).

3.4.2.1 Prevention of Heat Stress

Proper training and preventive measures will aid in averting loss of worker productivity and serious illness. Heat stress prevention is particularly important because once a person suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat-related illness.

To avoid heat stress, the following steps should be taken:

- Adjust work schedules.

- Modify work/rest schedules according to monitoring requirements.

- Mandate work slow-downs, as needed.

- Perform work during cooler hours of the day if possible or at night if adequate lighting can be provided.

- Provide shelter (air conditioned, if possible) or shaded areas to protect personnel during rest periods.

- Maintain worker's body fluids at normal levels. This is necessary to ensure that the cardiovascular system functions adequately. Daily fluid intake must approximately equal the amount of water lost in sweat, i.e., 8 fluid ounces (oz) (0.23 liter [L]) of water must be ingested for approximately every 8 oz (0.23 kilograms) of weight loss. The normal thirst mechanism is not sensitive enough to ensure that enough water will be consumed to replace lost sweat. When heavy sweating occurs, encourage the worker to drink more. The following strategies may be useful:

  — Maintain water temperature 50 to 60°F.

  — Provide small disposable cups that hold about 4 oz (0.1 L).

  — Have workers drink 16 oz (0.5 L) of fluid (preferably water or dilute drinks) before beginning work.

  — Urge workers to drink a cup or two every 15 to 20 minutes, or at least every monitoring break. A total of 1 to 1.6 gallons (4 to 6 L) of fluid per day are recommended, but more may be necessary to maintain body weight.

  — Train workers to recognize the symptoms of heat-related illness.

3.4.3 Cold-Related Illness

If work takes place in the winter months, effects of cold exposure are possible during the performance of field activities. Injury from cold exposure may occur in persons working outdoors during a period when temperatures average below freezing. The extremities, such as fingers, toes, and ears, are the most susceptible to frostbite.

3.4.3.1 Prevention of Cold-Related Illness

To avoid cold-related illness, the following steps should be taken:

- Educate workers to recognize the symptoms of frostbite and hypothermia.
- Identify and limit known risk factors.
- Assure the availability of an enclosed, heated environment on or adjacent to the Site.
- Assure the availability of dry changes of clothing.
- Develop the capability for temperature recording at the Site.
- Assure the availability of warm drinks.

3.4.4 Heavy Equipment Hazards

No work activities involving heavy equipment are anticipated at the Site.

3.4.5 Vehicle and Pedestrian Hazards

Vehicle traffic or pedestrians, particularly in busy areas, may be susceptible to site hazards or may present a hazard to site workers. Equipment must be located in an area that does not present a hazard to bystanders. Barriers must be used to separate the work areas from both vehicular and pedestrian traffic areas and to prevent inadvertent entry into the work area. When possible, work in high traffic areas will be performed when traffic is minimal. Safety cones (with a minimum height of 28 inches) will be placed around the work area to create a buffer zone. Workers should wear safety vests or reflective material to enhance visibility in these areas. The buffer zone will be maintained even when work is not being performed in the area to prevent unauthorized access and to make the work site visible.

3.4.6 Noise Hazards

Work around certain large equipment often creates excessive noise. Noise can cause workers to be startled, annoyed, or distracted; can cause physical damage to the ear, pain, and temporary and/or permanent hearing loss; and can interfere with communication. If workers are subjected to noise exceeding an 8-hour time-weighted average sound level of 85 dBA, hearing protection will be selected with an appropriate noise reduction rating to comply with 29 CFR 1910.95 and to reduce noise levels below levels of concern.

3.4.7 Electrical Hazards

Overhead power lines, electrical wiring, electrical equipment, and buried cables pose risks to workers of electric shock, burns, heart fibrillation, and other physical injuries, as well as fire and explosion hazards. Workers will take appropriate protective measures when working near live electrical parts, including inspection of work areas to identify potential spark/ignition sources, maintenance of a safe distance, proper illumination of work areas, provision of barriers to prevent inadvertent contact, and use of non-conductive equipment. If wiring or other electrical work is needed, it must be performed by a qualified electrician.

General electrical safety requirements include the following:

- Electrical wiring and equipment must be a type listed by UL, Factory Mutual Engineering Corporation, or other recognized testing or listing agency.

- Installations must comply with the National Electrical Safety Code or the National Electrical Code regulations.

- Portable and semi-portable tools and equipment must be grounded by a multi-conductor cord having an identified grounding conductor and a multi-contact polarized plug-in receptacle.

- Tools protected by an approved system of double insulation, or its equivalent, need not be grounded. Double insulated tools must be distinctly marked and listed by UL or FM.

- Live parts or wiring or equipment must be guarded to prevent persons or objects from touching them.

- Electric wire or flexible cord passing through work areas must be covered or elevated to protect it from damage by foot traffic, vehicles, sharp corners, projections, or pinching.
- Circuits must be protected from overload.

- Temporary power lines, switch boxes, receptacle boxes, metal cabinets, and enclosures around equipment must be marked to indicate the maximum operating voltage.

- Plugs and receptacles must be kept out of water unless equipped with approved submersible construction.

- Extension outlets must be equipped with ground fault circuit interrupters.

- Attachment plugs or other connectors must be equipped with a cord grip and be constructed to endure rough treatment.

- Extension cords or cables must be inspected prior to each use and replaced if worn or damaged. Cords and cables must not be fastened with staples, hung from nails, or suspended by bare wire.

- Flexible cords must be used only in continuous lengths without splice, with the exception of molded or vulcanized splices made by a qualified electrician.

3.4.7.1 High Voltage Hazards

Employees may be required to work around sources of high voltage at the Site. Caution should be exercised to minimize contact with high voltage equipment, including contact between sampling equipment and potentially charged items. The minimum working distances from power transmission and distribution lines and equipment that will be allowed at the Site are presented in the following table:

High Voltage Clearances

Nominal System Voltage	Minimum Required Clearance
0-50 kV	10 ft
51-100 kV	12 ft
101-200 kV	15 ft
201-300 kV	20 ft
301-500 kV	25 ft
501-750 kV	35 ft
751-1,000 kV	45 ft

Notes:
ft = Foot (feet)
kV = Kilovolt(s)

3.4.8 Utilities

No invasive subsurface work activities are anticipated at the Site, therefore; the involvement of utilities is not anticipated.

