Aztech
Technologies, Inc.

Proposal

Design and Installation of
Sub-Slab Depressurization System

Dutchess County Airport
Hanger Facility B953

Prepared for:

New York State Department of Environmental Conservation

5 McCrea Hill Road
Ballston Spa, NY 12020

CERTIFIED WOMAN-OWNED BUSINESS

www.aztechtech.com

Table of Contents

Sections

I……..…….……Project Technical Approach

II……..……..……..……..……...System Installation Plan

III…….....……..…….... Schedule Description

IV……..……..……..……..Project Cost Schedule

Prepared for:

Prepared by:

Aztech
Technologies, Inc.

Section – I

Project Technical Approach

Aztech Technologies, Inc. (Aztech) has prepared this proposal for the installation of a Sub-Slab Depressurization System (SSDS) at 32 Griffith Way, Wappingers Falls, NY at the Dutchess County Airport (the site). All activities detailed in this proposal are in compliance with standby remedial services contract number C100904, call out number 119161 (call out). This proposal is based on information obtained through soil vapor intrusion studies, communication tests conducted by Aztech, and the onsite meeting held between the New York State Department of Environmental Conservation (NYSDEC), New York State Department of Health (NYSDOH), Dutchess County (County), Associated Aircraft Group, Inc. (AAG), and Aztech.

Prior to Aztech's involvement with soil mitigation activities at the site, soil vapor intrusion studies conducted by others revealed indoor air concentrations of 1,2 Dibromoethane, 2-Butanone (MEK), Ethylbenzene, n-Hexane, m,p-xylene, and o-xylene above the guidance values. Concentrations in samples taken below the sub-slab existed above these values for ethylbenzene, m,p-xylene and o-xylene. Based on these results, mitigation was deemed necessary by the NYSDOH to improve indoor air quality.

At the recommendation of Aztech, communication tests were conducted on site on December 29 and 30, 2010, to provide more detailed information as to the feasibility of an SSDS at the hangar. During this test, the radius of influence (ROI) potential was the primary piece of information being obtained. Potential ROI was determined to be approximately 35-40 feet with 5 inches of water column and 20-25 CFM applied at the well head, making the installation of an SSDS a very competent method for the mitigation of soil vapors at the site.

During the onsite meeting held on March 1, 2011, Aztech confirmed the quantity and layout of the proposed SSDS with AAG, NYSDOH, NYSDEC, and County representatives. Once the location, layout, equipment, and materials of construction were established, Aztech researched and designed the system which is proposed in this document. The proposed SSDS is being installed to mitigate soil vapors from beneath the slab of the offices and work spaces surrounding the aircraft hangar. The system is not intended to improve the air quality of the atmosphere inside the facility, but to prevent the exposure of personnel inside from potentially harmful soil vapors know to exist under the slab. Due to the variety of activities being conducted at the hangar, supplemental point sources inside the facility could cause future indoor air samples to be above the guidance values. The proposed system can't mitigate these sources; it can only reduce exposure from the potential soil vapor found to exist on site.

Section - II

System Installation Plan

This section provides a detailed work plan for the installation of the SSDS at the Dutchess County Airport. Upon formal approval of all work agreements and contract documents, Aztech will begin contacting vendors to purchase equipment and materials. Once purchased and a date of delivery obtained, Aztech will provide the NYSDEC with a detailed schedule of system installation activities and will coordinate a mobilization date with the NYSDEC, the county, and AAG.

Once on site, Aztech will complete the health and safety seminar required by AAG. Once the completed and training requirements to work in the facility are met, Aztech will coordinate with AAG and designate and construct the equipment staging area, using temporary fencing and cones. Within this area, a box truck will be staged for the storage of tools and materials. Aztech will ensure all work and storage areas are well policed at all times while site work activities are being conducted.

Aztech plans install three separate extraction systems at the facility. Systems 1 and 2 will each consist of two extraction points, and be piped to two separate Radon Away HS-5000 fans mounted on the exterior of the structure. System 3 will consist one extraction point located on the north side of the structure, piped to one Radon Away GP-501 fan mounted in the space below the roof line.

Site work activities will begin with the installation of extraction points and lateral system piping. Aztech will begin by coring the extraction point locations, as shown in **Figure 2**. The extraction points will then be installed as detailed in **Figure 1**. System piping will be installed at each extraction point, and will be run vertically. At extraction points 1 though 4, the pipe will extend vertically, and then be run horizontal into the aircraft hangar. Once in the hangar, pipe will then be installed from the furthest most extraction point locations, and run towards the south eastern part of the structure, as detailed in Figure 2. Piping will run from extraction points 1 and 2, into System Fan Number 1. Piping from extraction points 3 and 4 will be piped into System Fan Number 2. Once at the southeast corner, piping from systems 1 and 2 will exit the building on top of the storage area/offices at the corner of the building. Once outside, the piping will be run to the system fans which will be mounted on the side of the building to the north of the small flat roof area, right next to the window of the facility break room. The fans will be mounted in an area in which prevents any disturbance to the break room window and where it will be protected from any snow shedding off of the main hanger roof. Electrical will then be run to the fans from the most practicable location, in order to reduce the distance run to the fans. At extraction point 5, the pipe will run in the opposite direction and be piped to the exterior of the structure. The fan will be installed in the space above the offices, and exhaust piping will exit the structure along the side building. Once on the exterior of the structure, a tee will be installed where it will be protected from snow shedding off the roof.

Section – III

Schedule Description

This section provides a detailed description of each item listed in Section IV, project cost schedule.

Item 1.0, Engineering and Project Management Activities:

This item includes costs for Aztech to engineer the proposed system, procure all equipment and materials to be installed, project management activities throughout the project, and the fabrication of project documents to be distributed to the NYSDEC, NYSDOH, County and AAG at the conclusion of the project. Aztech plans to submit a final report to the above parties which describes the system installed, details the operation and maintenance procedures, and includes all equipment manuals associated with system components. Any operation and maintenance costs beyond the items mentioned in this proposal would require additional funding to the call out.

