ECM
environmental compliance monitoring, inc.

OPERATION AND MAINTENANCE MANUAL
GROUND WATER TREATMENT SUMP SYSTEM
OPERABLE UNIT 2

Degussa Corporation
STONY POINT, NEW YORK SITE

MARCH 26, 2001

349 Route 206
Hillsborough Professional Building
Hillsborough, NJ 08876

Telephone: 908-874-0990
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LIST OF ATTACHMENTS

1.0 INTRODUCTION

This Operations and Maintenance (O&M) Manual sets forth the operating and maintenance procedures for the ground water treatment system sump constructed within the CSX Transportation Railroad (formerly Consolidated Rail Corporation) right-of-way located within the Operable Unit 2 (OU-2) portion of the former Kay Fries site in Stony Point, Rockland County, New York. A site location map, which shows the sump location on a USGS Haverstraw, New York 7.5-minute topographical quadrangle map is presented as Attachment 1. The ground water treatment sump is designed to intercept ground water proximal to the drainage swale at the base of the railroad escarpment, in accordance with the New York State Department of Environmental Conservation (NYSDEC) Record of Decision (ROD), dated November 1997.

1.1 PURPOSE

The purpose of this manual is to identify specific operating and maintenance items, which can be anticipated during the operational life of the ground water treatment system sump and presents the procedures and implementation schedule to facilitate the operation of the system in an efficient and economical manner. The ground water treatment system sump intercepts ground water in the aforementioned area of concern and is designed to remove the volatile constituents of concern from the ground water in the immediate area. Ground water infiltrates into the upgradient side (south) of the sump and discharges via the downgradient side in a natural flow-through mode. The infiltrated water is aerated via a mechanical blower that provides compressed air to a coarse bubble diffuser system, located at the base of the sump, and is activated by a preset timer to cycle the blower 30 minutes per hour. The sump components are designed to operate unattended with periodic inspection and minor on-site maintenance.

1.2 CONTACT INFORMATION

The aspects of operation, maintenance, monitoring, inspection, repair, and management associated with the ground water treatment system sump involve a project team with various expertise. Questions pertaining to the operation and maintenance of the ground water treatment sump should be directed to the following contact(s):

PRIMARY CONTACT	AFFILIATION & ADDRESS	TELEPHONE NO.
Bruce Manganiello Operations Manager	Environmental Compliance Monitoring, Inc. 349 Route 206 Hillsborough, New Jersey 08844	(908) 874-0990

ALTERNATE CONTACT	AFFILIATION & ADDRESS	TELEPHONE NO.
Andrew E. Kruczek Remediation/Regulatory Manager	degussa. 379 Interpace Parkway, PO Box 677 Parsippany, New Jersey 07054-0677	(973) 541-8050

1.3 HEALTH AND SAFETY

Due to the proximetry of the ground water treatment system sump location within the CSX Railroad right-of-way, access to the sump is via a sloped embankment. Additionally, the sump is a confined space as defined by OSHA 1910.146. As a result of the constraints required to access the sump, personnel health and safety to achieve operation and maintenance is of primary concern. The following mandatory health and safety requirements must be taken prior to sump access.

- Operation and Maintenance personnel must phone the ECM office at (908) 874-0990 and notify the primary site contact, Bruce Manganiello or in his absence the designated personnel of the site activity.

- Prior to opening the hatch doors the safety line and harness must be donned and the safety line secured to the fence post.

- Once the proper safety equipment is donned the sump hatch may be opened to conduct site activities.

- Upon completion of site activities, the sump hatch doors are to be closed, secured and locked. Once the doors are secured in the closed position and locked, doffing of the harness and safety line may be conducted.

- Operation and Maintenance personnel must phone the ECM office to notify, Bruce Manganiello or the designated substitute that the site activity is complete and the ground water treatment system sump is secure.

2.0 GROUND WATER TREATMENT SYSTEM SUMP COMPONENTS

The ground water treatment system sump was designed by AMEC (formerly Ogden Environmental and Energy Services Company, Inc.). The specifications and scope of work relative to construction and installation of the ground water treatment sump system are detailed in the plan (*Pipe and Wire Occupation)* prepared by AMEC and included herein as Attachment 2. The construction contractor URS Corporation utilized these specifications during installation of the ground water treatment system sump.

2.1 GROUND WATER TREATMENT SYSTEM SUMP

The sump consists of an eight-foot diameter by eight-foot in height galvanized corrugated steel pipe (CSP) positioned vertically on a pre-cast concrete base. The top of the sump is covered by a pre-cast concrete manhole cover with a four-feet by four-feet aluminum access hatch. The sump has an inner diameter and working height of eight feet, yielding a total volume of approximately 3,000 gallons. The top four-feet of the CSP riser is perforated, which allows ground water to infiltrate into the upgradient side of the sump and discharge via the downgradient side, in a natural flow-through mode.

During installation, the area surrounding the sump was backfilled from eight to four-feet below grade surface (BGS) with native soils. The area surrounding the perforated portion (four-feet BGS to grade) of the CSP riser was backfilled with crushed stone to facilitate ground water flow through the sump. A permeable geotextile fabric was installed around the crushed stone to minimize the infiltration of soil fines. The *As-Built Sump and Electrical Conduit Plan* prepared by URS Corporation (URS) subsequent to completion of the treatment system sump installation is presented in Attachment 3.

Maintenance

The recovery sump is generally maintenance-free; however, any soil fines that pass into the sump and collects at the base of the sump may become re-suspended during the aeration process. In the event that an excessive amount of sediment should accumulate, removal of the soil fines for appropriate off-site disposal would be necessary. Inspection of the sump for solids accumulation will be conducted on a semi-annual basis. Inspection will involve opening the hatch doors and probing the base of the sump with a tank stick for accumulation. If significant accumulation is noted, the level will be noted in the field logs. Cleaning of the sump will be

implemented on an as-needed basis, based on the findings of the inspection program. Additionally, during removal of the solids subsequent to evacuating the content of the sump, the diffusers will be visually inspected from the surface to assess potential cleaning of the diffusers. **CAUTION: THE GROUNDWATER TREATMENT SYSTEM SUMP IS A CONFINED SPACE AS DEFINED BY OSHA 1910.146. DO NOT ENTER SUMP WITHOUT THE PROPER CONFINED SPACE ENTRY PERMIT.**

2.2 DIFFUSED AIR SYSTEM

Ground water that is intercepted by the sump is aerated to induce volatilization of potential volatile organic compounds present in the ground water. Based on an operating cycle of 30 minutes per hour, a mechanical blower is activated, which provides compressed air to a coarse bubble diffuser system located at the base of the sump. The blower is housed in a weatherproof fiberglass enclosure and mounted on the concrete manhole slab adjacent to the aluminum access doors. The diffuser system distributes air through the accumulated ground water at a rate of 100 cubic feet per minute (cfm).

Power is supplied to the sump by a below-grade electrical service line via an existing on-site single-phase electrical feeder located south of the sump adjacent to the roadway leading to the INSL-X Coatings facility (Attachment 3). The electrical tie-in rises above grade to the metering panel south of Holt Drive approximately 100 feet west of the rail line. The power supply feeds an electrical control panel, which is mounted on the concrete slab adjacent to the blower. A sub-metering panel is mounted upgradient of the sump and is used to record electrical usage for the system.

Maintenance

Inspection of the blower system is conducted on a monthly basis to optimize operation of the system. The blower inspection includes lubrication requirements and inspection of the air intake filter.

The oil level in the blower gear housing will be assessed during each inspection and oil added according to the manufacturer specifications (Attachment 4, Blower Operation and Maintenance Manual, Page 6). Complete change of the blower oil will be conducted according to the manufacturer specifications (1,000 operating hours). Based on the current blower operating frequency of 30 minutes per hour, the oil will be changed on a quarterly (3 months) basis. The procedure to lubricate the blower is as follows:

- Shut-off and lock out the blower at the electrical control panel.

- Place an oil absorbent pad below the blower gear housing.
- Open the breather port on the blower. Open the oil level plug. Fill the gear housing until oil drips out of the oil level port (Refer to Attachment 4, Blower Operation and Maintenance Manual, Page 6 for location of oil breather, fill and drain ports)
- Close the breather and oil level ports.
- Remove oil absorbent pad for proper disposal.
- Remove the lock out from electrical control panel and start the blower.

The blower drive shaft bearings require grease at frequency of once per month. The bearings will be lubricated according to the manufacturer specifications (Attachment 4, Blower Operation and Maintenance Manual, Page 6) once per month during routine monthly inspections. The procedure for greasing the bearings is as follows:

- Shut-off and lock out the blower at the electrical control panel.
- Place an oil absorbent pad below the blower.
- Using a pressure grease gun, force NLGI #2 premium grade, petroleum base grease into each bearing until traces of clean grease come out of the relief fittings (Refer to Attachment 4, Blower Operation and Maintenance Manual, Page 6 for the location of the grease fitting and relief fitting).
- Remove oil absorbent pad for proper disposal.
- Remove the lock out from electrical control panel and start the blower.

The blower air intake filter will be inspected and cleaned on a monthly basis. When the air filter exceeds its serviceable life, which is defined by visual observations (i.e., discoloration of the filter pleated fabric), the air filter element will be replaced. The procedure for cleaning the air filter is as follows:

- Shut-off and lock out the blower at the electrical control panel.
- Remove the wing nut from the cover of the air filter housing. Remove the cover and remove the filter. Tap the filter to dislodge dirt particles from the pleated fabric.
- Replace the filter and the cover.
- Remove the lock out from electrical control panel and start the blower.

The blower electrical system is maintenance free. In the event that the electrical system should need servicing this function would be supplied by a subcontracted electrician.

A detailed description of the individual system components and the manufacturer maintenance requirements is presented in the Manufacturer Equipment Literature included as Attachment 4. The table presented below summarizes the recommended maintenance schedule.

RECOMMENDED MAINTENANCE SCHEDULE
OU-2 GROUND WATER TREATMENT SUMP SYSTEM
STONY POINT, NEW YORK

SYSTEM COMPONENT	MAINTENANCE TASK	FREQUENCY
Ground Water Sump	Inspect for solids accumulation.	Semi-Annually
Blower Gear Oil	Inspect add as needed. Oil Change.	Monthly Quarterly (every 3 months)
Blower Drive Shaft Bearings	Lubricate bearings.	Monthly
Blower Air Intake Filter	Inspect and clean.	Monthly Replace as needed

3.0 DOCUMENTATION

3.1 FIELD ACTIVITY LOGS

Documentation relative to the operation and maintenance procedures for the ground water treatment sump system is maintained to evaluate the effectiveness of the system and to assist in the troubleshooting and repair process.

As part of each field inspection of the ground water treatment sump, Field Activity Daily Logs (FADLs) are completed, which include all operation and maintenance activities completed during the inspection, the condition of the system's components, unusual conditions, and electrical meter readings. A sample FADL is presented in Attachment 5.

3.2 EFFLUENT MONITORING RESULTS

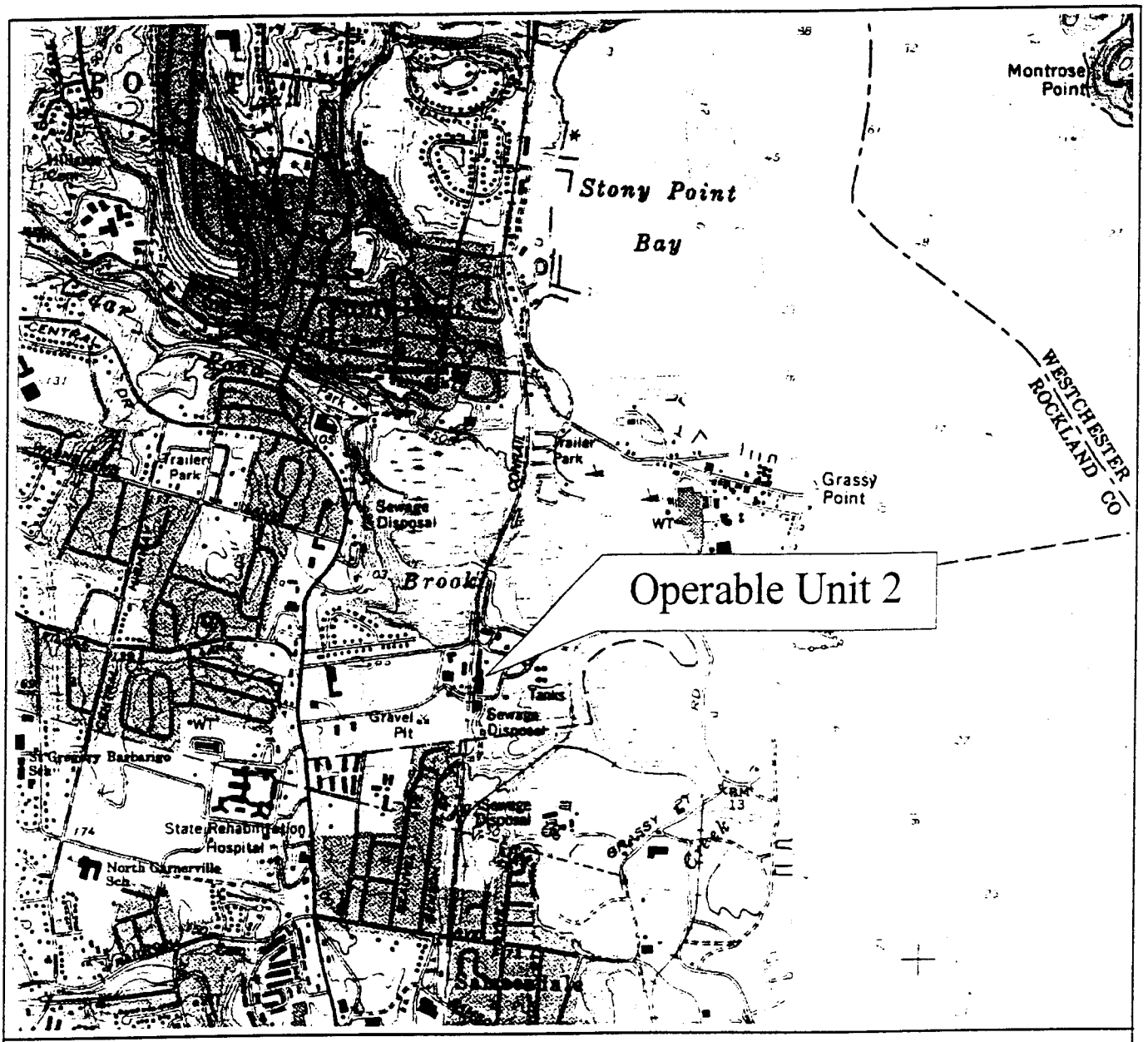
Discharge samples are collected from the down gradient side of the ground water treatment sump. The results of the effluent monitoring will be reported to the NYSDEC on an effluent monitoring report along with the associated analytical data package. A copy of the effluent monitoring report is presented in Attachment 6. The frequency for future discharge monitoring will be determined by the NYDEC pending review of analytical results from discharge sampling, which is currently occurring on a monthly basis.

5.0 SECURITY

A six-foot high chain-link fence with a locking gate currently surrounds the OU-2 ground water treatment system sump. Upon arrival and subsequent to each on-site inspection of the system, the gate is checked to ensure that it is locked and secure.

ATTACHMENT 1

SITE LOCATION MAP



Source: USGS 7.5 Minute Quadrangle Map
Haverstraw, NY (Photorevised 1979)

Attachment 1
Site Location Map

Operable Unit 2
Former Kay Fries Site
Stony Point Industrial Park
Rockland County, New York

OGDEN ENVIRONMENTAL AND ENERGY SERVICES CO., INC.
1777 SENTRY PARK WEST, ABINGTON HALL, SUITE 300, BLUE BELL, PA. 19422

ATTACHMENT 2

GROUND WATER RECOVERY SYSTEM SUMP SPECIFICATIONS

APPLICATION FOR PIPE / WIRE OCCUPATIONS CONSOLIDATED RAIL CORPORATIO

FOR

GROUNDWATER RECOVERY SUMP SYSTEM FOR OPERABLE UNIT 2 FORMER KAY FRIES SITE STONY POINT, NEW YORK

NYSDEC SITE NO. 3-44-023

SUBMITTED TO:
CONSOLIDATED RAIL CORPORATION
PHILADELPHIA, PENNSYLVANIA

SUBMITTED FOR:

CRENOVA
A Hüls Group Company

2 TURNER PLACE
PISCATAWAY, NEW JERSEY
08855-0365

PREPARED BY:

OGDEN ENVIRONMENTAL & ENERGY SERVIC COMPANY, INC.
285 DAVIDSON AVENUE, SUITE 100
SOMERSET, NEW JERSEY 08873

OGDEN PROJECT 87032-0000

REVISED:
AUGUST 5, 1999

APPLICATION FOR PIPE/WIRE OCCUPATIONS
CONSOLIDATED RAIL CORPORATION
FOR
GROUNDWATER RECOVERY SUMP SYSTEM FOR
OPERABLE UNIT 2, FORMER KAY FRIES SITE
STONY POINT, NEW YORK
NYSDEC SITE NO. 3-44-023

Submitted to:

Consolidated Rail Corporation
Philadelphia, Pennsylvania

Submitted for:

CREANOVA, Inc.
2 Turner Place
Piscataway, NJ 08855

Prepared by:

Ogden Environmental and Energy Services Co., Inc.
285 Davidson Avenue/Suite 103
Somerset, NJ 08873

Ogden Project 87032-0000

Revised August 5, 1999

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1.0 PURPOSE OF APPLICATION

This revised application for Pipe/Wire Occupations (Attachment 1) is submitted by Ogden Environmental and Energy Services Co., Inc. (Ogden) as an agent for CREANOVA, Inc., the responsible party for the former Kay Fries site. This revised application supersedes the prior application submitted by Ogden for CREANOVA. The need for this revised application is based on new information on site access and other site constraints, which have resulted in a revision to the proposed method of treatment of the collected groundwater as described herein.

This application is for the proposed installation of a below-grade groundwater recovery sump within Operable Unit 2 (OU2) at the former Kay Fries site in Stony Point, Rockland County, New York. Construction of this sump would occur within the right-of-way (ROW) of the Conrail River Line (West Shore Line) mainline tracks, near milepost 34+13. OU2 consists of a 7-acre portion of the former Kay Fries site located to the west of the Conrail railroad tracks. The New York State Department of Environmental Conservation (NYSDEC) in the Record of Decision (ROD) selected this remedial action, i.e., the proposed installation of the groundwater recovery sump, for OU2 dated November, 1997.

Pertinent information on this application is summarized below.

Licensee:	CREANOVA, Inc. P.O. Box 365, Turner Place Piscataway, NJ 08855-0365
Point of Contact:	Andrew E. Kruczek Manager, Environmental Services (732) 981-5453
Licensee's Agent:	Ogden Environmental and Energy Services Co., Inc. 285 Davidson Avenue/Suite 103 Somerset, NJ 08873
Point of Contact:	William J. Mikula, P.E. Principal Engineer (732) 302-9500

2.0 SCOPE OF APPLICATION

For the proposed installation of the groundwater recovery sump system, the application form CE-8, entitled "Specifications for Pipeline Occupancy of Consolidated Rail Corporation Property," was used. Upon review of the "Applicant's Checklist," the following items are believed to be applicable to the proposed system:

- (1) Review CE-8 specifications
- (2) Proper name and mailing address of Licensee
- (3) Application fee
- (4) Location data
- (5) Plan and profile drawings
- (7) Depth of bury
- (8) Method of installation
- (11) Size, voltage and types of wires, cables, or fiber optic cables
- (16) Number of tracks

The following items are believed to be not applicable to the proposed system:

- (6) Pipe data sheet
- (9) Distance from face of launching and receiving pits
- (10) Location of manholes and valves
- (12) Wire/cable vertical clearance from sag to top of rail
- (13) Distance from poles to centerline of track
- (14) Pole configuration
- (15) Angle of crossing
- (17) Length of longitudinal
- (18) R/W lines of dedicated highway
- (19) Bridge footing of dedicated highway bridge
- (20) Bridge attachment for dedicated highway bridge

Attachment 1 contains the completed Conrail Application form. Attachment 2 is the general site location map for the former Kay Fries site. Attachment 3 is a plan view of the general area surrounding the proposed occupancy.

3.0 GROUNDWATER RECOVERY SYSTEM CONSTRUCTION

3.1 Groundwater Recovery Sump

The main component of the remedial system is a below-grade groundwater recovery sump. As shown on Attachment 3, the proposed sump location will be between the location of groundwater seep sample (SS) points of most concern (SS-6 and SS-7). Sheet G-1, Site Plan and Details (Attachment 4) shows the cross-sectional view of the proposed occupancy. The proposed location places the proposed excavation for the sump installation outside of the "Theoretical Railroad Embankment Line," thereby precluding the need for installation of temporary sheet piling for railbed stabilization.

The sump will consist of a reinforced concrete base, an 8-foot diameter galvanized corrugated steel pipe (CSP) section installed vertically, and a reinforced concrete cover. As shown on Sheet G-2, System Details and Schematics (Attachment 5), the sump will have an approximate inner diameter of 8 feet and a working height of 8 feet, yielding a total volume of approximately 3,000 gallons. It will consist of a poured in place concrete base, an 8-foot-high riser section, and an at-grade concrete cover. The top half of the CSP riser will be provided with perforations, which will allow groundwater that collects around the sump to enter into the sump and exit the sump after treatment. A permeable geomembrane will be placed over the external surface of the upper half of the riser to minimize the infiltration of soil fines. The sump cover will be provided with a lockable access hatch constructed of galvanized steel. The sump will have a 4-inch vent that will extend approximately 5 feet above grade. Sheet G-2, System Details and Schematics (Attachment 5), provides the plan and section drawing for the sump.

3.2 Diffused Air System

Groundwater that is intercepted by the sump will collect in the sump and will be aerated in order to volatilize any Volatile Organic Compounds (VOCs) that are present in the groundwater. Upon reaching a liquid depth of 4 feet above the invert of the sump, a float switch will activate a

mechanical blower, which will provide compressed air to a coarse bubble diffuser system installed at the base of the sump.

The diffuser system will provide air from four coarse bubble diffusers at a total of 100 cubic feet per minute (cfm). The system will be operated roughly 20 minutes per hour to provide sufficient air to volatilize the VOCs. Sheet G-2 (Attachment 5) provides the diffuser detail.

The blower will be housed in a weatherproof fiberglass enclosure and mounted on the at-grade concrete slab, which also contains the sump access hatch. A 2-inch air header will supply compressed air from the blower to the diffused air system. The electrical control panel will be mounted separately, adjacent to the blower as shown on Sheet G-2. A chain- link fence with locking gate will provide security for the blower and control panels. Electrical power for the system will be supplied by a below-grade electrical service line via a connection from a nearby power pole located along the access road to the south of the site.

Attachment 6 provides the design parameters for the groundwater recovery sump system components.

3.3 Excavation and Installation Plan

The groundwater seeps of concern are located at the upgradient side of a drainage swale near the western ROW boundary of the Conrail mainline tracks. Attachment 3 provides the proposed location for the groundwater recovery sump relative to the groundwater seeps. The sump, including all mechanical and electrical components, will be installed via the existing Town of Stony Point access road that parallels the mainline tracks on the western side. All equipment and materials will be delivered to the site and trucked to the proposed sump location via the access road for installation. Excavation for the installation of the sump will be accomplished by a small backhoe positioned on the upgradient side of the drainage swale. This approach will not require the construction of any new access roads. Other construction procedures are as follows:

- Excavation of soil for placement of the sump will be performed to a depth of approximately 10 feet below existing grade. The diameter of the excavation will be the minimum necessary to maintain safe slopes in the excavation. The excavation will be shored and braced to prevent sidewall collapse.
- All soils removed from the excavation will be monitored with a photoionization detector (PID). Soils exhibiting readings on the PID above the background level will be sampled to determine whether offsite disposal is required. Soil will be disposed of in accordance with applicable federal and state regulations. Soil awaiting offsite disposal will be staged and securely covered with plastic at an area designated by the property owner. Soil that does not require offsite disposal will be placed back into the excavation or used as fill to regrade the slope around the sump following ASTM Designation D 1557 (Modified Proctor).
- The excavation will be maintained free of water during construction activities. Any groundwater that collects in the excavation will be pumped into a temporary holding tank. The collected groundwater will be transported offsite for treatment.
- An approximate 9-foot-diameter poured in-place reinforced concrete slab will serve as the foundation for the sump. The CSP riser will be bolted onto the poured concrete slab. A 1-foot-thick layer of concrete will be poured with the base of the riser to provide a sealed base. An approximate 10'6" diameter reinforced concrete cover will be placed on the CSP riser and offset as shown on sheet G-2 (Attachment 5)
- The sump will be excavated using a small backhoe. Pea gravel or washed crushed rock will be placed on the bottom of the excavation as bedding material onto which the bottom of the sump will be set. The reinforced concrete base of the sump will be poured in place. Once the base has been poured, the 8-foot riser will be installed onto the base. The annulus around the lower half of the riser will be backfilled with acceptable excavated materials. The annulus around the upper half of the upgradient side of the riser will be backfilled with ASTM-C33 AASHTO # 67 stone. Geotextile will be placed around the exterior of the sump.

- The proposed sump location is next to the railroad ditch (drainage swale) that currently directs storm water in the direction of Cedar Pond Brook, which is located to the north of the swale. After installation of the sump, the existing grade will be altered slightly to shift the drainage swale to the east and direct surface water away from the sump, thereby minimizing erosion of the soil around the sump. The disturbed surface soil will be provided with some form of erosion control (e.g., seeding or plastic sheeting).

4.0 GROUNDWATER RECOVERY SYSTEM OPERATION

The purpose of the remedial system to be installed within OU2 is to capture contaminated groundwater that is currently surfacing as it seeps at the base of the embankment at the upgradient side of the railroad ditch, near the western ROW boundary. This section describes how the sump system will be operated to accomplish the collection and treatment of this groundwater.

The sump will consist of an 8-foot working depth CSP riser, with perforations on the upper half of the riser that will allow groundwater that collects around the sump to enter the sump. On average, the sump is expected to fill very slowly (approximately 10 to 20 gallons per day) and is anticipated to fill to approximately 500 to 1,000 gallons every 2 to 3 months.

When the sump has filled to a predetermined level (4 feet above the invert), the collected groundwater will be aerated by the diffused air system that will be activated by a float switch. A timer will control the duration of each aeration cycle. The groundwater recovery sump system will be operated and maintained by CREANOVA as necessary. Access to the sump will occur via the existing Town of Stony Point access road. Treated groundwater samples will be collected from the sump at a frequency of once per month for the first quarter of operation, followed by semiannually thereafter. The system will be operated so as to achieve the greatest degree of removals of VOCs and approach the groundwater cleanup standards, or until it is determined to no longer be practical.

Any silt that passes into the sump will collect on the floor of the sump. When the groundwater is aerated, the silt will be resuspended. Accumulated silt and solids will be allowed to settle and will be removed for disposal as appropriate.

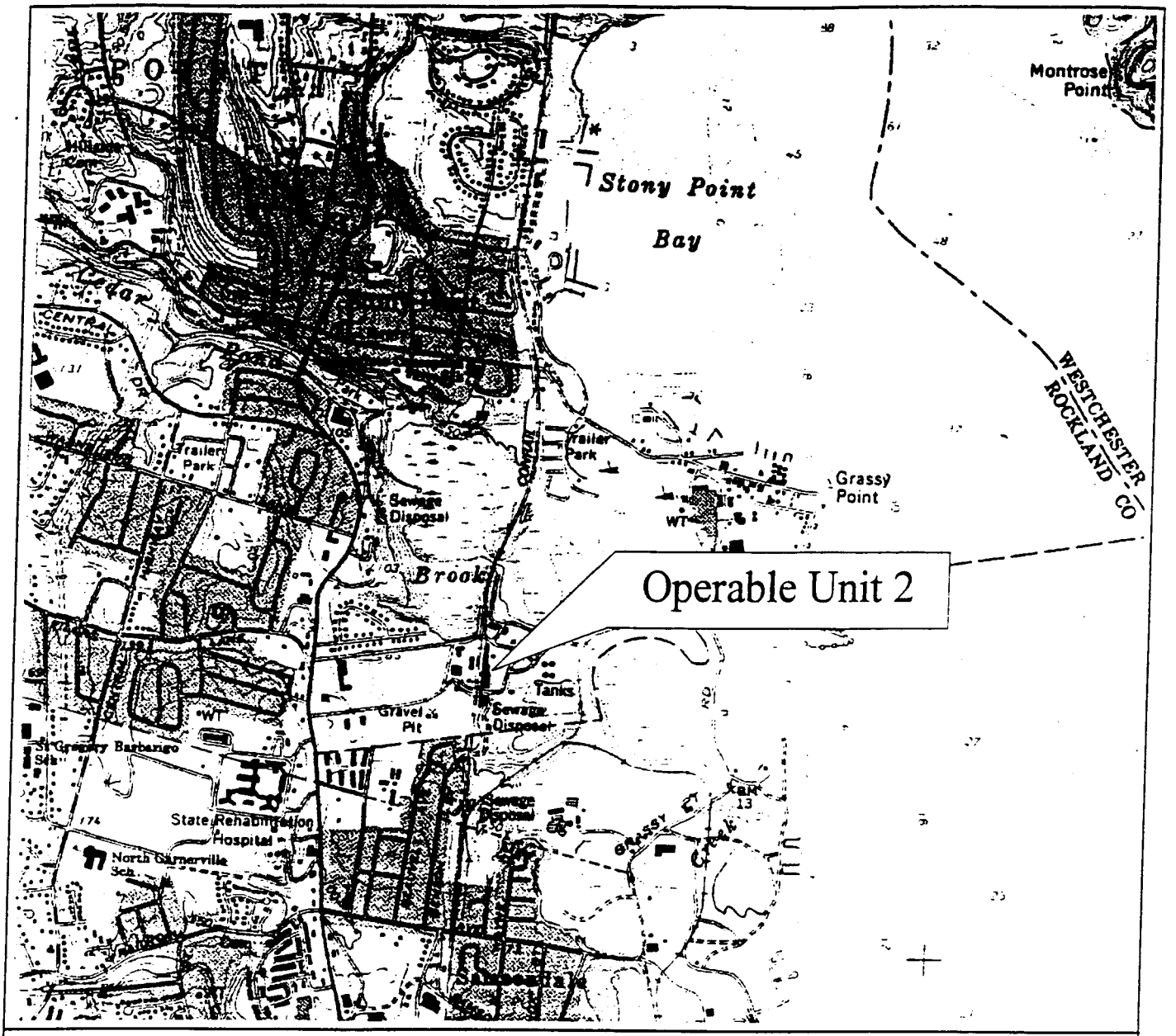
ATTACHMENT 1

CONRAIL APPLICATION FORM

NOT INCLUDED

ATTACHMENT 2

SITE LOCATION MAP



0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 5 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET

N

Source: USGS 7.5 Minute Quadrangle Map
Haverstraw, NY (Photorevised 1979)

Attachment 2
Site Location Map

Operable Unit 2
Former Kay Fries Site
Stony Point Industrial Park
Rockland County, New York

OGDEN ENVIRONMENTAL AND ENERGY SERVICES CO., INC.
1777 SENTRY PARK WEST, ABINGTON HALL, SUITE 300, BLUE BELL, PA 19422

ATTACHMENT 3

PLAN VIEW OF OCCUPANCY

ATTACHMENT 4

SHEET G-1 SITE PLAN AND DETAILS

ATTACHMENT 5

SHEET G-2 SYSTEM DETAIL AND SCHEMATICS

ATTACHMENT 6

DESIGN PARAMETERS FOR TREATMENT SYSTEM COMPONENTS

Attachment 6
Design Parameters for Treatment System Components
Groundwater Collection and Treatment System, Operable Unit 2
CREANOVA, Inc.
Former Kay-Fries, Inc. Site
Stony Point, New York

1. Corrugated Steel Pipe

Type	Galvanized Steel
Manufacturer/Model	CONTECH
Volume (ft^3/gal)	3000
Working capacity (ft^3/gal)	1500
Materials	CSP Riser, Reinforced Concrete Base

2. Diffuser System

Type	Coarse Bubble
Manufacturer/Model	Diffused Gas Technologies/Model SS-2
Air Flow Rate, scfm/diffuser	50
Efficiency, %	8-10
No. of Ports	34
Port Opening	1/8" and 3/16"
Materials	316 Stainless Steel
Inlet/NPT	¾"

3. Air Compressor

Type	Rotary
Manufacturer/Model	Model 2004 "Competitor"
Capacity, scfm	100
Operating Pressure, psi	4
Horsepower	5
Speed, rpm	4020
Materials (Housing/Impeller)	Cast Iron Steel
Power Requirements	230V
Discharge, NPT	83.846 CFM

4. Controls

Type	Pole Mounted
Manufacturer/Model	NEMA 4
Operating Mode	Hand/off/Auto
Alarm	Visible with interlock with blower
Float Switch and Timer	Dwyer L6 – Mounted in control panel

ATTACHMENT 3

URS AS-BUILT SUMP AND ELECTRICAL CONDUIT PLAN

URS

February 8, 2001

Mr. Andrew E. Kruczek
Degussa-Huls Corporation
P.O. Box 365
2 Turner Place
Piscataway, New Jersey 08855

Re: Former Kay Fries Site
Stony Point, New York
Sump Installation Project

Dear Mr. Kruczek:

URS has completed the installation of the seep collection sump for the Former Kay Fries site, Operable Unit - 2 (OU-2), Stony Point, New York. The sump was installed to the west of the base of the railroad embankment to collect water from seeps which were determined to be impacted by volatile organic compounds (VOCs). The attached as-built drawing shows the location of the sump and associated equipment, including the underground electrical conduit. URS used Ogden Environmental & Energy Services Company's Site Plan and Detail, which was part of the specifications package for the project, as the base map for the sump and electrical conduit as-built drawing.

The sump and associated equipment were installed in accordance with *Bid Specifications for Construction of Ground Water Recovery Sump System – Operable Unit 2*, dated August 11, 2000, with the following exceptions:

- In an effort to increase the amount of seep water collected and treated, the sump was relocated approximately 7-feet to the east of the originally planned location. This location was selected based on the location of observed seeps during excavation activities for sump installation.
- The base of the sump consists of a single, 10-inch thick, precast concrete pad into which the corrugated steel pipe (sump) was cast. This eliminated the need to pour the pad in the field and provided an improved seal against water infiltration at the base of the sump. Fort Miller drawing FM-11100-A, which is included in the O&M manual, provides sump construction details.
- A float switch to control the operation of the blower was not installed. Instead, a timer was installed which can operate the blower in 15-minute increments. The blower was set, and is currently operating, for ½-hour every hour (i.e. ½-hour on, ½-hour off for a total of 12 hours run time per day).
- The upper 4-foot section of the sump was wrapped with a 6oz. non-woven geotextile material instead of the specified 6oz. woven geotextile material. This change was implemented to increase the permeability of the sump, in an effort to increase the flow rate of seeps into the sump.

URS Corporation
2325 Maryland Road, 2nd Floor
Willow Grove, PA 19090
Tel: 215.657.5000
Fax: 215.657.5454

- URS installed a gate in the fence at the top of the embankment to provide easier access to the sump.

Thank you for allowing URS to be of service on this project. If you have any questions regarding the project, or the attached as-built drawing, do not hesitate to call.