3.4.9 Weather Hazards

Weather conditions should always be taken into consideration. Heavy rains, electrical storms, high winds, and extreme temperatures, for example, may create extremely dangerous situations for employees. Equipment performance may also be impaired because of inclement weather. Whenever unfavorable conditions arise, the Site Manager and SHSO/Field Team Leader will evaluate both the safety hazards and ability of the employees to effectively perform given tasks under such conditions. Activities will be halted at their discretion.

Wind direction should be accounted for when positioning equipment at sampling locations. If exposure to organic vapors is anticipated, workers should locate upwind of the sampling point. Wind direction often changes abruptly and without warning, so personnel should always be prepared to reposition, if necessary.

3.5 BIOLOGICAL HAZARDS

Potential hazards may be present at the Site due to bites from stray domestic and wild animals (to include rodents), spiders, bees, and other venomous arthropods, ticks may be encountered during field operations potentially resulting in Lyme disease, rabies, or punctures from sharp objects

presenting a possible hazard from tetanus. In the case of an animal or insect bite that can be serious or fatal, workers must seek immediate medical attention and report the incident to the SHSO/Field Team Leader prior to leaving the Site. An employee known to be allergic or sensitive to poisonous insects should alert the Site Manager and SHSO/Field Team Leader. Prompt medical attention procedures, as outlined in **Section 8.2** of this HASP will be followed in the event of animal bites (since many animals carry rabies or other diseases/viruses).

3.5.1 Bloodborne Pathogens

During the conduct of site operations, field crew may be exposed to blood and body secretions in support of emergency response operations where site personnel have been injured and require first aid and/or cardiopulmonary resuscitation (CPR). Due to the potential that blood and body secretions may contain disease causing organisms such as Hepatitis B virus and Human Immunodeficiency virus, in an emergency response situation, employees electing to provide first aid and CPR support, until the arrival of a competent on-site medical responder, should take appropriate measures to reduce or eliminate their potential for contact and exposure. The concept of "Universal Precautions" will be followed, which refers to the practice of assuming a potential hazard is present in a patient's bodily fluids. Employees providing first aid support should wear the appropriate PPE to prevent or reduce their potential for contact and exposure. This will typically be accomplished through the use of rubber gloves, splash-proof eye protection, and the use of mouth-to-mouth guards and proper cleanup (good sanitation and hygiene) following an incident. Hands and face should be thoroughly washed with water and an antiseptic soap or cleanser following an incident, or antiseptic containing disposable towelettes used in the absence of appropriate field washing facilities. The Program Health and Safety Officer should be notified of potential employee exposures to blood and body fluids while conducting work in support of this project.

3.5.2 West Nile Virus

West Nile virus is a member of the Japanese encephalitis complex of flaviviruses, is transmissible by mosquitoes, and can cause febrile, sometimes fatal human illness. Until 1999, this virus had never been reported in the Western Hemisphere. Mosquitoes, primarily bird-feeding species, are the primary vectors of West Nile virus, although the virus has been isolated from other bird-feeding arthropods, including some tick species. The natural transmission cycle of the virus involves a bird-mosquito cycle but may include a tick-bird cycle where soft ticks (Argasidaes) or hard ticks (Ixodidaes) are found feeding on reservoir birds. The urban cycle of the disease requires species of mosquitoes that will feed on free-ranging or domestic birds and people. The unprecedented introduction of West Nile virus into the metropolitan area of New York City in late-Summer 1999 has resulted in a large-scale review of existing programs and required resources to address this threat. Representatives of several local health units and state and federal agencies met to address each of the significant surveillance and response issues associated with this mosquito-borne disease. As a result of these discussions and consultation with community groups, the New York State Department of Health has developed a set of complementary action plans to prevent a further episode of West Nile virus infections.

According to New York State Department of Health, outdoor workers should take the following precautions to minimize potential exposure to the West Nile virus from adult mosquito bites:

- It is not necessary to change standard work health and safety practices outdoors unless there is evidence of the mosquito-borne disease.

- If the West Nile virus is identified in an area, workers should be advised of the precautions that they may choose to take to try to reduce the risk of mosquito bites:

  — Wear shoes, socks, long pants, and a long-sleeved shirt when outdoors for long periods of time or when mosquitoes are most active (between dusk and dawn). Maintain body fluids to avoid heat stress.

  — Consider the use of mosquito repellent, according to directions, when it is necessary to be outdoors for long periods or at times when mosquitoes are most active.

3.5.3 Lyme Disease

Lyme disease commonly occurs in summer and is transmitted by the bite of infected ticks. Hot spots in the United States include New York, New Jersey, Pennsylvania, Massachusetts, Connecticut, Rhode Island, Minnesota, and Wisconsin. Few cases have been identified in other states. Symptoms of Lyme disease include a rash or a peculiar red spot, like a bull's eye, which expands outward in a circular manner. The victim may have a headache, weakness, fever, a stiff neck, swilling and pain in the joints, and eventually, arthritis.

Tick repellant containing diethyltoluamide (DEET) should be used when working in tick-infested areas, and pants legs should be tucked into boots. In addition, workers should search the entire body every 3 or 4 hours for attached ticks. Ticks should be removed promptly and carefully without crushing, since crushing can squeeze the disease-causing organism into the skin. A gentle and steady pulling action should be used to avoid leaving the head or mouth parts in the skin. Hands should be protected with surgical gloves when removing ticks.

3.5.4 Pandemic Response

During a pandemic, the field crew must take precautionary steps to avoid the spread of communicable diseases. Some precautionary steps in each project task listed below may include the following:

- No carpooling where possible to maintain social distancing and reduce transmission between coworkers.