Item 2.0, Mobilization, Demobilization, and Site Services:

This section includes charges for vehicles traveling from 5 McCrea Hill Road, Ballston Spa, NY to the Dutchess County Airport Facility in Wappingers Falls, NY, organization of equipment and materials, and receipt of equipment and materials on site for the startup of the project. Charges in this section also cover per diem and lodging, demobilization, site cleanup activities, and all activities related to health and safety requirements on site. As per AAG, the current tenants of the aircraft hangar, all Aztech personnel conducting work on site are required to go through a short health and safety seminar, given by AAG. This item also covers the time required to complete this training.

Item 3.0, Installation of Extraction Points:

This item includes all of the materials, equipment, and labor necessary to install five (5) extraction points in office, storage, and work shop areas surrounding the aircraft hangar. Extraction Points will be core drilled at predetermined locations based on the radius of influences observed during communication testing activities. At each point, three-inch perforated polyvinyl chloride (PVC) pipe will be installed to a depth of approximately eighteen inches below the slab, and will be connected to a coupling at the slab surface as shown in Figure 1. All PVC pipe will be schedule 40 wall thickness. At each extraction point pea gravel will be used as backfill material, which will surround the screened area. The pea gravel will be installed up to the base of the slab and then be sealed tightly with backer rod followed by hydraulic cement to the elevation of the top of the slab. Each extraction point will include a monometer installed on the vertical pipe rise above the sump. All connections will be made using solvent welding techniques, using the appropriately sized PVC fittings, primer, and glue. The piping will be mounted vertically along the closest wall to the extraction point. At extraction points 1 though 4, the pipe will then be run horizontally into the aircraft hanger area. At point 5 it will be run to the system fan, to be installed in the space above the offices, and then the pipe will continue to the exterior of the structure. All piping will be sloped back to the extraction points to prevent the build-up of condensation in the pipe. Where necessary, Aztech will section off some of the extraction points using dry wall or other means, in order to prevent potential disturbance to the AAG facility staff. Once the extraction locations are confirmed with AAG

representatives, costs associated with moving these points will require additional funding through an addendum to the call out. Labor estimates for this item also assumes full cooperation from AAG staff and representatives. Aztech will review the work to be completed and schedule with AAG in an appropriate time frame to coordinate the movement of Aircraft and equipment and materials in the area we will be working. However, it has been expressed that there may be times when it is impossible for AAG to assist us with our requests, due to normal facility operations or emergency situations not foreseen. Under these circumstances, Aztech will attempt to continue with the installation of other items on site, but these delays out of our control may require additional funding to the call out.

Item 4.0, Lateral Pipe Installation:

Installation of lateral pipe will include all materials, equipment, and labor necessary to run piping from the extraction point connections to the exterior of the structure from all of the extraction points. All piping used will be PVC schedule 40 wall thickness. Access to the elevated areas where pipe will be mounted will be attained by using either scissor lifts or ladders. Proper safety equipment will be utilized at all times while operating the scissor lift. From extraction points 1 and 4, piping will be run into the hangar and connect to their respective system header pipe as shown in Figure 2. Extraction point 2 will penetrate into the space just below the roof, run horizontally towards the hangar area, and then penetrate into the hangar where it will connect to its respective header pipe. Extraction point 3 will be installed in the office/storage area located at the southeastern part of the building, and will run along the wall and penetrate into the hangar area. It will then connect into the header pipe for System Number 2. Extraction point 5 will run from the extraction point into the space just below the roof, where the fan will be installed. The exhaust piping from the fan will then run to the north, and penetrate to the exterior of the structure where the pipe will terminate. All lateral piping installed will be mounted using the appropriate type clevis or split ring hangers, and 3/8“ threaded rod. The threaded rod will be attached to the wall by either unistrut brackets or threaded rod mounting plates, and concrete anchoring devices. All piping will be sloped back to the extraction points to prevent the collection of water build up in the header pipe. All header pipe in the hangar will be hung using the appropriate type clevis or split ring hangers, and 3/8“ threaded rod. The angle brackets or wall mounting plates used to suspend the pipe will be secured to the concrete block walls using concrete anchors. Once at the southeast corner, the lateral piping will penetrate to the exterior of the building. The penetration points will be sealed using hydraulic cement and spray foam. The piping will then terminate at the locations where System Fans 1 and 2 will be installed. Aztech will review the work to be completed and schedule with AAG in an appropriate time frame to coordinate the movement of Aircraft and equipment and materials in the area we will be working. However, it has been expressed that there may be times when it is impossible for AAG to assist us with our requests, due to normal facility operations or emergency situations not foreseen. Under these circumstances, Aztech will attempt to continue with the installation of other items on site, but these delays out of our control may require additional funding to the call out.

Item 5.0, Treatment System Components:

Costs associated with the treatment system components include all materials, equipment, and labor necessary to purchase the system fans and electrical components of the system. A copy of the installation instructions for each system fan is included in **Attachment A**. The installation instructions for each fan include specifics such as fan curves, warranty information, and other specifics.

Item 6.0, Treatment System Installation:

Cost associated with the installation of the treatment system will include all materials, equipment, and labor necessary to install the system fans and electrical components of the system. This section also includes the verification of system operation and all necessary costs associated with sub-contracting a locally licensed electrician to verify the electrical components of the system. This item also includes the costs to install exhaust stacking from the systems to the top of the nearest facility roof line, providing the appropriate spacing requirements needed for installation of SSDS exhaust piping. Exhaust piping from the HS-5000 fans will be two inch schedule 40 PVC pipe and will be capped using a tee with protective caging. Exhaust piping from the GP-501 fan will be 3 - inch schedule 40 PVC pipe and will be capped using a tee with protective caging. This system is being designed assuming no treatment is needed to the system exhaust. Any air monitoring or testing to the exhaust of the system would require additional funding to the call out.

Item 7.0, Verification and Testing:

This section includes the costs associated with the labor, equipment and materials needed to verify system operation. Once the system has been installed, Aztech will conduct a full communication test to confirm and verify the radius of influence of the extraction points. At the conclusion of the communication test, Aztech will provide the NYSDEC with a final report in which outlines the operation and maintenance procedures of the system. Included in this report will be all of the equipment manuals associated with the system.