Sincerely,

URS CORPORATION

Michael J. Rykaczewski, P.E.
Project Director

K:\degussa-huls stony point\sumpinstall\ongoingreports\text\install

M-D Pneumatics

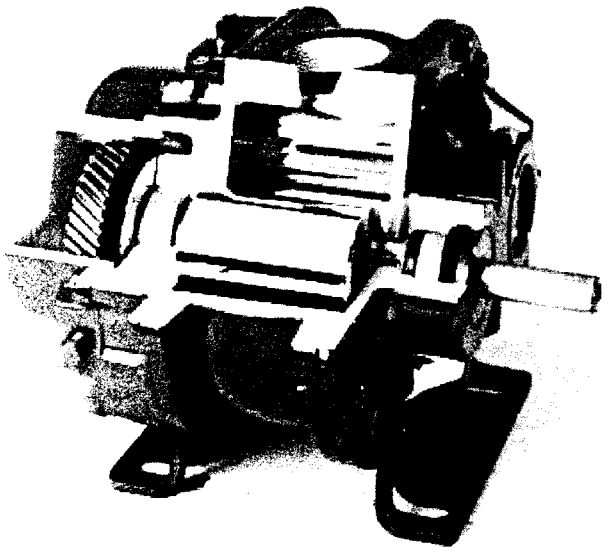
COMPETITOR+ PLUS™

Rotary Positive Displacement Air Blower

Models

2002	3003	4002	5003	6005
2004	3006	4005	5006	6008
		4007	5009	6015

INSTALLATION
OPERATION
MAINTENANCE
REPAIR
MANUAL



WARNING

DO NOT OPERATE BEFORE READING MANUAL.

REGISTERED PNEUMATICS GROUP ISO 9001 TUTHILL CORPORATION INTERNATIONAL QUALITY STANDARD

07/2000

LEADING THE SEARCH FOR NEW SOLUTIONS

TUTHILL
Pneumatics Group

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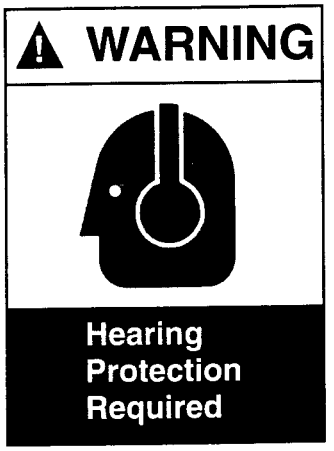
SAFETY INSTRUCTIONS

1. Do not operate before reading the enclosed instruction manual.
2. Use adequate protection, warning and safety equipment necessary to protect against hazards involved in installation



SAFETY WARNING

- Keep hands and clothing away from rotating machinery, inlet and discharge openings.
- Blower and drive mounting bolts must be secured.
- Drive belts and coupling guards must be in place.
- Noise level may require ear protection.
- Blower heat can cause burns if touched.

TUTHIL PNEUMATICS GROUP SPRINGFIELD, MO USA

NOTICE

The above safety instruction tags were attached to your unit prior to shipment. Do not remove, paint over or obscure in any manner.

Failure to heed these warnings could result in serious bodily injury to the personnel operating and maintaining this equipment.

TABLE OF CONTENTS

SAFETY PRECAUTIONS

For equipment covered specifically or indirectly in this instruction book, it is important that all personnel observe safety precautions to minimize the chances of injury. Among many considerations, the following should particularly be noted:

- Blower casing and associated piping or accessories may become hot enough to cause major skin burns on contact.
- Internal and external rotating parts of the blower and driving equipment can produce serious physical injuries. Do not reach into any opening in the blower while it is operating, or while subject to accidental starting. Cover external moving parts with adequate guards.
- Disconnect power before doing any work, and avoid bypassing or rendering inoperative any safety or protective devices.
- If blower is operated with piping disconnected, place a strong, coarse screen over the inlet and avoid standing in discharge air stream.
- Avoid extended exposure in close proximity to machinery with high intensity noise levels.
- Use proper care and good procedures in handling, lifting, installing, operating, and maintaining the equipment.
- Other potential hazards to safety may also be associated with operation of this equipment. All personnel working in or passing through the area should be warned by signs and trained to exercise adequate general safety precautions.
- Hearing protection may be required depending on silencing capabilities.

INTRODUCTION

CONGRATULATIONS on your purchase of a new M-D COMPETITOR PLUS™ Rotary Positive Displacement Blower from Tuthill Pneumatics Group. Please examine the blower for shipping damage, and if any are found, report it immediately to the carrier. If the blower is to be installed at a later date make sure it is stored in a clean, dry location and rotated regularly. Make sure covers are kept on all openings. If blower is stored outdoors be sure to protect it from weather and corrosion.

M-D COMPETITOR PLUS™ blowers are built to exacting standards and if properly installed and maintained will provide many years of reliable service. We urge you to take time to read and follow every step of these instructions when installing and maintaining your blower. We have tried to make these instructions as straightforward as possible. We realize getting any new piece of equipment up and running in as little time as possible is imperative to production.

WARNING: **Serious injury can result from operating or repairing this machine without first reading the service manual and taking adequate safety precautions.**

IMPORTANT: Record the blower model and serial numbers of your machine in the OPERATING DATA form below. You will save time and expense by including this reference identification on any replacement part orders, or if you require service or application assistance.

OPERATING DATA

It will be to the user's advantage to have the requested data filled in and available in the event a problem should develop in the booster or the system. This information is also helpful when ordering spare parts.

Model No. _____

Serial No. _____
(Recorded from nameplate on unit)

Startup Date _____

Blower RPM _____

Blower Sheave Diameter _____

Motor Sheave Diameter _____

Motor RPM _____ HP _____

V-Belt Size _____ Length _____

Type of Lubrication:
Oil (Gear Case) _____

Grease (Drive End) _____

Pressure _____

Vacuum _____

Any other special accessories with this unit

_____

NOTES:

INSTALLATION

WARNING: Customers are cautioned to provide adequate protection, warning and safety equipment necessary to protect personnel against hazards involved in the installation and operation of this equipment in the system or facility.

Do not use air blowers on explosive or hazardous gases. Casing pressure must not exceed 25 PSIG (1.72 bar g). Each size blower has limits on pressure differential, running speed, and discharge temperature, which ***must not*** be exceeded. These limits are shown on the Specification Sheet "Maximum Operating Limits".

LOCATION

Install the blower in a clean, dry, well lighted area if possible. Leave plenty of room around the blower for inspection and maintenance.

FOUNDATION

We recommend a solid foundation be provided for permanent installation. It is necessary that a suitable base be used, such as a steel combination base under blower and motor, or a separate sole plate under each.

Before tightening the bolts, check to see that both mounting feet are resting evenly on the foundation, shim as necessary to eliminate stress on the base when the bolts are tightened.

Where a solid foundation is not feasible, care must be taken to insure that equipment is firmly anchored to adequate structural members.

DRIVE

When the blower is V-belt driven the sheaves must be positioned so that the hub face of the blower sheave is not more than 1/4" (6.5 mm) from the blower drive end plate and the driver sheave is as close to the driver bearing as possible. Care should be taken when installing sheave onto shaft. The faces of the sheaves should be accurately in line to minimize belt wear.

Adjust the belt tension to the belt manufacturer's specifications.

For installations where the blower is to be operated by direct drive, selection of the driver should be such as not to exceed the maximum speed ratings of the blower. (See Specification Sheet "Maximum Operating Limits.)

A flexible type coupling should be used to connect driver and blower shafts. The two shafts must be aligned within .005" (.13 mm) T.I.R. (Total Indicated Runout)

PROTECTIVE MATERIALS

Remove protective materials from the shaft.

Remove the protective covers from the inlet and outlet ports and inspect the interior for dirt and foreign material.

WARNING: Keep hands, feet, foreign objects and loose clothes from inlet and outlet openings to avoid injury or damage if lobes are to be rotated at this point.

LUBRICATION

Do not start up the blower until you are positive that it has been properly and fully lubricated. (See Lubrication Section.)

PIPING

Inlet and outlet connections on all blowers are large enough to handle maximum volume with minimum friction loss. Maintain same diameter piping. Silencers must not be supported by the blower. Bending moments must be avoided.

Be certain all piping is clean internally before connecting to the blower. We recommend placing a 16-mesh wire screen backed with hardware cloth at or near the inlet connections for the first 50 hours of use until the system is clean. Make provisions to clean the screen after a few hours of operation and completely discard it once the system is clean, as it will eventually deteriorate and small pieces going into the blower can cause serious damage. A horizontal or vertical air flowing piping configuration is easily achieved by rearranging the mounting feet position.

WARNING: Do not operate equipment without adequate silencing devices since high noise level may cause hearing damage. (Reference OSHA Standards.)

RELIEF VALVES

We recommend the use of relief valves to protect against excessive pressure or vacuum conditions. These valves should be tested at initial start-up to be sure they are adjusted to relieve at or below the maximum pressure differential rating of the blower.

CAUTION: Upon completion of the installation, and before applying power, rotate the drive shaft by hand. It must move freely. If it does not, look for uneven mounting, piping strain, excessive belt tension or coupling misalignment or any other cause for binding.

LUBRICATION

The bearings at the drive shaft end of the blower are grease lubricated. The timing gears and bearings at the other end are lubricated by the lower timing gear (when in the horizontal flow configuration) acting as a oil slinger, carrying oil to the upper timing gear and providing splash lubrication for the bearings. Both timing gears act as stingers when the blower is in the vertical flow configuration.

Use a good grade industrial type oil with protection for gears and bearings.

FILLING PROCEDURE

To fill the gear housing, remove the oil breather* (A) and oil level plug (B) on the gear end. Fill the gear housing until oil drips out of the oil level hole. Replace plugs in their respective holes.

*Models 2002 and 2004 do not have oil breathers. In this case, remove plug to fill.

WARNING: Do not start the blower until you are sure oil has been put in the gear housing.

GREASE LUBRICATED BEARINGS

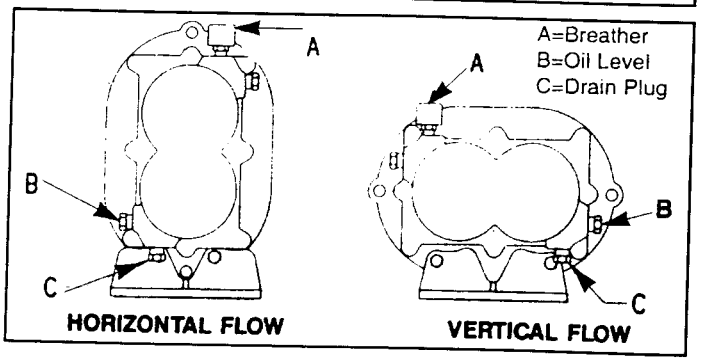
Service drive end bearings at regular intervals. (See "Suggested Lubrication Intervals for Grease Lubricated Bearings" below.) Use NLGI #2 premium grade, petroleum base grease with high temperature resistance and good mechanical stability Using a pressure gun, force new grease into each bearing until traces of clean grease come out of the relief fitting.

CAUTION: To avoid blowing out the drive shaft seal, do not inject grease too rapidly.

LUBRICATION INSTRUCTIONS FOR OIL LUBRICATED GEARS AND BEARINGS

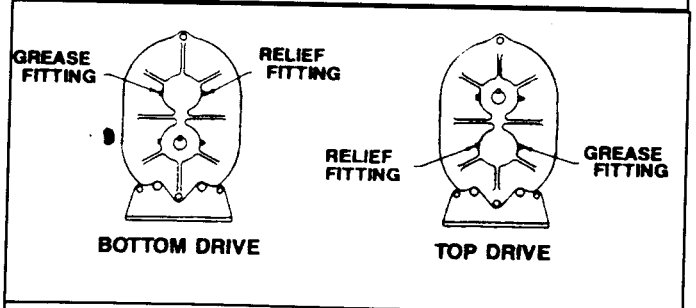
Add fresh oil as required to maintain proper level. Drain and refill after the first 100 hours of operation and thereafter every 1,000 hours of operation under normal service, more frequently depending on the type of oil and oil operating temperature. Use a good quality oil.

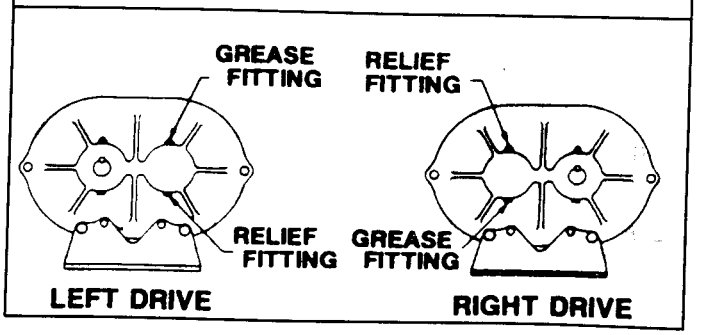
AMBIENT TEMPERATURE	OIL GRADE	OIL VISCOSITY RANGE SSU AT 100° F
Above 90° F	SAE 50	1000-1200
32° F to 90° F	SAE 40	700-1000
0° F to 32° F	SAE 30	500-700
Below 0° F	SAE 20	300-500



SUGGESTED LUBRICATION INTERVALS FOR GREASE LUBRICATED BEARINGS

SPEED	OPERATING HOURS PER DAY		
IN	8	16	24
RPM	GREASING INTERVALS IN WEEKS		
750-1000	7	4	2
1000-1500	5	2	1
1500-2000	4	2	1
2000-2500	3	1	1
2500-3000	2	1	1
3000 and up	1	1	1





CAUTION

Most Competitor Plus blowers are shipped from the factory in a left hand drive, vertical flow configuration.

If drive shaft location is changed, the oil level plug and the breather must be relocated to proper positions. See figure 100. Failure to change plug location will result in blower failure.

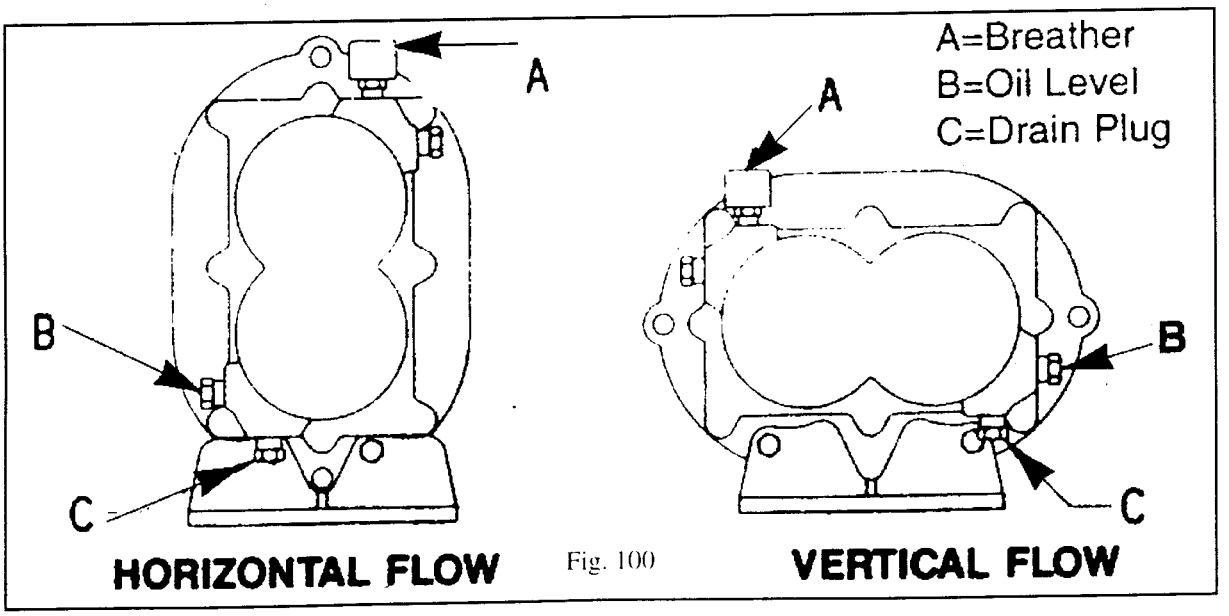


Fig. 100

PREVENTATIVE MAINTENANCE

A good maintenance program will add years of service to your blower.

A newly installed blower should be checked frequently during the first month of operation, especially lubrication. Check oil level in the gear housing and add oil as needed. Complete oil changes are recommended every 1000 operating hours, or more frequently depending on the type of oil and oil operating temperature.

The following is recommended as a minimum maintenance program.

DAILY MAINTENANCE

1. Check and maintain oil level, and add oil as necessary.
2. Check for unusual noise or vibration (See Troubleshooting on page 8)

WEEKLY MAINTENANCE

1. Clean all air filters. A clogged air filter can seriously affect the efficiency of the blower and cause overheating and oil usage.
2. Check relief valve to assure it is operating properly

MONTHLY MAINTENANCE

1. Inspect the entire system for leaks.
2. Inspect condition of oil and change if necessary (see page 6)

3 Check drive belt tension and tighten if necessary.

START-UP CHECKLIST

We recommend that these startup procedures be followed in sequence and checked (✓) off in the boxes provided in any of the following cases:

- During initial installation
- After any shutdown period
- After maintenance work has been performed
- After blower has been moved to a new location

Date Checked

1. Check the unit for proper lubrication. Proper oil level cannot be over-emphasized. Refer to Lubrication Section.
2. Check Alignment.

   For Direct Drive: Check coupling and shaft alignment.
   For Belt Drive: Check for proper belt alignment and tension.
3. Turn the rotors by hand to be certain they do not bind.

   WARNING: Disconnect power. Make certain power is off and locked out before touching any rotating element of the blower, motor or drive components.
4. "Bump" the unit with the motor a few times to check rotation and to be certain it turns freely and smoothly.
5. Start the unit and operate it for 30 minutes at no load. During this time. feel the cylinder for hot spots. If minor hot spots occur, refer to the Troubleshooting Section.
6. Apply the load and observe the operation of the unit for one hour. Check the unit frequently during the first day of operation.
7. If minor malfunctions occur, discontinue operation and refer to the Troubleshooting Section.

TROUBLESHOOTING

Although **M-D COMPETITOR PLUS™** blowers are well designed and manufactured, problems may occur due to normal wear and the need for readjustment. The chart below lists symptoms that may occur along with probable causes and remedies.

SYMPTOM	PROBABLE CAUSE	REMEDIES
Loss of oil.	Gear housing not tightened properly.	Tighten gear housing bolts.
	Lip seal failure.	Disassemble and replace lip seal.
	Insufficient sealant.	Remove gear housing and replace sealant.(See Disassembly and Inspection section on page 10)
Excessive bearing or gear wear.	Improper lubrication.	Correct oil level. Replace dirty oil. (See Lubrication section on page 6)
	Excessive belt tension.	Check belt manufacturer's specifications for tension and adjust accordingly.
	Coupling misalignment.	Check carefully, realign if necessary.
Lack of volume.	Slipping belts.	Check belt manufacturer's specifications for tension and adjust accordingly.
	Worn lobe clearances.	Check for proper clearances (See Assembly Clearances on page 14)
	Speed too low.	Increase blower speed within limits. Check system to assure an open flow path.
Knocking.	Unit out of time.	Re-time.
	Distortion due to improper mounting or pipe strains.	Check mounting alignment and relieve pipe strains.
	Excessive pressure differential.	Reduce to manufacturer's recommended pressure. Examine relief valve and reset if necessary.
	Worn gears.	Replace timing gears (See Disassembly and Inspection section on page 10)
Excessive blower temperature.	Too much or too little oil in gear reservoir.	Check oil level. (See Lubrication section on page 6)
	Too low operating speed.	Increase blower speed within limits.
	Clogged filter or silencer.	Remove cause of obstruction.
	Excessive pressure differential.	Reduce pressure differential across the blower.
	Elevated inlet temperature.	Reduce inlet temperature.
	Worn lobe clearances.	Check for proper clearances (See Assembly Clearances on page 14)
Rotor end or tip drag.	Insufficient assembled clearances.	Correct clearances (See Assembly Clearances on page 14)
	Case or frame distortion.	Check mounting and pipe strain.
	Excessive operating pressure.	Reduce pressure differential.
	Excessive operating temperature.	Reduce pressure differential or reduce inlet temperature.
Vibration.	Belt or coupling misalignment.	Check carefully, realign if necessary.
	Lobes rubbing.	Check cylinder for hot spots, then check for lobe contact at these points. Correct clearances (See Assembly Clearances on page 14)
	Worn bearings or gears.	Check condition of gears and bearings; replace if necessary
	Unbalanced or rubbing lobes.	Possible buildup on casing or lobes, or inside lobes. Remove buildup and restore clearances.
	Driver or blower loose.	Check mounting and tighten if necessary.
	Piping resonance.	Check pipe supports, check resonance of nearby equipment, check foundation.

RECOMMENDED SHUTDOWN PROCEDURE TO MINIMIZE RISK OF FREEZING OR CORROSION

When high humidity or moisture is present in an air piping system, condensation of water can occur after the blower is shut down and the blower begins to cool. This creates an environment favorable to corrosion of the iron internal surfaces, or in cold weather, the formation of ice. Either of these conditions can close the operating clearances, causing the blower to fail upon future start-up.

The following shutdown procedure outlined below minimizes the risk of moisture condensation, corrosion and freezing. **Care must be taken so as not to overload or overheat the blower during this procedure.**

1. Isolate the blower from the moist system piping, allowing the blower to intake atmospheric air.Operate the blower under a slight load allowing the blower to heat within safe limits. The heat generated by the blower will quickly evaporate residual moisture.

2. For carpet cleaning applications, after the work is completed, simply allow the blower to run a few (3-5) minutes with the suction hose and wand attached. The suction hose and wand will provide enough load to the blower to evaporate the moisture quickly.

3. For extended shutdown, inject a small amount of a light lubricating oil such as 3-in-One® or a spray lubricant such as WD-40® into the inlet of the blower just prior to shutdown. The lubricant will provide an excellent protective coating on the internal surfaces. If using a spray lubricant, exercise care to prevent the applicator tube from getting sucked into the blower. The applicator tube will damage the blower, most likely to the point that repair would be required.

August 1999

DISASSEMBLY & INSPECTION

With proper maintenance and lubrication, normal life expectancy for gears, bearings, and seals can be achieved. However, over a period of time these parts must be repaired or replaced to maintain the efficiency of your blower. This section is written in a way that will allow you to completely disassemble your blower. The inspection of certain repairable or replaceable parts is referred to at the point of disassembly where these parts are exposed. If at any point of inspection, repair or replacement is deemed necessary, appropriate instruction will be given to achieve these repair or replacement is deemed necessary, appropriate instruction will be given to achieve these repairs or replacements.

Remove the oil drain plug [18] in the bottom of the gear cover [5] and drain the oil. Take out eight cap screws [16] and remove the gear cover. It may be necessary to tap the sides with a mallet or wooden block to break the seal joint.

Gears are not exposed for visual inspection. Items in brackets [ ] are referenced to item numbers on page 16.

Inspect the gears for the following:

- Broken Teeth
- Chipped Teeth
- Uneven Wear
- Excessive Wear
- Any Other Abnormalities

WARNING: **Before performing any repair or replacement, disconnect and lock out power.**

BLOWER DISASSEMBLY

Position blower with the drive gear on the left when facing the gears. Remove socket head screws and washers. [tems 29 & 26].

Align timing marks and count four (4) teeth down and place reference marks on the gears. (Refer to Figure 1 below)

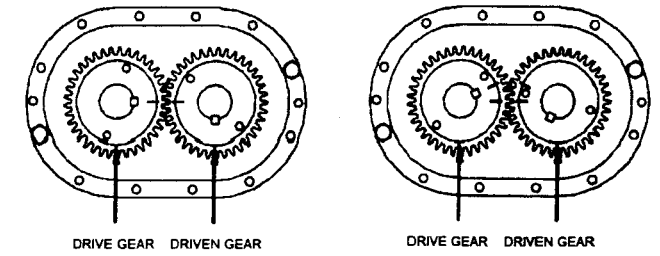


Figure 1. Timing Gear Alignment

Align reference marks and use puller to pull the driven gear. (Gear on right side). (Refer to Figure 2 below)

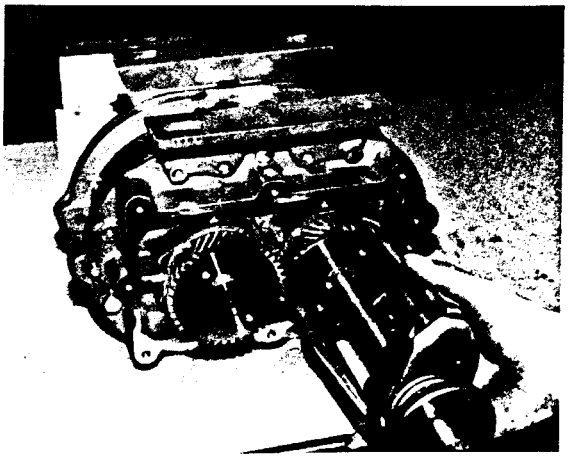


Figure 2. Pulling Driven Gear with Jaw Puller

Use puller to remove drive gear. A bar puller (Refer to Figure 3 below) or jack screws can be used.

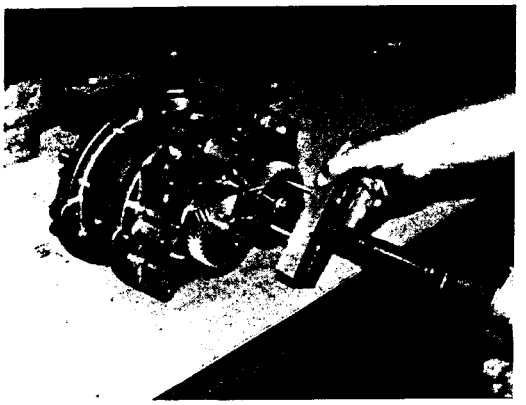


Figure 3. Pulling Drive Gear with Bar Puller

Remove shim and spacer. [Items 28 & 30]

Turn blower around and remove grease cover [Item 10]

Remove eight (8) cap screws. [Item 15]

Use jackscrews to remove end plate. (Refer to Figure 4 below)

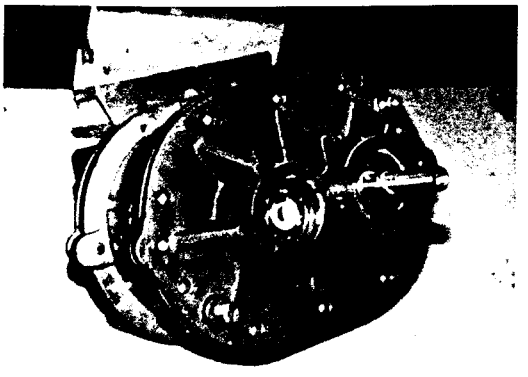


Figure 4. Pulling Drive End Plate

Press rotors out of end plate in press if available. If press is not available, support end plate and rotors in the housing. Block up housing and use a soft mallet to drive the rotors out. (Refer to Figure 5 below)

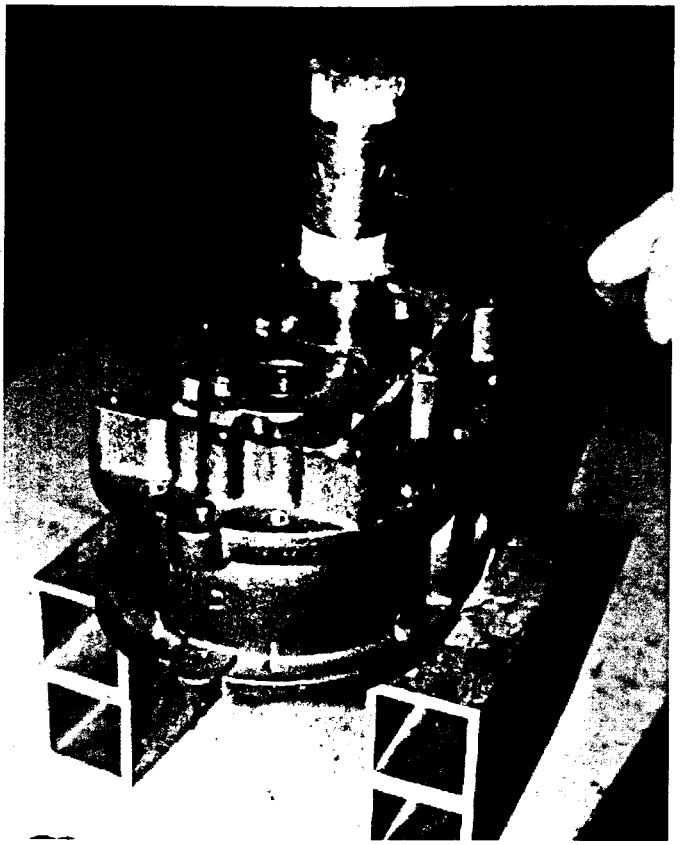


Figure 5. Driving Rotors Out Using Soft Mallet

A jaw type puller can also be used. (Refer to Figure 6 below)

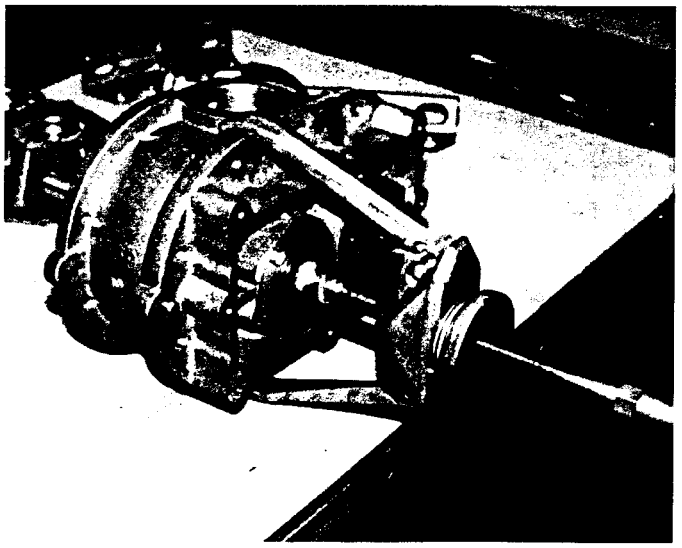


Figure 6. Driving Rotors Out Using Jaw Puller

Using a tube or round bar of a slightly smaller diameter than the shaft clearance holes in the end plates, tap the bearings out of the end plates. Bearing retainers [Item 22] must be removed before knocking out the bearings. (Refer to Figure 7 below)

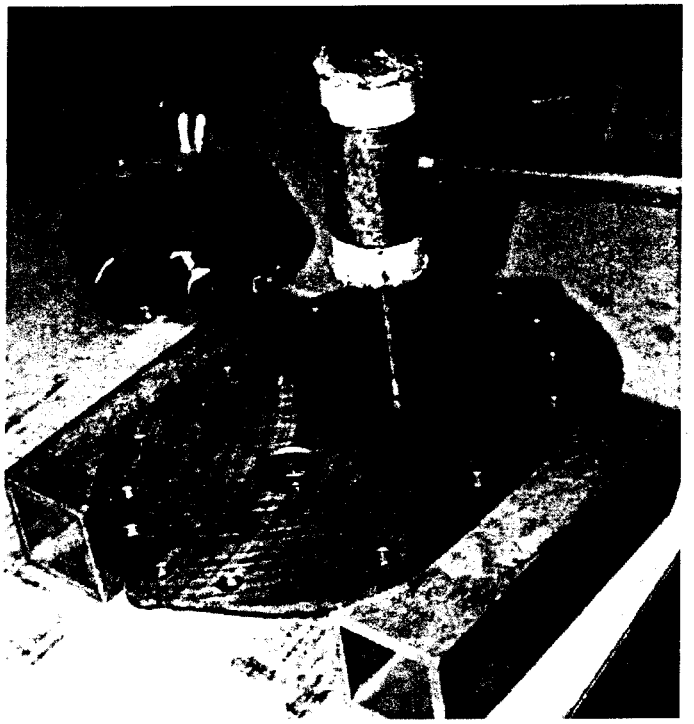


Figure 7. Tapping Bearings Out of End Plates

Remove seals from both end plates with a punch or dull chisel. The seals ***will*** be damaged during removal and must be replaced.

Inspect all parts for wear and or damage.

Clean and inspect all parts for burrs and polish seal journals with at least 320 grit emery or crocus cloth.

Items in brackets [ ] are referenced to item numbers on page 16.

BLOWER ASSEMBLY

After thorough cleaning of the seal and bearing bores of both end plates apply a thin coat of sealant on the outside diameter of the new seals and press them into the end plate using a tool that will bear on the outer edge of the seal. Spring side of the seal should be facing you. Apply a thin coat of grease to the seal lip.

Using the drive end plate as a fixture, support it high enough so the input shaft of the drive rotor clears the assembly surface. (Refer to Figure A1 below). Place rotors in fixture with the drive rotor to the left. (See Figures A1 and A2 below)

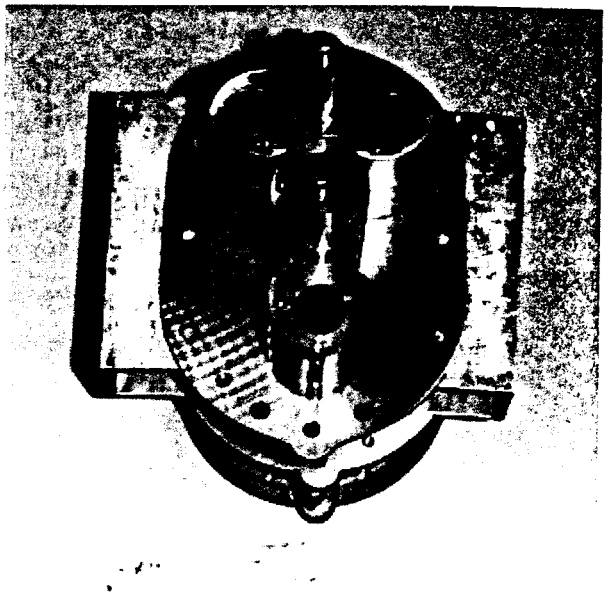


Figure A1. Rotors Assembled on Drive End Plate

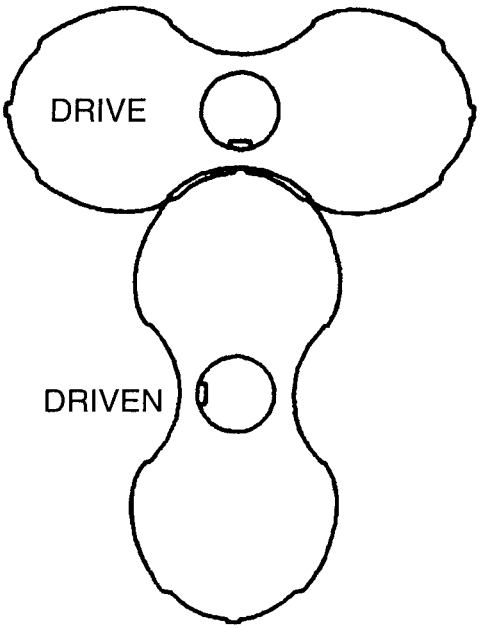


Figure A2. Detail of Proper Keyway Positions
(**NOTE:** Keyway positions are exactly opposite for models 6005, 6008 and 6015)

Place end plate [Item 4] on rotors.

Apply a thin coat of lubricant on the rotor shafts and the inner race of the bearings. Tap the bearings [13] into place using a tube with a flanged end that will contact both the inner and outer bearing races. (Refer to Figure A3 below).