- Minimize employees in small spaces to avoid crowding and maintain 6 ft between workers.

- When a 6-ft distance cannot be maintained between the field crew, face coverings will be worn (e.g., a scarf, bandana, or face mask).

- Maintain diligent use of PPE including nitrile gloves and safety glasses to limit contact with eyes.

- The field crew shall frequently clean hands with soap and water for at least 20 seconds, especially if in a public place or after blowing nose, coughing, or sneezing.

  — If soap and water are not readily available, the field crew shall use a hand sanitizer that contains at least 60 percent alcohol.

  — The field crew shall avoid touching eyes, nose, and mouth with unwashed hands or with gloved hands.

- The field crew should discuss work roles prior to the start of work to reduce passing tools, logbooks, iPads, and other equipment between individuals.

- Any field crew or potential site visitors should be excused from the jobsite if the following pertains to them:

  — Currently experiencing fever, chills, a cough, sore throat, or shortness of breath

  — Has traveled within the last 14 days

  — Has been in contact with anyone, including family members, who have traveled within the last 14 days

4. GENERAL SAFETY PRACTICES

4.1 SAFETY PROCEDURES

Safe work practices that will be followed by site workers include, but are not limited to, the following rules:

- At least one copy of this HASP must be at the project site, in a location readily available to personnel, and reviewed by project personnel prior to starting work.
- Site personnel must use the buddy system.
- Potentially contaminated PPE must not be removed from the work area before being cleaned or properly packaged and labeled.
- Potentially contaminated waste, debris, and clothing must be properly contained, and legible and understandable precautionary labels affixed to each container to define its content.
- Removing potentially contaminated soil or debris from protective clothing or equipment with compressed air, shaking, or any other means that may re-suspend contaminants into the air is prohibited.
- Eat, drink, and smoke only in those areas designated by the Site Manager/SHSO/Field Team Leader. These activities will not take place within any work zone.
- Large bulk containers, such as 55-gallon drums, must only be moved with the proper equipment, and must be secured to prevent dropping or loss of control during transport.
- Emergency equipment such as eyewash, fire extinguishers, etc. must be staged in readily-accessible locations.
- Employees must be aware, and inform their partners or fellow team members, of the potential non-visible effects of exposure to toxic materials. The symptoms of such exposures may include the following:

  — Headaches
  — Dizziness
  — Nausea
  — Blurred vision
  — Cramps
  — Irritation of eyes, skin, or respiratory tract

- Visitors to the Site must adhere to the following:

  — Visitors must report to the Site's Site Manager or SHSO/Field Team Leader upon arrival to get site orientation.

  — Visitors must be accompanied by Site Manager or SHSO/Field Team Leader at all times when on-site.

  — Visitors will not be allowed in areas of work activities (i.e., groundwater sampling).

Each employee required to take prescription drugs will notify the SHSO/Field Team Leader prior to the start of work, and upon approval, may take prescription drugs in away from the area of work activities only. Controlled or unauthorized drugs will **not** be permitted on-site at any time.

4.2 BUDDY SYSTEM

On-site personnel must use the buddy system. Visual contact must be maintained between crew members, and crew members must observe each other for signs of chemical exposure and heat/cold stress. Indications of adverse effects include, but are not limited to the following:

- Changes in complexion and skin coloration
- Changes in coordination
- Changes in demeanor
- Excessive salivation and pupillary response
- Changes in speech pattern

Team members must also be aware of potential exposure to possible safety hazards, unsafe acts, or non-compliance with safety procedures.

If protective equipment or noise levels impair communications, pre-arranged hand signals must be used for communication. Personnel must stay within line of sight of another team member.

4.3 EMERGENCY EQUIPMENT

Adequate emergency equipment for the activities conducted on-site and as required by applicable sections of 29 CFR 1910 and 29 CFR 1926 must be maintained on-site. Personnel will be provided with access to emergency equipment including, but not limited to, the following:

- Emergency eyewash unit(s) (portable) meeting American Nation Standards Institute Z358.1-1990

- Fire extinguishers of adequate size, class, number, and location (one in each EA vehicle) as required by applicable sections of 29 CFR 1910 and 29 CFR 1926

- First aid kit of adequate size for the number of personnel on-site

4.4 PERSONAL HYGIENE AND SANITATION

4.4.1 Break Area

Breaks will be taken away from the active work area after site personnel complete any required decontamination procedures. There will be no smoking, eating, drinking, or chewing gum or tobacco in the area of work activities.

4.4.2 Potable Water

The following rules apply for project field operations:

- An adequate supply of potable water will be provided at the work site. Potable water must be kept away from hazardous materials, contaminated clothing, and contaminated equipment.

- Portable containers used to dispense drinking water must be capable of being tightly closed and must be equipped with a tap dispenser. Water must not be consumed directly from the container, nor dipped from the container.

- Containers used for drinking water must be clearly marked and not used for any other purpose.

- Disposable cups will be supplied; both a sanitary container for unused cups and a receptacle for disposing of used cups must be provided.

4.4.3 Sanitary Facilities

No access to facilities for washing before eating, drinking, or smoking will be provided directly on-site. However, local businesses located adjacent to the Site can be used for sanitary purposes. Personnel are required to wash off exposed skin surfaces prior to eating, smoking, or drinking following site operations and work activities.

4.4.4 Lavatory

No toilet facilities will be provided directly on-site. However, local businesses located adjacent to the Site can be used for lavatory purposes.

4.4.5 Trash Collection

Trash from work activities will be bagged in trash bags and disposed of as miscellaneous trash.

4.5 SPILL CONTROL PLAN

Personnel must take every necessary precaution to minimize the potential for spills during site operations. On-site personnel are obligated to report immediately any discharge, no matter how small, to the Project Manager. In the event of a significant spill, containment, control, and cleanup

procedures will adhere to NYSDEC Technical Procedural Guidance document for personnel health and safety protection.