Section – IV

Project Cost Schedule

This section provides a breakdown of costs associated with the installation of a sub-slab depressurization system (SSDS) at the site, as detailed in section III.

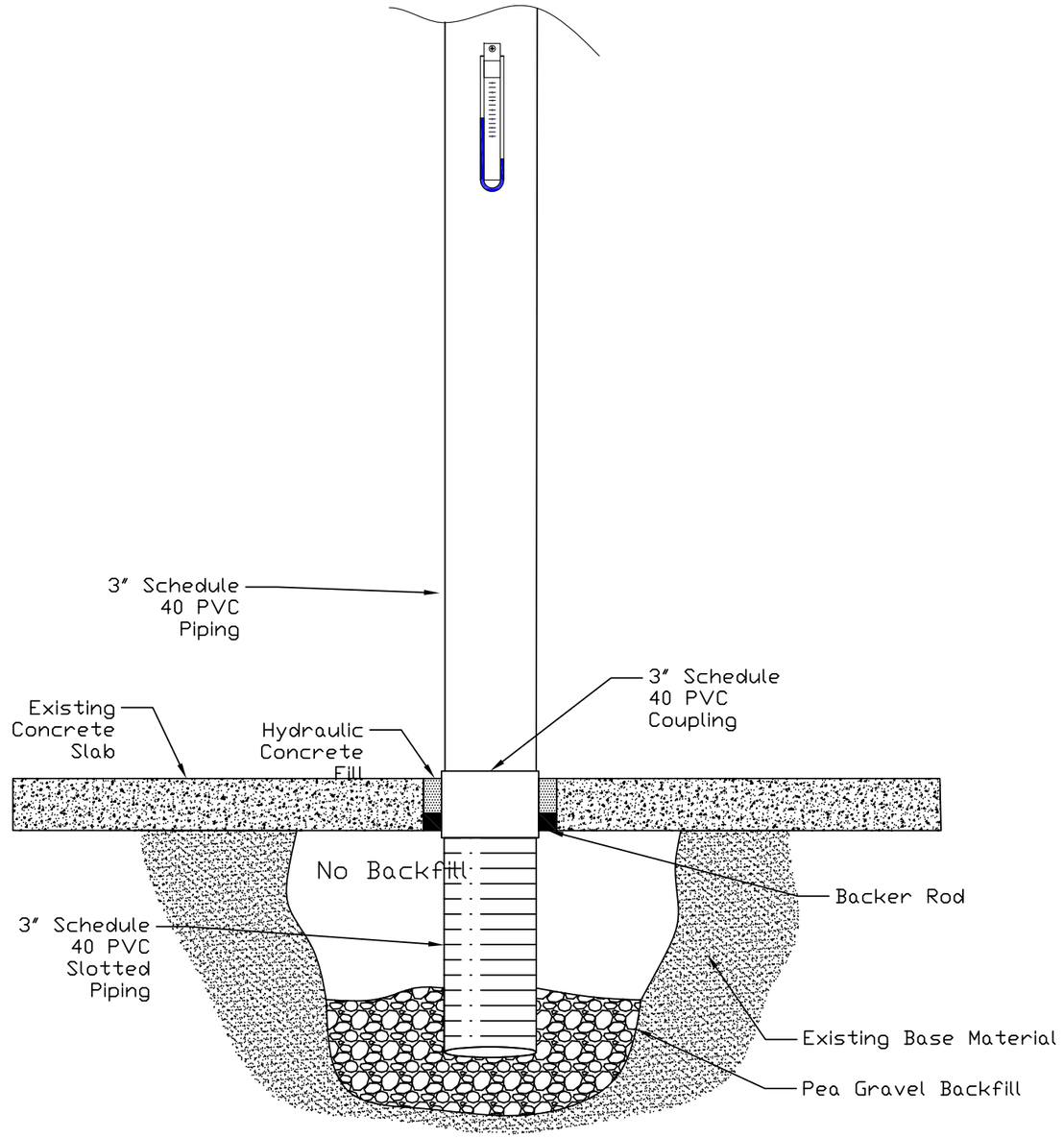
Table 1

Task	Item Description	Estimated Quantity	Quantity Description	Unit Rate	Computed Totals
1.0	Engineering and Project Management Activities	1	Lump Sum	$12,578	$12,578
2.0	Mobilization, Demobilization, and Site Services	1	Lump Sum	$11,579	$11,579
3.0	Installation of Extraction Points	5	Each	$1,518.80	$7,594
4.0	Lateral Pipe Installation	1	Lump Sum	$17,760	$17,760
5.0	Treatment System Components	1	Lump Sum	$4,149	$4,149
6.0	Treatment System Installation	1	Lump Sum	$4,135	$4,135
7.0	Verification and Testing	1	Lump Sum	$1,247	$1,247
Totals					$59,042

Table Notes:

1. Costs above are based on rates provided in Contract Number C100904, for both prevailing and non-prevailing wage rates.

Figure 1



Aztech Technologies, Inc.

EXPERTISE YOU CAN COUNT ON

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NYSDEC Region 3 Spill# 03-14078
Dutchess County Airport Hanger Facility