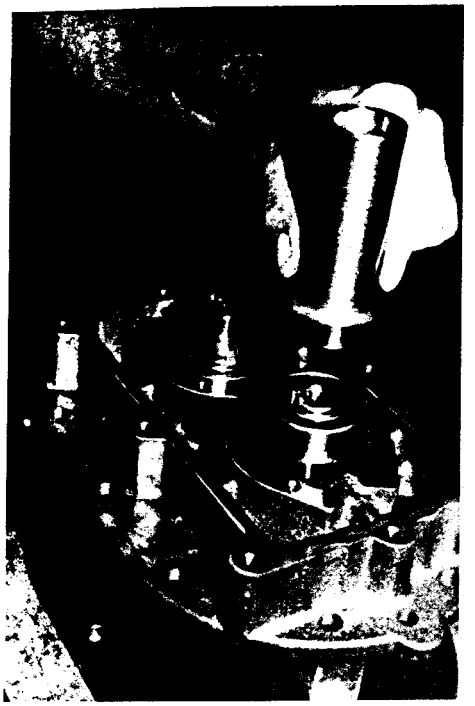


Figure A3. Tapping Bearings into End Plates

Rotor alignment will be opposite that of Figure A2 on all 6" units (keyway on drive rotor will be up and driven to the right).

WARNING: Keep hands and loose clothing away from lobes and gears.

Install bearing retainers [Items 22 & 25] to both bearings.

Check clearances between the end of the rotors and the face of the end plate. Refer to assembly clearances chart on page 14 for proper clearances for your model blower, and refer to page 13 for procedures for checking and adjusting clearances.

If clearances check OK, put a spacer [28] and a shim [30] on each shaft. Timing shims that were removed should be put back on the shaft from which they were removed.

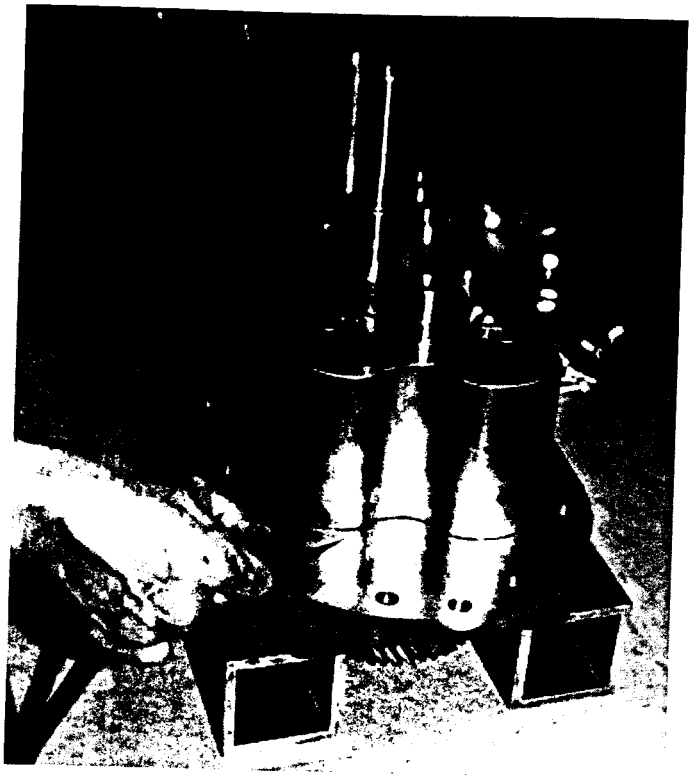


Figure A4. Checking Gear End Clearances

Lubricate shafts and bores on gears. Begin by pressing on the DRIVE gear. This will be pressed on the drive rotor, which is to the left.

Start the driver gear on the shaft and align the reference timing marks and press gear on. Lock gears in place with cap screw [29] and washer [26]. Turn assembly over and rest the unit on the cap screws and washers on the gear end.

Set dowel pins [9] in housing and position housing over the rotors and fasten with cap screws [15]. Check housing to rotor clearance. (Refer to Figure A5) A depth mic can be used.

Set on drive end plate [3] and fasten with cap screws [15]. (**ATTENTION:** There are four cap screws [17] which are used to fasten the feet on.) Lubricate shafts and bearings. Install the ball bearing [12] on the driven rotor and the roller bearing [11] on the input shaft.

Install grease cover [Item 10] and drive shaft seal [23].

Install any removed plugs [18] and replace breather [27] if required.

Items in brackets [ ] are referenced to item numbers on page 16.

ADJUSTING ROTOR INTERLOBE CLEARANCE

Using feeler gauges take interlobe readings and record on each side of housing as indicated in Figure A5 below. By removing or adding shim behind the helical gear, it rotates as it is moved in or out and the driven rotor turns with it, thus changing the clearance between rotor lobes.

Changing the shim thickness .006" (.15 mm) will change the rotor lobe clearance .003" (.08 mm) or one-half the amount.

EXAMPLE: Referring to Figure A5 below, check the clearance at AA (right hand reading) and BB (left hand reading). If AA reading is .009" (.23 mm) and BB reading .003" (.08 mm) by removing .006" (.15 mm) shims. the readings will change one half the amount removed or .003" (.08 mm). AA should then read .006" (.15 mm) and BB should read .006" (.15 mm). The final reading should be within .002" (.05 mm) of each other.

To determine the amount of shim to add or remove, subtract the small figure from the larger. If the right side is higher than the left side, remove shim. If the right side is reading lower, add shim.

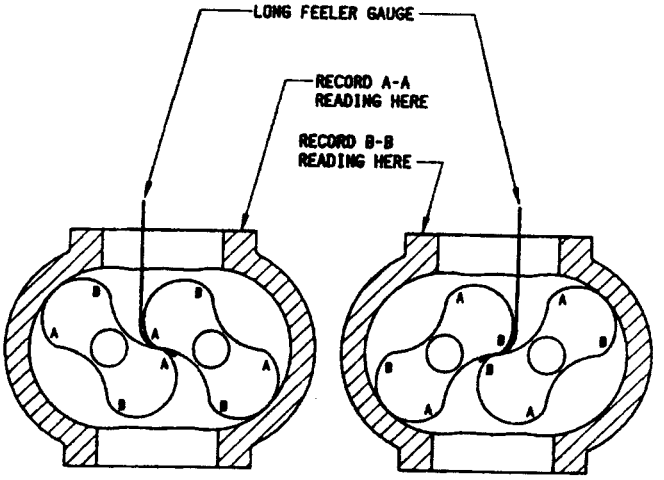


Figure A5. Checking Gear End Clearances

LUBRICATION, FINAL ASSEMBLY AND MOUNTING

Pack the bearing cavities with suitable grease. Install bearing cover plate [10]. Replace front lip seal [23] taking care not to damage the lip as it passes over the keyway. Lip must point inward toward the bearing. Apply a good quality RTV silicone sealant to the inner surface of the gear cover [5]. Install the gear cover with cap screws [16] and tighten evenly.

Fill gear cover with oil and grease front-end bearings. Refer to the Lubrication Section in this manual for oil and grease specification and filling procedures.

To insure blower has not been distorted during mounting in the installation, turn the lobes by hand to make sure they are not making contact prior to connecting to the driver.

M-D COMPETITOR+ PLUS™

MAINTENANCE AND SERVICE SPECIFICATIONS SHEET

ASSEMBLY CLEARANCES

Metric values (mm) are shown in parentheses ( )
All other values are in inches

MODEL	LOBES TO END PLATES			LOBE TO CASING		INTERLOBE
	TOTAL	DRIVE END	GEAR END	MINIMUM	MAXIMUM	MININUM
2002, 2004	.005" / .010"	.003"	.002"	.004"	.008"	.006"
3003, 3006	.005" / .010"	.003"	.002"	.004"	.008"	.008"
4002, 4005,4007	.007" / .012"	.004"	.003"	.005"	.009"	.010"
5003, 5006, 5009	.007" / .012"	.004"	.003"	.005"	.009"	.012"
6005, 6008, 6015	.011" / .015"	.008"	.003"	.006"	.010"	.010"

OIL RESERVOIR CAPACITIES

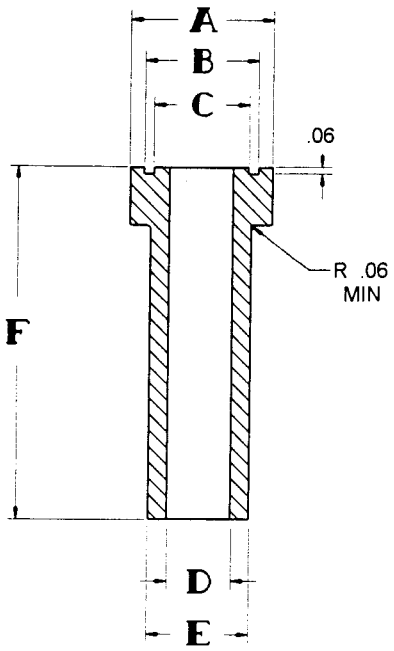
MODEL	FLUID OUNCES (LITRES)			
	HORIZONTAL FLOW		VERTICAL FLOW	
2002, 2004	3.5	(.10)	6.0	(.18)
3003, 3006	6.0	(.18)	16.0	(.47)
4002, 4005, 4007	7.0	(.21)	22.8	(.67)
5003, 5006, 5009	16.0	(.47)	27.6	(.82)
6005, 6008, 6015	28.0	(.83)	52.0	(1.54)

MAXIMUM OPERATING LIMITS

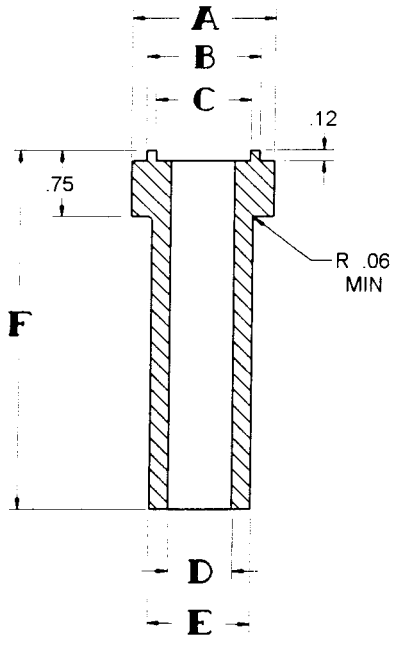
MODEL	RPM	PRESSURE PSI (mbar)	VACUUM in. Hg (mbar)	TEMPERATURE RISE F° (C°)
2002	5275	12 (825)	14 (475)	225 (125)
2004	5275	7 (480)	14 (475)	185 (103)
3003	3600	12 (825)	14 (475)	170 (94)
3006	3600	7 (480)	14 (475)	115 (64)
4002	3600	15 (1035)	14 (475)	240 (133)
4005	3600	10 (690)	14 (475)	170 (94)
4007	3600	7 (480)	14 (475)	130 (72)
5003	2850	15 (1035)	14 (475)	195 (108)
5006	2850	10 (690)	14 (475)	180 (100)
5009	2850	7 (480)	14 (475)	115 (64)
6005	2350	15 (1035)	16 (540)	250 (139)
6008	2350	12 (827)	16 (540)	240 (133)
6015	2350	6 (415)	12 (410)	130 (72)

SPECIAL TOOL DRAWINGS

All dimensions shown are in inches.



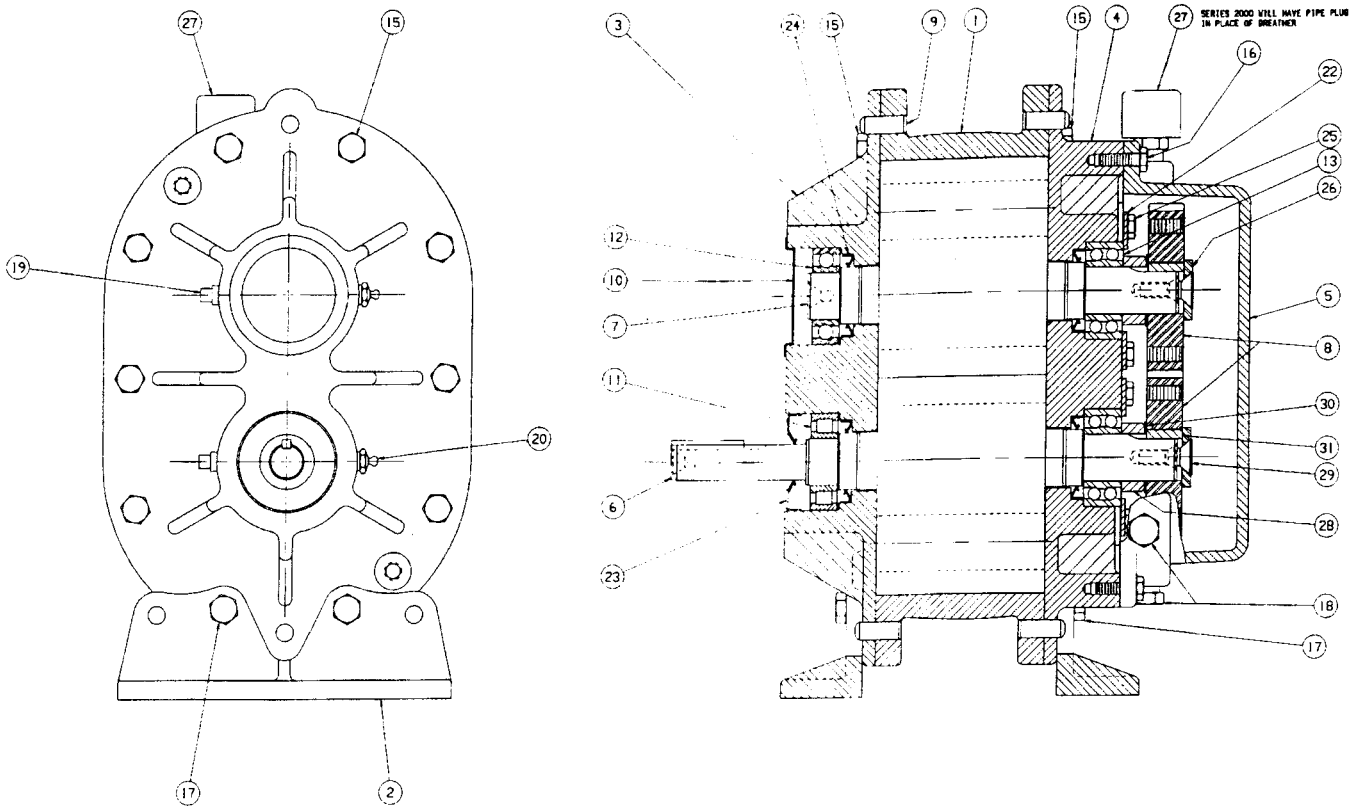
MODEL	PART	A	B	C	D	E	F	G
2000	2200718 B	1.560± .001	1.27± .005	.98± .005	.70± .005	1.10± .005	3.50± .005	3.00± .005
3000	3300718 B	2.035± .001	1.70± .005	1.335± .005	1.015± .005	1.415± .005	3.75± .005	3.00± .005
4000	4200718 B	2.425± .001	2.02± .005	1.61± .005	1.21± .005	1.61± .005	4.50± .005	3.75± .005
5000	5300718 B	2.820± .001	2.42± .005	1.81± .005	1.41± .005	1.81± .005	5.00± .005	4.25± .005
6000	6500718 B	3.135± .001	2.73± .005	2.00± .005	1.605± .005	2.00± .005	6.25± .005	5.50± .005



MODEL	PART NUMBER	A	B	C	D	E	F
2000	2200708 B	1.560± .001	1.24± .005	1.04± .005	.70± .005	1.10± .005	4.00± .005
3000	3300708 B	2.035± .001	1.74± .005	1.54± .005	1.015± .005	1.415± .005	4.37± .005
4000	4200708 B	2.425± .001	1.865± .005	1.665± .005	1.21± .005	1.61± .005	5.25± .005
5000	5300708 B	2.820± .001	2.427± .005	2.227± .005	1.41± .005	1.81± .005	5.68± .005
6000	6500708 B	3.135± .001	2.74± .005	2.54± .005	1.605± .005	2.00± .005	7.00± .005

M-D COMPETITOR+ PLUS™

CUTAWAY VIEW AND PARTS LIST



ITEM	DESCRIPTION	QTY	ITEM	DESCRIPTION	QTY
1	Housing	1	15	Screw, Hex Head	16
2	Mounting Foot	2 *	16	Screw, Hex Head	8 **
3	Drive End Plate	1	17	Screw, Hex Head	4
4	Gear End Plate	1	18	Plug, Oil	3
5	Gear Cover	1	19	Relief Fitting	2
6	Drive Rotor	1	20	Grease Fitting	2
7	Driven Rotor	1	22	Bearing Retainer	4
8	Timing Gear	2	23	Lip Seal, Drive Shaft	1
9	Dowel Pin	4	24	Lip Seal	4
10	Bearing Cover Plate	1	25	Screw, Hex Head	4
11	Roller Bearing, Drive Shaft	1	26	Washer	2
12	Bearing	1	27	Breather †	1
13	Bearing	2			

* Item 2: Models 6005, 6008 and 6015 require (2) each of left and right feet.
** Item 16: Models 5003, 5006 and 5009 require (6) each.
† Item 27: Models 2002 and 2004 requires a pipe plug in lieu of breather.

When ordering parts, use the item number shown, plus your model and serial number.

WARRANTY

Subject to the terms and conditions hereinafter set forth and set forth in General Terms of Sale, Tuthill Pneumatics Group (the seller) warrants products and parts of its manufacture, when shipped, and its work (including installation and start-up) when performed, will be of good quality and will be free from defects in material and workmanship. This warranty applies only to Seller's equipment, under use and service in accordance with seller's written instructions, recommendations and ratings for installation, operating, maintenance and service of products, for a period as stated in the table below. Because of varying conditions of installation and operation, all guarantees of performance are subject to plus or minus 5% variation. (Non-standard materials are subject to a plus or minus 10% variation)

Product Type	**Type of Application**	
	Atmospheric Air or Process Air Without Liquids Present	**Process Gases Other Than Air, or Any Liquid Injected Application**
New	24 months from date of shipment, or 18 months after initial startup date, whichever occurs first	18 months from date of shipment, or 12 months after initial startup date, whichever occurs first
Remanufactured	6 months from date of shipment	6 months from date of shipment
Repair	3 months from date of shipment, or remaining warranty period, whichever is greater	3 months from date of shipment, or remaining warranty period, whichever is greater

THIS WARRANTY EXTENDS ONLY TO BUYER AND/OR ORIGINAL END USER, AND IN NO EVENT SHALL THE SELLER BE LIABLE FOR PROPERTY DAMAGE SUSTAINED BY A PERSON DESIGNATED BY THE LAW OF ANY JURISDICTION AS A THIRD PARTY BENEFICIARY OF THIS WARRANTY OR ANY OTHER WARRANTY HELD TO SURVIVE SELLER'S DISCLAIMER.

All accessories furnished by Seller but manufactured by others bear only that manufacturer's standard warranty.

All claims for defective products, parts, or work under this warranty must be made in writing immediately upon discovery and, in any event within one (1) year from date of shipment of the applicable item and all claims for defective work must be made in writing immediately upon discovery and in any event within one (1) year from date of completion thereof by Seller. Unless done with prior written consent of Seller, any repairs, alterations or disassembly of Seller's equipment shall void warranty. Installation and transportation costs are not included and defective items must be held for Seller's inspection and returned to Seller's Ex-works point upon request.

THERE ARE NO WARRANTIES, EXPRESSED, IMPLIED OR STATUTORY WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF, INCLUDING WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS OF PURPOSE.

After Buyer's submission of a claim as provided above and its approval, Seller shall at its option either repair or replace its product, part, or work at the original Ex-works point of shipment, or refund an equitable portion of the purchase price.

The products and parts sold hereunder are not warranted for operation with erosive or corrosive material or those which may lead to build up of material within the product supplied, nor those which are incompatible with the materials of construction. The Buyer shall have no claim whatsoever and no product or part shall be deemed to be defective by reason of failure to resist erosive or corrosive action nor for problems resulting from build-up of material within the unit nor for problems due to incompatibility with the materials of construction.

Any improper use, operation beyond capacity, substitution of parts not approved by Seller, or any alteration or repair by others in such manner as in Seller's judgment affects the product materially and adversely shall void this warranty.

No employee or representative of Seller other than an Officer of the Company is authorized to change this warranty in any way or grant any other warranty. Any such change by an Officer of the Company must be in writing.

The foregoing is Seller's only obligation and Buyer's only remedy for breach of warranty, and except for gross negligence, willful misconduct and remedies permitted under the General Terms of Sale in the sections on **CONTRACT PERFORMANCE, INSPECTION AND ACCEPTANCE** and the **PATENTS** Clause hereof, the foregoing is **BUYER'S ONLY REMEDY HEREUNDER BY WAY OF BREACH OF CONTRACT, TORT OR OTHERWISE, WITHOUT REGARD TO WHETHER ANY DEFECT WAS DISCOVERED OR LATENT AT THE TIME OF DELIVERY OF THE PRODUCT OR WORK.** In no event shall Buyer be entitled to incidental or consequential damages. Any action for breach of this agreement must commence within one (1) year after the cause of action has occurred.

July, 2000

TUTHILL
Pneumatics Group

Page: 1 of 2
Date: 10/6/2000

Factory Offices
Tuthill Pneumatics Group
4840 West Kearney Street
P. O. Box 2877
Springfield, Missouri USA 65801-2877
Tel: (417) 865-8715 (800) 825-6937
Fax: (417) 865-2950
blowerxpert@tuthill.com

Application Worksheet (Normal Condition)

Reference/Quote:

AMBIENT CONDITIONS:

Atmospheric Pressure:	14.7 PSIA
Elevation:	0 Feet
Ambient Temperature:	70 Fahrenheit

APPLICATION REQUIREMENTS:

Gas:	AIR	Gas Properties:	
Molecular Weight:	28.966		
Cp:	0.241	Duty Cycle:	more than 4 hours
K Value (Cp/Cv):	1.398		
Inlet Temperature:	70 Fahrenheit		
Inlet Volume:	100 ICFM		
Standard Volume:	100 SCFM		
Mass Flow:	450 lbs./hr		
Inlet Pressure:	14.7 PSIA		
Discharge Pressure:	4 PSIG		

MODEL SELECTED FOR THE APPLICATION:

Model Number:	COMPETITOR PLUS 3003-21L2
Materials of Construction	Iron (standard)
Flow Direction	Vertical Flow
Connection Size	2 NPT Inlet 2 NPT Discharge
Seal Type:	Lip
Lubrication:	Splash/Grease
Rotative Speed:	2163 RPM (60.09 % of Max)
Gear Tip Velocity:	1982 FPM
Discharge Temperature:	111 Fahrenheit
Discharge Volumetric Flow:	84.7 CFM
Required Input Power:	2.685 BHP
Estimated Blower Noise:	88.15 dB(A) at 1 meter, open field
Noise Level Based On:	Inlet filter/silencer only Discharge piped to process

SELECTED BLOWER OPTIONS:
Vertical Flow
Left Drive

TESTING:
Standard Mechanical Integrity Test

TUTHILL
Pneumatics Group

Page: 2 of 2
Date: 10/6/2000

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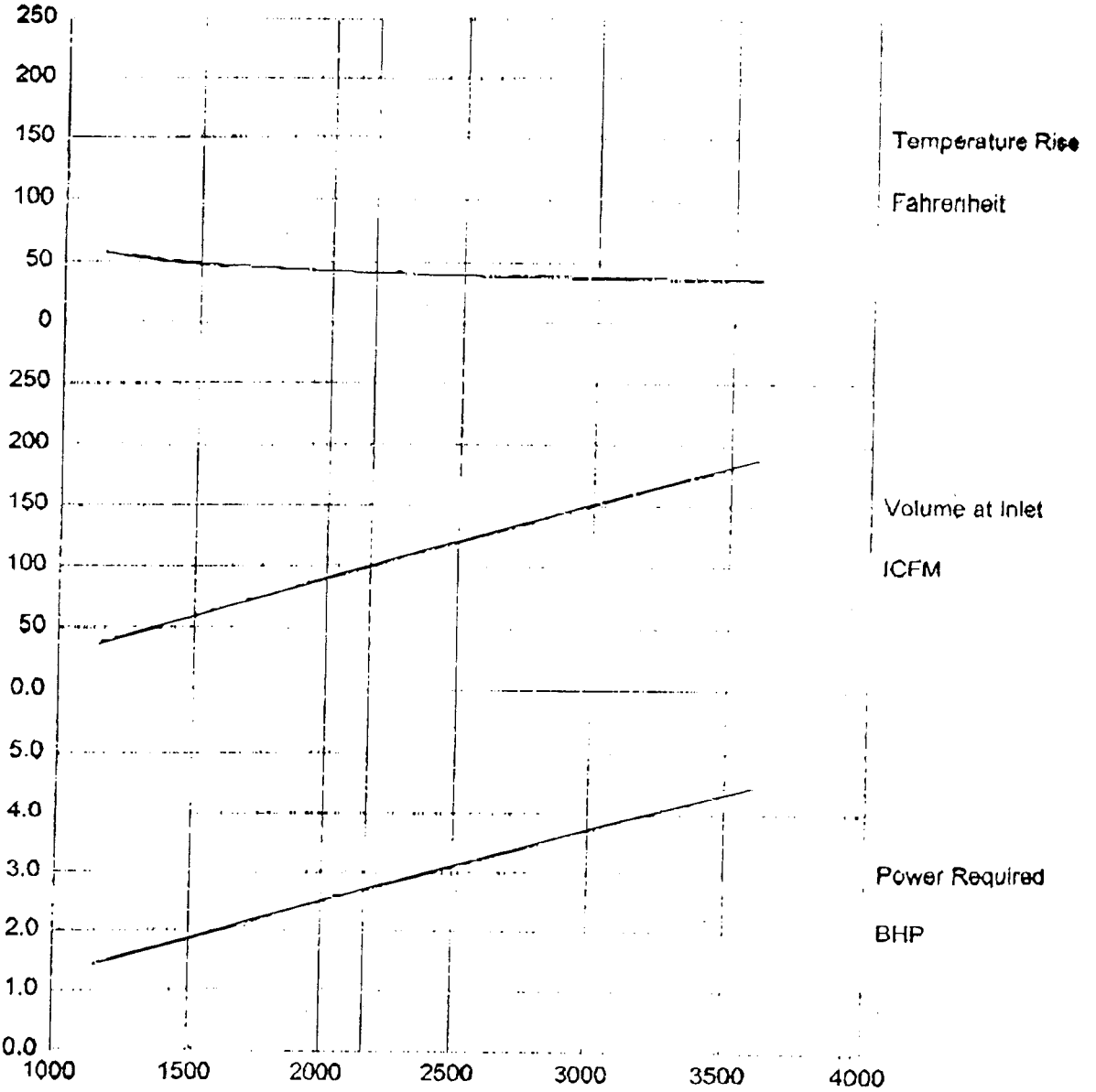
Tel: (417) 865-8715 (800) 825-6937
Fax: (417) 865-2950
blowerxpert@tuthill.com

Normal Condition Performance Curve for 3003-21L2

Reference/Quote:



Performance Curve Based Upon The Conditions Of:

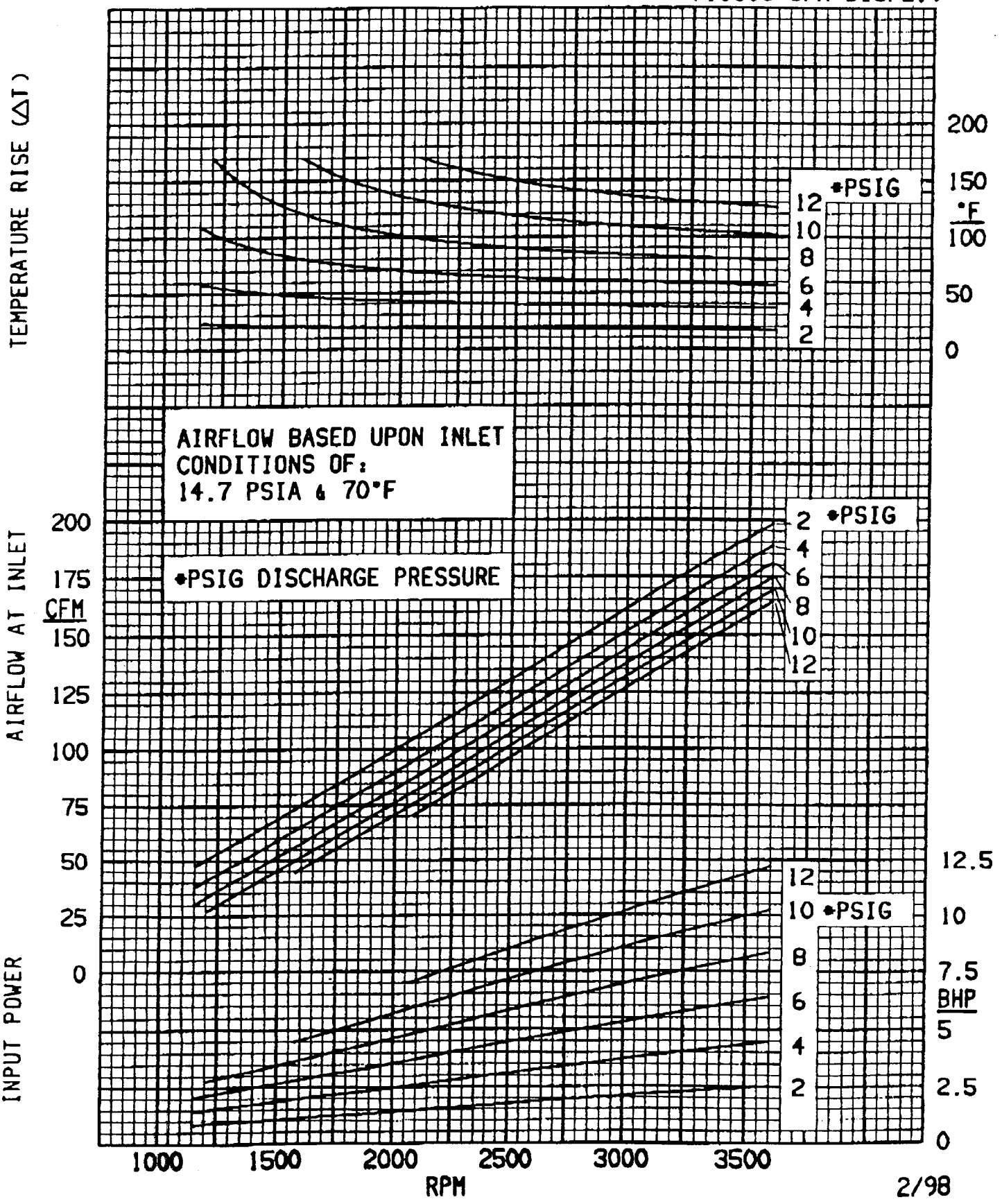
Displacement	0.062 CFR
Atmospheric Pressure:	14.7 PSIA
Elevation:	0 Feet
Gas:	AIR
Inlet Temperature	70 Fahrenheit
Molecular Weight	28.966
K Value	1.398
Inlet Pressure	14.7 PSIA
Discharge Pressure	4 PSIG

TUTHILL CORPORATION | M-D Pneumatics Division Springfield Missouri USA

C-1408

3003 COMPETITOR PLUS™ PRESSURE CURVE

(.0616 CFR DISPL.)



2/98

M-D Blower Flow Ranges

Whether you require standard or custom models, M-D Pneumatics offers a wide selection of rotary positive displacement blowers available in most countries around the world.

ACOUSTICAIR™

Blower Sizes	NOMINAL FLOW RANGE To 15 PSIG or as noted	BHP
4109	61-490 CFM	2.5-38
4112	96 662 CFM	3.0-50
4706	85 628 CFM	2.8-49
4709	129 926 CFM	3.6-69
4712	180-1228 CFM	4.4-90
5607	123-789 CFM	3.7-60
5611	178-1168 CFM	4.8-86
5614	234-1489 CFM	5.7-100
5618	(To 12 PSIG) 321-1922 CFM	7.0-100

COMPETITOR® PLUS™

		BHP
2002	(To 12 PSIG) 7-73 CFM	0.3-4.0
2004	(To 7 PSIG) 12-150 CFM	0.4-5.6
3003	(To 12 PSIG) 28-198 CFM	0.8-12
3006	(To 7 PSIG) 86-334 CFM	1.2-12
4002	17-198 CFM	0.6-15
4005	(To 10 PSIG) 39-399 CFM	1.1-20
4007	(To 7 PSIG) 52-527 CFM	1.4-18
5003	39-346 CFM	1.0-25
5006	(To 10 PSIG) 65-581 CFM	1.6-28
5009	(To 7 PSIG) 125-865 CFM	2.2-29
6005	72-532 CFM	1.8-39
6008	(To 12 PSIG) 116-854 CFM	2.7-50
6015	(To 6 PSIG) 286-1601 CFM	4.9-46

EQUALIZER®

		BHP
4606/4607	95-631 CFM	2.9-48
4609/4610	150-924 CFM	3.8-68
4612/4613	194-1224 CFM	4.6-89
6012	350-1628 CFM	7.2-119
6016	493-2183 CFM	9.1-150
6024	(To 10 PSIG) 830-3290 CFM	13-126

DIFFUSED GAS TECHNOLOGIES, INC.
1776 Mentor Ave. Suite 360
Cincinnati, Ohio 45212
TEL: 513-531-4426
FAX: 513-531-4436

2/16/01

To: Les Aurbach/URS/tel: 215-657-5000/FAX: 215-657-5454

From: Steve Deiters

Re: Replacement Air Filters/Stoney Point Industrial Park

As a follow up to our telephone conversation of yesterday afternoon listed below you will find the part number of the replacement air filters for the filter/silencer that was supplied on the subject job. The part number is F8-108 and sells for $160.00 for a carton of six. They ship from stock. As I mentioned on the phone if theyremove the filter and blow compressed air through the opposite side of the filter they can extend the life of the filter, however they do eventually have to be replaced. See the attached catalog sheet for a description of the procedure.

I also mentioned on the phone that there is a pressure drop indicator available that identifies when the filter should be cleaned/replaced. The part number on the pressure drop indicator is A40-108 and it sells for $60.00. They are very easily retrofitted. Just take the wing nut off, slip over the banjo fitting, adhere the gauge with self sticking tape (which is supplied) to the side of the housing and it is ready to go. This gauge also ships from stock. See the attached technical data.

Let me know if I can be of any further assistance.

F64

Air Intake Filters and Filter Silencers

Air Intake Filter and Filter Silencer

The Series F64 Air Intake Filter and Filter Silencer is designed to mount directly on the inlet of an engine, blower or compressor. It will provide 16dB to 20dB noise reduction and the paper filter media has an efficiency of 99% on 1 micron particles.

SERVICE LIFE & CLEANING: The service life of the element is dependent upon the surrounding environment and cannot be predicted.

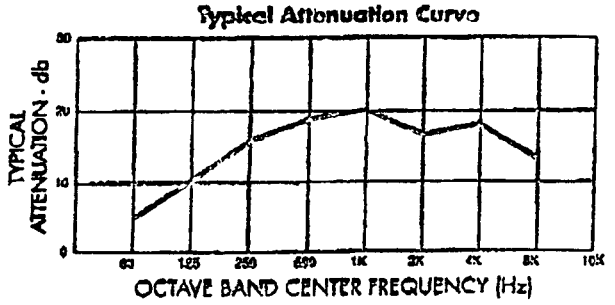
To prevent COLLAPSING of the filter element, STODDARD SILENCERS recommends the differential pressure across the filter element NOT exceed 15 inches of water column. Positive indication that the element requires cleaning or replacement can be provided with STODDARD SILENCERS model A40-108 Pressure Drop Indicator, at an extra charge.