Spill equipment (i.e., absorbent towels) will be kept in EA site vehicles to clean up minor spills(1). Any spill that is not considered a minor spill will be addressed by safety and emergency professionals. Sorbent materials used for the cleanup will be containerized and labeled separately from other wastes. In the event of a spill, the Project Manager will follow the provisions outlined in the NYSDEC Spill Guidance Manual to contain and control released materials and to prevent the spread to off-site areas.

Note:

(1) A minor chemical spill is one that staff are capable of handling safely without the assistance of safety and emergency personnel.

5. PERSONAL PROTECTIVE EQUIPMENT

5.1 LEVELS OF PROTECTION

Based upon currently available information, the Site is considered non-hazardous and will require Level D protection for currently anticipated conditions and activities. Site monitoring does not include intrusive activities, so unknown chemical hazards will not be encountered. Level D protection is sufficient for the monitoring activities covered by this HASP.

5.1.1 Level D Personal Protective Equipment

Level D will be worn for initial entry on-site and initially for all activities and will consist of the following:

- Coveralls or appropriate work clothing
- Steel-toe, steel-shank safety boots/shoes
- Hard hats (when overhead hazards are present or as required by the SHSO/Field Team Leader)
- Chemical resistant gloves (nitrile/neoprene) when contact with potentially contaminated soil or water is expected
- Safety glasses with side shields
- Hearing protectors (during drilling or other operations producing excessive noise)
- Boot covers (optional unless in contact with potentially contaminated soil or water)
- Poly-coated coveralls (when contact with contaminated soil and water is anticipated, e.g., when surging/pumping wells and pressure-washing equipment).
- Insulated clothing, hats, etc. must be worn when temperatures or wind chill fall below 40°F

5.2 HEARING PROTECTION

Hearing protection must be available and properly worn whenever noise levels exceed 85 dBA (noise level at which a normal conversation cannot be carried on at a 3-ft distance). When the SHSO/Field Team Leader determines that a potential excessive noise exposure exists, a sound level meter will be used for measurements. Two types of hearing protection will be available on-site: foam earplugs and earmuffs. The hearing protectors will have a Noise Reduction Rating sufficient to reduce the sound level to below 85 dBA.

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6. EMPLOYEE TRAINING

6.1 SITE WORKERS

Personnel who will be performing non-hazardous on-site tasks are not required to have been trained according to United States Department of Labor OSHA Standard, 29 CFR 1910.120/29 CFR 1926.65 *Hazardous Waste Operations and Emergency Response.* These workers will have appropriate health and safety training based upon their specific job tasks and activities.

The Site Manager, SHSO/Field Team Leader, and personnel conducting the site monitoring activities (e.g., groundwater monitoring) will be trained as required to meet the United States Department of Labor OSHA Standard, 29 CFR 1910.120/29 CFR 1926.65, *Hazardous Waste Operations and Emergency Response* to qualify as a hazardous waste site worker and supervisor. Training will include the following:

- A minimum of 40 hours of initial off-site instruction
- A minimum of 3 days of actual field experience under the direct supervision of a trained, experienced supervisor
- An 8-hour refresher training period annually
- Additional training that addresses unique or special hazards/operational requirements
- First aid and CPR

On-site management and supervisors who are directly responsible for or who supervise employees will receive at least 8 additional hours of specialized management training. Copies of training certificates and dates of attendance will be available through the SHSO/Field Team Leader upon request.

6.2 SITE-SPECIFIC TRAINING

The SHSO/Field Team Leader will be responsible for developing a site-specific occupational hazard training program and providing training to personnel who are to work at the Site. At a minimum, this training will consist of the following topics:

- Names of personnel responsible for site health and safety
- Safety, health, and other hazards at the Site
- Proper use of PPE
- Work practices by which the employee can minimize risk from hazards
- Safe use of engineering controls and equipment on the Site
- Acute effects of compounds at the Site
- Decontamination procedures

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7. MEDICAL SURVEILLANCE

7.1 MEDICAL EXAMINATIONS

Site workers potentially involved with the field sampling operations must have satisfactorily completed a comprehensive medical examination by a licensed occupational physician within 12 months (or 24 months with the approval of the consulting physician) prior to the start of site operations. The date of medical examination of each qualified person will be maintained on-site with the project field team. Medical surveillance protocols must comply with 29 CFR 1910.120/29 CFR 1926.65.

Medical examinations and consultations must be provided for employees covered by this program on the following schedule:

- Prior to assignment
- At least annually for employees covered by the program
- At termination of employment or reassignment to an area where the employee would not be covered if the employee has not been examined within the past 6 months
- As soon as possible upon the development of signs or symptoms that may indicate an overexposure to hazardous substances or health hazards
- More frequently if the physician deems such examination necessary to maintain employee health

7.2 RECORDS

An accurate record of the medical surveillance and exposure will be maintained for each employee for a period of no less than 30 years after the termination of employment, as per 29 CFR 1910.1020. Records must include at least the following information about the employee:

- Name and social security number
- Physician’s written opinions, recommendations, limitations, and test results
- Employee medical complaints related to hazardous waste operations
- Information provided to the physician by the employee concerning possible exposures, accidents, etc.

7.3 FIRST AID AND MEDICAL TREATMENT

Persons on-site must report a near-miss incident, accident, injury, or illness to their immediate supervisor or the Site Manager. First aid will be provided by the designated site first aider. Injuries

and illnesses requiring medical treatment must be documented. The Site Manager must conduct an accident investigation as soon as emergency conditions no longer exist, and first aid and/or medical treatment has been ensured. The accident/incident report must be completed and submitted to the Corporate Health and Safety Officer within 24 hours after the incident.

If first aid treatment is required, first aid kits are kept in EA field vehicles. If treatment beyond first aid is required, the injured individual(s) should be transported to the medical facility. If the injured is not ambulatory or shows signs of not being in a comfortable or stable condition for transport, then an ambulance/paramedics should be summoned. If there is a doubt as to the injured worker's condition, it is best to let the local paramedic or ambulance service examine and transport the worker.