Figure 1

DATE: 3/21/11

Scale: NA

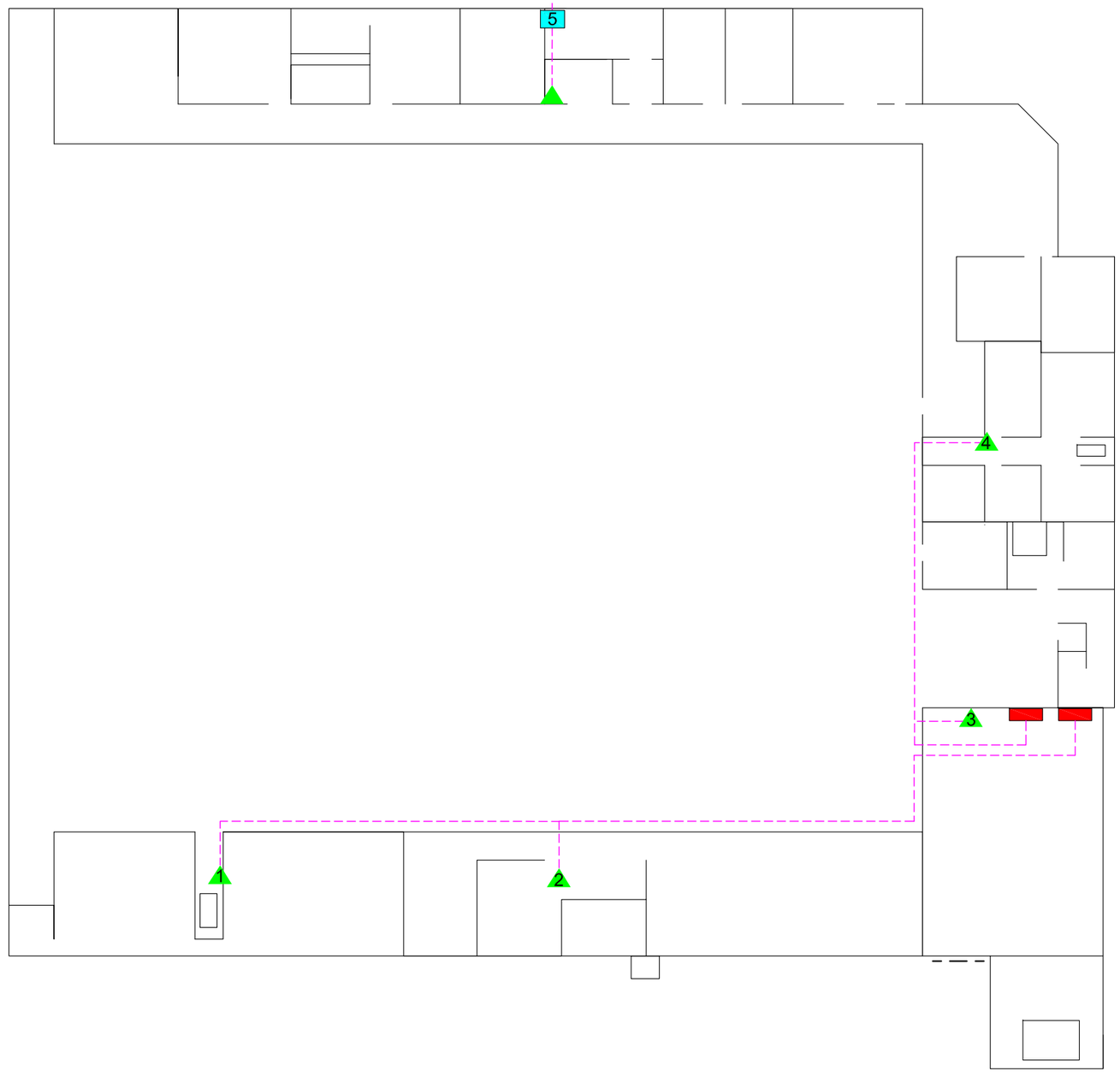
Proposed SSDS Extraction Point Detail

Figure 2

Prepared for:

Prepared by:

Aztech
Technologies, Inc.



Map Key

- Proposed Extraction Point Location
- 3" PVC Piping
- HS5000 Fan
- GP 501 Fan

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SITE: NYSDEC Region 3 Spill# 03-14078
Dutchess County Airport Hanger Facility
32 Griffith Way
Wappingers Falls, NY

Figure 2

DATE: 3/21/11 | Scale: NA

Proposed Sub-Slab Depressurization System Layout

Attachment A

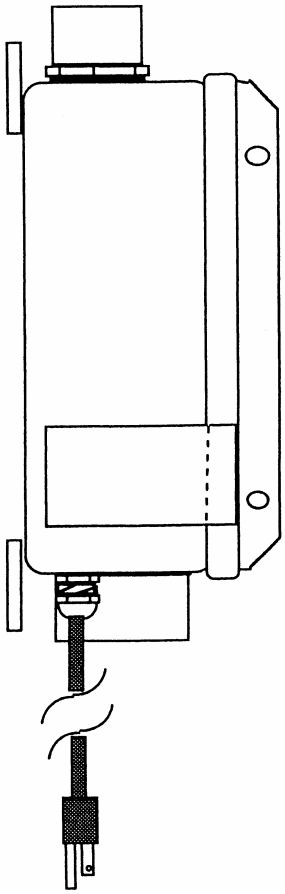
Prepared for:

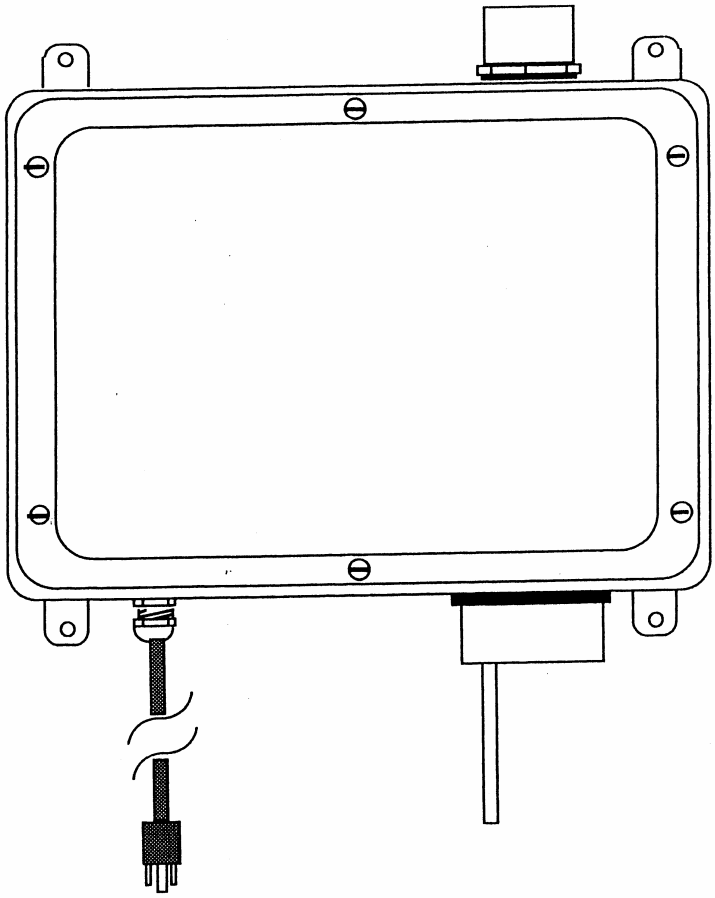
Prepared by:

Aztech
Technologies, Inc.