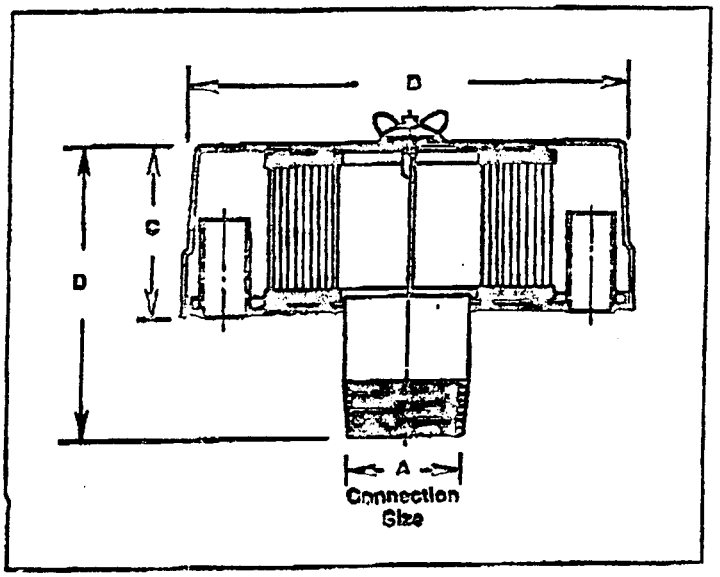
To extend service life, rap element gently to dislodge accumulated dirt. An alternate method is to direct compressed air (75 PSIG max) through the element opposite to the direction of air flow. THE FILTER ELEMENT MUST EVENTUALLY BE REPLACED.

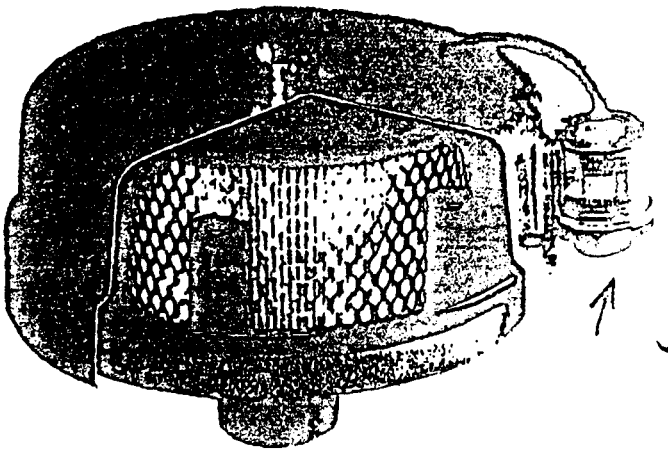
ALTERNATE FILTRATION MEDIA
AVAILABLE FOR F64

REFER TO PAGE FOUR

Pre-Filter wrap available at added cost
Consult Factory
(90% on 75 micron particles and larger)





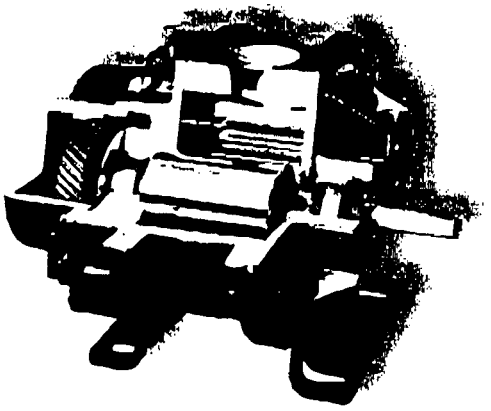


F64 shown with optional A40-108 Pressure Drop Indicator.

F64 Series

Model	A Connection Size	B	C	D	Rated CFM	Wt.	Replacement Element Number
F64-1	1" NPT	10	4	7	35	9	F8-108
F64-1½	1½" NPT	10	4	7	80	9	F8-108
F64-2	2" NPT	10	4	7	135	10	F8-108
F64-2½	2½" NPT	10	4	7	180	10	F8-108
F64-3	3" NPT	16	5	8	285	20	F8-109
F64-4	4" NPT	16	5	8	520	20	F8-109
F64-5	5" NPT/FLG	16	5	8	750	23	F8-109
F64-6	6" Flange	20	5	8	1235	40	F8-110
F64-8	8" Flange	20	10	13	2125	50	F8-111
F64-10	10" Flange	26	15¼	20	3335	95	F8-137
F64-12	12" Flange	26	15¼	20	4675	100	F8-137
F64-14	14" Flange	26	15¼	20	5855	115	F8-137

Sizes 10", 12" and 14" are FILTERS only



COMPETITOR PLUS™

Rotary Positive Blowers

COMPETITOR PLUS rotary blowers are designed to be interchangeable with equivalent sizes of Roots Universal RAI®, and many Sutorbilt® California Series B and F, and Legend™ Series L and P blowers. **COMPETITOR PLUS** models are rated up to 15 PSIG discharge pressure or 16" Hg dry vacuum.

In addition to interchangeability, M-D has improved on existing designs with the following superior features ordinarily found only on premium blowers:

Helical Gearing

COMPETITOR PLUS blowers are timed with hardened, precision helical gears, keyed to the rotor shafts, not taper fit spur gears offered by other manufacturers which have greater backlash, and can slip and lose timing. Helical gears are also quieter, reducing mechanical noise.

Stronger Bearings

COMPETITOR PLUS blowers include double row ball bearings at the gear end, stronger than single row ball bearings offered by other manufacturers. Drive shaft bearing is cylindrical roller type for additional strength against side loading from V-belt drives. As a result of this superior design, **COMPETITOR PLUS** blowers offer an average design bearing life of up to 50% greater than models offered by other manufacturers.

Rotors with Integral Shafts

COMPETITOR PLUS blowers include precision machined ductile iron rotors with large, integrally cast shafts, not press fit and/or pinned shafts offered by other manufacturers which can loosen over time and cause rotor clash. All rotors are dynamically balanced for vibration-free rotation.

Positive End Clearances

End clearances are positively established at the blower gear end, eliminating the risk of shifting end clearances when installing or removing drive components. This also eliminates the need for those special fork and saddle tools required by other brands to reset end clearances.

Polished Sealing Surfaces

All shaft surfaces in contact with sealing members are polished to reduce seal wear and risk of leakage.

Individually Tested

Every **COMPETITOR PLUS** blower is factory tested to assure you of the highest quality. While some manufacturers perform only sample testing, M-D goes the distance to insure that your blower meets our rigid ISO 9001 registered quality standards.

ISO 9001 Registration

COMPETITOR PLUS blowers are manufactured under M-D's ISO 9001 registered quality assurance program, the first American manufacturer of rotary blowers to gain such international recognition.

Warranty

Every **COMPETITOR PLUS** blower is backed by M-D's limited warranty for a period of 18 months after installation or 2 years after original blower shipment, whichever occurs first.

Versatility

COMPETITOR PLUS blowers can be field converted from horizontal to vertical flow, or vice versa, without any special tools or additional components.

Metric Availability

All **COMPETITOR PLUS** blowers are available with metric drive shaft and process connections.

Worldwide Sales and Service

With sales offices and service facilities located on six continents, you can be assured of availability and service for your **COMPETITOR PLUS** blowers.

Material Specifications:

Housing: Cast Iron

End Plates: Cast Iron

End Cover: Cast Iron

Rotors: Ductile iron

Shafts: Ductile iron cast integrally with rotors

Bearings: Gear end - Double row ball, both rotors
Drive end - Cylindrical roller on drive rotor
Single row ball on driven rotor

Drive Shaft: Ductile iron, cast integrally with drive rotor

Gears: Heat treated alloy steel, helical cut

Seals: Lip seals on rotor shafts and drive shaft

Lubrication: Oil splash on gear end, grease on drive end

Model Size	Max. Press. PSI	Max. Vac. (In. Hg)	Nom Min RPM @ Max. Disch. Press.	Nom Max RPM @ Max. Disch. Press.	Displ. CFR
2002	12	14	2940	5275	.016
2004	7	14	1480	5275	.032
3003	12	14	2080	3600	.0616
3006	7	12	1150	3600	.102
4002	15	14	1820	3600	.061
4005	10	14	1300	3600	.121
4007	7	12	1000	3600	.160
5003	15	14	1900	2850	.132
5006	10	14	980	2850	.221
5009	7	12	700	2850	.323
6005	15	16	1240	2350	.246
6008	12	16	890	2350	.395
6015	6	12	600	2350	.740

LEADING THE SEARCH FOR NEW SOLUTIONS

TUTHILL CORPORATION | M-D Pneumatics Division

4840 West Kearney Street, P.O. Box 2677
Springfield, Missouri USA 65801-2677
Tel 417 865-8715 800 825-6937 Fax 417 865-2950

www.mdpneumatics.com

ISO 9001:1994

TUTHILL
Pneumatics Group

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P. O. Box 2877
Springfield, Missouri USA 65801-2877
Tel: (417) 865-8715 (800) 825-6937
Fax: (417) 865-2950
blowerxpert@tuthill.com

Page: 1 of 2
Date: 10/6/2000

Application Worksheet (Normal Condition)

Reference/Quote:

AMBIENT CONDITIONS:

Atmospheric Pressure:	14.7 PSIA
Elevation:	0 Feet
Ambient Temperature:	70 Fahrenheit

APPLICATION REQUIREMENTS:

Gas:	AIR
Molecular Weight:	28.966
Cp:	0.241
K Value (Cp/Cv):	1.398
Inlet Temperature:	70 Fahrenheit
Inlet Volume:	100 ICFM
Standard Volume:	100 SCFM
Mass Flow:	450 lbs./hr
Inlet Pressure:	14.7 PSIA
Discharge Pressure:	4 PSIG

Gas Properties:

Duty Cycle: more than 4 hours

MODEL SELECTED FOR THE APPLICATION:

Model Number:	COMPETITOR PLUS 3003-21L2
Materials of Construction	Iron (standard)
Flow Direction	Vertical Flow
Connection Size	2 NPT Inlet 2 NPT Discharge
Seal Type:	Lip
Lubrication:	Splash/Grease
Rotative Speed:	2163 RPM (60.09 % of Max)
Gear Tip Velocity:	1982 FPM
Discharge Temperature:	111 Fahrenheit
Discharge Volumetric Flow:	84.7 CFM
Required Input Power:	2.685 BHP
Estimated Blower Noise:	88.15 dB(A) at 1 meter, open field
Noise Level Based On:	Inlet filter/silencer only Discharge piped to process

SELECTED BLOWER OPTIONS:
Vertical Flow
Left Drive

TESTING
Standard Mechanical Integrity Test

TUTHILL
Pneumatics Group

Factory Offices
Tuthill Pneumatics Group
4840 West Kearney Street
P. O. Box 2877
Springfield, Missouri USA 65801-2877
Tel: (417) 865-8715 (800) 825-6937
Fax: (417) 865-2950
blowerxpert@tuthill.com

Date: 10/6/2000

Application Worksheet (Normal Condition)

Reference/Quote:

AMBIENT CONDITIONS:

Atmospheric Pressure:	14.7 PSIA
Elevation:	0 Feet
Ambient Temperature:	70 Fahrenheit

APPLICATION REQUIREMENTS:

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Molecular Weight:	28.966
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Inlet Volume:	100 ICFM
Standard Volume:	100 SCFM
Mass Flow:	450 lbs./hr
Inlet Pressure:	14.7 PSIA
Discharge Pressure:	4 PSIG

Gas Properties:

Duty Cycle: more than 4 hours

MODEL SELECTED FOR THE APPLICATION:

Model Number:	COMPETITOR PLUS 3003-21L2
Materials of Construction	Iron (standard)
Flow Direction	Vertical Flow
Connection Size	2 NPT Inlet 2 NPT Discharge
Seal Type:	Lip
Lubrication:	Splash/Grease
Rotative Speed:	2163 RPM (60.09 % of Max)
Gear Tip Velocity:	1982 FPM
Discharge Temperature:	111 Fahrenheit
Discharge Volumetric Flow:	84.7 CFM
Required Input Power:	2.685 BHP
Estimated Blower Noise:	88.15 dB(A) at 1 meter, open field
Noise Level Based On:	Inlet filter/silencer only Discharge piped to process

SELECTED BLOWER OPTIONS:
Vertical Flow
Left Drive

TESTING
Standard Mechanical Integrity Test

DATA SHEET

CONTROL PANEL

DATE: November 17, 2000

PROJECT NAME: Stoney Point

PROJECT NO: 00-377

HORSEPOWER: 3 **VOLTAGE:** 230 **PHASE:** 1 **TYPE:** Simplex

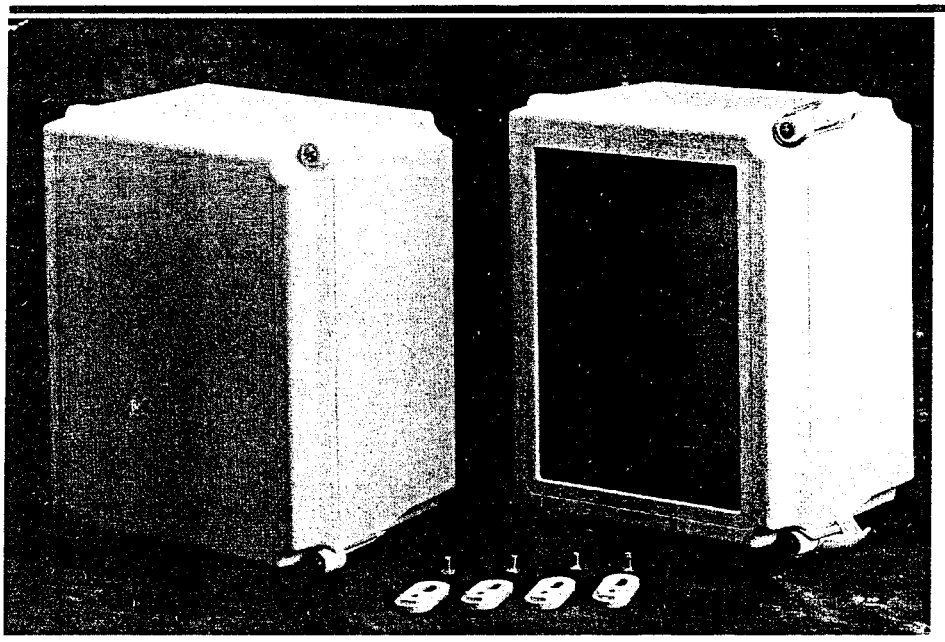
QTY	ITEM	MFG	MODEL #
	ENCLOSURE & ACCESSORIES		
1	ENCLOSURE	HOFFMAN	A-16148CHQRFG
1	SUBPANEL	HOFFMAN	A-16P14
	MAIN POWER COMPONENTS		
1	MAIN CIRCUIT BREAKER	SQUARE D	QOU230
1	CONTACTOR	SPRECHER & SCHUH	CA7-30-10-120-NO
1	OVERLOAD	SPRECHER & SCHUH	CEP7-M32
1	TRANSFORMER	SQUARE D	9070-TF75D1
2	PRIMARY FUSES	BUSSMAN	FNQ-R 1
1	SECONDARY FUSE	BUSSMAN	FNM 1
	SWITCHES & INDICATORS		
1	HOA SWITCH	MCGILL	7102-B
1	SWITCH PLATE	HOFFMAN	A-6P4
	RELAYS & MISC COMPONENTS		
1	TIME CLOCK	PARAGON	1015-00RSB
1	GROUND LUG	BURNDY	ADR6
3	TERMINAL BLOCKS	SQUARE D	9080-GR6

EG

AS BUILT

Fiberglass Hinged Cover Type 4X Enclosures

Bulletin A48



Application

Designed for use as electrical junction boxes in highly corrosive environments including oil refineries and chemical processing plants, waste water treatment and marine installations, electroplating plants, agricultural environments and food or animal processing plants. These enclosures are also suitable as instrument housings in both indoor and outdoor applications. The efficient design and simple construction of the hinged cover fiberglass style combines for a low cost, yet reliable and aesthetic enclosure. Window cover enclosure provides easy visual inspection of interior components.

Construction

- Molded fiberglass polyester has outstanding chemical and temperature resistance and exhibits excellent weatherability and physical properties
- Fiberglass is easily punched, drilled, filed or sawed
- Seamless foam-in-place gasket assures watertight and dust-tight seal
- Polyester mounting feet and stainless steel attachment screws are provided with each enclosure
- Scratch-resistant GE Lexan Margard® windows are permanently bonded in place
- Molded-in-place threaded brass inserts and plated steel screws are provided for mounting optional panels and terminal kits
- Removable hinged cover attached to body with monel hinge pin
- **Screw Cover Enclosures** are secured with two captivated monel cover screws
- **Enclosures with Quick-Release Latches** (U.S. patent number 4,917,421) have corrosion-resistant polyester latches located in corners which provide unobstructed access to enclosure
- Hinge pin and bail are corrosion-resistant monel
- Knockout padlock provisions included in each latch

Finish/Color

Optional steel panels are white. Optional stainless steel, aluminum, and composite panels are unpainted. Fiberglass material is light gray inside and out.

Industry Standards

UL 508 Type 4, Type 4X, Type 12, and Type 13
NEMA/EEMAC Type 4, Type 4X, Type 12, and Type 13
Enclosure flammability rating UL94-5V
Window flammability rating UL94V-0
CSA Type 4, Type 4X, Type 12, and Type 13
IEC 529, IP66

Price List Page **6.07**

Accessories

See General Accessories index page 492.

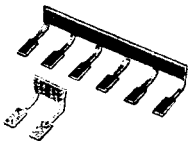
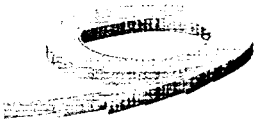
Composite Swing-Out Panel Kit
Latch Kit
Panel Extenders
Panels (See table)
Terminal Kit Assembly
Ventilators
Wiring Duct

Box Lug Terminal Block

BLOCKS			END BARRIER		
Catalog Number	Block Color	Standard Pack^	Catalog Number	Barrier Color	Standard Pack^
9080GR6	White	50	GM6B	White	10
9080GRB6	Black		GMB6B	Black	
9080GRL6	Blue		GML6B	Blue	
9080GRG6	Green		GMG6B	Green	
9080GRE6	Grey		GME6B	Grey	
9080GRS6	Orange		GMS6B	Orange	
9080GRR6	Red		GMR6B	Red	
9080GRY6	Yellow		GMY6B	Yellow	

^ Orders must specify standard package quantities or multiples of that quantity.

For a listing of track and additional accessories, reference the Square D Digest 170.

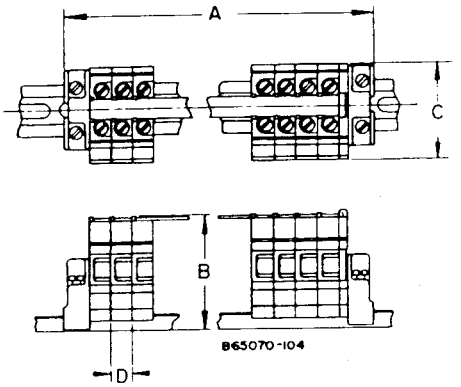
Description	Catalog Number	Standard Pack
 6 Pole Jumper	9080GH72	10
2 Pole Jumper	9080GH73	20
 25 ft. blank vinyl marking strip	9080GH220	1
 Vinyl marking strip (numbered 1 to 25)	9080GH21	5
 Marking strip end plug	9080GH60	50

Max voltage rating: 600 volts
Max amperage rating: 60 amperes
Wire range: #22 to #8 AWG
Max wire combinations:

1 - #8	1 to 5 - #18
1 to 3 - #12	1 to 8 - #20
1 to 4 - #14	1 to 10 - #22
1 to 4 - #16	

Wire type: Solid or stranded copper wire
Density: 35 blocks per foot of track
Block material: Nylon
Box lug material: Copper
Temperature rating: -40° to 257°F
-40° to 125°C
Flammability rating: UL94V2
Recommended screw tightening torque:
18-20 lbf.-in. (2.1-2.3 N-m)

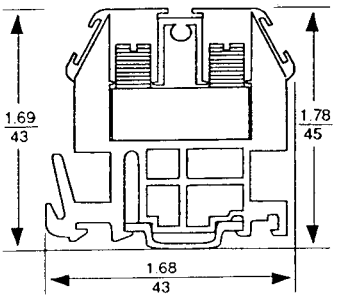
Assemblies



Dim. A * (in.)	Dim. B (in.)	Dim. C (in.)	Dim. D (in.)	Max. Sect. per foot (nominal)
.35N + .93	1.82'	1.68	.35	35

* Where N is total number of sections. If slip-on end clamps are used, subtract .8 inches.

Dimensions



Bulletin No. 9080HO9501
June, 1995

Square D Company
P.O. Box 27446
Raleigh, NC 27611

SQUARE D
GROUPE SCHNEIDER

Standard Sizes Hinged Solid Cover Type 4X Enclosures

Catalog Number Screw Cover	Catalog Number Quick-Release	Enclosure Size A x B x C	* Panel Catalog Number	Panel Size D x E	Mounting G x H	Overall L x W	F	J	K	M	O	Q	R	T	U
A-664CHSCFG	A-664CHQRFG	6.00x6.00x4.00 (152x152x102)	A-6P6	4.88x4.88 (124x124)	6.94x4.00 (176x102)	6.50x6.50 (165x165)	3.45 (88)	3.25 (83)	1.00 (25)	4.25 (108)	4.25 (108)	5.64 (143)	5.12 (130)	0.12 (3)	5.64 (143)
A-864CHSCFG	A-864CHQRFG	8.00x6.00x4.00 (203x152x102)	A-8P6	6.75x4.88 (171x124)	8.94x4.00 (227x102)	8.50x6.50 (216x165)	3.45 (88)	3.25 (83)	1.00 (25)	6.25 (159)	4.25 (108)	7.64 (194)	7.12 (181)	0.12 (3)	5.64 (143)
A-1086CHSCFG	A-1086CHQRFG	10.00x8.00x6.00 (254x203x152)	A-10P8	8.75x6.88 (222x175)	10.94x6.00 (278x152)	10.50x8.50 (267x216)	5.45 (138)	4.94 (125)	1.31 (33)	8.25 (210)	6.25 (159)	9.61 (244)	9.12 (232)	0.12 (3)	7.61 (193)
A-12106CHSCFG	A-12106CHQRFG	12.00x10.00x6.00 (305x254x152)	A-12P10	10.75x8.88 (273x226)	12.94x8.00 (329x203)	12.50x10.50 (318x267)	5.45 (138)	4.69 (119)	1.56 (40)	10.25 (260)	8.25 (210)	11.58 (294)	11.12 (282)	0.12 (3)	9.58 (243)
A-14128CHSCFG	A-14128CHQRFG	14.00x12.00x8.00 (356x305x203)	A-14P12	12.75x10.88 (324x276)	14.94x10.00 (379x254)	14.55x12.55 (370x319)	7.45 (189)	6.50 (165)	1.81 (46)	12.25 (311)	10.25 (260)	13.59 (345)	13.12 (333)	0.15 (4)	11.59 (294)
A-16148CHSCFG	A-16148CHQRFG	16.00x14.00x8.00 (406x356x203)	A-16P14	14.75x12.88 (375x327)	16.94x12.00 (430x305)	16.55x14.55 (420x370)	7.45 (189)	6.23 (158)	2.08 (53)	14.25 (362)	12.25 (311)	15.56 (395)	15.12 (384)	0.15 (4)	13.56 (344)
A-181610CHSCFG	A-181610CHQRFG	18.00x16.00x10.00 (457x406x254)	A-18P16	16.75x14.88 (425x378)	18.94x14.00 (481x356)	18.58x16.58 (472x421)	9.45 (240)	7.66 (195)	2.66 (68)	16.25 (413)	14.25 (362)	17.53 (445)	17.12 (435)	0.16 (4)	15.53 (394)

Millimeter dimensions ( ) are for reference only; do not convert metric dimensions to inch.

* Panels must be ordered separately. Optional stainless steel, aluminum, and composite material panels are also available for most sizes. See General Accessories.

Standard Sizes Hinged Window Cover Type 4X Enclosures

Catalog Number Screw Cover	Catalog Number Quick-Release	Enclosure Size A x B x C	* Panel Catalog Number	Panel Size D x E	Mounting G x H	Overall L x W	F	J	K	M	N	O	P	Q	R	T	U
A-664CHSCFGW	A-664CHQRFGW	6.00x6.00x4.00 (152x152x102)	A-6P6	4.88x4.88 (124x124)	6.94x4.00 (176x102)	6.50x6.50 (165x165)	3.45 (88)	3.25 (83)	1.00 (25)	4.25 (108)	4.25 (108)	4.25 (108)	4.25 (108)	5.64 (143)	5.12 (130)	0.12 (3)	5.64 (143)
A-864CHSCFGW	A-864CHQRFGW	8.00x6.00x4.00 (203x152x102)	A-8P6	6.75x4.88 (171x124)	8.94x4.00 (227x102)	8.50x6.50 (216x165)	3.45 (88)	3.25 (83)	1.00 (25)	6.25 (159)	4.25 (108)	4.25 (108)	6.25 (159)	7.64 (194)	7.12 (181)	0.12 (3)	5.64 (143)
A-1086CHSCFGW	A-1086CHQRFGW	10.00x8.00x6.00 (254x203x152)	A-10P8	8.75x6.88 (222x175)	10.94x6.00 (278x152)	10.50x8.50 (267x216)	5.45 (138)	4.94 (125)	1.31 (33)	8.25 (210)	6.25 (159)	6.25 (159)	8.25 (210)	9.61 (244)	9.12 (232)	0.12 (3)	7.61 (193)
A-12106CHSCFGW	A-12106CHQRFGW	12.00x10.00x6.00 (305x254x152)	A-12P10	10.75x8.88 (273x226)	12.94x8.00 (329x203)	12.50x10.50 (318x267)	5.45 (138)	4.69 (119)	1.56 (40)	10.25 (260)	8.25 (210)	8.25 (210)	10.25 (260)	11.58 (294)	11.12 (282)	0.12 (3)	9.58 (243)
A-14128CHSCFGW	A-14128CHQRFGW	14.00x12.00x8.00 (356x305x203)	A-14P12	12.75x10.88 (324x276)	14.94x10.00 (379x254)	14.55x12.55 (370x319)	7.45 (189)	6.50 (165)	1.81 (46)	12.25 (311)	10.25 (260)	10.25 (260)	12.25 (311)	13.59 (345)	13.12 (333)	0.15 (4)	11.59 (294)
A-16148CHSCFGW	A-16148CHQRFGW	16.00x14.00x8.00 (406x356x203)	A-16P14	14.75x12.88 (375x327)	16.94x12.00 (430x305)	16.55x14.55 (420x370)	7.45 (189)	6.23 (158)	2.08 (53)	14.25 (362)	12.25 (311)	12.25 (311)	14.25 (362)	15.56 (395)	15.12 (384)	0.15 (4)	13.56 (344)
A-181610CHSCFGW	A-181610CHQRFGW	18.00x16.00x10.00 (457x406x254)	A-18P16	16.75x14.88 (425x378)	18.94x14.00 (481x356)	18.58x16.58 (472x421)	9.45 (240)	7.66 (195)	2.66 (68)	16.25 (413)	14.25 (362)	14.25 (362)	16.25 (413)	17.53 (445)	17.12 (435)	0.16 (4)	15.53 (394)

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* Panels must be ordered separately. Optional stainless steel, aluminum, and composite material panels are also available for most sizes. See General Accessories.

Data subject to change without notice.

☎ 612 421 2240 FAX 612 422 2178

MOUNTING FEET

NOTE: If circuit breaker was purchased in a bulk pack, mounting feet must be ordered separately.

1. Install mounting feet on each end of circuit breaker.

BASES DE MONTAJE

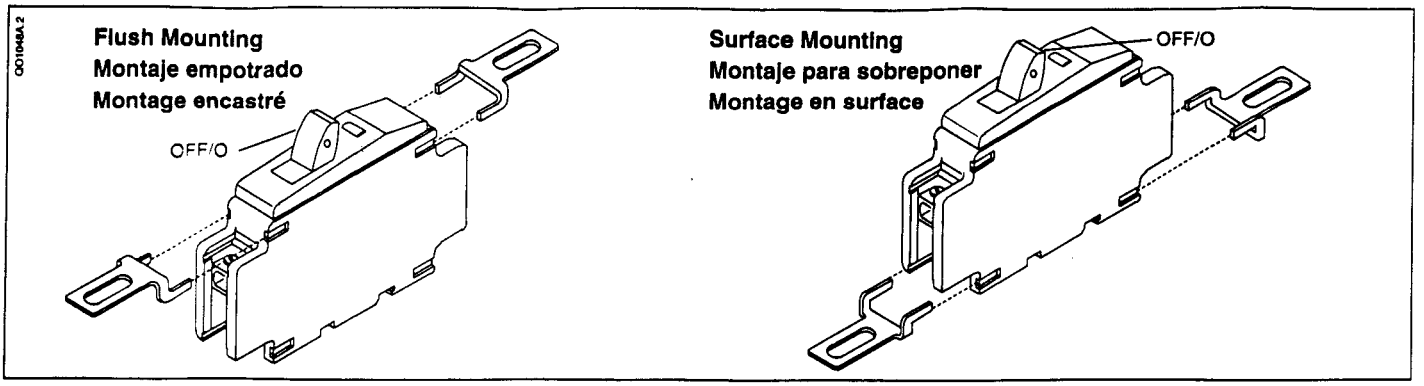
NOTA: Si el interruptor automático se compró como parte de un paquete, las bases de montaje se deben solicitar por separado.

1. Instale las bases de montaje en cada extremo del interruptor automático.

PIEDS DE MONTAGE

REMARQUE : Si le disjoncteur a été acheté dans un emballage en vrac, les pieds de montage doivent être commandés séparément.

1. Installer les pieds de montage à chaque extrémité du disjoncteur.



2. Use a screw through each mounting foot to fasten circuit breaker inside enclosure.

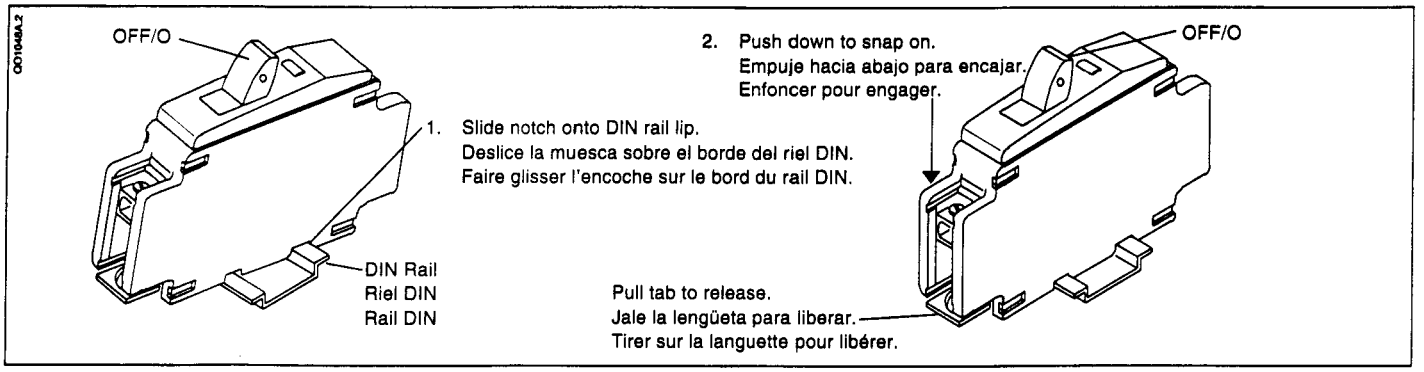
2. Coloque un tornillo a través de cada base de montaje para fijar el interruptor al interior del gabinete.

2. Utiliser une vis à travers chaque pied de montage pour fixer le disjoncteur à l'intérieur du coffret.

DIN RAIL MOUNTING

MONTAJE EN RIEL DIN

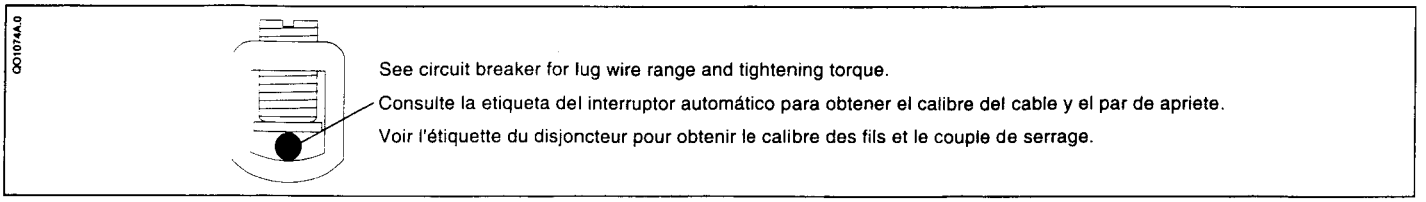
MONTAGE SUR RAIL DIN



CONNECTING WIRES

CONEXION DE LOS CABLES

RACCORDEMENT DES FILS



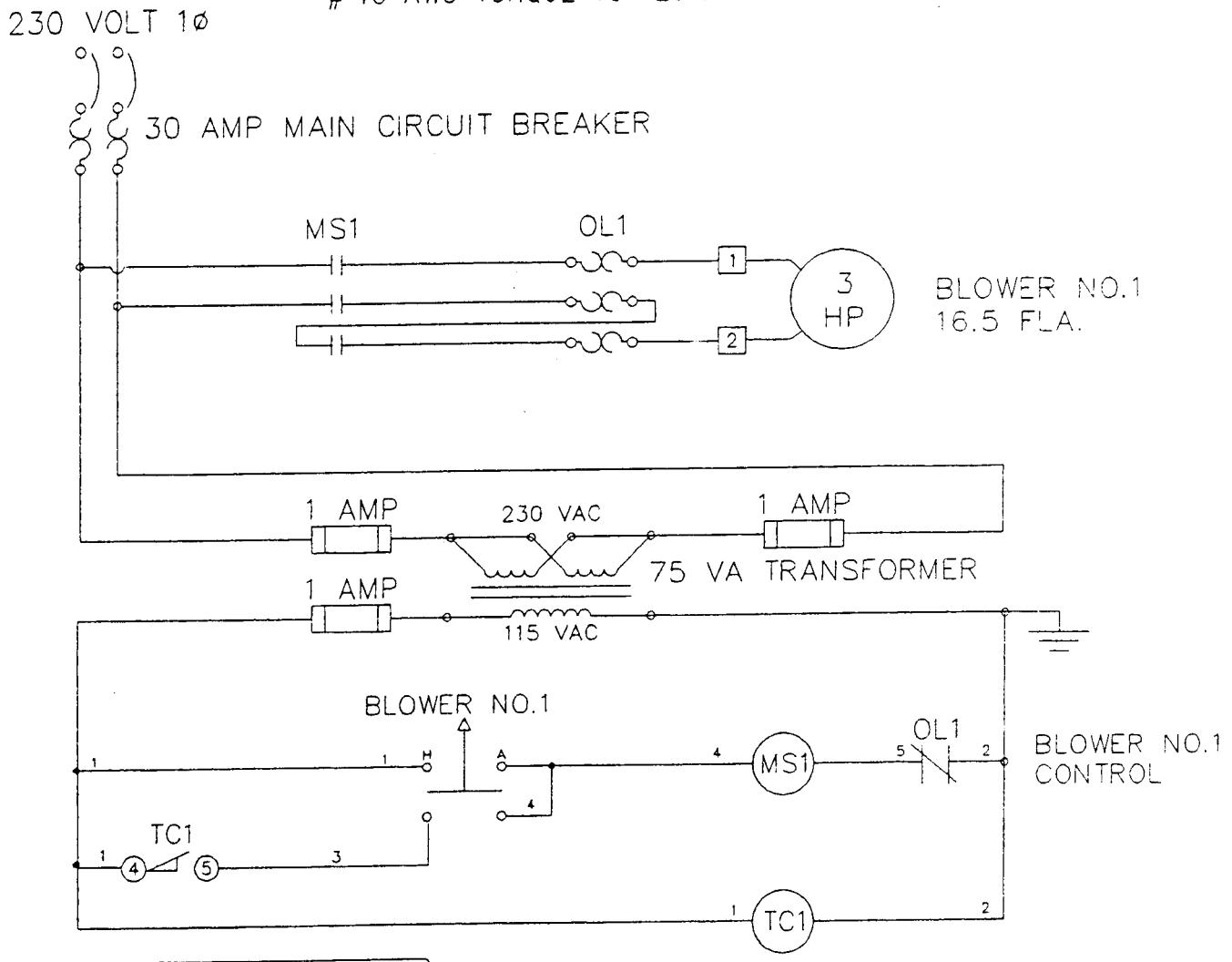
Square D Company
PO Box 3069, 3700 Sixth St SW
Cedar Rapids IA 52406-3069 USA
Field Services: 1-800-634-2003

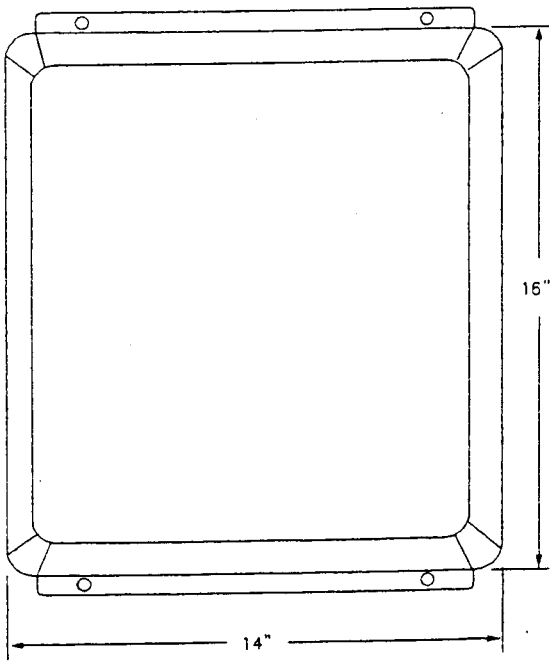
Importado en México por:
Schneider Electric México, S.A. de C.V.
Calz. J. Rojo Gómez 1121
Col. Gpe. del Moral 09300 México, D.F.
Tel. 686-30-00

Schneider Canada Inc.
19 Waterman Avenue, M4B 1 Y2
Toronto, Ontario
(416) 752-8020

SQUARE D

NOTE
USE 75° C COPPER WIRE ONLY
10 AWG TORQUE TO 120 IN. LB.