8. ACCIDENT PREVENTION AND CONTINGENCY PLAN

8.1 ACCIDENT PREVENTION

Field personnel will receive health and safety training prior to the initiation of site activities. On a day-to-day basis, individual personnel should be constantly alert for indicators of potentially hazardous situations and for signs and symptoms in themselves and others that warn of hazardous conditions and exposures. Rapid recognition of dangerous situations can avert an emergency. Before daily work assignments, regular meetings should be held.

Discussion should include the following:

- Tasks to be performed
- Time constraints (e.g., rest periods, cartridge changes)
- Hazards that may be encountered, including their effects, how to recognize symptoms and monitor them, concentration limits, or other danger signals
- Emergency procedures

8.2 CONTINGENCY PLAN

8.2.1 Emergency Recognition

Prior to work startup, personnel must be familiar with emergency condition identification, notification, and response procedures. **The emergency telephone numbers for local emergency response and reporting organizations and directions and map to the nearest hospital are included in Attachment E. NOTE: The HASP will be left open to the emergency contacts page at all times during site activities.** The Site Manager and SHSO/Field Team Leader will rehearse/review emergency procedures and/or applicable site contingencies initially during site orientation and as part of the ongoing site safety program. On-site emergencies will ultimately be handled by off-site emergency personnel. Initial response and first-aid treatment; however, will be provided on-site.

Person(s) identifying an accident, injury, emergency condition, or a scenario requiring implementation of a response in support of this Plan will immediately take actions to report the situation to the Site Manager. Notification may take place by runner, hand-held radio, or telephone. The Site Manager/SHSO/Field Team Leader will initiate the required response based upon the type of incident, following the procedures contained in this HASP. A chain-of-command and sign-in sheets for personnel on the Site will be established at the beginning of each workday to ensure personnel are accounted for and who will take control should the Site Manager or SHSO/Field Team Leader become injured. The following items constitute those site conditions requiring an emergency response or contingency action in accordance with this HASP:

- Fire/Explosion:
  - The potential for human injury exists
  - Toxic fumes or vapors are released
  - The fire could spread on-site or off-site, and possibly ignite other flammable materials or cause heat-induced explosions
  - The use of water and/or chemical fire suppressants could result in contaminated runoff
  - An imminent danger of explosion exists
- Natural Disaster:
  - A rainstorm exceeds the flash flood level
  - The Site is in a projected tornado/hurricane path, or a tornado/hurricane has damaged facility property
  - Severe wind gusts are forecasted or have occurred and have caused damage to the facility
- Medical Emergency:
  - Overexposure to hazardous materials
  - Trauma injuries (broken bones, severe lacerations/bleeding, burns, animal bites)
  - Eye or significant skin contact with hazardous materials
  - Loss of consciousness
  - Heat stress (heat stroke)
  - Heart attack
  - Respiratory failure
  - Allergic reaction
- Discovery of Unanticipated Hazards (e.g., unmarked utility lines, heavily contaminated material).

Follow-up operations to evaluate and control the source of fire, explosions, and hazardous materials incidents will occur only after discussion with the Project Manager and Site Manager. The Site Manager will act as the Emergency Coordinator at the Site to coordinate on-site activities and contingencies until the arrival of outside response organizations. If the Site Manager is unable to act as the Emergency Coordinator, then the authority to take action will be transferred to the SHSO/Field Team Leader, or other designee, as indicated in the daily updated chain-of-command.

8.2.2 Emergency Procedures

In the event of an emergency, the information available at that time must be properly evaluated and the appropriate steps taken to implement the Emergency Response Plan. The Site Manager (or SHSO/Field Team Leader if the Site Manager is part of the emergency) will assume command of the situation. He/she/they will alert the emergency management system and evacuate personnel to the pre-designated evacuation location. In a site emergency, the Site Manager (or the SHSO/Field Team Leader if the Site Manager is not available) must sound an emergency alarm (designated as an air horn or car horn) repeatedly several times, upon hearing work must stop, and personnel must move to the pre-designated evacuation location. If the emergency situation cannot be conveyed by word of mouth, a whistle or other horn will be sounded. Three short blasts, separated by a 2-second silence, will be used as the emergency signal. First aid will be administered only to limit further injury and stabilize the victim. The local Emergency Medical Services must be notified immediately, if needed. The routes to the nearest hospital are shown in **Attachment E**. The Site Manager/SHSO/Field Team Leader will make required notifications to include, but not be limited to, the NYSDEC representative and Project Manager, as defined in **Section 2** and the appropriate federal and state agencies.

Site personnel will have the capability of notifying emergency responders directly from the Site using the phone in the company vehicle or in the site support office. In the event of an accident/incident, the Project Manager should be immediately notified of a reportable accident/incident or contingency.

The following information will be provided when reporting an emergency:

1. Name and location of person reporting
2. Location of accident/incident
3. Name and affiliation of injured party
4. Description of injuries, fire, spill, or explosion
5. Status of medical aid and/or other emergency control efforts
6. Details of chemicals involved
7. Summary of accident, including suspected cause and time it occurred
8. Temporary control measures taken to minimize further risk

This information is not to be released to parties other than those listed in this section and Emergency Response Team members. Once emergency response agencies have been notified, the Project Manager will be notified immediately.

8.2.3 Chemical Exposure

If a member of the field crew demonstrates symptoms of chemical exposure, the procedures outlined below should be followed:

- Another team member (buddy) should remove the individual from the immediate area of contamination. The buddy should communicate to the Site Manager (via voice and hand signals) of the chemical exposure. The Site Manager should contact the appropriate emergency response agency.

- Precautions should be taken to avoid exposure of other individuals to the chemical.
- If the chemical is on the individual's clothing, the chemical should be neutralized or removed if it is safe to do so, or the clothing should be removed and bagged.
- If the chemical has contacted the skin, the skin should be washed with copious amounts of water.
- In case of eye contact, an emergency eye wash should be used. Eyes should be washed for at least 15 minutes.