HS SERIES INSTALLATION INSTRUCTIONS

BY RadonAway™





RadonAway, Inc. Ward Hill, MA. P/N IN007 Rev F

RadonAway Ward Hill, MA.

HS Series Fan Installation Instructions

Please Read and Save These Instructions.

DO NOT CONNECT POWER SUPPLY UNTIL FAN IS COMPLETELY INSTALLED. MAKE SURE ELECTRICAL SERVICE TO FAN IS LOCKED IN "OFF" POSITION. DISCONNECT POWER BEFORE SERVICING FAN.

1. **WARNING!** Do not use fan in hazardous environments where fan electrical system could provide ignition to combustible or flammable materials.

2. **WARNING!** Do not use fan to pump explosive or corrosive gases.

3. **WARNING!** Check voltage at the fan to insure it corresponds with nameplate.

4. **WARNING!** Normal operation of this device may affect the combustion airflow needed for safe operation of fuel burning equipment. Check for possible backdraft conditions on all combustion devices after installation.

5. **NOTICE!** There are no user serviceable parts located inside the fan unit. **Do NOT attempt to open.** Return unit to the factory for service.

6. All wiring must be performed in accordance with the National Fire Protection Association's (NFPA)"National Electrical Code, Standard #70"-current edition for all commercial and industrial work, and state and local building codes. All wiring must be performed by a qualified and licensed electrician..

7. **WARNING!** In the event that the fan is immersed in water, return unit to factory for service before operating.

8. **WARNING!** Do not twist or torque fan inlet or outlet piping as Leakage may result.

9. **WARNING!** Do not leave fan unit installed on system piping without electrical power for more than 48 hours. Fan failure could result from this non-operational storage.

INSTALLATION INSTRUCTIONS (Rev F)
for DynaVac High Suction Series
HS2000 p/n 23004-1
HS3000 p/n 23004-2
HS5000 p/n 23004-3

1.0 SYSTEM DESIGN CONSIDERATIONS

1.1 INTRODUCTION

The DynaVac is intended for use by trained, professional Radon mitigators. The purpose of this instruction is to provide additional guidance for the most effective use of the DynaVac. This instruction should be considered as a supplement to EPA standard practices, state and local building codes and state regulations. In the event of a conflict, those codes, practices and regulations take precedence over this instruction.

1.2 ENVIRONMENTALS

The DynaVac is designed to perform year-round in all but the harshest climates without additional concern for temperature or weather. For installations in an area of severe cold weather, please contact RadonAway for assistance. When not in operation, the DynaVac should be stored in an area where the temperature is never less than 32 degrees F. or more than 100 degrees F. The DynaVac is thermally protected such that it will shut off when the internal temperature is above 104 degrees F. Thus if the DynaVac is idle in an area where the ambient temperature exceeds this shut off, it will not restart until the internal temperature falls below 104 degrees F.

1.3 ACOUSTICS

The DynaVac, when installed properly, operates with little or no noticable noise to the building occupants. There are, however, some considerations to be taken into account in the system design and installation. When installing the DynaVac above sleeping areas, select a location for mounting which is as far away as possible from those areas. Avoid mounting near doors, fold-down stairs or other uninsulated structures which may transmit sound. Insure a solid mounting for the DynaVac to avoid structure-borne vibration or noise.

The velocity of the outgoing air must also be considered in the overall system design. With small diameter piping, the "rushing" sound of the outlet air can be disturbing. The system design should incorporate a means to slow and quiet the outlet air. The use of the RadonAway Exhaust Muffler, p/n 24001, is strongly recommended.

1.4 GROUND WATER

Under no circumstances should water be allowed to be drawn into the inlet of the DynaVac as this may result in damage to the unit. The DynaVac should be mounted at least 5 feet above the slab penetration to minimize the risk of filling the DynaVac with water in installations with occasional high water tables.

In the event that a temporary high water table results in water at or above slab level, water will be drawn into the riser pipes thus blocking air flow to the DynaVac. The lack of cooling air will result in the DynaVac cycling on and off as the internal temperature rises above the thermal cutoff and falls upon shutoff. Should this condition arise, it is recommended that the DynaVac be disconnected until the water recedes allowing for return to normal operation.

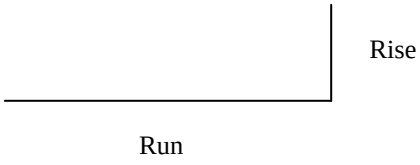
1.5 CONDENSATION & DRAINAGE

(WARNING!: Failure to provide adequate drainage for condensation can result in system failure and damage the DynaVac).

Condensation is formed in the piping of a mitigation system when the air in the piping is chilled below its dew point. This can occur at points where the system piping goes through unheated space such as an attic, garage or outside. The system design must provide a means for water to drain back to a slab hole to remove the condensation.

The use of small diameter piping in a system increases the speed at which the air moves. The speed of the air can pull water uphill and at sufficient velocity it can actually move water vertically up the side walls of the pipe. This has the potential of creating a problem in the negative pressure (inlet) side piping. For DynaVac inlet piping, the following table provides the minimum recommended pipe diameters as well as minimum pitch under several system condition. Use this chart to size piping for a system.

Pipe Diam.	Minimum Rise per Foot of Run*		
	@ 25 CFM	@ 50 CFM	@ 100 CFM
4"	1/32 "	3/32 "	3/8 "
3"	1/8 "	3/8 "	1 1/2 "



*Typical operational flow rates:

HS3000, or HS5000	20 - 40 CFM
HS2000	50 - 90 CFM

All exhaust piping should be 2" PVC.