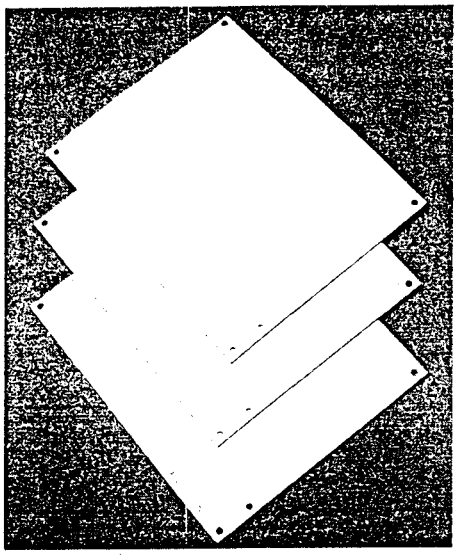
NEMA 4X FIBERGLASS

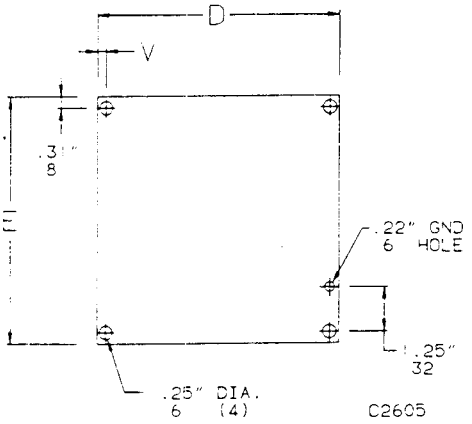
AS BUILT

QUALITY CONTROLS, INC.
3411 CHURCH STREET CINCINNATI, OHIO 45244 • (513) 272-3900

STONEY POINT
BLOWER CONTROL PANEL

HP: 3	FLA: 16.5	VOLT: 230	PHASE: 1	HERTZ: 60	DATE: 11-16-00
DWG.BY: MTP		APPROVED BY:		JOB #: 00-377	
DWG.NO: E00377-1		CUSTOMER			





Panels for Junction Boxes

Steel panels are 14 gauge with a white finish. Stainless steel panels are 14 gauge Type 304 and have a commercial #2B finish which is protected on one side with a plastic film. Aluminum panels are 5052-H32 aluminum alloy .080-inch (2 millimeters) thick and protected on one side with a plastic film. Panel mounting hardware is furnished with all enclosures which accept these panels.

Catalog Number Steel	Catalog Number Stainless Steel	Catalog Number Aluminum	Panel Size D x E	V
A-6P4	A-6P4SS	A-6P4AL	4.88x2.88 (124x73)	0.31 (8)
A-6P6	A-6P6SS	A-6P6AL	4.88x4.88 (124x124)	0.31 (8)
A-8P6	A-6P6SS	A-8P6AL	6.75x4.88 (171x124)	0.25 (6)
A-12P6	——	——	10.75x4.88 (273x124)	0.25 (6)
A-8P8	——	——	6.75x6.88 (171x175	0.25 (6)
A-10P8	A-10P8SS	A-10P8AL	6.75x6.88 (171x175)	0.25 (6)
A-14P8	——	——	12.75x6.88 (324x175)	0.25 (6)
A-10P10	——	——	8.75x8.88 (222x226)	0.25 (6)
A-12P10	A-12P10SS	A-12P10AL	10.75x8.88 (273x226)	0.25 (6)
A-16P10	——	——	14.75x8.88 (375x226)	0.25 (6)
A-12P12	A-12P12SS	——	10.75x10.88 (273x276	0.25 (6)
A-14P12	A-14P12SS	A-14P12AL	12.75x10.88 (324x276)	0.25 (6)
A-16P14	A-16P14SS	A-16P14AL	14.75x12.88 (375x327)	0.25 (6)

Millimeter dimensions ( ) are for reference only; do not convert metric dimensions to inch.

Class 720

Low Ampere QOU Series 3 Circuit Breaker

No. of Poles	Description	AIR Rating	Voltage Rating	Ampere Rating	Catalog Number	Unit Price	Order Qty.
One	Thermal-Magnetic Circuit Breaker	10,000 AIR	120/240 Vac	10	QOU110 QOU110B	**$21.50** **20.10**	1 40
		5,000 AIR	277 Vac	10	QYU110□ QYU110B□	**65.00** **64.00**	1 40
		10,000 AIR	120/240 Vac	15	QOU115 QOU115B	**21.50** **20.10**	1 40
				15	QOU115HM QOU115HMB	**21.50** **20.10**	1 40
		5,000 AIR	277 Vac	15	QYU115□ QYU115B□	**65.00** **64.00**	1 40
		10,000 AIR	120/240 Vac	20	QOU120 QOU120B	**21.50** **20.10**	1 40
				20	QOU120HM QOU120HMB	**21.50** **20.10**	1 40
		5,000 AIR	277 Vac	20	QYU120□ QYU120B□	**65.00** **64.00**	1 40
		10,000 AIR	120/240 Vac	25	QOU125 QOU125B	**21.50** **20.10**	1 40
		5,000 AIR	277 Vac	25	QYU125□ QYU125B□	**65.00** **64.00**	1 40
		10,000 AIR	120/240 Vac	30	QOU130 QOU130B	**21.50** **20.10**	1 40
		5,000 AIR	277 Vac	30	QYU130□ QYU130B□	**65.00** **64.00**	1 40
		10,000 AIR	120/240 Vac	35	QOU135 QOU135B	**21.50** **20.10**	1 40
				40	QOU140 QOU140B	**21.50** **20.10**	1 40
				45	QOU145 QOU145B	**21.50** **20.10**	1 40
				50	QOU150 QOU150B	**21.50** **20.10**	1 40
				60	QOU160 QOU160B	**21.50** **20.10**	1 40
				70	QOU170 QOU170B	**41.50** **37.80**	1 40
Two	Thermal-Magnetic Circuit Breaker	10,000 AIR	120/240 Vac	10	QOU210 QOU210B	**46.40** **44.60**	1 20
				15	QOU215 QOU215B	**46.40** **44.60**	1 20
			240 Vac	15	QOU215H QOU215HB	**90.00** **85.00**	1 20
			120/240 Vac	20	QOU220 QOU220B	**46.40** **44.60**	1 20
			240 Vac	20	QOU220H QOU220HB	**90.00** **85.00**	1 20
Two	Thermal-Magnetic Circuit Breaker	10,000 AIR	120/240 Vac	25	QOU225 QOU225B	**$ 46.40** **44.60**	1 20
			240 Vac	25	QOU225H QOU225HB	**90.00** **85.00**	1 20
			120/240 Vac	30	QOU230 QOU230B	**46.40** **44.60**	1 20
			240 Vac	30	QOU230H QOU230HB	**90.00** **85.00**	1 20
			120/240 Vac	35	QOU235 QOU235B	**46.40** **44.60**	1 20
				40	QOU240 QOU240B	**46.40** **44.60**	1 20
				45	QOU245 QOU245B	**46.40** **44.60**	1 20
				50	QOU250 QOU250B	**46.40** **44.60**	1 20
	Non-Auto Switch	N/A	240Vac	60	QOU200 QOU200B	**46.40** **44.60**	1 20
	Thermal-Magnetic Circuit Breaker	10,000 AIR	120/240 Vac	60	QOU260 QOU260B	**46.40** **44.60**	1 20
				70	QOU270 QOU270B	**92.00** **90.00**	1 20
Three	Thermal-Magnetic Circuit Breaker	10,000 AIR	240 Vac	10	QOU310 QOU310B	**153.00** **150.00**	1 40
				15	QOU315 QOU315B	**153.00** **150.00**	1 40
				20	QOU320 QOU320B	**153.00** **150.00**	1 40
				25	QOU325 QOU325B	**153.00** **150.00**	1 40
				30	QOU330 QOU330B	**153.00** **150.00**	1 40
				35	QOU335 QOU335B	**153.00** **150.00**	1 40
				40	QOU340 QOU340B	**153.00** **150.00**	1 40
				45	QOU345 QOU345B	**153.00** **150.00**	1 40
				50	QOU350 QOU350B	**153.00** **150.00**	1 40
				60	QOU360 QOU360B	**153.00** **150.00**	1 40
	Non-Auto Switch	N/A	240Vac	60	QOU300 QOU300B	**153.00** **150.00**	1 40

□ UL Recognized Component, Supplementary Protector.

Note: See ordering instructions (page 5-37), all catalog numbers ending in B must be ordered in bulk package quantities.

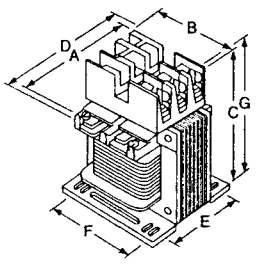
Low Amp QOU Accessories (10 – 60 Amp)

Description	Catalog Number	Unit Price	Order Qty.
4-pole Jumper Bar Assy. W/Front Wiring With Base, Cover and Screw	QOU14100JBAF	**$39.10**	1
Single Phase, 4-pole, 100A Jumper Bar Base with Front Wiring	QOU14100BAFB	**28.10**	40
Single Phase, 4-pole, 100A Jumper Bar Base with Left Side Wiring	QOU14100BALB	**28.10**	40
Single Phase 4-pole, 100A Jumper Bar Base with Right Side Wiring	QOU14100BARB	**28.10**	40
4-pole Jumper Bar Assy. w/Left Sside Wiring with Base, Cover and Screw	QOU14100JBAL	**39.10**	1
4-pole Jumper Bar Cover.	QOU14100CAB	**7.00**	80
Mounting Screw for Jumper Bar Cover	QOU1CMSB	**0.20**	80
6-pole Jumper Bar Assy. W/Front Wiring With Base, Cover and Screw	QOU16150JBAF	**52.10**	1
Single Phase, 6-pole, 150A Jumper Bar Base with Front Wiring	QOU16150BAFB	**36.50**	40
Single Phase, 6-pole, 150A Jumper Bar Base with Left Side Wiring	QOU16150BALB	**36.50**	40
Single Phase, 6-pole, 150A Jumper Bar Base with Right Side Wiring	QOU16150BARB	**36.50**	40
4-Pole jumper bar assy. w/Right Side Wiring with Base, Cover and Screw.	QOU1600JBAR	**52.10**	1
6-pole Jumper Bar Cover	QOU16150CAB	**9.20**	80
Vertical Rainproof Cover 2- & 3-pole QO, QOU, Q2, EH FA and KA	BCV▲ BCVB▲	**16.40** **14.40**	1 10

Description	Catalog Number	Unit Price	Std. Qty.
Horizontal Rainproof Cover 2-pole QO, QOU, Q2, EH and 3-pole Q2, EH	BCH▲ BCHB▲	**$16.40** **14.40**	1 10
1-pole Finger Safe Cover For High Amp QOU	QOUHFSC1 QOUHFSC1B	**1.30** **0.80**	1 80
1-pole Finger Safe Cover For Low Amp QOU	QOULFSC1 QOULFSC1B	**1.30** **0.80**	1 80
Cover Plate for One 2-pole QOU Circuit Breaker	QOUCP2 QOUCP2B	**4.40** **3.60**	1 80
Cover Plate for One 3-pole QOU Circuit Breaker	QOUCP3 QOUCP3B	**8.30** **6.70**	1 80
Cover Plate for Two 2-pole QOU Circuit Breakers	QOUCP4 QOUCP4B	**5.20** **4.20**	1 80
Cover Plate for Three 2-pole QOU Circuit Breakers	QOUCP6 QOUCP6B	**8.20** **6.50**	1 80
Quick Connector End Connection Wiring	QOUEC QOUECB	**3.00** **2.30**	1 80
Quick Connector Forward or Reverse Wiring	QOUFR QOUFRB	**3.00** **2.30**	1 80
1-pole QOU Mounting Foot	QOUMF1▲ QOUMF1B▲	**0.40** **0.30**	1 80
2-pole QOU Mounting Foot	QOUMF2▲ QOUMF2B▲	**0.70** **0.60**	1 80
3-pole QOU Mounting Foot	QOUMF3▲ QOUMF3B▲	**1.10** **0.80**	1 80

▲ For use on low and high amp QOU.

DE2 | Discount Schedule



Type TF: Factory Installed Primary and Secondary Fusing

Voltage Code D1

UL/CSA VA	CE VA	Type	D1 240 X 480 120	Dimension Accessory KEY
50	50	TF50	$ 50.00	I
75	75	TF75	56.00	I
100	100	TF100	61.00	I
150	150	TF150	65.00	I
200	200	TF200	77.00	I
250	160	TF250	87.00	I
300	200	TF300	95.00	I
350	250	TF350	100.00	I
500	300	TF500	120.00	I
750	500	TF750	161.00	I
1000	750	TF1000	194.00	I
1500	1000	TF1500	269.00	I
2000	1500	TF2000	324.00	I

Voltage Code D2, D3 and D5

UL/CSA VA	CE VA	Type	D2 240 x 480 24	D3 208 120	D5 600 120	Dimension Accessory KEY
50	50	TF50	$ 56.00	$ 56.00	$ 56.00	I
100	100	TF100	70.00	70.00	70.00	I
150	150	TF150	84.00	84.00	84.00	I
300	200	TF300	129.00	129.00	129.00	I
500	300	TF500	158.00	158.00	158.00	I

Voltage Code D23

UL/CSA VA	CE VA	Type	D23 120/240 24	Dimension Accessory KEY
50	50	TF50	$ 56.00	I
75	75	TF75	64.00	I
100	100	TF100	70.00	I
150	150	TF150	84.00	I
200	200	TF200	89.00	I
250	160	TF250	116.00	I
300	200	TF300	129.00	I
350	250	TF350	131.00	I
500	300	TF500	158.00	I

Voltage Code D20

UL/CSA VA	CE VA	Type	D20 208/230/460 115	Dimension Accessory KEY
50	50	T50	$ 82.00	II
100	100	T100	89.00	II
150	150	T150	109.00	II
200	200	T200	134.00	II
300	200	T300	166.00	II
500	300	TF500	185.00	II

Dimensions

VA Key I	VA Key II	VA Key III	Figure	A	B	C	D▲	E	F	G★	SLOT
25 VA	...	...	3	3.09	3.00	4.00	3.84	2.00	2.50	4.20	.20 x .38
...	...	25 VA	3	4.00	3.43	4.00	4.80	2.00	2.50	4.20	.20 X .48
50 VA	25 VA	...	3	3.09	3.00	4.00	3.84	2.00	2.50	4.20	.20 x .38
...	...	50 VA	3	4.19	3.43	4.25	4.99	2.38	2.81	4.45	.20 X .48
75 VA	50 VA	...	3	3.34	3.38	4.25	4.09	2.38	2.81	4.45	.20 X .48
...	75 VA	...	3	3.59	3.75	4.55	4.34	2.88	3.13	4.75	.20 x .38
...	...	75 VA	3	4.88	3.75	4.55	5.68	2.88	3.13	4.75	.20 x .38
100 VA	...	...	3	3.34	3.38	4.25	4.09	2.38	2.81	4.45	.20 X .48
...	...	100 VA	3	4.88	3.75	4.55	5.68	2.88	3.13	4.75	.20 x .38
150 VA	100 VA	...	3	3.59	3.75	4.55	4.34	2.88	3.13	4.75	.20 x .38
200 VA	150 VA	...	3	3.59	3.75	4.55	4.34	2.88	3.13	4.75	.20 x .38
250 VA	...	150 VA	3	5.25	3.75	4.55	6.05	2.88	3.13	4.75	.20 x .38
300 VA	200 VA	200 VA	3	4.70	4.50	5.10	5.50	2.56	3.75	5.30	.20 x .38
350 VA	250 VA	250 VA	3	5.09	4.50	5.10	5.89	3.00	3.75	5.30	.20 x .38
...	300 VA	...	3	5.09	4.50	5.10	5.89	3.00	3.75	5.30	.20 x .38
...	...	300 VA	3	5.46	4.50	5.10	6.26	3.56	3.75	5.30	.20 x .38
500 VA	350 VA	...	3	5.46	4.50	5.10	6.26	3.56	3.75	5.30	.20 x .38
...	...	350 VA	3	5.46	4.50	5.10	6.26	3.56	3.75	5.30	.20 x .38
750 VA	500 VA	500 VA	3	5.66	5.25	5.73	6.46	3.43	4.38	5.93	.28 X .56
1000 VA	750 VA	750 VA	3	6.04	5.25	5.73	6.84	4.31	4.38	5.93	.28 X .56
1500 VA	1000 VA	1000 VA	3	5.81	7.06	7.46	6.61	4.13	5.81	7.66	.28 X .56
2000 VA	1500 VA	1500 VA	3	7.04	7.06	7.46	7.84	4.56	5.81	7.66	.28 X .56

▲ Dimensions with fingersafe covers installed.
★ Dimensions with fuse pullers installed.

Field Installed Fuse Options

Primary And Secondary Fusing

Catalog	List Price	Accessory Key		
9070FB-3A	$26.40	I: 25-200VA	II: 25-150VA	
9070FB-3B	26.40	I:250-2000VA	II: 200-1500VA	III: 25-1500VA

Primary Fusing

Catalog	List Price	Accessory Key		
9070FB-2A	$22.70	I: 25-200VA	II: 25-150VA	
9070FB-2B	22.70	I:250-2000VA	II: 200-1500VA	III: 25-1500VA

Secondary Fusing

Catalog	List Price	Accessory Key		
9070FB-1A	$15.80	I: 25-200VA	II: 25-150VA	
9070FB-1B	15.80	I:250-2000VA	II: 200-1500VA	III: 25-1500VA
9070SF25A	6.60	I: 25-200VA	II: 25-150VA	
9070SF25B	6.60	I:250-2000VA	II: 200-1500VA	III: 25-1500VA
9070SF41A▲	5.40	I: 25-200VA	II: 25-150VA	
9070SF41B▲	5.40	I:250-2000VA	II: 200-1500VA	III: 25-1500VA

▲ Only used on single secondary voltage codes

Fuse Pulles (use on TF, and FB accessory)

Catalog	List Price
9070FP-1	$9.90

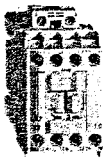
Factory Installed Secondary Fuse Clips

D1:240 x 480-120

UL/CSA VA	CE VA	Catalog Number	List Price
50	50	9070T50D1SF41	$ 40.30
100	100	9070T100D1SF41	52.00
150	150	9070T150D1SF41	55.00
250	160	9070T250D1SF41	79.00
500	300	9070T500D1SF41	113.00
750	500	9070T750D1SF41	154.00

How to Order:

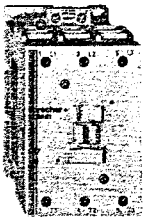
To Order Specify:	Catalog Number		
	Class	Type	Voltage Code
● Class Number ● Type Number ● Voltage Code	9070	TF500	D1



Cat. No. CA7-23-10

Cat. No. CA7-37-00

Cat. No. CA7-43-00



Cat. No. CA7-85-00

I_e		Ratings for Switching AC Motors AC-2, AC-3, AC-4										Total Auxiliary Contacts Installed			
[A]		kW (50 Hz)				UL/CSA HP (60 Hz)									
						1 Ø			3 Ø						
AC-3 460V	AC-1 40°C	230V	415V 400V	500V	690V	115V	230V	200V	230V	460V	575V	N.O.	N.C.	Cat. No.	★
9	32	3	4	4	4	1/3	1	2	2	5	7-1/2	1	0	CA7-9-10-*	
												0	1	CA7-9-01-*	
12	32	4	5.5	5.5	5.5	1/2	2	3	3	7-1/2	10	1	0	CA7-12-10-*	
												0	1	CA7-12-01-*	
16	32	5.5	7.5	7.5	7.5	1	3	5	5	10	10	1	0	CA7-16-10-*	
												0	1	CA7-16-01-*	
23	32	7.5	11	11	11	2	3	5	7-1/2	15	15 ❶	1	0	CA7-23-10-*	
												0	1	CA7-23-01-*	
30	50	10	15	15	15	2	5	7-1/2	10	20	20	0	0	CA7-30-00-*	
												1	0	CA7-30-10-*	
												0	1	CA7-30-01-*	
37	50	11	18.5	18.5	18.5	3	5	10	10	25	25	0	0	CA7-37-00-*	
												1	0	CA7-37-10-*	
												0	1	CA7-37-01-*	
43	85	13	22	22	22	3	7-1/2	10	15	30	30	0	0	CA7-43-00-*	
												1	0	CA7-43-10-*	
												0	1	CA7-43-01-*	
60	100	18.5	30	30	30	5	10	15	20	40	40	0	0	CA7-60-00-*	
												1	0	CA7-60-10-*	
												0	1	CA7-60-01-*	
72	100	22	37	37	37	5	15	20	25	50	50	0	0	CA7-72-00-*	
												1	0	CA7-72-10-*	
												0	1	CA7-72-01-*	
85	100	25	45	45	45	7-1/2	15	25	30	60	60	0	0	CA7-85-00-*	
												1	0	CA7-85-10-*	
												0	1	CA7-85-01-*	

❶ 16.8A maximum

* Voltage Suffix Code and Terminal Position

The Cat. No. as listed is incomplete. Select a voltage suffix code from the table below to complete the Cat. No.
Example: 120V, 60HZ: **Cat. No. CA7-9-10-*** becomes **Cat. No. CA7-9-10-120.**

Standard Coil AC Voltages ❷

	AC Control Voltage													
	24	110	120	220	208	208-240	240	277	380-400	400-415	440	480	550	600
Suffix Code for 50Hz ➡	24A	120		240			277		380	415	480		600	
Suffix Code for 60Hz ➡	24B		120		208	220W	240	277			380	480		600

Coil Terminal Position

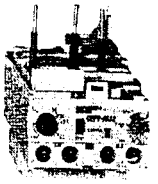
– All contactors are delivered with the coil terminals located on the **line side** (above).
– For **load side** (below) coil terminations, insert a **"U"** prior to the coil voltage code.
Ordering example: CA7-9-10-U120.

❷ For other voltages, contact your local sales office.

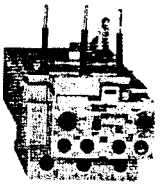
Cat. No. CA7-9-10-

Cat. No. CA7-9-10-U-

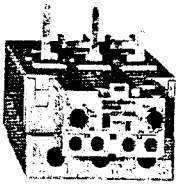
Manual Reset



Cat. No. CEP7-M32-32-10



Cat. No. CEP7-M45-45-10

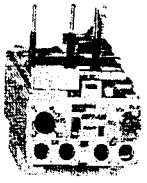


Cat. No. CEP7-M85-85-10

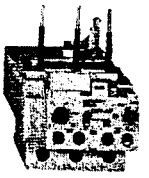
	Mounts to Contactor	Reset ❶	Adjustment Range (A)	Trip Class 10 Cat. No.	★	Trip Class 20 Cat. No.	★
Manual Reset for 3∅ Applications ❸							
3∅ Only	CA4-9...CA7-23	M	0.1...0.32	CEP7-M32-0.32-10		CEP7-M32-0.32-20	
		M	0.32...1.0	CEP7-M32-1.0-10		CEP7-M32-1.0-20	
		M	1.0...2.9	CEP7-M32-2.9-10		CEP7-M32-2.9-20	
		M	1.6...5.0	CEP7-M32-5-10		CEP7-M32-5-20	
		M	3.7...12	CEP7-M32-12-10		CEP7-M32-12-20	
		M	12...32	CEP7-M32-32-10		CEP7-M32-32-20	
	CA7-30...37	M	12...37	CEP7-M37-37-10		CEP7-M37-37-20	
	CA7-43	M	14...45	CEP7-M45-45-10		CEP7-M45-45-20	
	CA7-60...85	M	26...85	CEP7-M85-85-10		CEP7-M85-85-20	
Manual Reset for 1∅ Applications ❸							
1∅ Only	CA4-9...CA7-23	M	2.0...7.0	CEP7S-M32-7-10		CEP7S-M32-7-20	
		M	5.0...15	CEP7S-M32-15-10		CEP7S-M32-15-20	
		M	12...32	CEP7S-M32-32-10		CEP7S-M32-32-20	
	CA7-30...37	M	12...37	CEP7S-M37-37-10		CEP7S-M37-37-20	
	CA7-43	M	14...45	CEP7S-M45-45-10		CEP7S-M45-45-20	
	CA7-60...85	M	26...85	CEP7S-M85-85-10		CEP7S-M85-85-20	

❶ M = Manual

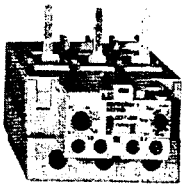
Automatic/Manual Reset



Cat. No. CEP7-A32-32-10



Cat. No. CEP7-A45-45-10



Cat. No. CEP7-A85-85-10

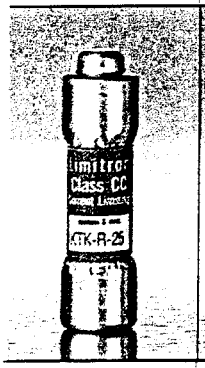
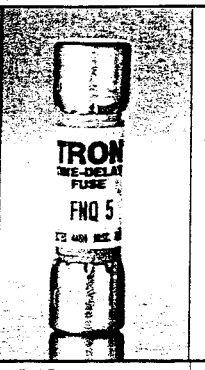
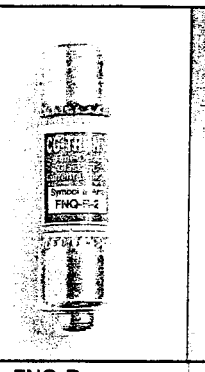
	Mounts to Contactor	Reset ❷	Adjustment Range (A)	Trip Class 10 Cat. No.	★	Trip Class 20 Cat. No.	★
Automatic/Manual Reset for 3∅ Applications ❸							
3∅ Only	CA4-9...CA7-23	A	0.1...0.32	CEP7-A32-0.32-10		CEP7-A32-0.32-20	
		A	0.32...1.0	CEP7-A32-1.0-10		CEP7-A32-1.0-20	
		A	1.0...2.9	CEP7-A32-2.9-10		CEP7-A32-2.9-20	
		A	1.6...5.0	CEP7-A32-5-10		CEP7-A32-5-20	
		A	3.7...12	CEP7-A32-12-10		CEP7-A32-12-20	
		A	12...32	CEP7-A32-32-10		CEP7-A32-32-20	
	CA7-30...37	A	12...37	CEP7-A37-37-10		CEP7-A37-37-20	
	CA7-43	A	14...45	CEP7-A45-45-10		CEP7-A45-45-20	
	CA7-60...85	A	26...85	CEP7-A85-85-10		CEP7-A85-85-20	
Automatic/Manual Reset for 1∅ Applications ❸							
1∅ Only	CA4-9...CA7-23	A	2.0...7.0	CEP7S-A32-7-10		CEP7S-A32-7-20	
		A	5.0...15	CEP7S-A32-15-10		CEP7S-A32-15-20	
		A	12...32	CEP7S-A32-32-10		CEP7S-A32-32-20	
	CA7-30...37	A	12...37	CEP7S-A37-37-10		CEP7S-A37-37-20	
	CA7-43	A	14...45	CEP7S-A45-45-10		CEP7S-A45-45-20	
	CA7-60...85	A	26...85	CEP7S-A85-85-10		CEP7S-A85-85-20	

❷ A = Automatic/Manual

❸ 3∅ CEP units are only designed for 3∅ applications. 1∅ CEP units are only designed for 1∅ applications.

Ferrule Fuses

$13/32" \times 1\frac{1}{2}"$

Non-Time-Delay	Dual-Element Time-Delay			
				
KTK-R	**FNM**	**FNQ**	**FNQ-R**	**FNW**
KTK with rejection feature. U.L. Class CC. Branch circuit fuse. (See Section 1-15.)	Fusetron. Fibre. For circuits with high inrush currents.	For motor control transformers & other circuits with inrush I's. 10,000 AIC. Dual element to $3^2/_{10}$A; single element above $3^2/_{10}$A.	For motor transformers. Interrupting Rating 200,000 AIC. U.L. Class CC (See Section 1-15A)	Fibre. For motor control transformers & other circuits with inrush I's. 10,000 AIC.
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–
KTK-R-1/10 600V[U]	FNM-1/10 250V[UC]	FNQ-1/10 500V[UC]	–	–
KTK-R-1/8 600V[U]	–	FNQ-1/8 500V[UC]	–	–
–	FNM-15/100 250V[UC]	FNQ-15/100 500V[UC]	–	–
–	–	–	–	–
KTK-R-2/10 600V[U]	FNM-2/10 250V[UC]	FNQ-2/10 500V[UC]	–	–
–	–	FNQ-3/16 500V[UC]	–	–
KTK-R-1/4 600V[U]	FNM-1/4 250V[UC]	FNQ-1/4 500V[UC]	FNQ-R-1/4 600V[UC]	–
KTK-R-3/10 600V[U]	FNM-3/10 250V[UC]	FNQ-3/10 500V[UC]	FNQ-R-3/10 600V[UC]	–
–	–	–	–	–
–	FNM-4/10 250V[UC]	FNQ-4/10 500V[UC]	FNQ-R-4/10 600V[UC]	–
KTK-R-1/2 600V[U]	FNM-1/2 250V[UC]	FNQ-1/2 500V[UC]	FNQ-R-1/2 600V[UC]	–
–	FNM-5/10 250V[UC]	FNQ-5/10 500V[UC]	FNQ-R-5/10 600V[UC]	–
KTK-R-3/4 600V[U]	–	–	FNQ-R-3/4 600V[UC]	–
–	FNM-6/10 250V[UC]	FNQ-6/10 500V[UC]	FNQ-R-6/10 600V[UC]	–
KTK-R-1 600V[U]	FNM-1 250V[UC]	FNQ-1 500V[UC]	FNQ-R-1 600V[UC]	–
–	–	–	–	–
–	FNM-1 1/8 250V[UC]	FNQ-1 1/8 500V[UC]	FNQ-R-1 1/8 600V[UC]	–
–	FNM-1 1/4 250V[UC]	FNQ-1 1/4 500V[UC]	–	–
–	FNM-1 4/10 250V[UC]	–	FNQ-R-1 4/10 600V[UC]	–
KTK-R-1 1/2 600V[U]	FNM-1 1/2 250V[UC]	FNQ-1 1/2 500V[UC]	FNQ-R-1 1/2 600V[UC]	–
–	FNM-1 5/10 250V[UC]	FNQ-1 5/10 500V[UC]	FNQ-R-1 5/10 600V[UC]	–
–	FNM-1 6/10 250V[UC]	–	FNQ-R-1 6/10 600V[UC]	–
KTK-R-2 600V[U]	FNM-2 250V[UC]	FNQ-2 500V[UC]	FNQ-R-2 600V[UC]	–
–	FNM-2 1/4 250V[UC]	FNQ-2 1/4 500V[UC]	FNQ-R-2 1/4 600V[UC]	–
–	FNM-2 1/2 250V[UC]	FNQ-2 1/2 500V[UC]	FNQ-R-2 1/2 600V[UC]	–
–	FNM-2 8/10 250V[UC]	–	FNQ-R-2 8/10 600V[UC]	–
KTK-R-3 600V[U]	FNM-3 250V[UC]	FNQ-3 500V[UC]	FNQ-R-3 600V[UC]	–
–	FNM-3 3/10 250V[UC]	FNQ-3 3/10 500V[UC]	FNQ-R-3 3/10 600V[UC]	–
–	FNM-3 1/2 250V[UC]	FNQ-3 1/2 500V[UC]	FNQ-R-3 1/2 600V[UC]	–
KTK-R-4 600V[U]	FNM-4 250V[UC]	FNQ-4 500V[UC]	FNQ-R-4 600V[UC]	–
–	FNM-4 1/2 250V[UC]	FNQ-4 1/2 500V[UC]	–	–
KTK-R-5 600V[U]	FNM-5 250V[UC]	FNQ-5 500V[UC]	FNQ-R-5 600V[UC]	–
–	FNM-5 5/10 250V[UC]	FNQ-5 5/10 500V[UC]	–	–
KTK-R-6 600V[U]	FNM-6 250V[UC]	FNQ-6 500V[UC]	FNQ-R-6 600V[UC]	–
–	FNM-6 1/4 250V[UC]	FNQ-6 1/4 500V[UC]	FNQ-R-6 1/4 600V[UC]	–
KTK-R-7 600V[U]	FNM-7 250V[UC]	FNQ-7 500V[UC]	FNQ-R-7 600V[UC]	–
–	–	–	FNQ-R-7 1/2 600V[UC]	–
KTK-R-8 600V[U]	FNM-8 250V[UC]	FNQ-8 500V[UC]	FNQ-R-8 600V[UC]	–
KTK-R-9 600V[U]	FNM-9 250V[UC]	FNQ-9 500V[UC]	FNQ-R-9 600V[UC]	–
KTK-R-10 600V[U]	FNM-10 250V[UC]	FNQ-10 500V[UC]	FNQ-R-10 600V[UC]	–
KTK-R-12 600V[U]	FNM-12 125V[U]	FNQ-12/14 500V[UC]	–	FNW-12 250V[U]
KTK-R-15 600V[U]	FNM-15 125V[UC]	FNQ-15 500V[UC]	–	FNW-15 250V[U]
KTK-R-20 600V[U]	FNM-20 32V	FNQ-20 500V[U]	–	FNW-20 250V[U]
KTK-R-25 600V[U]	FNM-25 32V	FNQ-25 500V[U]	–	FNW-25 250V[U]
KTK-R-30 600V[U]	FNM-30 32V	FNQ-30 500V[U]	–	FNW-30 250V[U]

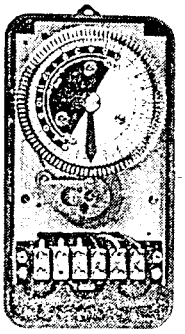
[U]U.L. Listed. [R]U.L. Recognized under Component Program. [C]CSA Listed.