Chemical exposure incidents must be reported in writing to the Program Health and Safety Officer. The SHSO/Field Team Leader or Site Manager is responsible for completing the accident report provided in **Attachment F**.

8.2.4 Personal Injury

Personnel should always be alert for signs and symptoms of illnesses related to chemical, physical, and on-site health hazards. Severe injuries resulting from accidents must be recognized as emergencies and treated as such. If feasible, in the field, at least two people currently trained in first aid/CPR must be present on-site. This will normally be the Field Manager and SHSO/Field Team Leader.

In a medical emergency, the Site Manager (or the SHSO/Field Team Leader if the Field Manager is not available) must sound the emergency air horn or car horn several times, upon which work must stop and personnel must move to the pre-designated evacuation location. If the emergency situation cannot be conveyed by word of mouth, a whistle or other horn will be sounded. Three short blasts, separated by a 2-second silence, will be used as the emergency signal. Personnel currently trained in first aid will evaluate the nature of the injury, decontaminate the victim (if necessary), and initiate first aid assistance immediately and transport if appropriate. First aid will be administered only to limit further injury and stabilize the victim. The local Emergency Medical Services must be notified immediately, if needed. The routes to the nearest hospital are shown in **Attachment E**. Although not anticipated, victims who are heavily contaminated with toxic or dangerous materials must be decontaminated before being transported from the Site. Decontamination will consist of removal of contaminated coveralls/clothing and wrapping the victim in a sheet or other cloth like material. No persons will re-enter the site of injury/illness until the cause of the injury or symptoms has been determined and controlled. At no time will personnel transport victims to emergency medical facilities unless the injury does not pose an immediate threat to life and transport to the emergency medical facility can be accomplished without the risk of further injury. Emergency Medical Services will be used to transport serious injuries off-site unless deemed otherwise by the Site Manager/SHSO/Field Team Leader.

The Site Manager must complete an Accident/Loss and Incident Report and submit it to the Project Manager within 24 hours of the following types of incidents:

- Job-related injuries and illnesses
- Accidents resulting in loss or damage to property
- Accidents involving vehicles and/or vessels, whether or not they result in damage to property or personnel
- Accidents in which there may have been no injury or property damage, but which have a high probability of recurring with at least a moderate risk to personnel or property
- Near-miss incidents, which could have resulted in any of the conditions defined above

An accident that results in a fatality or the hospitalization of three or more employees must be reported within 8 hours to the United States Department of Labor through the Project Manager.

In order to support on-site medical emergencies, first aid/emergency medical equipment will be available at the following locations:

- First-aid kit; work vehicle
- Eye wash; work vehicle
- Emergency alarm; horn on the work vehicle
- Copy of the HASP, work vehicle
- Telephone; work vehicle

The eye wash kit must be portable and capable of supplying at least a 15-minute supply of potable water to the eyes.

8.2.5 Operations Shutdown

The Site Manager, SHSO/Field Team Leader, the Project Manager or field crew may mandate operations shutdown. Conditions warranting work stoppage will include (but are not limited to):

- Uncontrolled fire
- Explosion
- Uncovering potentially dangerous buried hazardous materials
- Condition immediately dangerous to life and health or the environment
- Potential for electrical storms
- Treacherous weather-related conditions
- Limited visibility

8.2.6 Evacuation Procedures

In the event the Site must be evacuated, the following procedures should be followed:

- The Site Manager will initiate evacuation procedures by signaling to leave the Site.

- Personnel in the work area should evacuate the area and meet in the common designated area.

- Personnel suspected to be in or near the work area should be accounted for and the whereabouts of missing persons determined immediately.

Further instruction will then be given by the Site Manager.

8.2.7 Procedures Implemented in the Event of a Major Fire, Explosion, or On-Site Health Emergency Crisis

Fire and explosion must be immediately recognized as an emergency. The SHSO/Field Team Leader (or Site Manager if SHSO/Field Team Leader is not available) must sound an emergency signal, and personnel must be decontaminated (if necessary) and evacuated to the pre-designated evacuation location.

Only persons properly trained in fire suppression and other emergency response procedures will support control activities. Control activities will consist of the use of on-site portable fire extinguishers for limited fire suppression and employee evacuation. Upon sounding the emergency alarm, personnel will evacuate the hazard location and assemble at the designated site meeting area.

Only those site personnel trained in the use of portable fire extinguisher use will attempt to suppress a site fire. Small multipurpose dry chemical extinguishers will be maintained in each vehicle on-site. Fires not able to be extinguished using on-site extinguishers will require the support of the local fire department.

The Site Manager should take measures to reduce injury and illness by evacuating personnel from the hazard location as quickly as possible. The Site Manager must then notify the local fire department. The Site Manager will determine proper follow-up actions. Site personnel will not resume work during or after a fire/explosion incident until the emergency coordinator has directed that the incident is over, and work may resume. During the incident, site personnel will remain outside the incident area and obey the instructions of the Emergency Coordinator.

8.2.8 Emergency Telephone Numbers

Attachment E provides a listing of emergency telephone numbers.

8.3 SPILL CONTAINMENT PROCEDURES

Small incidental spills, (i.e., those which cause no injury to personnel or the public), may be cleaned up quickly and easily. For large spills, (i.e., those that contaminate personnel or the environment), attend to first aid measures first, stop the source of the spill if possible, and then notify appropriate emergency response services. Safety of workers will be managed by adhering to policies and procedures outlined in the NYSDEC Technical Procedural Manual for Personal Health and Safety Protection.

Spills of hazardous materials or wastes which are listed by EPA as having a reportable quantity value must be reported to appropriate federal, state, and local agencies if a reportable quantity or greater is released. The Site Manager is responsible for determining the appropriate agencies prior to work startup.