1.6 "SYSTEM ON" INDICATOR

A properly designed system should incorporate a "System On" Indicator for affirmation of system operation. A Magnehelic pressure gauge is recommended for this purpose. The indicator should be mounted at least 5 feet above the slab penetration to minimize the risk of filling the gauge with water in installations with occasional high water tables.

1.7 SLAB COVERAGE

The DynaVac can provide coverage of well over 1000 sq. ft. per slab penetration. This will, of course, depend on the sub-slab aggregate in any particular installation and the diagnostic results. In general, sand and gravel are much looser aggregates than dirt and clay. Additional suction points can be added as required. It is recommended that a small pit (2 to 10 gallons in size) be created below the slab at each suction hole.

1.8 ELECTRICAL WIRING

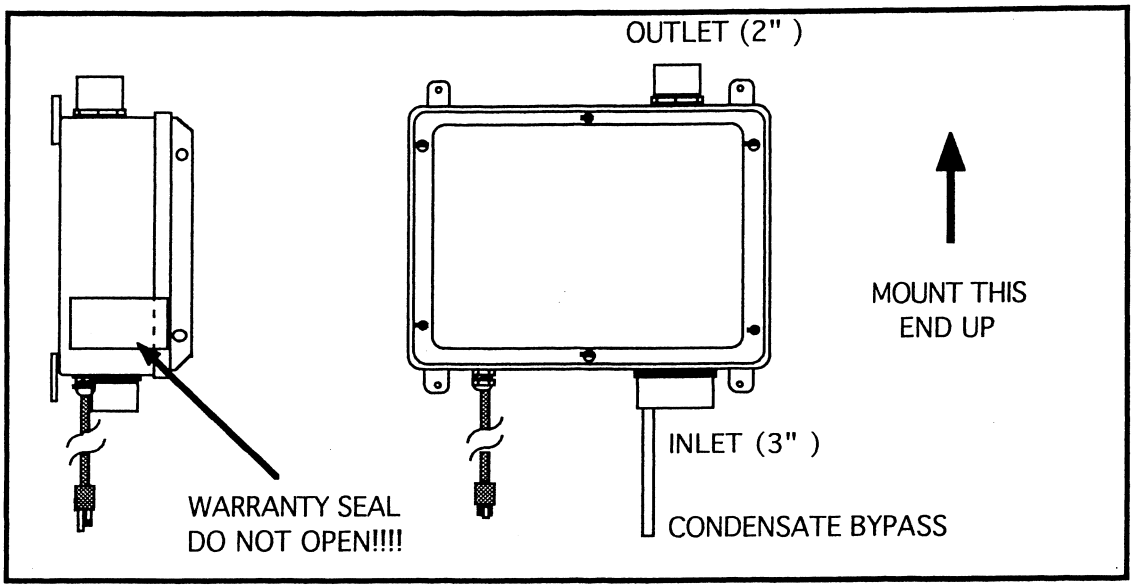
The DynaVac plugs into a standard 120V outlet. All wiring must be performed in accordance with the National Fire Protection Association's (NFPA)"National Electrical Code, Standard #70"-current edition for all commercial and industrial work, and state and local building codes. All wiring must be performed by a qualified and licensed electrician.

1.8a ELECTRICAL BOX (optional)

The optional Electrical Box (p/n 20003) provides a weathertight box with switch for outdoor hardwire connection. All wiring must be performed in accordance with the National Fire Protection Association's (NFPA)"National Electrical Code, Standard #70"-current edition for all commercial and industrial work, and state and local building codes. All wiring must be performed by a qualified and licensed electrician. Outdoor installations require the use of a U.L. listed watertight conduit.

1.9 SPEED CONTROLS

Electronic speed controls can **NOT** be used on HS series units.



2.0 INSTALLATION

2.1 MOUNTING

Mount the DynaVac to the wall studs, or similar structure, in the selected location with (4) 1/4" x 1 1/2" lag screws (not provided). Insure the DynaVac is both plumb and level.

2.2 DUCTING CONNECTIONS

Make final ducting connection to DynaVac with flexible couplings. Insure all connections are tight. Do not twist or torque inlet and outlet piping on DynaVac or leaks may result.

2.3 VENT MUFFLER INSTALLATION

Install the muffler assembly in the selected location in the outlet ducting. Solvent weld all connections. The muffler is normally installed above the roofline at the end of the vent pipe.

2.5 OPERATION CHECKS

____ Make final operation checks by verifying all connections are tight and leak-free.

____ Insure the DynaVac and all ducting is secure and vibration-free.

____ Verify system vacuum pressure with Magnehelic. Insure vacuum pressure is less than the maximum recommended as shown below:

DynaVac	HS2000	14" WC
DynaVac	HS3000	21" WC
DynaVac	HS5000	40" WC

(Above are based on sea-level operation, at higher altitudes reduce above by about 4% per 1000 Feet.)
If these are exceeded, increase number of suction points.

____ Verify Radon levels by testing to EPA protocol.

Addendum

PRODUCT SPECIFICATIONS

Model	Maximum Static Suction	Typical CFM vs Static Suction WC (Recommended Operating Range)						Power* Watts @ 115 VAC
		0"	10"	15"	20"	25"	35"	
HS2000	18"	110	72	40	-	-	-	150-270
HS3000	27"	40	33	30	23	18	-	105-195
HS5000	50"	53	47	42	38	34	24	180-320

*Power consumption varies with actual load conditions

Inlet: 3.0" PVC
Outlet: 2.0" PVC
Mounting: Brackets for vertical mount
Weight: Approximately 18 lbs.
Size: Approximately 15"W x 13"H x 8"D
Minimum recommended inlet ducting (greater diameter may always be used):
HS3000, HS5000 --- 2.0" PVC Pipe
HS2000 --- Main feeder line of 3.0" or greater PVC Pipe
Branch lines (if 3 or more) may be 2.0" PVC Pipe
Outlet ducting: 2.0" PVC
Storage temperature range: 32 - 100 degrees F.
Thermally protected
Locked rotor protection
Internal Condensate Bypass

IMPORTANT INSTRUCTIONS TO INSTALLER

Inspect the HS Series Fan for shipping damage within 15 days of receipt. Notify **RadonAway of any damages immediately**. Radonaway is not responsible for damages incurred during shipping. However, for your benefit, Radonaway does insure shipments.
There are no user serviceable parts inside the fan. **Do not attempt to open.** Return unit to factory for service.