1015, 1215 and 42010 Series

15 Minute Intervals
One to 48 ON/OFF Operations per Day

15-minute multiple interval timer with adjustable dial and 96 self-contained trippers for one to 48 ON/OFF operations per day. 15 minute minimum and 23 3/4 hour maximum ON or OFF time. Skip-a-day feature allows schedule to be omitted on any day or days of the week without permanently disturbing preset schedule. Heavy duty industrial type synchronous motor. Standard NEMA 3 indoor/outdoor metal enclosure side hinged with combination 1/2-3/4 inch knockouts in bottom and sides. Hasp for padlock or seal.

1215 Series: Spring wound carry-over takes over during power outage, keeping control running until power resumes. Carry-over has 10-hour reserve requiring only two hours wind up for each hour of power outage.



1015 Series

1215 Series

Applications

• Oil Well Pumps • Poultry Feeders • Process Equipment • Music Systems • Fans • Heaters • Blowers • Silo Unloaders

How to Specify

Installer shall furnish and install Paragon (Model No.) 15-Minute Multiple Interval Time Control with 24-hour dial and (SPDT, SPST, DPST) switch. Isolated contacts to be rated at (10 amps at 120 volts, 5 amps at 208-240 volts, 5 amps at 480 volts) 125 VA pilot duty. Control shall have skip-a-day feature. Control shall have NEMA 3 indoor/outdoor metal enclosure. 1215 Series: Control shall have spring wound carry-over.

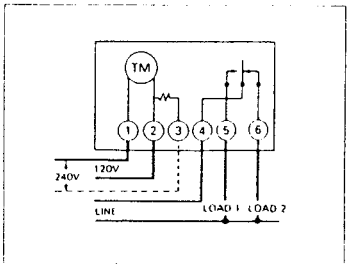
42010 Series

Time Control Model No.	EDP No. #4988-	Switch Type	Switch Rating Per Pole: Amp	VA	hp	Wiring Diag. #	AC Line: Volts	Hz	Enc Type NEMA	Shipping Wgt.: Lb.	Kg.
1015 Series - With Skip-a-day -allows schedule to be omitted on any day or days of the week without permanently disturbing preset schedule											
1015-00RS	21020	SPDT	10			1	120	60	3	9	4.1
			5	125			208-240				
1015-00RSB	21045	SPDT	10			1	120	60	-	8-1/2	3.9
			5	125			208-240				
1015-40TS	21040	SPDT	5	125		2	480	60	3	9	4.1
1015-40TSB	21042	SPDT	5	125		2	480	60	-	8-1/2	3.9
1215 Series - With spring wound carry-over.											
1215-00RS	21070	SPDT	10	125		1	120	60	3	10	4.5
			5	125			208-240	60			
42010 Series											
42011-00	22320	SPST	15	345	1	3	120	60	3	7	3.2
*42011-20	22328	SPST	10	345	1	3	208-240	60	3	7	3.2
42013-00	22340	DPST	15	345	1	4	120	60	3	7	3.2
42013-20	22348	DPST	10	345	2	4	208-240	60	3	7	3.2

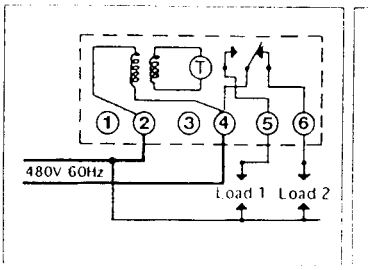
*Available in 50 Hz

Models with suffix "B" are recognized under the component program of UL and CSA.

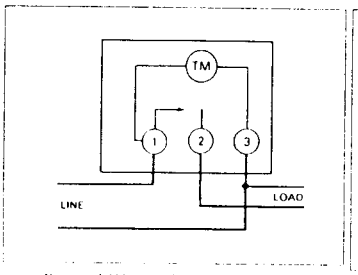
For enclosure dimensions, see page 45.



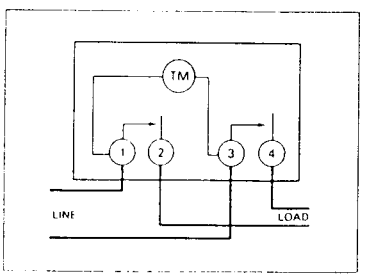
Typical Wiring Diagram #1: SPDT



Typical Wiring Diagram #2: SPDT



Typical Wiring Diagram #3: SPST



Typical Wiring Diagram #4: DPST

Toggle Switches

RATINGS	CIRCUIT	TOGGLE POSITION			CATALOG NUMBER TYPE OF TERMINATION			
		UP	CENTER	DOWN (keyway)	.187 Q.C.	SCREW	.250 Q.C.	SOLDER LUG
7100 SERIES TOGGLE								
6A-125VAC 3A-250VAC	SPST	ON	NONE	OFF	7105A	7105B	7105C	7105D
		(ON)	NONE	OFF	7135A	7135B	7135C	7135D
		ON	NONE	(OFF)	7145A	7145B	7145C	7145D
	SPDT	ON	NONE	ON	7101A	7101B	7101C	7101D
		ON	OFF	ON	7102A	7102B	7102C	7102D
		(ON)	NONE	ON	7151A	7151B	7151C	7151D
		(ON)	OFF	ON	7152A	7152B	7152C	7152D
		(ON)	OFF	(ON)	7162A	7162B	7162C	7162D
7000 SERIES TOGGLE								
15A-125VAC 10A-250VAC	SPST	ON	NONE	OFF	7005A	7005B	7005C	7005D
		(ON)	NONE	OFF	7035A	7035B	7035C	7035D
		ON	NONE	(OFF)	7045A	7045B	7045C	7045D
	SPDT	ON	NONE	ON	7001A	7001B	7001C	7001D
		ON	OFF	ON	7002A	7002B	7002C	7002D
		(ON)	NONE	ON	7051A	7051B	7051C	7051D
		(ON)	OFF	ON	7052A	7052B	7052C	7052D
		(ON)	OFF	(ON)	7062A	7062B	7062C	7062D
7200 SERIES TOGGLE								
20A-125VAC 10A-250VAC ¾ HP, 125-250VAC	SPST	ON	NONE	OFF	7205A	7205B	7205C	7205D
		(ON)	NONE	OFF	7235A	7235B	7235C	7235D
		ON	NONE	(OFF)	7245A	7245B	7245C	7245D
	SPDT	ON	NONE	ON	7201A	7201B	7201C	7201D
		ON	OFF	ON	7202A	7202B	7202C	7202D
		(ON)	NONE	ON	7251A	7251B	7251C	7251D
		(ON)	OFF	ON	7252A	7252B	7252C	7252D
		(ON)	OFF	(ON)	7262A	7262B	7262C	7262D

For .687 Toggle And .468 Bushing Length Add-100 To Part Number Specified
For Dust And Moisture Resistant Seal Add "S" To Part Number Specified *
* Standard Feature On Momentary Switches

( ) Denotes Momentary

SPECIFICATIONS

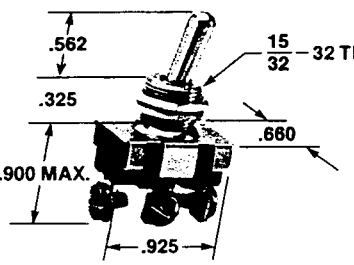
Agency Listings
CSA Certified

Contact Mechanism
Slow-Make/Slow-Break Butt Contact

Contact Material
7100 Series:
Stationary - Copper Alloy/Silver Plated
Movable - Copper Alloy
7000 And 7200 Series:
Stationary (Center) - Copper Alloy/Silver Plated
Stationary (End)-Silver Cadmium Oxide Composite
Movable-Silver Cadmium Oxide Composite

Dielectric Strength
1000 Volts RMS Minimum

Mounting Means
15/32" Diameter Threaded Bushing
Keyway .078-.083 Wide X .037-.043 Deep
Standard Hardware Supplied —
One Hex Nut Assembled And
One Hex Nut Unassembled.



LEESON ELECTRIC CORPORATION

BOX 241 GRAFTON, WISCONSIN 53024 U S A

GENERAL INSTALLATION & OPERATING INSTRUCTIONS

Before Operation – Before making electrical power connections check for proper grounding of motor and application. All electrical contacts and connections must be properly insulated and enclosed. Couplings, belts, chains or other mounted devices must be in proper alignment, balance and secure to insure safe motor operation.

Electrical Wiring – Prior to connecting to the power line check nameplate for proper voltage and rotation connection. This motor should be installed in compliance with the National Electrical Code and any other applicable codes. Voltage at motor not to exceed + or – 10% of nameplate voltage. Authorized person should make all electrical connections.

Lubrication – This motor is supplied with prelubricated ball bearings, lubricated for life of bearing.

Mounting – This motor should be securely mounted to the application. Sufficient ventilation area should be provided to insure proper operation.

Service – If mechanical or electrical failure occurs, first check for proper electrical connections, fusing or unusual binding of mechanical connections. If unable to correct problem, contact firm from whom machine (or motor) was purchased. DESCRIBE PROBLEM AND INCLUDE COMPLETE NAMEPLATE DATA.

Always specify genuine Leeson replacement parts

RENSEIGNEMENTS GENERAUX D'INSTALLATION ET DE FONCTIONNEMENT

Avant la mise en service – Avant d effectuer les raccordements au reseau de l energie verifier si les mises à la terre du moteur et de l appareil entraine sont faites correctement. Tous les contacts et connexions electriques doivent être correctement isoles et enveloppés. Les accouplements, courroies, chaines ou autres accessoires installés doivent être bien alignes, balancés et bien fixés, afin d assurer le fonctionnement du moteur en toute securité.

Branchement électrique – Avant de raccordor a la source d energie, verifier la plaque signalétique du moteur afin que le raccordement soit fait pour la bonne tension et le sens de rotation requis. Ce moteur doit être installé en conformite au Code Electrique National et tous les autres codes applicables. La tension au moteur ne doit pas être plus ou moins de 10% de la tension indiquee sur la plaque signalétique. Seulement une personne autorisee doit faire toutes les connexions électriques.

Lubrification – Ce moteur est pourvu de roulements à billes pré-lubrifiés, lubrifiés pour la duree de vie du palier.

Fixation – Ce moteur doit être fermement et securitairement fixé au bâti ou et à l appareil entraîné. Une aire de ventilation suffisante est requise pour assurer le bon fonctionnement du moteur.

Service – Si un manquement mecanique ou électrique se produit, verifier d abord les raccords électriques, les fusibles, ou les raccords mécaniques pouvant avoir une tension inusitee. Si le manque ne peut être corrige en place, communiquer avec l établissement duquel vous avez achete la machinerie (ou le moteur). DÉCRIVEZ LE PROBLÈME ET INCLURE LES RENSEIGNEMENTS COMPLETS DE LA PLAQUE SIGNALETIQUE.

Toujours specifier des pièces de rechange authentique Leeson

LEESON ELECTRIC MOTORS

004054

STATEMENT OF WARRANTY

Leeson Electric Corporation guarantees all motors manufactured by it to be free from defects in workmanship and materials when operated under normal conditions and in accordance with nameplate characteristic limits. This warranty shall be in effect for a period of twelve months from date of installation, but shall in no event be in effect for more than twenty-four months from date of manufacture. THIS WARRANTY SHALL BE IN LIEU OF ANY OTHER WARRANTY, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Leeson Electric Corporation will repair or replace, at its option, any motor which has been found to be defective and is within the warranty period, provided that the motor is shipped, with previous factory authorization, freight prepaid, to Leeson's plant in Grafton, Wisconsin, U.S.A., or to Leeson's nearest authorized service station. All return shipments are made F.O.B. Leeson's factory or service station. Leeson is not responsible for removal, installation, or any other incidental expenses incurred in shipping the motor to or from Leeson.

Leeson Electric Corporation's liability under this warranty shall be solely limited to repair or replacement of the motor within the warranty period, and Leeson shall not be liable, under any circumstances, for consequential or incidental damages, including, but not limited to, personal injury or labor cost.

Under no circumstances will Leeson Electric Corporation be responsible for any expense in connection with any repairs made by anyone other than the factory or an authorized service station, unless such repairs have been specifically authorized in writing.

ATTESTATION DE GARANTIE

La Corporation Leeson Electrique garantit tous les moteurs de sa fabrication comme étant libre de tout vice de fabrication, si ils sont utilisés dans des conditions normales et selon les limites caractéristiques de la plaque signalétique. Cette garantie est valable pour une durée de douze (12) mois de la date d'installation, mais en aucun cas elle ne dépassera vingt-quatre (24) mois de la date de fabrication. CETTE GARANTIE EXCLUT EXPRESSEMENT TOUT AUTRE GARANTIE EXPRESSE OU IMPLICITE ET EXCLUT TOUTE GARANTIE DE QUALITE MARCHANDE OU DE CONVENANCE A UN USAGE PARTICULIER.

La Corporation Leeson Electrique réparera ou remplacera, à sa discretion, tout moteur qui aura été trouvé défectueux pendant la période de garantie à condition que le moteur soit expédié, après en avoir reçu l'autorisation de l'usine, frais de transport payé soit à l'usine de Leeson à Grafton, Wisconsin, U.S.A. ou au centre de service le plus rapproché. Toutes les expéditions des moteurs réparés ou remplacés sont faites F.A.B. l'usine ou le Centre de Service. Leeson n'est pas responsable pour les dépenses de l'enlèvement du moteur, l'installation, et tout autres dépenses fortuites encourues en rapport à l'expedition et le retour du moteur.

La responsabilité de la Corporation Leeson Electrique, selon les conditions de cette garantie, se limite uniquement à la reparation ou au remplacement du moteur pendant la période de garantie et Leeson ne sera responsable, en aucune circonstance, pour les dommages fortuits subis, incluant, mais non limité aux blessures corporelles ou coûts de main d'oeuvre.

En aucune circonstance La Corporation Leeson Electrique ne sera responsable d'aucune dépense en rapport à des réparations faites par d'autres que l'usine ou un Centre de Service Autorisé à moins que de telles réparations aient été spécifiquement autorisées par écrit.

Always specify
genuine Leeson replacement parts

Toujours specifier
des pièces de rechange authentique Leeson

LEESON ELECTRIC CORPORATION
BOX 241 GRAFTON, WISCONSIN 53024 U.S.A.

SINGLE PHASE MOTORS

RIGID BASE • CAPACITOR START • GENERAL PURPOSE

LEESON

DRIP-PROOF

HP	RPM 60 Hz	NEMA Frame	Catalog Number	List Price	Disc Sym.	App Wgt (lbs.)	Voltage	Overload Prot.	F.L. Amps 230 V.	"C" Dim. (Inches)
1½	3450	56	**110361**	$281	A	29	115/208-230	None	8.6	10.88
	3450	56	**110110**	294	A	29	115/208-230	Man.	8.6	10.88
	3450	56	**113631**☆	305	A	36	115/208-230	Man.	6.7	11.38
	3450	143T	**120107**	281	B	32	115/208-230	None	8.6	11.28
	1725	56H	**110005**☆[ ]	343	A	45	115/208-230	None	8.6	11.88
	1725	56H	**110006**☆☐	374	A	45	115/208-230	Man.	8.6	11.88
	1725	56H	**113266**☆[ ]	411	A	42	115/208-230	Man.	6.7	12.38
	1725	...	...	...	...	...	...	...	...	...
	1725	145T	**120042**☆	325	B	40	115/208-230	None	8.6	12.28
	1725	145T	**120004**☆	374	B	39	115/208-230	Man.	8.6	12.28
	1725	145T	**120001**☆	409	B	45	115/208-230	Auto.	8.6	12.28
	1140	...	...	...	...	...	...	...	...	...
2	3450	56	**110363**	374	A	38	115/208-230	None	12.0	11.88
	3450	56	**110362**	397	A	38	115/208-230	Man.	12.0	12.38
	3450	56	**113632**☆	399	A	38	115/208 230	Man.	8.6	11.38
	3450	145T	**120106**	401	B	40	115/208-230	None	12.0	12.28
	3450	...	...	...	...	...	...	...	...	...
	1725	145T	**120067**☆	388	B	47	115/230	None	10.5	13.28
	1725	145T	**120005**☆	422	B	47	230	Man.	10.5	12.78
	1725	145T	**120879**☆	430	A	47	115/208-230	Man.	8.6	13.31
	1725	182T	131515	397	B	64	115/208-230	None	12.4	13.19
	1725	182T	131536	422	B	63	115/208-230	Man.	12.4	13.19
	1725	182T	131535	418	B	58	115/208-230	Auto.	12.4	13.19
3	3450	...	...	...	...	...	...	...	...	...
	3450	182T	131636	452	B	75	115/208-230	None	16.0	14.69
	1725	184T	131534	426	B	75	115/230	None	16.8	14.19
→	1725	184T	131561	503	B	75	115/230	Man.	16.8	14.19
	1725	184T	131530	499	B	75	115/230	Auto.	16.8	14.19
5	3450	184T	131616	538	B	84	230	None	26.5	15.69
	1725	184T	131537	510	B	82	230	None	21.0	14.69
	1725	184T	131560	510	B	82	208	None	23.2	14.69
	1725	184T	131622	611	B	85	230	Man.	21.0	14.69
7½	1725	215T	**140155**☆†	748	B	134	230	None	36.0	17.25
10	1725	215TZ	**140311**☆†✓	1061	B	162	230	None	43.0	20.75
	1725	...	...	...	...	...	...	...	...	...

TOTALLY ENCLOSED FAN COOLED (TEFC)

NEMA Frame	Catalog Number	List Price	Disc Sym.	App. Wgt. (lbs.)	Voltage	Overload Prot.	F.L. Amps 230V	"C" Dim (Inches)
56	**110094**	$320	A	34	115/208-230	None	8.5	12.31
56	**110109**	375	A	34	115/208-230	Man.	8.5	12.31
...	...	...	...	...	...	...	...	...
143T	**120130**	320	B	34	115/208-230	None	8.5	13.25
56H	**110253**☆☐	338	A	39	115/208-230	None	8.6	12.81
56H	**113333**☆[ ]	388	A	40	115/208-230	Man.	8.6	12.81
...	...	...	...	...	...	...	...	...
56H	**110019**☆☐	421	A	43	115/208-230	Auto.	8.6	12.81
145T	**120026**☆	338	B	42	115/208-230	None	8.6	13.25
145T	**120009**☆	388	B	40	115/208-230	Man.	8.6	13.25
...	...	...	...	...	...	...	...	...
184T	**130028**	881	B	76	115/208-230	None	11.0	15.38
56H	**110352**☐	417	A	44	115/208-230	None	10.0	13.31
56H	**110402**[ ]	439	A	44	115/208-230	Man.	10.0	13.31
...	...	...	...	...	...	...	...	...
145T	**120036**	417	B	44	115/208-230	None	10.0	13.75
145T	**120395**	439	B	44	115/208-230	Man.	10.0	13.75
...	...	...	...	...	...	...	...	...
145T	**120867**☆	552	B	45	115/208-230	Man.	9.2	13.75
...	...	...	...	...	...	...	...	...
182T	131509	479	B	70	115/208-230	None	12.4	13.47
...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...
145T	**120341**☆	450	B	48	230	None	14.0	13.75
182T	131637	490	B	77	115/208-230	None	17.5	15.97
184T	131533	559	B	91	115/230	None	16.8	15.47
...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...
184T	131549	676	B	107	230	None	24.0	16.97
184T	131538†	667	B	103	230	None	23.0	16.47
...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...
215T	**140120**†☆	882	B	176	230	None	33.6	20.13
...	...	...	...	...	...	...	...	...
215T	**140414**†☆	1145	B	202	230	Man.	40.0	20.63

☐ Combination 56H base motors have mounting holes for NEMA 56 and NEMA 143 5T and a standard NEMA 56 shaft.
☆ Capacitor start/capacitor run design for reduced amperage, others are capacitor start/induction run.
✓ Motor with standard diameter shaft, 1.0" longer than standard.
† Class F insulated.
❖ These totally enclosed single phase motors have 1.15 Service Factors.

QUICK REFERENCE

Catalog numbers in blue are NEW items.

NATIONAL METER INDUSTRIES INCORPORATED

Meters and Transducers

Series 2000
Series 4000
Series 7000

LINE 3 OFF

2 CT

Installation and
Owners Manual

Made in *U.S.A.*

WATT WATCHER

WARRANTY

National Meter Industries, Inc. warrants their meters to be free of any and all defects in materials and workmanship and will give satisfactory service for a period of 24 (twenty-four) months from date of purchase. If the meter should malfunction, a call must be made to our Customer Service Department, 1-800-325-6674 for verification. After verifying a meter malfunction, an Authorized Return Number (ARN) will be issued. Freight is to be prepaid with the (ARN) written on the Packing Slip.

After examination of the returned meter by N.M.I. Technicians proves the meter to be a warranteed failure, the meter will be repaired or replaced without charge.

This warranty is null and void if the meter shows evidence of having been tampered with, abused, connected to the wrong voltage or if our specifications were exceeded. (SEE SPECIFICATION BULLETIN) The customer will be notified by phone of any charges before repairs are made.

10 YEAR CALIBRATION CHECK

N.M.I. will, without charge, check and recalibrate (if necessary), any meter for a period of 10 (ten) years. These meters must be sent back to N.M.I. Factory using corresponding ARN, with freight and handling paid by customer in both directions.

Field Calibration Check is available. Consult Customer Service for charges. N.M.I. is not responsible for any damage or monetary losses, whether direct, indirect, incidental or consequential. Every precaution has been taken in the preparation of our manuals. N.M.I. takes no responsibility for errors or omissions in the installation of it's meters. All installations must be made by qualified electricians and follow all local and national codes that are applicable.

When Installing or Removing a Meter, De-energize All Voltage Circuits. If CT's are Installed Without Meter, Shunt Black and White Wires.

CONTENTS

INTRODUCTION

You now have in your possession one of the most reliable and highly accurate meters ever manufactured!
To insure proper installation and performance please take the time to read all of the manual pages that apply to the meter or transducer that you are installing. This installation must be performed by a licensed electrician. The installation information contained within this manual is to be used only as a guide for the installer and all applicable electrical codes MUST take precedence over information contained here within.
Thank you for putting your trust in a "WATT WATCHER" meter!
From the Employees at National Meter Industries, Inc.

WARNING

We recommend that all electrical circuits that you are working on be DE-ENERGIZED prior to installation of this meter. If this is not possible then any and all OSHA Safety Rules must apply when working on energized circuits. This installation must only be performed by a licensed electrician.

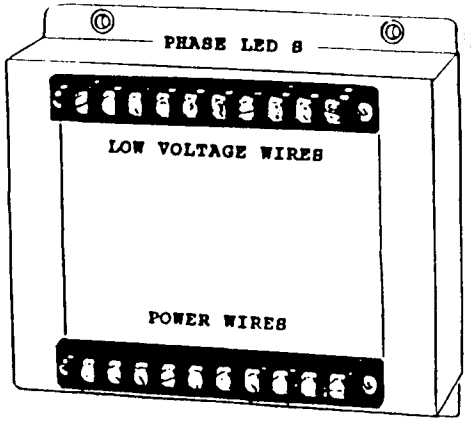
CHECK FOR SHIPPING DAMAGE

The "WATT WATCHER" meters are shipped in protective packaging. After unpacking the meter please check for obvious damage. If damaged, return the meter PROMPTLY to place of purchase.

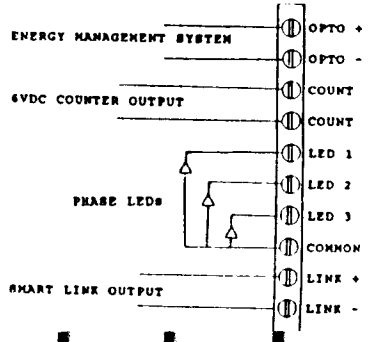
NOTICE TO INSTALLER

AFTER INSTALLATION THIS MANUAL MUST BE LEFT WITH THE METER. THANK YOU.

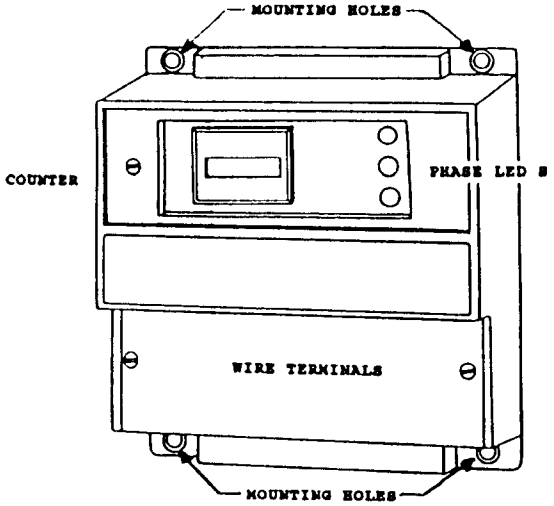
SERIES 2000 WATT HOUR TRANSDUCER



The Series 2000 Watt Hour Transducer is designed to monitor the energy consumption on single and three phase loads, and are operated by either current or voltage transformers. Models are available which will accommodate up to 480 volts.
These Transducers are most often used as watt hour pulse generators for energy management systems. These transducers are also used for reading kilowatt hours and operating counters in remote locations.
The phase LEDs attached to the terminals will flash when a load is applied to the circuit being monitored. The LEDs can be located elsewhere by attching longer leads to them. IMPORTANT: be sure to maintain the polarity on the LEDs when extending these leads.
The Series 2000 Watt Hour Transducer is designed to be surface mounted in a dry location. The exposed wiring terminals make it necessary for it to be installed within a NEMA enclosure or a switchboard rated for the environment. There are holes in each corner for easy mounting.
Refer to the wiring instruction diagrams for the line and C.T. connections. See the following diagram for low voltage and communication connections.



SERIES 4000 KILOWATT HOUR METER

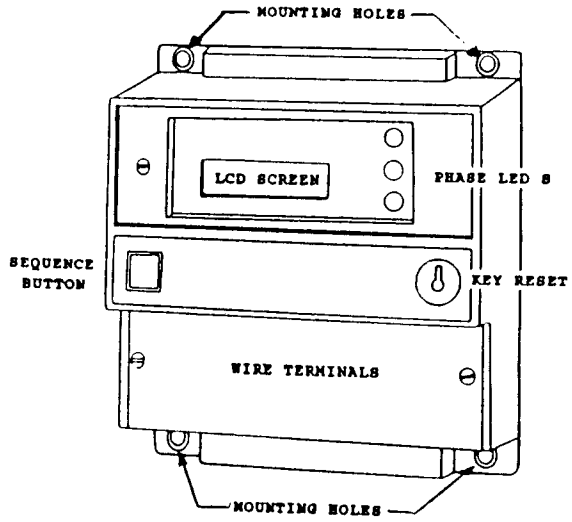


The Series 4000 Kilowatt Hour Meter is designed to monitor the energy consumption on single and three phase loads, and are operated by either current or voltage transformers. Models are available which will accommodate up to 480 volts. This meter is most often used in revenue billing.

The Series 4000 Meter is designed to be surface mounted in a dry location or within a NEMA enclosure rated for the environment. This meter has four (4) mounting holes, one in each corner, sized for No. 8 screws. A 3/4 inch conduit hole for power wires is provided on the lower left side of the meter. A small hole can be drilled on lower right side for entry of the low voltage cable, if needed. Keep all low voltage wiring separate from any power wires.

A connector is provided below the terminal strip for the grounding conductor. Use a 1/2 inch knockout punch beneath the terminal strip to create a conduit opening in the back plate, if needed.
IMPORTANT: Extreme caution must be taken when drilling the back plate not to allow metal shavings to get behind the printed circuit board.

SERIES 7000 KILOWATT HOUR DEMAND METER



The Series 7000 Kilowatt Hour Demand Meter is designed to monitor the energy consumption and demand on single and three phase loads, and are operated by either current or voltage transformers. Models are available which will accommodate up to 480 volts. This meter is most often used in revenue billing demand and kilowatt hour charges. If daily KW peaks are desired reset the Maximum Demand every 24 hours.

The Series 7000 Meter is designed to be surface mounted in a dry location or within a NEMA enclosure rated for the environment. This meter has four (4) mounting holes, one in each corner, sized for No. 8 screws. A 3/4 inch conduit hole for power wires is provided on the lower left side of the meter. A small hole can be drilled on the lower right side for entry of the low voltage communication cable, if needed. Keep all low voltage wiring separate from any power wires.

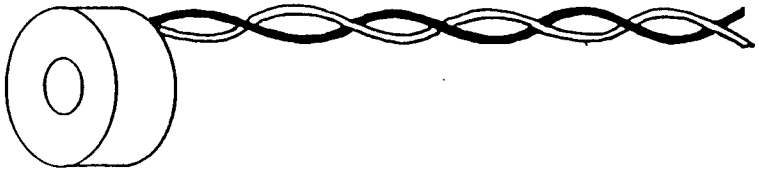
A connection is provided below the terminal strip for the grounding conductor. Use a 1/2 inch knockout punch beneath the terminal strip to create a conduit opening in the back plate, if needed.
IMPORTANT: Extreme caution must be taken when drilling the back plate not to allow metal shavings to get behind the printed circuit board.

WIRING INSTRUCTIONS

1. NOTE: All wiring to this meter must comply to N.E.C. 70 or any other local code having jurisdiction. If a non-metallic raceway is used to feed the meter, a grounding conductor must be installed.

2. The voltage wires connected to the line terminals in the meter can be No.14 gauge. The "WATT WATCHER" meters draw less than one amp of current. Voltage wires should be protected with either 5 Amp "in-line" fuses or a 15 Amp circuit breaker.

3. If the raceway exceeds 6 feet in length and contains both voltage and current transformer wires, then the black and white C.T. wires must be twisted as illustrated below.



4. The voltage wires feeding the meter must be in phase with the C.T. wires. (See applicable Wiring Instruction page)

5. Form all wires neatly within the meter's terminal area. Strip off 1/8 inch of insulation and enter the wires under the screw pads beneath the terminal screws. Make certain that all screws are tightened on the terminal board whether used or not.

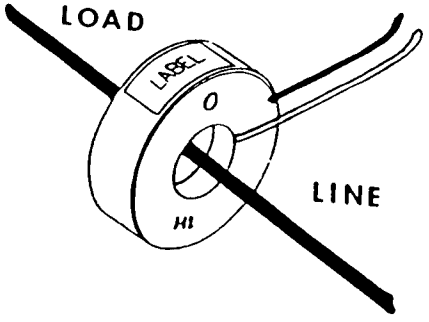
6. Check your wiring for possible errors. Energize the circuits ONLY when you are sure that the proper connections have been made.

SOLID CORE CURRENT TRANSFORMERS

The "WATT WATCHER" meters are operated by remote current transformers "C.T.s."

Our solid core C.T.s are smaller in size due to the light burden that our meters impose upon them. They take up less space in electrical panels and are totally insulated to 600 volts.

When using the solid core C.T.s you must disconnect the primary wire or wires to be monitored and slide the C.T. over them.
NOTE: The White Dot or 'H1' symbol on a solid core current transformer MUST face towards the line side of the service.



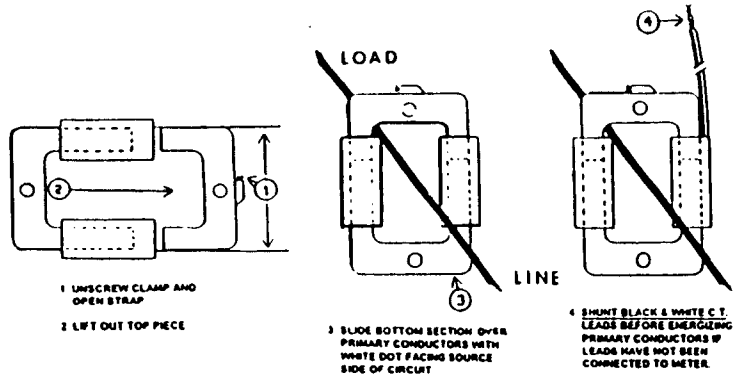
The meter measures the secondary side of the C.T.. The 100 Amp solid core C.T.s have a secondary full load rating of 1 Amp. The higher rated C.T.s have a secondary rating of 5 amps at full load. The C.T.s come with 3 foot wires leads attached . If longer wire leads are needed use the following chart to determine the wire size :

LENGTH TO 20' USE No. 14 GAUGE WIRE
LENGTH TO 30' USE No. 12 GAUGE WIRE
LENGTH TO 50' USE No. 10 GAUGE WIRE
OVER 50' CONSULT FACTORY

CAUTION: Shunt both black and white wires on the C.T. if the C.T.s are installed on an energized primary wire before the meter is connected. OPEN LEADS COULD HAVE DANGEROUS VOLTAGE LEVELS!

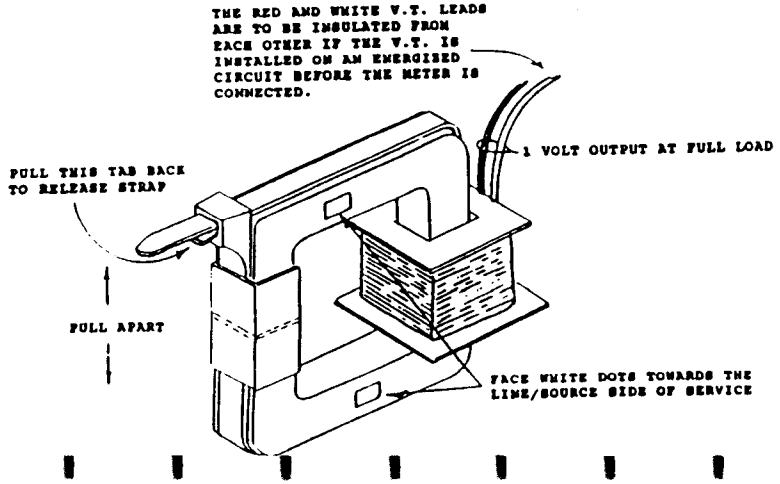
SPLIT CORE CURRENT TRANSFORMERS

We do not recommend that you work on an energized conductor, however, EXTREME CAUTION must be taken when you choose to do so. Split Core C.T.s are designed to come apart so that disconnecting the primary wires is not necessary. (See the following)



SPLIT CORE VOLTAGE TRANSFORMERS

Split core voltage transformers "V.Ts" look similar to split core current transformers except that instead of current flowing through the secondary wires they produce a voltage. They are identified by their label and by their red and white wire leads. A 200 Amp. V.T. has one (1) volt output at full load. A resistor is wired across the coil changing the current to voltage. DO NOT twist the red and white secondary wires when installing the V.T. on an energized primary conductor, prior to meter installation. Insulate the two wires from each other as you would any other voltage circuit.