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Attachment A

Health and Safety Plan Review Record

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Health and Safety Plan Review Record

I have read the Health and Safety Plan for this Site and have been briefed on the nature, level, and degree of exposure likely as a result of participation in this project. I agree to conform to all the requirements of this Plan.

Site: Primo-shield, Utica, New York			
Name	**Signature**	**Affiliation**	**Date**

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Attachment B

Safety Data Sheets

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Attachment C

Personal Protective Equipment Activity Record

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Personal Protective Equipment Activity Record

Site: Primo-shield, Utica, New York		
Weather Condition:		**On-Site Hours: From**
		To
Changes in Personal Protective Equipment Levels[(a)]	**Work Operations**	**Reasons for Change**
Site Health and Safety Plan Violations	**Corrective Action Specified**	**Corrective Action Taken (yes/no)**
Observations and Comments:		
Completed by: _____ **Site Health and Safety Officer** **Date**		
(a) Only the Site Health and Safety Officer may change personal protective equipment levels, using only criteria specified in the Health and Safety Plan.		

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Attachment D

Site and Entry Log

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Site Entry and Exit Log

Site: Primo-shield, Utica, New York				
Name	**Date**	**Time of Entry**	**Time of Exit**	**Initials**

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Attachment E

Emergency Telephone Numbers and Hospital Directions

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Emergency Telephone Numbers and Hospital Directions

Site: Primo-shield, Utica New York	
Police: Utica Police Department	9-1-1 or **+1-315-735-3301**
Fire: Utica Fire Department	9-1-1 or + **+1-315-731-2000**
Ambulance: Kunkel Ambulance Service	9-1-1 or + +1-315-797-4111
Hospital: St. Luke's Campus – Mohawk Valley Health System	9-1-1 or +1-315-624-6000
Upstate New York Poison Control 750 E Adams Street, Syracuse, New York 13210	+1-800-222-1222

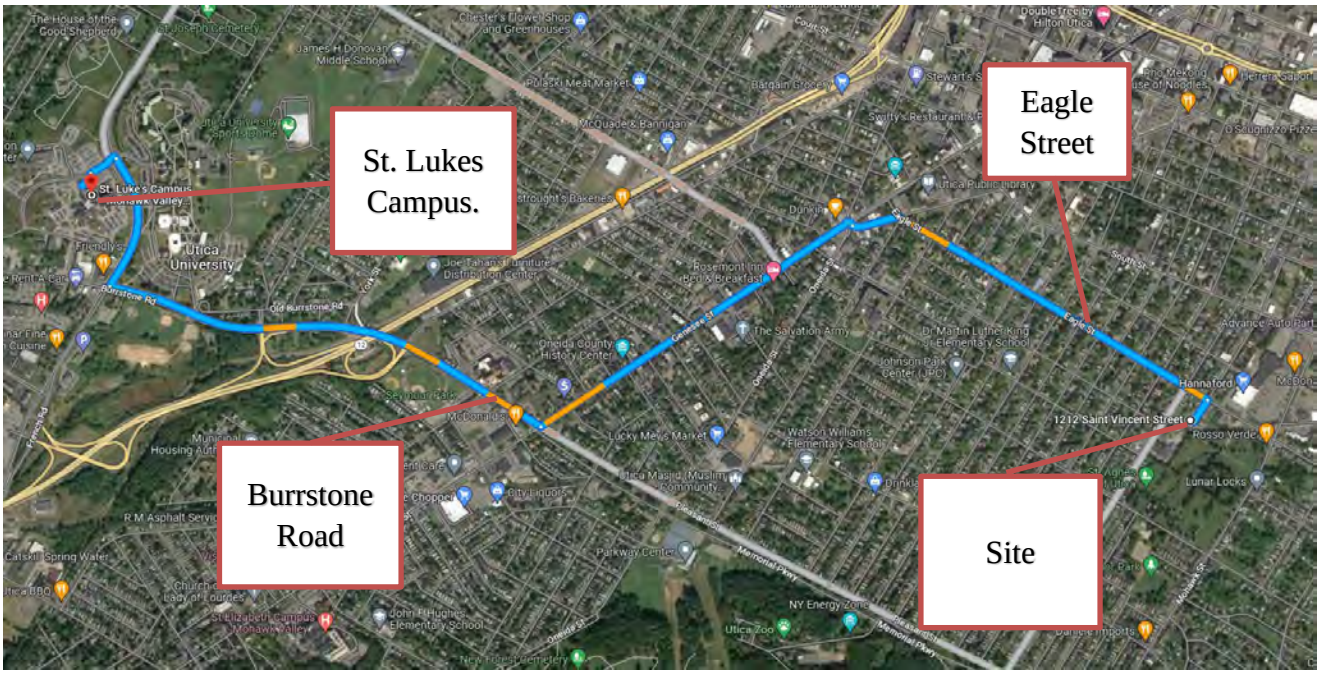
Directions to 1656 Champlin Avenue, Utica, New York 13502
St. Luke's Campus – Mohawk Valley Health System

Head northeast on St. Vincent Street for 300 ft toward Eagle S and turn left onto St Eagle Street, continuing for about 4 miles. Then turn left onto Park Avenue and travel for 0.1 miles. At the traffic circle, take the 3rd exit onto Genesee Street, then travel for 0.9 miles. Turn right onto Burrstone Road. In 1.1 miles, turn right onto Champlin Avenue and travel for 0.3 miles. Turn left at the first cross street into the destination.