Install the HS Series Fan in accordance with all EPA standard practices, and state and local building codes and state regulations.

WARRANTY

Subject to any applicable consumer protection legislation, RadonAway warrants that the HS Series Fan (the "Fan") will be free from defects in materials and workmanship for a period of one (1) year from the date of manufacture (the "Warranty Term"). Outside the Continental United States and Canada the Warranty Term is one (1) year from the date of manufacture.

RadonAway will replace any Fan which fails due to defects in materials or workmanship. The Fan must be returned (at owner's cost) to the RadonAway factory. Proof of purchase must be supplied upon request for service under this Warranty.

This Warranty is contingent on installation of the Fan in accordance with the instructions provided. This Warranty does not apply where any repairs or alterations have been made or attempted by others, or if the unit has been abused or misused. Warranty does not include damage in shipment unless the damage is due to the negligence of RadonAway.

RadonAway is not responsible for installation, removal or delivery costs associated with this Warranty.

EXCEPT AS STATED ABOVE, THE HS SERIES FANS ARE PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

IN NO EVENT SHALL RADONAWAY BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR RELATING TO, THE FAN OR THE PERFORMANCE THEREOF. RADONAWAY'S AGGREGATE LIABILITY HEREUNDER SHALL NOT IN ANY EVENT EXCEED THE AMOUNT OF THE PURCHASE PRICE OF SAID PRODUCT. THE SOLE AND EXCLUSIVE REMEDY UNDER THIS WARRANTY SHALL BE THE REPAIR OR REPLACEMENT OF THE PRODUCT, TO THE EXTENT THE SAME DOES NOT MEET WITH RADONAWAY'S WARRANTY AS PROVIDED ABOVE.

For service under this Warranty, contact RadonAway for a Return Material Authorization (RMA) number and shipping information. No returns can be accepted without an RMA. If factory return is required, the customer assumes all shipping cost to and from factory.

RadonAway
3 Saber Way
Ward Hill, MA 01835
TEL. (978) 521-3703
FAX (978) 521-3964

Record the following information for your records:

Serial No._____
Purchase Date_____

RadonAway Ward Hill, MA IN014 Rev F

XP/GP/XR Series Fan Installation Instructions

Please Read And Save These Instructions.

DO NOT CONNECT POWER SUPPLY UNTIL FAN IS COMPLETELY INSTALLED. MAKE SURE ELECTRICAL SERVICE TO FAN IS LOCKED IN "OFF" POSITION. DISCONNECT POWER BEFORE SERVICING FAN.

1. **WARNING!** Do not use fan in hazardous environments where fan electrical system could provide ignition to combustible of flammable materials.

2. **WARNING!** Do not use fan to pump explosive or corrosive gases.

3. **WARNING!** Check voltage at the fan to insure it corresponds with nameplate.

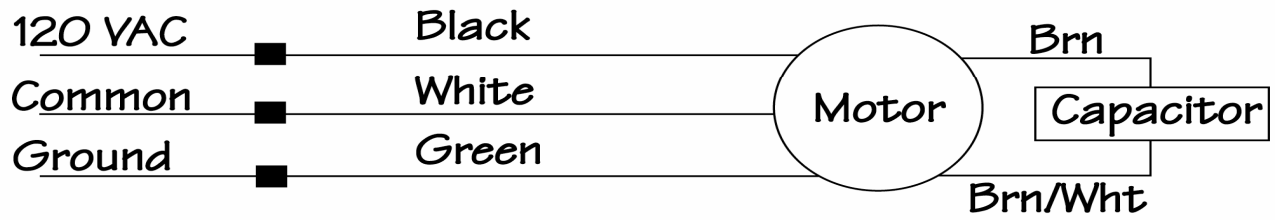
4. **WARNING!** Normal operation of this device may affect the combustion airflow needed for safe operation of fuel burning equipment. Check for possible backdraft conditions on all combustion devices after installation.

5. **NOTICE!** There are no user serviceable parts located inside the fan unit. **Do NOT attempt to open.** Return unit to the factory for service.

6. All wiring must be performed in accordance with the National Fire Protection Association's (NFPA)"National Electrical Code, Standard #70"-current edition for all commercial and industrial work, and state and local building codes. All wiring must be performed by a qualified and licensed electrician.

7. **WARNING!** Do not leave fan unit installed on system piping without electrical power for more than 48 hours. Fan failure could result from this non-operational storage.

DynaVac GP/XP/XR/RP Series Fan Wiring Diagram



DynaVac - XP/XR Series		DynaVac - GP Series	
XP101	p/n 23008-1,-2	GP201	p/n 23007-1
XP151	p/n 23010-1,-2	GP301	p/n 23006-1,-2
XP201	p/n 23011-1,-2	GP401	p/n 23009-1
XR161	p/n 23018-1,-2	GP501	p/n 23005-1,-2
XR261	p/n 23019-1,-2		

1.0 SYSTEM DESIGN CONSIDERATIONS

1.1 INTRODUCTION

The DynaVac GP/XP/XR Series Radon Fans are intended for use by trained, professional Radon mitigators. The purpose of this instruction is to provide additional guidance for the most effective use of a DynaVac Fan. This instruction should be considered as a supplement to EPA standard practices, state and local building codes and state regulations. In the event of a conflict, those codes, practices and regulations take precedence over this instruction.

1.2 ENVIRONMENTALS

The GP/XP/XR Series Fans are designed to perform year-round in all but the harshest climates without additional concern for temperature or weather. For installations in an area of severe cold weather, please contact RadonAway for assistance. When not in operation, the fan should be stored in an area where the temperature is never less than 32 degrees F. or more than 100 degrees F.