THREE PHASE FOUR WIRE "WYE"

APPLICATION

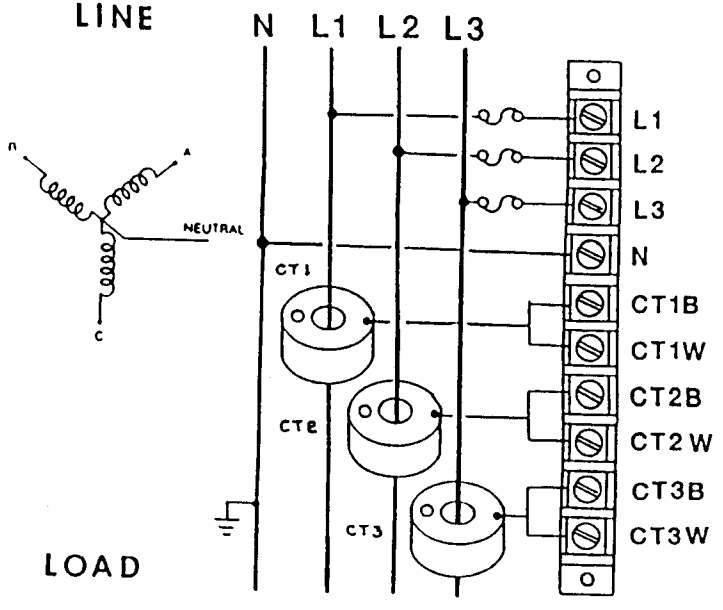
This wiring configuration is most often used in commercial and industrial applications when there is a need to power three phase equipment along with lighting and other single phase loads. The voltage can either be 120 / 208 or 277 / 480.

WIRING INSTRUCTIONS

Three phase four wire circuits require three (3) current transformers (C.Ts). Note that Line 1 (L1) and current transformer 1 are on the same phase. The same applies for Line 2 (L2) and (C.T.2) along with Line 3 (L3) and (C.T.3). The neutral wire is connected to the (N) terminal on the meter.

REMEMBER: The White Dot or 'H1' on the current transformer must face towards the line side / source side of the service. The voltage wires should be protected with either 5 amp " in-line" fuses or a 15 amp circuit breaker.

CHECK ALL CONNECTIONS FOR POSSIBLE ERRORS PRIOR TO ENERGIZING THE CIRCUIT.



THREE PHASE THREE WIRE DELTA
(Floating- Ungrounded)

APPLICATION

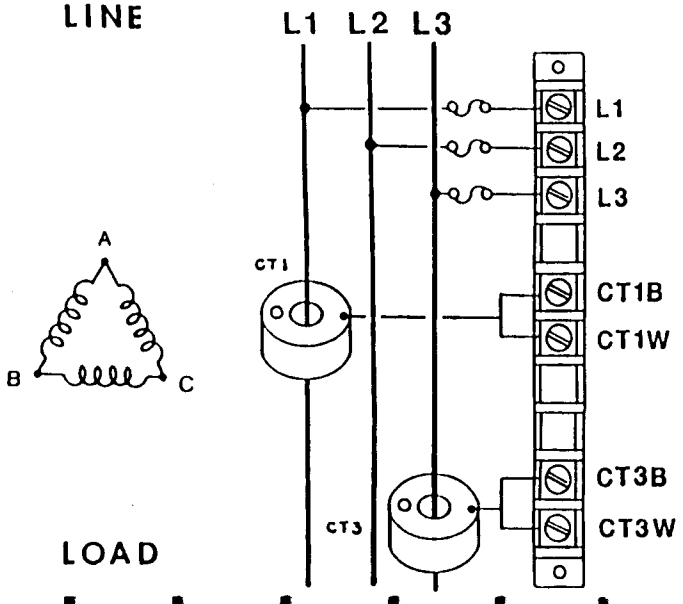
This wiring configuration is most often used in chemical plants, refineries, etc. To verify that there isn't a voltage potential between ground and each phase apply the leads of a digital volt meter to ground and each of the 3 phases, the readings should be zero (0). A digital volt meter might indicate low field readings. The voltage between phases can be either 240, 480

WIRING INSTRUCTIONS

Three phase three wire circuits or services require only two (2) current transformers (C.T.s) and three voltage wires. Note that Line 1 (L1) and (C.T. 1) are on the same phase. There are NO C.T.s on Line 2. Line 3 (L3) and (C.T. 3) are on the remaining phase. The White Dot or the 'H1' mark on the C.T. must face towards the line side / source side of the service. The voltage wires should be protected with either 5 amp "in-line" fuses or a 15 amp circuit breaker.

IMPORTANT: Never connect grounded C.T.s directly to the meter when employing a floating system. If the specifications require that you ground the C.T.s, then the use of "Slave C.T.s" will be necessary. (Consult Factory).

CHECK ALL CONNECTIONS FOR POSSIBLE ERRORS PRIOR TO ENERGIZING THE CIRCUIT.



THREE PHASE THREE WIRE
(Corner Grounded Service)

APPLICATION

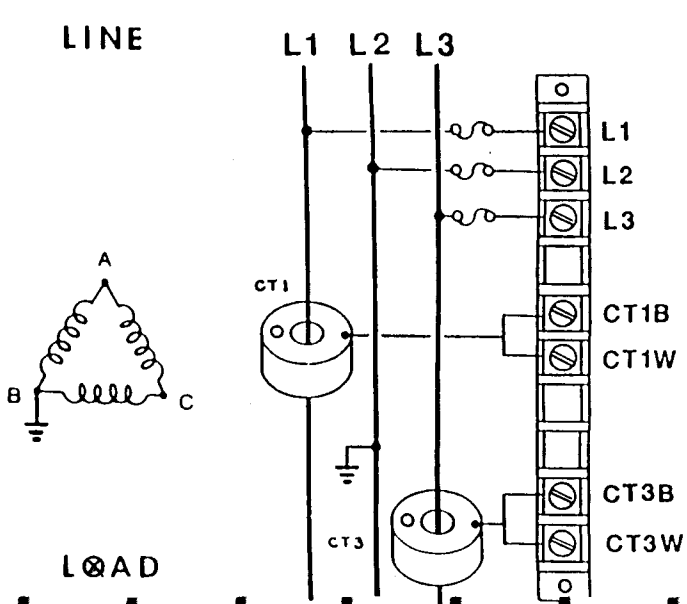
This wiring configuration is most often used in heavy industrial applications. To verify this configuration use a volt meter to measure voltage between two phases and ground. The third phase to ground will have zero readings; this phase is considered the grounded phase. The voltage between phases can be either 240, 480

WIRING INSTRUCTIONS

Three phase three wire circuits or services require only two (2) current transformers (C.T.s) and three voltage wires. Note that Line 1 (L1) and (C.T. 1) are on the same phase. There are NO C.T.s on Line 2. Line 3 (L3) and (C.T. 3) are on the remaining phase. The White Dot or the 'H1' mark on the C.T. MUST face towards the line side / source side of the service. The voltage wires should be protected with either 5 amp "in-line" fuses or a 15 amp circuit breaker.

IMPORTANT: After identifying the grounded phase, You MUST place this phase on the (L2) terminal of the meter.

CHECK ALL CONNECTIONS FOR POSSIBLE ERRORS PRIOR TO ENERGIZING THE CIRCUIT.



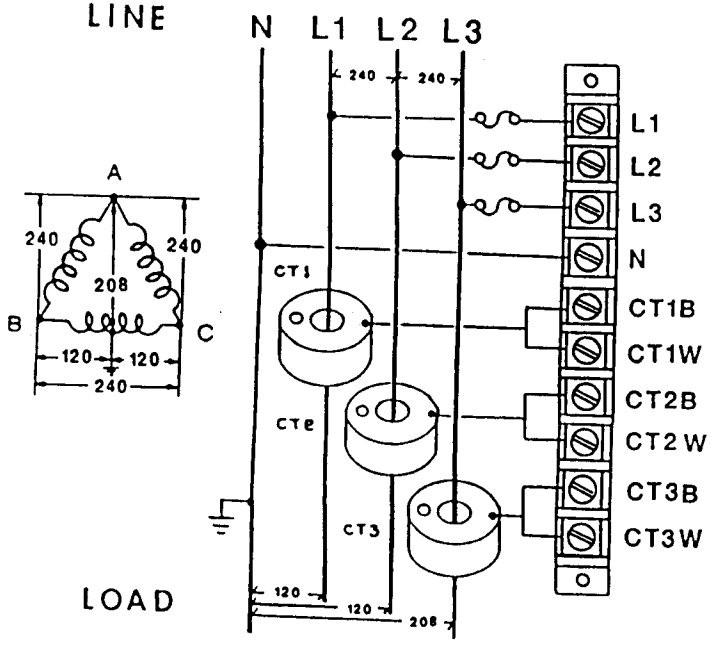
THREE PHASE FOUR WIRE
(Center Grounded, Hi-Leg)

APPLICATION

This wire configuration is most often used in older industrial applications where three phase equipment loads are greater then the single phase loads. Most of these services are being phased out with newer three phase four wire WYE systems.

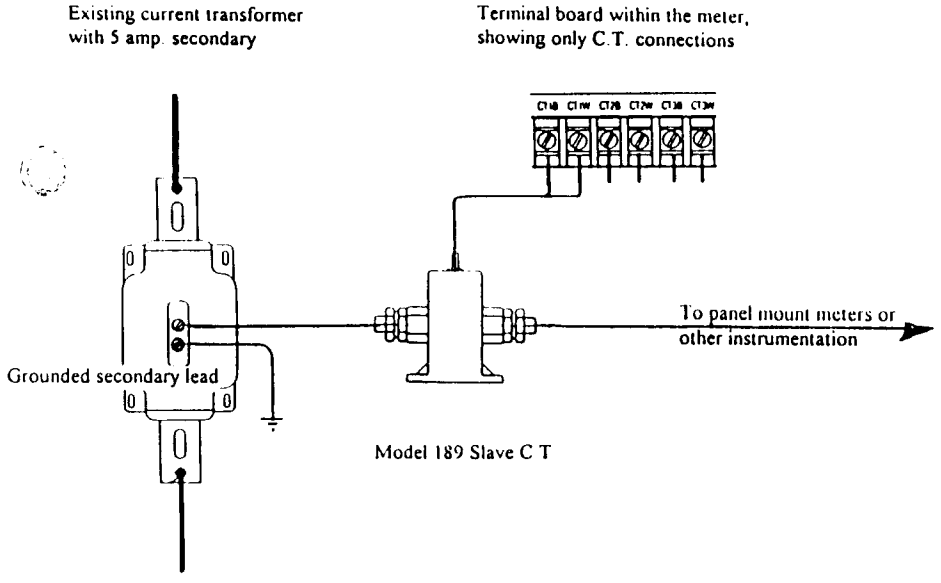
WIRING DIAGRAM

Three phase four wire circuits require three (3) current transformers (C.T.s). Note that Line 1 (L1) connected to the meter and (C.T. 1) are on the same phase. This holds true for Line 2 (L2) and (C.T. 2), along with Line 3 (L3) and (C.T. 3). The neutral wire is connected to the (N) terminal on the meter. IMPORTANT: The Hi -Leg measuring 208 volts to neutral must be on the (L3) terminal of the meter . The White Dot or 'H1' mark on the C.T. must face the line side / source side of the service.
CHECK ALL CONNECTIONS FOR POSSIBLE ERRORS PRIOR TO ENERGIZING THE CIRCUIT.



CONNECTING EXISTING CURRENT TRANSFORMERS

Do not connect directly to existing current transformers (C.T.S) that are used to operate other instruments (i.e. amp. meters, watt meters). The Watt Watcher Circuit Board contains resistors and traces that could lead to errors in both our meter and any panel meter connected in series with it.
You can use existing C.T.S if the Watt Watcher Meter is the only instrument connected to them. If existing C.T.s are used and grounded, then ground the Watt Watcher C.T. Terminals marked "C.T.B".
Cascading C.T.S, or commonly known as "Slave" C.T.S, should be used when connecting the Watt Watcher Meters to existing C.T.S., powering other instruments. The burden rating of the main C.T.S., must be adequate to power all instruments connected. (see dwg. below)



METER OPERATION

The flashing LEDs on the face of the meter will indicate proper meter operation. Each LED flashes independently and is linear to the load being applied to that phase.
The duration of the flashes signifies the amount of load on that phase. The LEDs will glow continuously when the load is greater than 90% of the C.T. rating. The kilowatt hour indicator will change at the rate of 1 kilowatt hour unless otherwise noted on the face of the meter. A laymens way of checking the meters accuracy is by applying the mathematical equation below:

1. (Volts x Amps x PF/1000) = Kilowatts of each phase.
2. Add the KW of each phase that has a CT around it. (Don't calculate line 2 of a delta service)
3. There are 3600 seconds to a minute.
4. Divide the total KW into 3600 seconds.
5. The quotient is the number of seconds between each KWHR.
6. Divide seconds by 60 to get minutes between counts.

EXAMPLE:
Phase A 100 Amps = 12 KW at unity power factor
Phase B 50 Amps = 6 KW
Phase C 50 Amps = 6 KW
Total 24 KW divided into 3600= 150 sec.

150 seconds divided by 60 sec. =2.5 minutes
One kwhr will be added to the counter every 2.5 minutes.

NOTE: To achieve by results the circuit load should be steady during sampling.

IF THIS METER DOES NOT OPERATE NORMALLY, REFER TO "IN CASE OF DIFFICULTY" SECTION.

IN CASE OF DIFFICULTY

First check applicable wiring diagrams to see if ALL wires are properly installed. Also, check to see that all of the terminal screws are tightened.
If more help is needed please refer to the following information.

EITHER NONE OR ONLY SOME OF THE LEDs FLASH
LEDs will not flash if ONLY voltage is being supplied to the meter.
REMEDY:
Check all line terminals on the meter for the correct voltage.
Apply a load to the wires being monitored.
Be sure that the White Dot or "H1" Mark on the current transformer (C.T.) is facing the line side of the service. The voltage tap to Line 1 (L1) and (C.T.1) on the meter MUST be phase related.

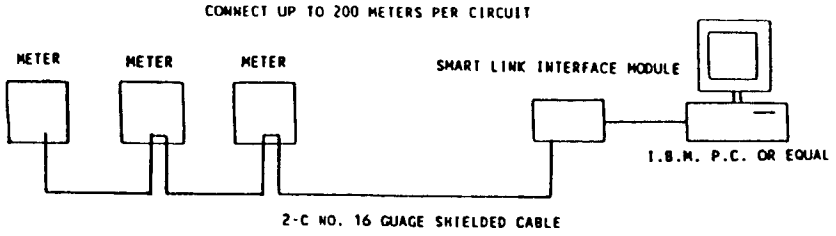
THE FLASH DURATION OF THE LEDs IS NOT ALWAYS THE SAME
The meter monitors each phase independently with the LEDs indicating this process.
REMEDY:
Balancing the load on the service or circuits being monitored will result in the LEDs flashing more evenly.
The LED will remain lit when ninety percent (90%) of the rated current transformer (C.T.) load has been reached.

THE DISPLAY ON THE LCD SCREEN IS NOT CLEAR
(Series 7000 & 8000 only)
REMEDY:
Check the temperature range listed in the Meter Specifications page.
Refer to the "Contrast Adjustment for the LCD Screen" on page 17.

If you are still experiencing difficulty please call our Factory Technical Department at: 800-325-6674.

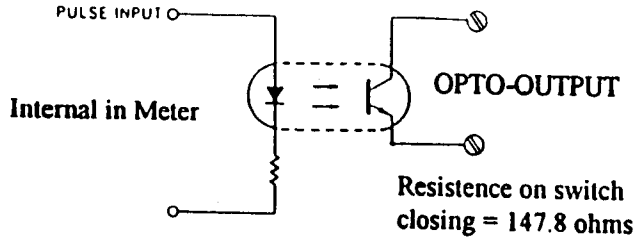
SMART LINK OUTPUT
(Optional)

The factory installed Smart Link Output allows the "WATT WATCHER" Software programs to read the meters through the Smart Link Interface Module, plugged into the RS232 port on the computer.
This is the door way to the readings held in the meter's non-volatile memor
The Smart Link is protected against high voltage impulses and can be accessed only by National Meter Industrie's Hardware and Software.



OPTO-ISOLATED SWITCHING TRANSISTOR
(Standard)

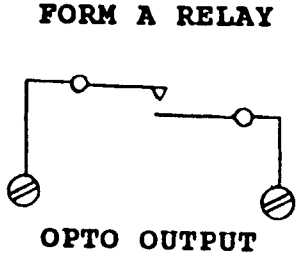
The opto output is an isolated switching transistor. This switch is used in conjunction with load management or monitoring systems. The rating is 80V DC and 80 MA max. The pulse is set at one (1) kilowatt hour unless specified when ordered. Pulse rates of one (1), ten (10) , one hundred (100) or one (1) kwhr. are available. Ten (10) On pluses per second is our maximum speed.



OPTO ISOLATED SWITCHING RELAY (Optional)

SPECIFICATIONS:

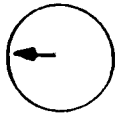
Form A Relay (Dry Contacts)
130 Volts A.C. or 100 Volts D.C.
.5 amp. switching
1.5 amp. carry
0.0 OHMS when closed



INITIAL PROGRAMMING

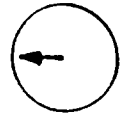
Off Position.
Insert and remove key in this off position.

1. To set meter insert the key and turn the key to the left (counterclockwise), then release the key. "SET TIME" window will appear with cursor under the Year.



2. Push the yellow button on the left until correct Year appears.

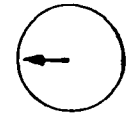
3. Turn key again to the left and cursor will appear under the Month, then release the key.



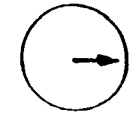
4. Push button on left again until correct Month appears.

5. Repeat above steps for setting Day, Hour, and Minute. NOTE: Use Military Time to set clock.

6. Turn key to the left (counterclockwise) to display Current KWHR Screen, then release.



7. To reset Maximum Demand.
Insert key and turn it to the right (clockwise). Push button on left while key is held in clockwise position. Zeros (0000) will appear under the Maximum Demand Screen. Release key switch and push button, now the meter has been reset.



CONTRAST ADJUSTMENT FOR THE LCD SCREEN

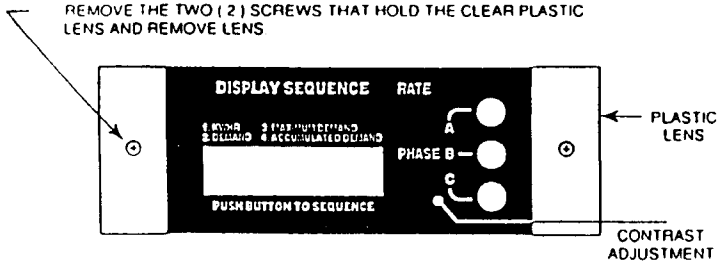
The Series 7000 LCD screens are sensitive to temperature extremes. Cold temperatures will cause the screen to lighten while hot temperatures will darken it. The screens are factory adjusted to an ambient temperature of plus or minus seventy degrees Fahrenheit. In the rare chance an adjustment is needed follow the instructions below:

1. The Meter must be energized for the LCD screen to work.

2. The contrast adjustment pot is located behind the plastic lens.

3. The LCD screen is sensitive to static electricity. Be extremely careful NOT to touch the screen.

4. Use a 1/16 inch screwdriver and place it carefully into the slot of the adjustment pot. Desired contrast will be obtained by turning the adjustment pot to the right or to the left.



BATTERY: The battery is projected to last approximately 7 - 8 years. The battery must be replaced by a qualified technician. Call our Factory Technical Department for further information.

EXPLANATION OF WINDOW DISPLAYS

WINDOW 0 - CURRENT KWHR
This window will always appear after a 1 minute time out cycle from the previous selection. Unless indicated there are no multipliers to read Kilowatt Hours. If "BAT" appears, or "OCS" appears in the right hand corner of the screen then call Factory Technical Service.

WINDOW 1 - CURRENT DEMAND
The Current Demand Window numbers represent the Current Demand Sub-Intervals as shown below.
DEMAND INTERVALS:
15 minute demand interval has a 1 minute sub-interval
30 minute demand interval has a 1 minute sub-interval
1 hour demand interval has a 2 minute sub-interval

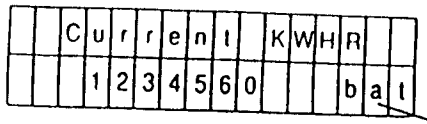
WINDOW 2 - MAXIMUM DEMAND
This window displays the Maximum Demand reading reached since the meter was last reset. We utilize the sliding window method for demand readings. The last sub-interval reading slides into the next demand interval.
NOTE: This window resets to 0 when the key switch is turned to the right (clockwise) and the yellow button is pushed.

WINDOW 3 - MAXIMUM DEMAND TIME
This window displays the month, day, hour, and minute that the Maximum Demand occurred since the meter was last reset.

WINDOW 4 - ACCUMULATIVE DEMAND
Each time you reset the meter, the Maximum Demand is added to the Accumulative Demand File. This file cannot be reset except by the Factory. Recording the Accumulative Demand each month secures the fact that the meter has not been reset if the number has not changed.

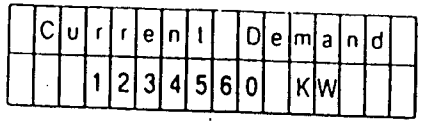
WINDOW 5 - PRESENT TIME
This window allows you to monitor the meter's time sequence by keeping the Clock accurate. A prolonged power outage may cause the clock to run slow.
If this occurs reset clock by turning the key switch counterclockwise toward Set Time to bring up the Set Time window. (Refer to Initial Programming Section, Steps 1 - 5)
NOTE: Use Military Time to set the clock.

WINDOW DISPLAY SCREENS

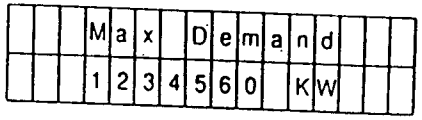


Window Number: 0
Window Timeout: none
Next Window: 1

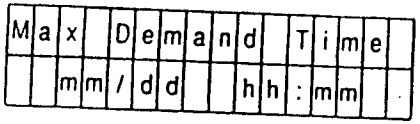
bat will appear when battery is low. Consult Factory.



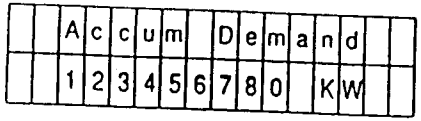
Window Number: 1
Window Timeout: 60 sec.
Next Window: 2



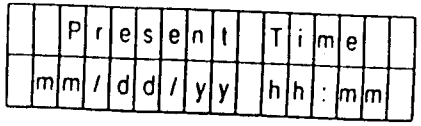
Window Number: 2
Window Timeout: 60 sec.
Next Window: 3



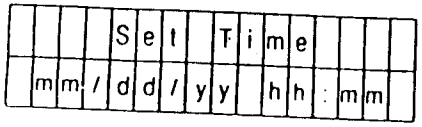
Window Number: 3
Window Timeout: 60 sec.
Next Window: 4



Window Number: 4
Window Timeout: 60 sec.
Next Window: 5



Window Number: 5
Window Timeout: 60 sec.
Next Window: 0



This window will only APPEAR WHEN KEY IS TURNED CCW TO SET OR RESET TIME.

METER SPECIFICATIONS

ENCLOSURES:

- SERIES 1000, 4000, 7000, 8000 and 10K ABS Plastic
- SERIES 2000, 3000 and 5000: 18 Gage Painted Steel

ELECTRICAL:

- Operating Input Voltage: - 40% to +20 %
- Voltage Range: Models 120 to 480 VAC
- Meter Burden: 2.5 VA
- Current Transformer Burden: 1 VA
- Frequency Range: 48 to 63 Hz.
- Self Diognostics: LED Visual Display
- Dielectric Withstand: 1200 V for 1 min.
- Transient Voltage: ANSI C37.90 1989

COMPLIANCE:

- Complies to ANSI C12.1 Performance Tables
- Power Factor: .5 to Unity
- FCC Class A Part 15
- Underwriters Laboratories, Inc.
- New York City Approvals
- California Weights and Measures Approvals

ENVIRONMENTAL:

- Models 1000, 2000, 3000 and 4000: - 20 to +60 degree C
- Models 7000, 8000 and 10K: 0 to +40 degree C
- Humidity Rating: 5 to 95% Non-Condensing

DISPLAYS:

- Electro-mechanical 6 Didget, 3/16 inch high
- LCD Alpha Numeric 16 Charaters

PULSE SWITCH:

- Standard Switching Transistor: Rated at 80 VDC / 80 ma. max.
- (Optional) Switching Form A Relay: 120 VAC /.5 amp resistive

SAMPLING AND REPORTING:

- True RMS Complex Power Wave Forms
- Demand Interval Choice of 15, 30 or 60 minutes
- Subinterval of 1 min. for 15 and 30 min. Demand Windows, and 2 min. for 60 min. Demand Window
- Rolling Window Demand Intervals

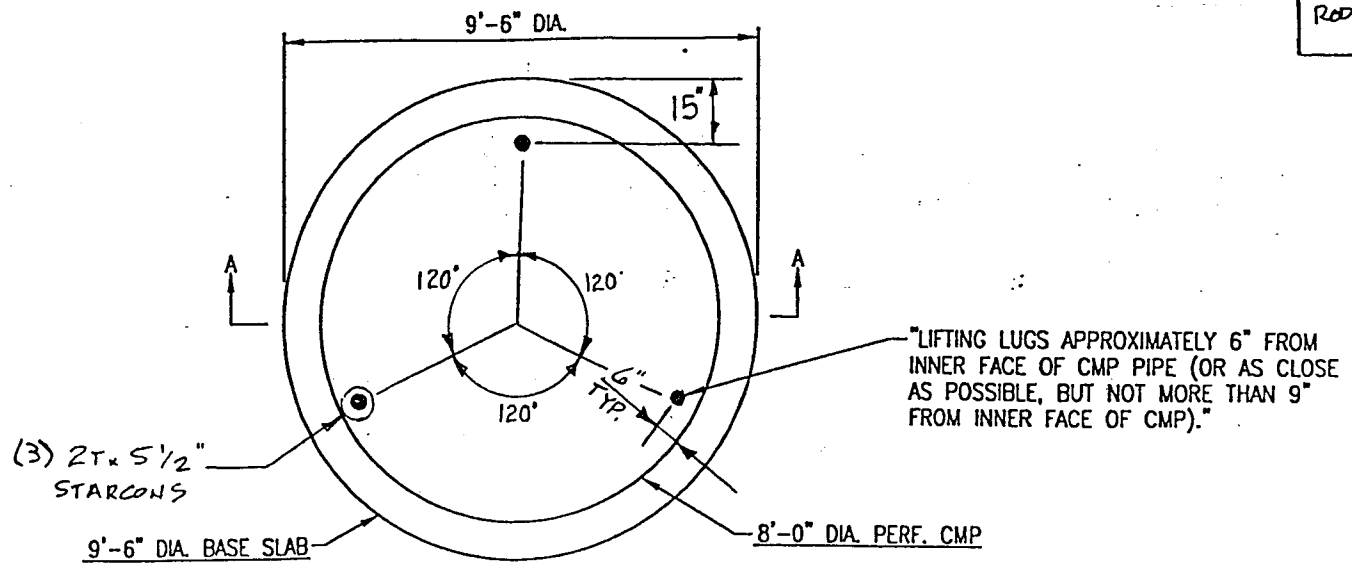
COMMUNICATIONS:

- Model 10K Imports to RS 232
- Smart Link Interface Module (Amplified RS 232)

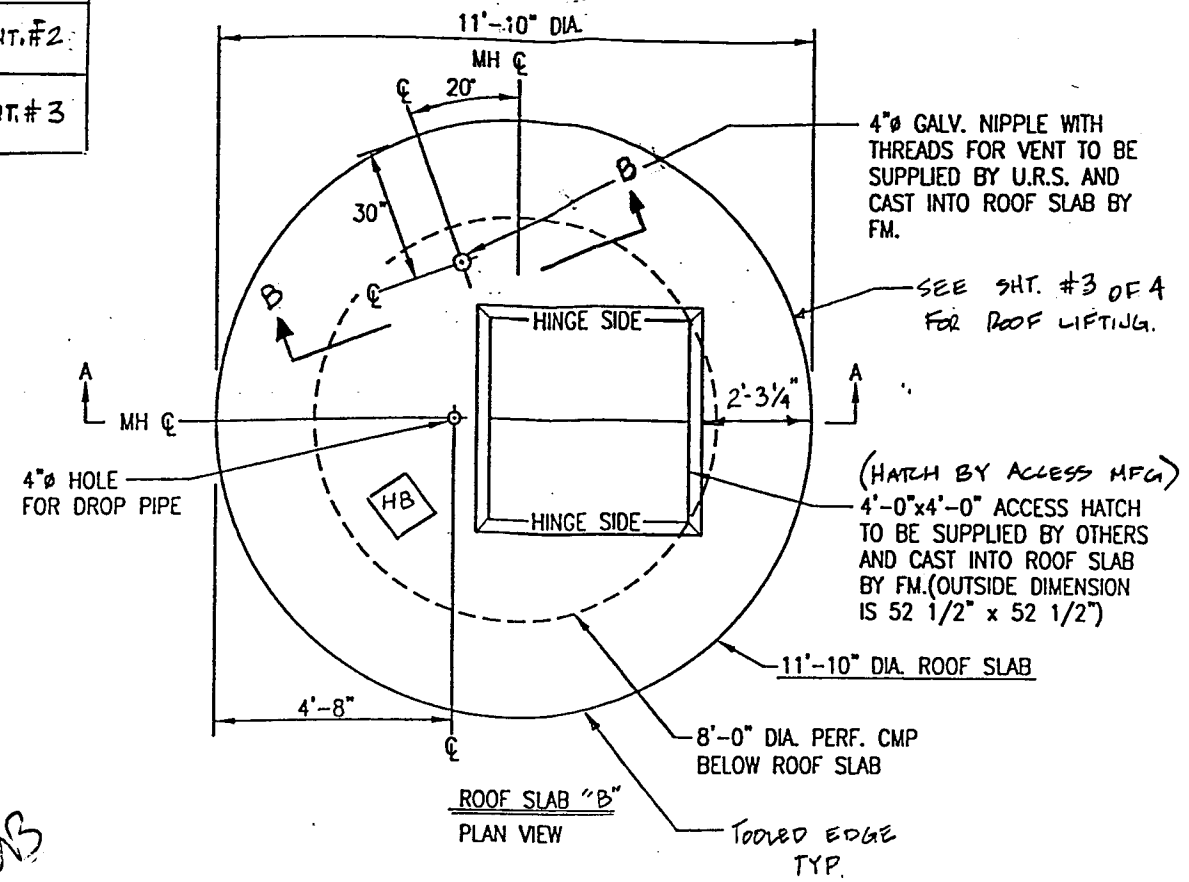
MK#:CS-1

SECTION	VOL(CY)	WGT(T)	REF.
BASE "A"	2.2	4.6	SHT. #2
ROOF "B"	2.4	4.8	SHT. #3

SHIPLOOSE:
(3) 2T LIFT EYES

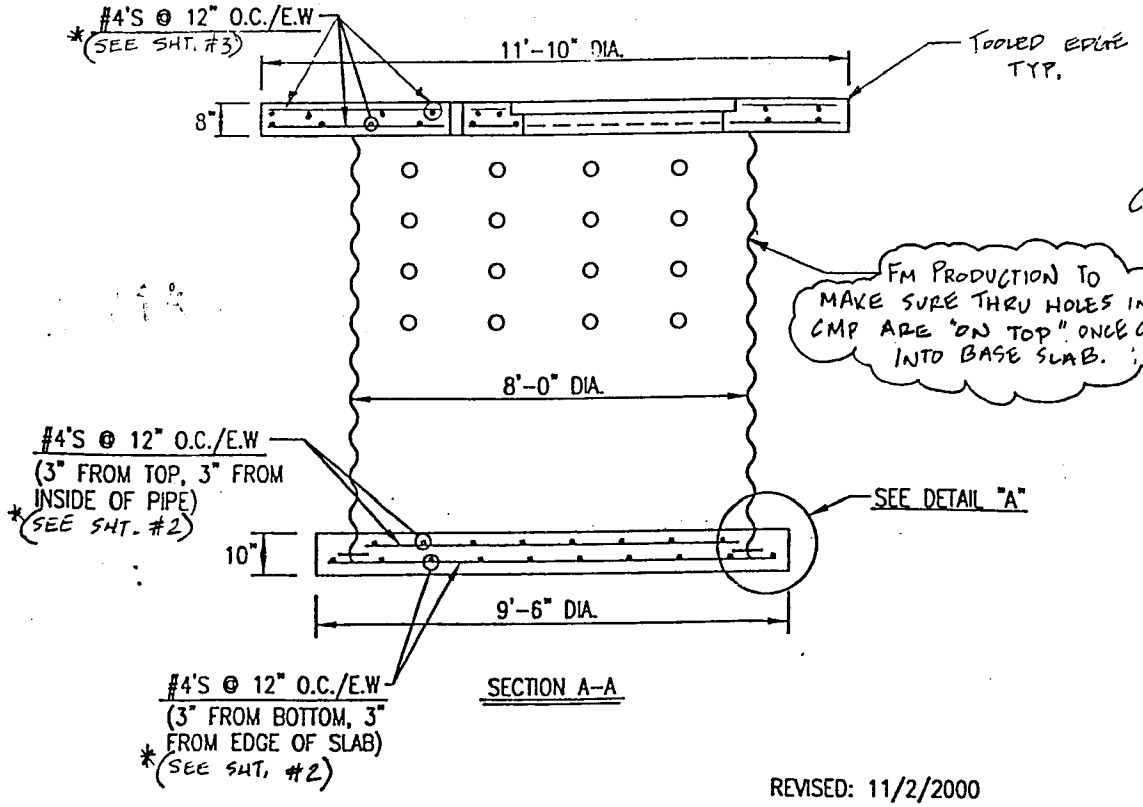


BASE SLAB "A"
PLAN VIEW

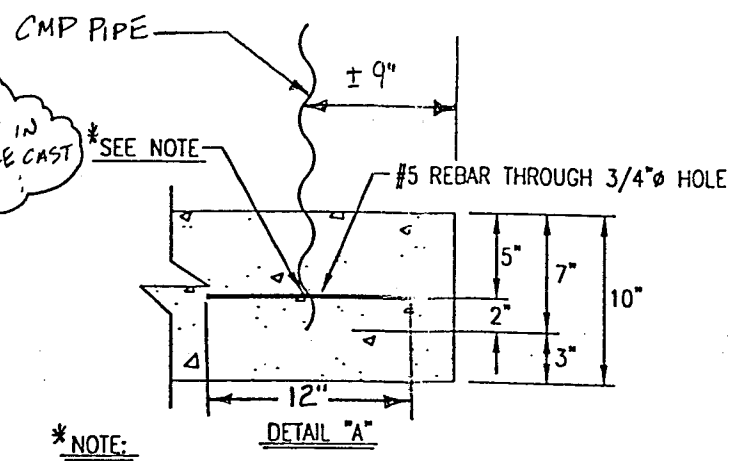


ROOF SLAB "B"
PLAN VIEW

MS

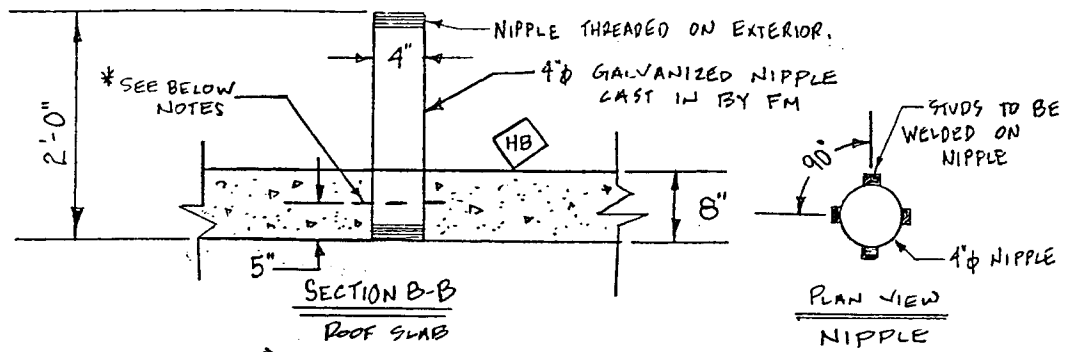


SECTION A-A



DETAIL "A"

NOTE:
3/4"ø HOLES SPACED 18" AROUND CIRCUMFERENCE OF CMP, 2" UP FROM BOTTOM EDGE OF CMP, TO BE PROVIDED IN PIPE SECTION PRIOR TO SHIPPING PIPE TO FORT MILLER. FORT MILLER TO PLACE 12" LONG(MIN), #5 REBAR THROUGH HOLES FOR ANCHORS DURING FORMING AND POURING PROCESS.