Map to Hospital

Directions to St. Luke's Campus – Mohawk Valley Health System

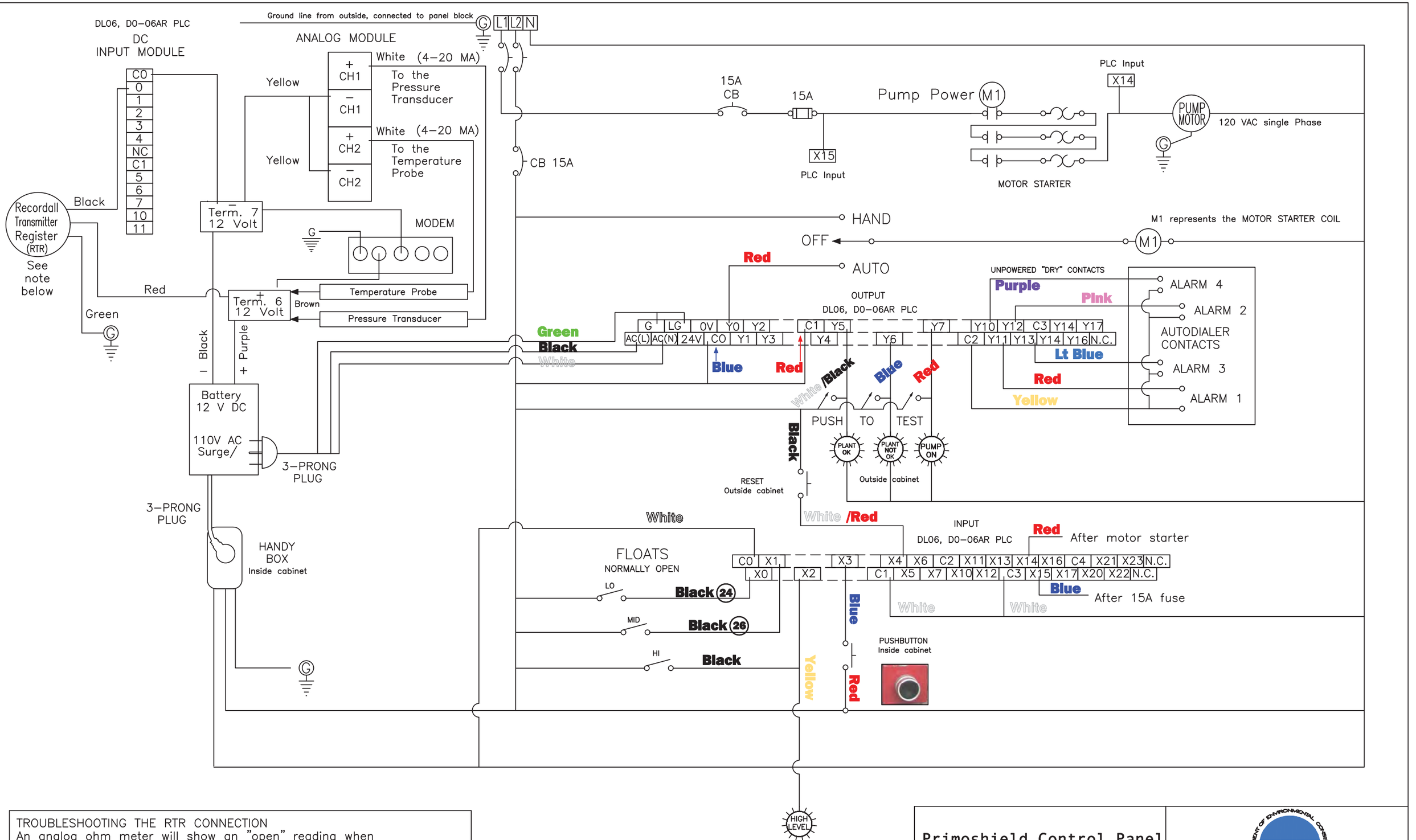
Head northeast on St. Vincent Street for 300 ft toward Eagle S and turn left onto St. Eagle Street, continuing for about 4 miles. Then turn left onto Park Avenue and travel for 0.1 miles. At the traffic circle, take the 3rd exit onto Genesee Street, then travel for 0.9 miles. Turn right onto Burrstone Rd. In 1.1 miles, turn right onto Champlin Avenue and travel for 0.3 miles. Turn left at the first cross street into the destination.



Appendix J

Programmable Logic Controller Wiring Diagram

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TROUBLESHOOTING THE RTR CONNECTION
An analog ohm meter will show an "open" reading when across the OUTPUT leads to the RTR. When operating the RTR, the ohm meter should show a momentary deflection toward zero when the RTR sends a signal.

Primoshield Control Panel Schematic/Wiring Diagram

Design by Carl Hoffman, Payson Long and Will Welling

Drawing Date: 01/30/2012

plc_wiring2.dwg

WBW Edited: 11/28/2012

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Appendix K

Federal Emergency Management Administration
Flood Insurance Map

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NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain **areas** not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was New York State Plane FIPSZONE 3102. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #8202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was derived from digital orthophotography provided by the New York Office of Cyber Security & Critical Infrastructure Coordination. This information was provided as 30-centimeter and 60-centimeter resolution natural color orthoimagery from photography dated April 2004.

Based on updated topographic information, this map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map. Also, the road to floodplain relationships for unrevised streams may differ from what is shown on previous maps.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information on available products associated with this FIRM, visit the **Map Service Center (MSC)** website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

If you have **questions about this map**, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange (FMIX) at **1-877-FEMA-MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary
0.2% annual chance floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
Limit of Moderate Wave Action
513 — Base Flood Elevation line and value; elevation in feet*
(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

Cross section line
Transect line
Culvert, Flume, Penstock or Aqueduct
Road or Railroad Bridge
Footbridge
87°07'45", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
"76°"N — 1000-meter Universal Transverse Mercator grid values, zone 18N
600000 FT — 5000-foot grid values: New York State Plane coordinate system, Central zone (FIPSZONE 3102), Transverse Mercator projection
DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5 — River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
September 27, 2013

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0753F

FIRM

FLOOD INSURANCE RATE MAP

for ONEIDA COUNTY, NEW YORK (ALL JURISDICTIONS)

CONTAINS:

COMMUNITY	NUMBER
NEW HARTFORD, TOWN OF	360535
UTICA, CITY OF	360558

PANEL 753 OF 926
MAP SUFFIX: F

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
36065C0753F

EFFECTIVE DATE
SEPTEMBER 27, 2013

Federal Emergency Management Agency

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