SECTION B-B
ROOF SLAB

PLAN VIEW
NIPPLE

NOTES
HB = HEAVY BROOM FINISH

1) FM TO WELD (4) STUDS AS SHOWN (PLAN VIEW-NIPPLE) ON GALVANIZED NIPPLE @ ±90° APART TO PREVENT SLIPPAGE.
2) STUDS AS PER FM MAINTENANCE.

GENERAL NOTES:

1. CONCRETE TO TEST 4,000 PSI AT 28 DAYS.
2. REINFORCING STEEL PER ASTM A615, GRADE 60.
3. 8'-0" DIA. PERFORATED CORRUGATED METAL PIPE TO BE SUPPLIED BY U.R.S. AND CAST INTO 9'-6" DIA. BASE SLAB BY FORT MILLER.
4. BLOWER MOTOR AND HOUSING AND DROP PIPE TO BE SUPPLIED BY OTHERS AND INSTALLED BY U.R.S. IN THE FIELD.
5. LIFTING HOOKS/ANCHORS TO BE AS PER FORT MILLER STANDARD REQUIREMENT FOR THESE SLABS.
6. FM PRODUCTION TO ENSURE CMP IS PLUMB UPON POURING BASE SLAB.

REVISED: 11/2/2000

THE FORT MILLER Co., Inc.
P.O. BOX 98
SCHUYLERVILLE, NY 12871
(518) 664-9871
(518) 695-5000

PROJECT: URS c/o DEGUSSA-HULS, STONY POINT, NY
SUBJECT: PRECAST CONCRETE SLABS
CONTRACTOR: URS/DAMES & MOORE
ENGINEER:

DATE: 11/1/2000
DRN. BY: RJP-LSF
CHK. BY:
SCALE: NONE

F.M. JOB NO. 40182
SHEET NO. 1 OF 4
DWG. NO. FM-11100-A

40182 - CS-1, BASE SLAB

URS c/o DEGUSS. .IULS

RFP: 11-13-00

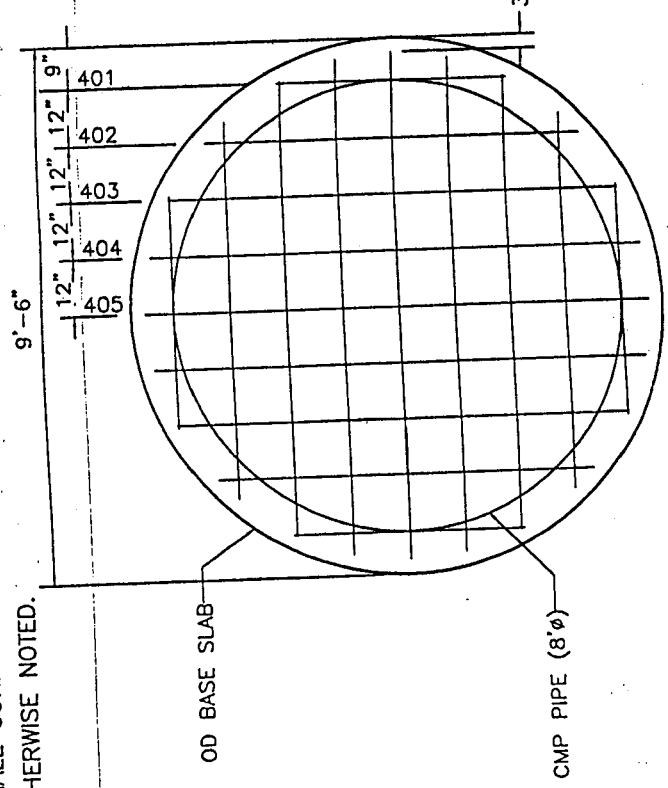
Item	Typ	Qty	Part	Tot Lgt	Cut Lgt	Mark	BT	A	B	C	D	E	F	G	H	K	R	J	O	Spec Inst	Tag Color	Wgt
1	Str	4	4	4'2		401		4'2														
2	Str	4	4	6'9		402		6'9														
3	Str	4	4	8'1		403		8'1														
4	Str	4	4	8'10		404		8'10														
5	Str	2	4	9'0		405		9'0														
6	Str	4	4	3'9		406		3'9														
7	Str	4	4	5'9		407		5'9														
8	Str	4	4	6'9		408		6'9														
9	Str	4	4	7'4		409		7'4														
10	Str	2	4	7'6"		410		7'6														
11	Str	17	5	1'0		511		1'0														

FORT MILLER
THE FORT MILLER CO.
P.O. BOX 98
SCHUYLERVILLE, N.Y. 12871
(518)695-5000
(518)664-9871

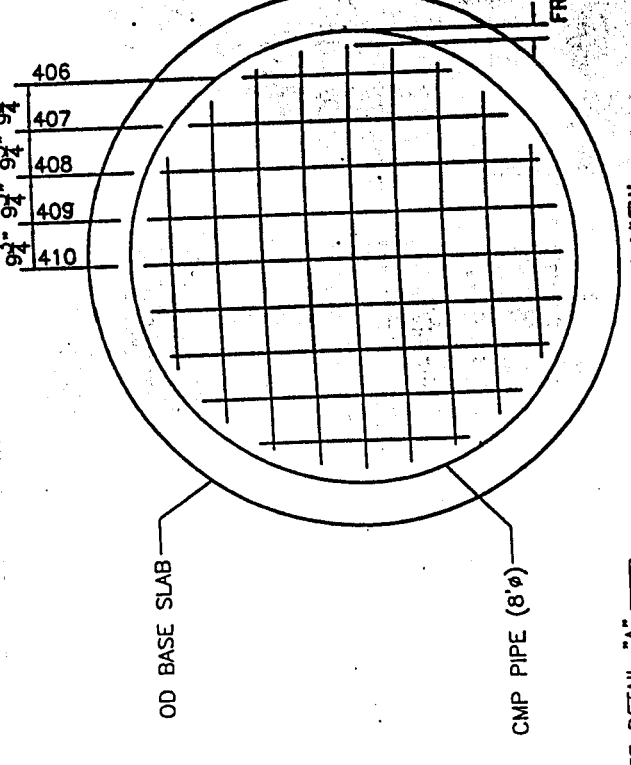
JOB #: 40182 DATE: 11-13-00 MK#:CS-1
PRODUCT: PRECAST BASE SLAB
LOCATION: STONY POINT, NY
CONTRACTOR: URS, DAMES & MOORE

BY:LJF
RFP:
SHEET#: 2 OF 4

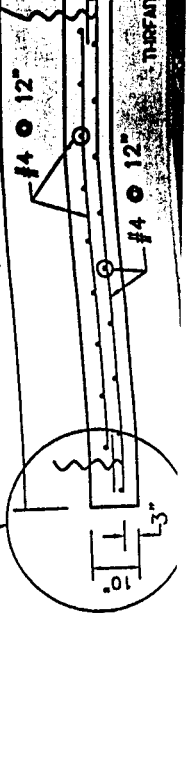
NOTES:
1) CONCRETE STRENGTH, f'_c = 4,000 PSI.
2) REINFORCEMENT SHALL CONFORM TO ASTM A185 SPECIFICATIONS.
3) 3" CL. UNLESS OTHERWISE NOTED.



PLAN VIEW
BASE SLAB "A"-BOTTOM MAT ONLY



PLAN VIEW
BASE SLAB "A"-TOP MAT ONLY



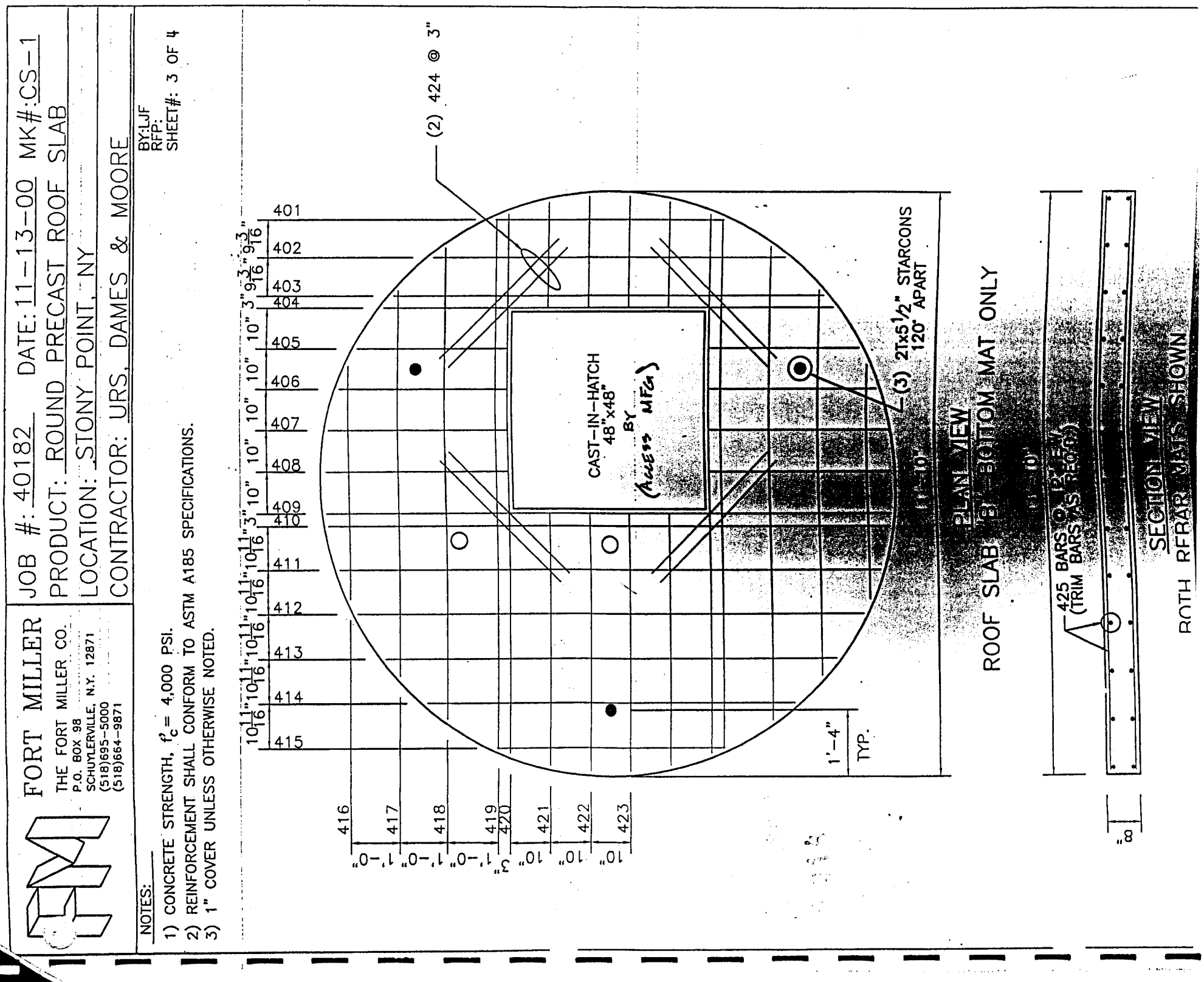
Item	Typ	Qty	Part	Tot Lgt	Cut Lgt	Mark	BT	A	B	C	D	E	F	G	H	K	R	J	O	Spec Inst	Tag Color	Wgt
1	Str	1	4	4'9		401		4'9														
2	Str	1	4	7'3		402		7'3														
3	Str	1	4	8'10		403		8'10														
4	Str	1	4	9'3		404		9'3														
5	Str	2	4	3'1		405		3'1														
6	Str	2	4	3'5		406		3'5														
7	Str	2	4	3'8		407		3'8														
8	Str	2	4	3'9		408		3'9														
9	Str	1	4	11'7		409		11'7														
10	Str	1	4	11'7		410		11'7														
11	Str	1	4	11'2		411		11'2														
12	Str	1	4	10'5		412		10'5														
13	Str	1	4	9'3		413		9'3														
14	Str	1	4	7'7		414		7'7														
15	Str	1	4	4'9		415		4'9														
16	Str	2	4	4'9		416		4'9														
17	Str	2	4	7'10		417		7'10														
18	Str	2	4	9'6		418		9'6														
19	Str	2	4	10'8		419		10'8														
20	Str	2	4	10'11		420		10'11														
21	Str	2	4	11'5		421		11'5 → TRIM AS REQ'D.														
22	Str	1	4	11'8		422		11'8 → TRIM AS REQ'D														
23	Str	1	4	11'8		423		11'8 → TRIM AS REQ'D														
24	Str	8	4	3'0		424		3'0														
25	Str	22	4	11'8		425		11'8 → TRIM AS REQ'D														

FORT MILLER
THE FORT MILLER CO.
P.O. BOX 98
SCHUYLERVILLE, N.Y. 12871
(518)695-5000
(518)664-9871

JOB #: 40182 DATE: 11-13-00 MK#: CS-1
PRODUCT: ROUND PRECAST ROOF SLAB
LOCATION: STONY POINT, NY
CONTRACTOR: URS, DAMES & MOORE

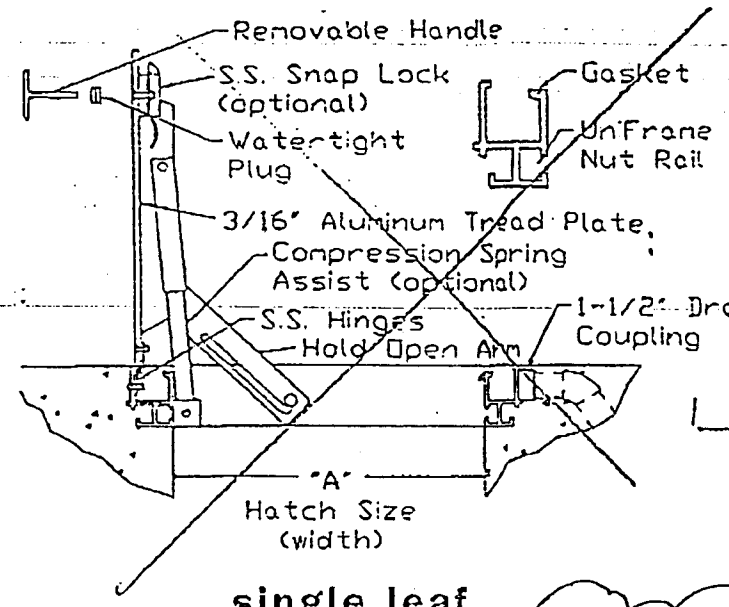
BY: LJF
RFP:
SHEET#: 3 OF 4

NOTES:
1) CONCRETE STRENGTH, f'_c = 4,000 PSI.
2) REINFORCEMENT SHALL CONFORM TO ASTM A185 SPECIFICATIONS.
3) 1" COVER UNLESS OTHERWISE NOTED.



GROUNDWATER RECOVERY SYSTEM
STONY POINT INDUSTRIAL PARK
STONY POINT, N.Y.

SHT. 4 OF 4



single leaf

INSIDE DIMENSIONS		* OUTSIDE DIMENSIONS		WEIGHT
A	B	width	length	lbs.
24"	24"	28 1/2"	28 1/2"	42#
24"	30"	28 1/2"	34 1/2"	47#
24"	36"	28 1/2"	40 1/2"	53#
24"	42"	28 1/2"	46 1/2"	58#
30"	30"	34 1/2"	34 1/2"	60#
30"	36"	34 1/2"	40 1/2"	59#
30"	48"	34 1/2"	52 1/2"	70#
36"	36"	40 1/2"	40 1/2"	67#
36"	48"	40 1/2"	54 1/2"	80#
42"	42"	46 1/2"	46 1/2"	82#
48"	48" D	52 1/2"	52 1/2"	97#
48"	72" D	52 1/2"	74 1/2"	125#
60"	60" D	64 1/2"	64 1/2"	133#

LEAF → 48"x48"

48"x48" HATCH

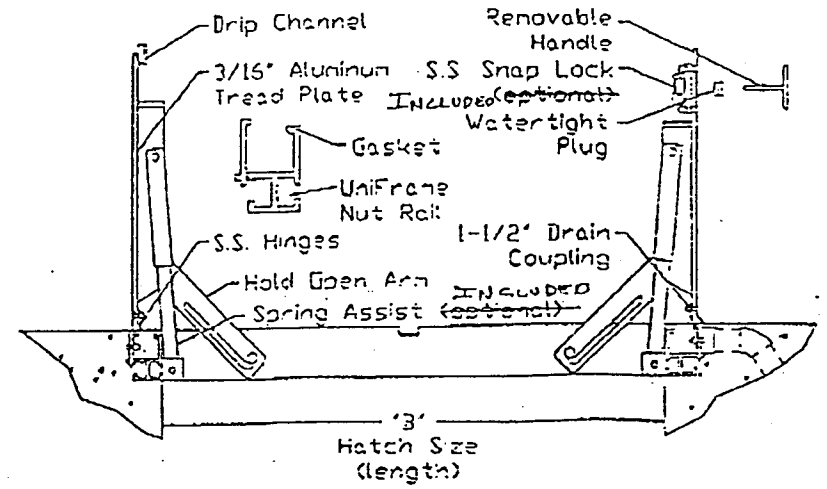
D-Denotes double leaf
*Add 1/2" for rough opening

ALUMINUM WATERTIGHT PEDESTRIAN LOADING

SPECIFICATIONS: Access door shall be a watertight aluminum door as manufactured by Access Manufacturing, Inc., Maspeth, NY. Access door shall be fabricated with structural grade aluminum diamond plate. Plate shall be 3/16" thick, designed to support 300 lbs./s.f. live load. Door shall be equipped with an automatically locking hold open arm which locks the door in the open position. Door shall have a stainless steel recessed lift handle. Frame shall be extruded with anchor flanges and an integral aluminum nut rail to accept 1/2" nuts. Frame shall be a channel type, equipped with a neoprene gasket and 1-1/2" drain coupling. All hardware shall be stainless steel. Hinges shall be stainless steel with stainless steel pins and tamper proof fasteners. Factory finish shall be a mill finish with a bituminous coating applied to the exterior of frame. Manufacturer shall guarantee materials and workmanship for a period of ten (10) years. Lock shall be a ~~(staple for a padlock~~, stainless steel snap lock with removable handle, ~~recessed hasp, stainless steel pentahead, keyed deadbolt lock or hasp and staple~~.)

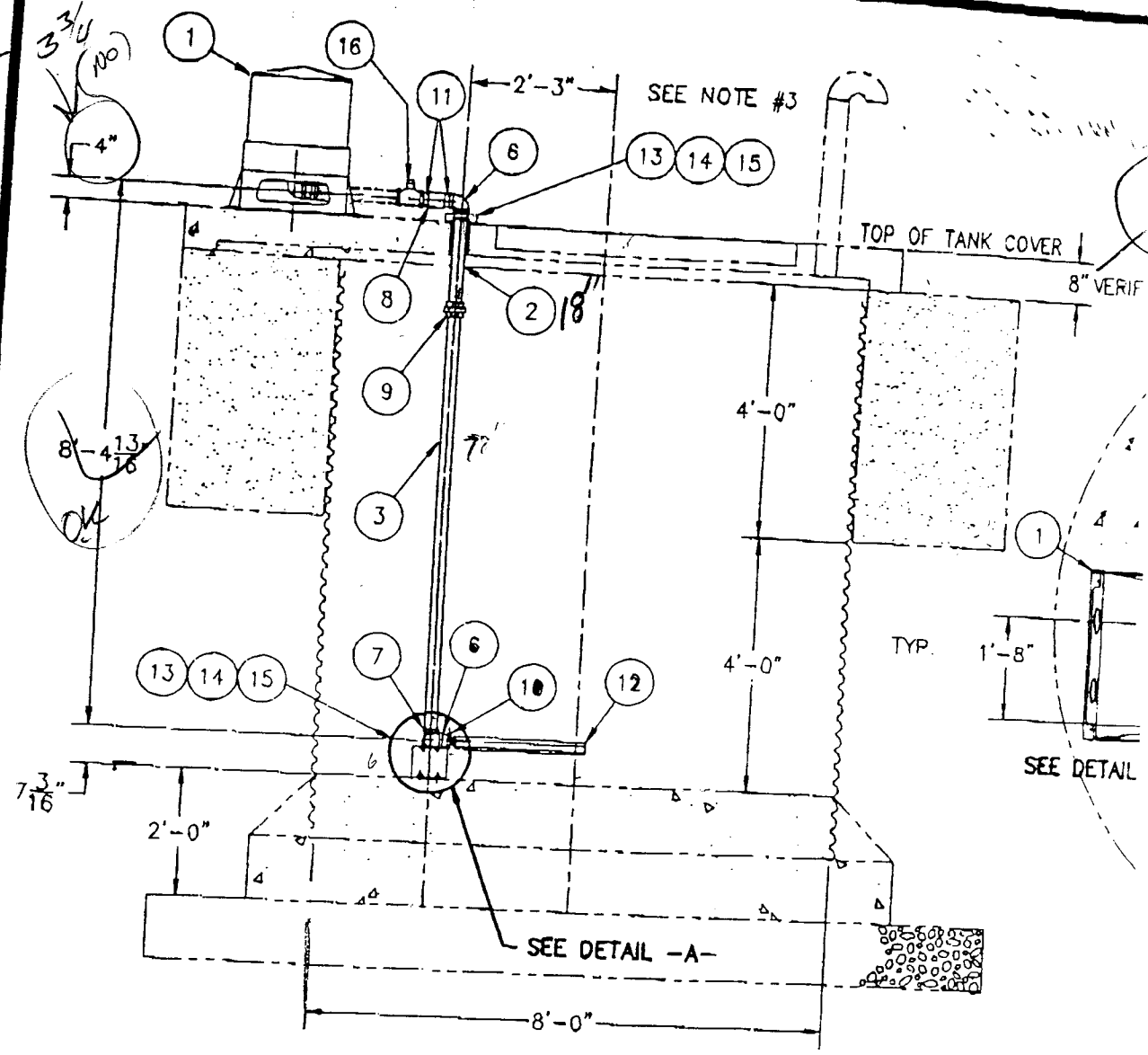
SPECIFIED OPTIONS: Door shall include (compression spring assist, skirting to depth of slab, fiberglass insulation, safety chains and posts.)

double leaf

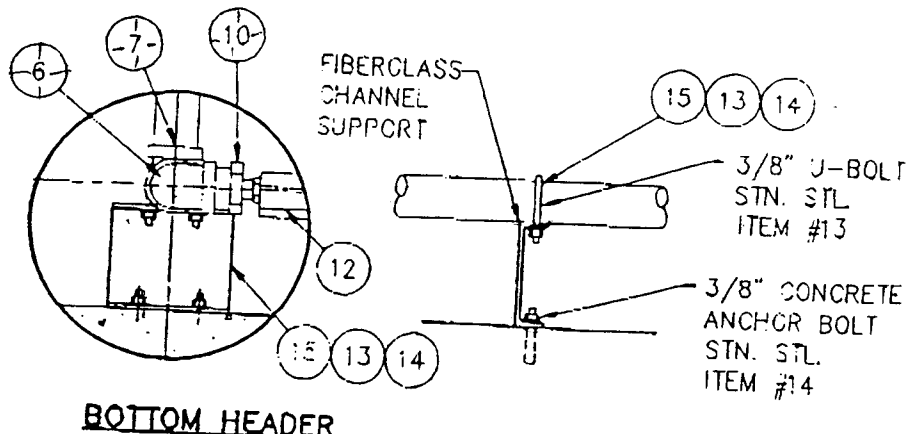


Stony Point

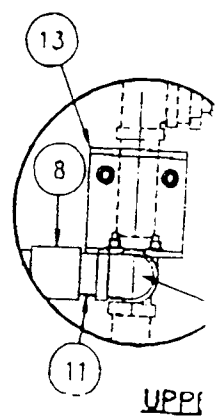
A



ELEVATION VIEW



BOTTOM HEADER SUPPORT DETAIL -A-



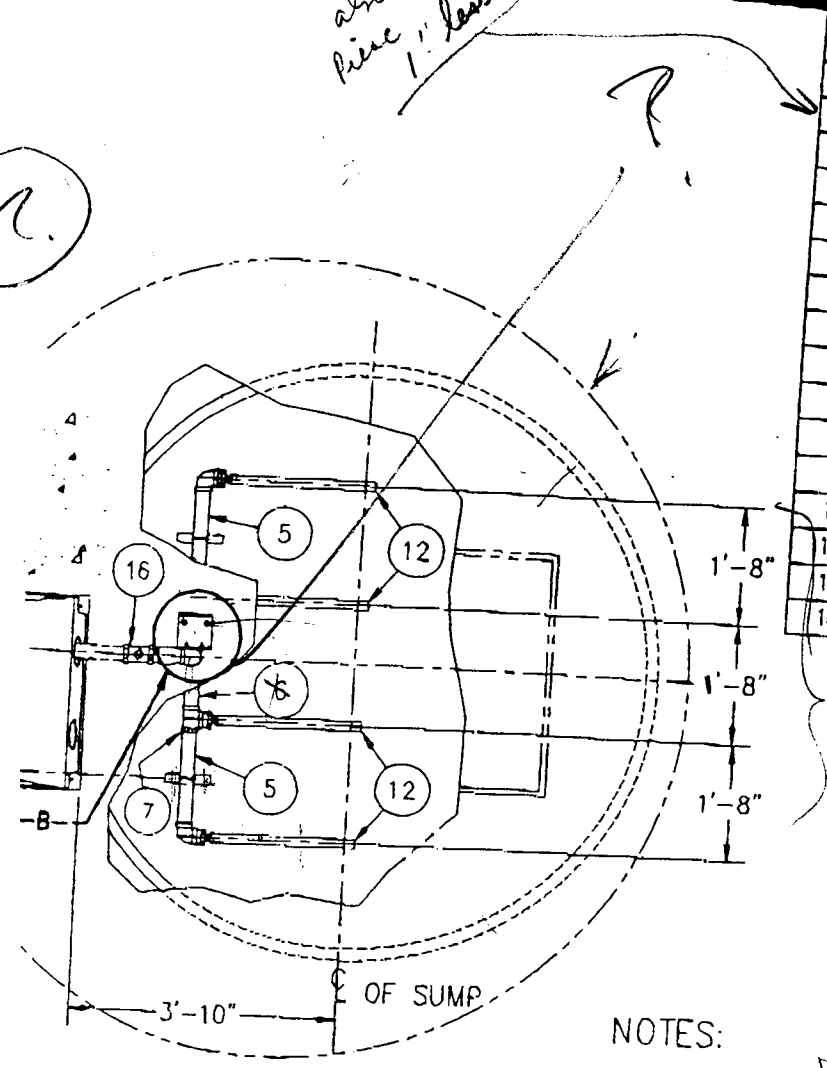
UPPI SUPPOI

REV.	DATE	DESCRIPTION	APPROV.

B

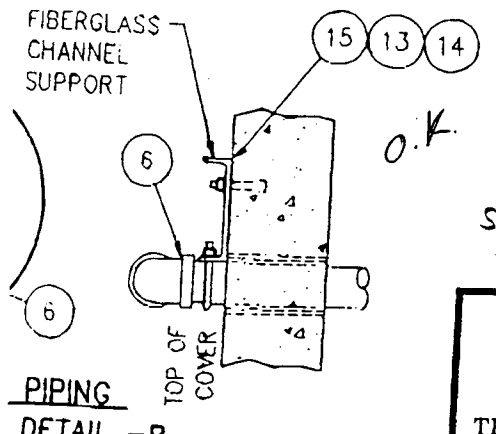
11

Stony Pt



PLAN VIEW

ITEM	QTY	DESCRIPTION
1	1	BLOWER/MOTER UNIT
2	1	PIPE, 2" DIA. SCH.40 S.S. x 18" LG.-UPPER DROP PIPE
3	1	PIPE, 2" DIA. SCH.40 S.S. x 78" LG.-LOWER DROP PIPE
4	2	PIPE, 2" DIA. SCH.40 S.S. x 6" LG.-INNER HEADER PIPE
5	2	PIPE, 2" DIA. SCH.40 S.S. x 17" LG.-OUTER HEADER PIPE
6	3	PIPE FITTING, 2" DIA. SCH.40 S.S. 90° ELBOW -
7	3	PIPE FITTING, 2" DIA. SCH.40 S.S. TEE
8	1	PIPE FITTING, 2" DIA. SCH.40 S.S. COUPLING
9	1	PIPE FITTING, 2" DIA. SCH.40 S.S. UNION
10	4	PIPE FITTING, 2" x 3/4" DIA. SCH.40 S.S. RED. BUSHING
11	2	PIPE NIPPLE SHT., 2" DIA. SCH.40 S.S. x 2 1/2" LG.
12	4	SS-2 S.S. DIFFUSER
13	3	6" FIBERGLASS CHANNEL SUPPORT
14	2	3/8" U-BOLT FOR 2" PIPE, W/ NUTS & WASHERS,STN. STL.
15	4	3/8" WEDGE ANCHOR, STN. STL.
16	1	2" BRONZE GAS COCK



PIPING DETAIL -B-

NOTES:

1.) SEE ENGINEERS PLANS FOR LOCATION OF CONTROL PANEL.
2.) INSTALLATION CONTRACTOR TO SUPPY 2" BLOWER CONNECTION PIPING FROM VALVE TO FLEXIBLE CONNECTOR BELOW BASE. FLEXIBLE CONNECTOR MOUNTED HORIZONTALLY BELOW BASE
3.) CONTRACTOR TO VERIFY LOCATION OF DROP PIPE THRU THE PRECAST MANHOLE COVER TO ASSURE ADEQUATE ROOM FOR MOUNTING BLOWER ASSY. AND ALUM. ACCESS HATCH
4.) CONTRACTOR TO VERIFY ELEVATIONAL DIMENSIONS OF TANK AND THICKNESS OF CONCRETE COVER.
5.) CONTRACTOR TO USE PIPE DOPE OR TAPE FOR ALL THREADED FITTINGS AND CONNECTIONS

Steve Dutter 513-531-4426

DIFFUSED GAS TECHNOLOGIES, INC.
1776 Mentor Ave., Suite 160
Cincinnati, Ohio 45212
TEL (513) 531-4426 FAX (513) 531-4436

THIS DRAWING CONTAINS INFORMATION THAT IS PROPRIETARY TO DIFFUSED GAS TECHNOLOGIES AND IS NOT TO BE USED WITHOUT PERMISSION OF DIFFUSED GAS TECHNOLOGIES

STONEY POINT PROJECT

AERATION PIPING & DIFFUSERS PLAN & ELEVATION VIEW LAYOUT

SCALE: 3/8"=1" : B SIZE	QUOTE NO.	PROJECT NO.	
DRAWN BY: JJM	DATE: 10/24/00	SHEET	DRAWING NO.
CHECKED BY: SD	DATE: 10/24/00	1 OF 1	15124-01

ATTACHMENT 5

FIELD ACTIVITY DAILY LOG

ECM

FIELD ACTIVITY DAILY LOG

PROJECT NAME:	Date
PROJECT NUMBER:	Project Page
FIELD ACTIVITY SUBJECT:	Sheet of

DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:

ATTACHMENT 6

EFFLUENT MONITORING REPORT

Degussa Corporation - Stony Point, New York
Effluent Monitoring Report
OU-2 Interceptor Sump

Sample Date: Time(s): Location: _____
Samples Collected By: _____ Sample ID: _____

Effluent Parameter	Sample Result	Units	Allowable Discharge		Mass Loadings	
Sample Date Flow	not metered	gpd	N/A		N/A	
Daily Average Flow	not metered	gpm	50	gpm	N/A	
pH (Range)		SU	6.0 - 9.0	Y/N	N/A	
BOD, 5-day		mg/l	40	Y/N	< 0.000000	lbs/day
1,1,1-Trichloroethane		ug/l	10	Y/N	< 0.000000	lbs/day
1,4-Dioxane		ug/l	150	Y/N	< 0.000000	lbs/day
Benzene		ug/l	10	Y/N	< 0.000000	lbs/day
Chlorobenzene		ug/l	10	Y/N	< 0.000000	lbs/day
Chloroethane		ug/l	10	Y/N	< 0.000000	lbs/day
Chloroform		ug/l	10	Y/N	< 0.000000	lbs/day
Ethylbenzene		ug/l	10	Y/N	< 0.000000	lbs/day
Methylene Chloride		ug/l	10	Y/N	< 0.000000	lbs/day
Toluene		ug/l	10	Y/N	< 0.000000	lbs/day
Xylenes, Total		ug/l	10	Y/N	< 0.000000	lbs/day
1,1-Dichloroethane		ug/l	10	Y/N	< 0.000000	lbs/day
1,1-Dichloroethene		ug/l	10	Y/N	< 0.000000	lbs/day
1,2-Dichloroethane		ug/l	10	Y/N	< 0.000000	lbs/day
1,1,2,2-Tetrachloroethane		ug/l	10	Y/N	< 0.000000	lbs/day
Dimethylphthalate		ug/l	30	Y/N	< 0.000000	lbs/day
Diethylphthalate		ug/l	30	Y/N	< 0.000000	lbs/day
Tetrachloroethylene		ug/l	10	Y/N	< 0.000000	lbs/day
Napthalene		ug/l	10	Y/N	< 0.000000	lbs/day
Copper, Total		ug/l	78	Y/N	< 0.000000	lbs/day
Copper, Dissolved		ug/l	Monitor	Y/N	< 0.000000	lbs/day
Cyanide, Amenable		ug/l	60	Y/N	< 0.000000	lbs/day
Mercury, Total		ug/l	0.8	Y/N	< 0.000000	lbs/day
Lead, Total		ug/l	224	Y/N	< 0.000000	lbs/day
Nickel, Total		ug/l	115	Y/N	< 0.000000	lbs/day
Zinc, Total		ug/l	647	Y/N	< 0.000000	lbs/day
Bis(2-ethylhexyl)Phthalate		ug/l	600	Y/N	< 0.000000	lbs/day
Phenolics, Total		ug/l	800	Y/N	< 0.000000	lbs/day
Arsenic, Total		ug/l	25	Y/N	< 0.000000	lbs/day
Chromium, Total		ug/l	240	Y/N	< 0.000000	lbs/day
Selenium, Total		ug/l	6	Y/N	< 0.000000	lbs/day
Vanadium, Total		ug/l	200	Y/N	< 0.000000	lbs/day
Aluminum, Total		ug/l	2,000	Y/N	< 0.000000	lbs/day