1.3 ACOUSTICS

The GP/XP/XR Series Fan, when installed properly, operates with little or no noticeable noise to the building occupants. The velocity of the outgoing air should be considered in the overall system design. In some cases the "rushing" sound of the outlet air may be disturbing. In these instances, the use of a RadonAway Exhaust Muffler is recommended.

1.4 GROUND WATER

In the event that a temporary high water table results in water at or above slab level, water may be drawn into the riser pipes thus blocking air flow to the GP/XP/XR Series Fan. The lack of cooling air may result in the fan cycling on and off as the internal temperature rises above the thermal cutoff and falls upon shutoff. Should this condition arise, it is recommended that the fan be turned off until the water recedes allowing for return to normal operation.

1.5 SLAB COVERAGE

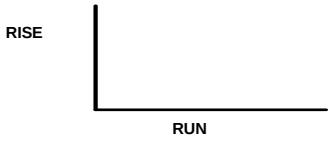
The GP/XP/XR Series Fan can provide coverage up to 2000+ sq. ft. per slab penetration. This will primarily depend on the sub-slab material in any particular installation. In general, the tighter the material, the smaller the area covered per penetration. Appropriate selection of the GP/XP/XR Series Fan best suited for the sub-slab material can improve the slab coverage. The GP & XP series have a wide range of models to choose from to cover a wide range of subslab material. The higher static suction fans are generally used for tighter subslab materials. The XR Series is specifically designed for high flow applications such as stone/gravel and drain tile. Additional suction points can be added as required. It is recommended that a small pit (5 to 10 gallons in size) be created below the slab at each suction hole.

1.6 CONDENSATION & DRAINAGE

Condensation is formed in the piping of a mitigation system when the air in the piping is chilled below its dew point. This can occur at points where the system piping goes through unheated space such as an attic, garage or outside. The system design must provide a means for water to drain back to a slab hole to remove the condensation. The GP/XP/XR Series Fan **MUST** be mounted vertically plumb and level, with the outlet pointing up for proper drainage through the fan. Avoid mounting the fan in any orientation that will allow water to accumulate inside the fan housing. The GP/XP/XR Series Fans are **NOT** suitable for underground burial.

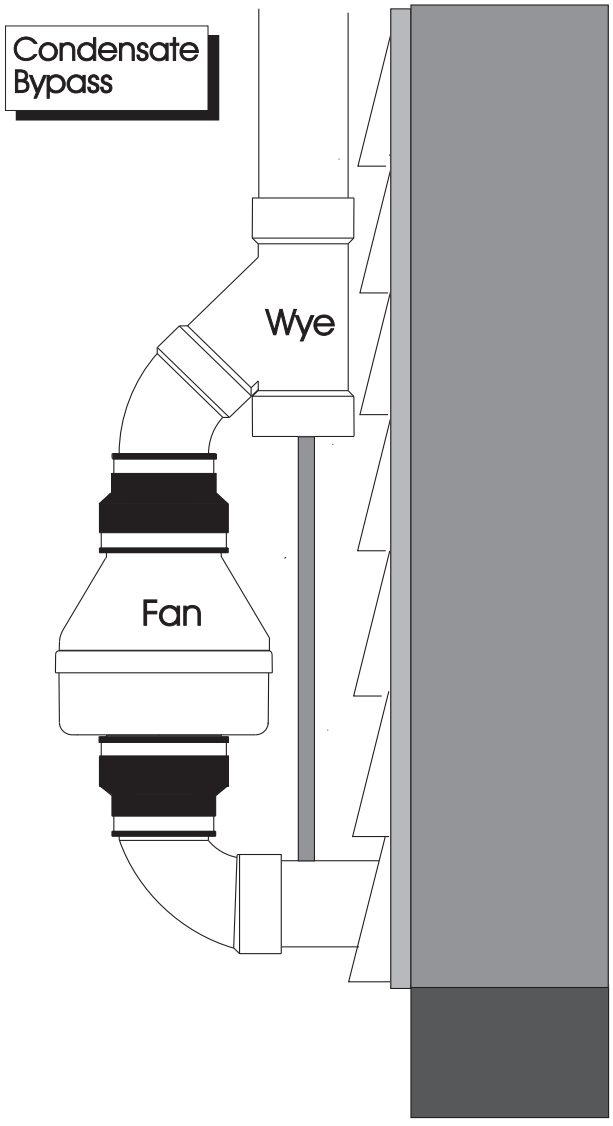
For GP/XP/XR Series Fan piping, the following table provides the minimum recommended pipe diameter and pitch under several system conditions.

Pipe Dia.	Minimum Rise per Foot of Run* @25 CFM	@50 CFM	@100 CFM
4″	1/8″	1/4″	3/8″
3"	1/4"	3/8"	1 1/2"



*Typical GP/XP/XR Series Fan operational flow rate is 25 - 90 CFM. (For more precision, determine flow rate by using the chart in the addendum.)

Under some circumstances in an outdoor installation a condensate bypass should be installed in the outlet ducting as shown. This may be particularly true in cold climate installations which require long lengths of outlet ducting or where the outlet ducting is likely to produce large amounts of condensation because of high soil moisture or outlet duct material. Schedule 20 piping and other thin-walled plastic ducting and Aluminum downspout will normally produce much more condensation than Schedule 40 piping.



The bypass is constructed with a 45 degree Wye fitting at the bottom of the outlet stack. The bottom of the Wye is capped and fitted with a tube that connects to the inlet piping or other drain. The condensation produced in the outlet stack is collected in the Wye fitting and drained through the bypass tube. The bypass tubing may be insulated to prevent freezing.

1.7 "SYSTEM ON" INDICATOR

A properly designed system should incorporate a "System On" Indicator for affirmation of system operation. A manometer, such as a U-Tube, or a vacuum alarm is recommended for this purpose.

1.8 ELECTRICAL WIRING

The GP/XP/XR Series Fans operate on standard 120V 60 Hz. AC. All wiring must be performed in accordance with the National Fire Protection

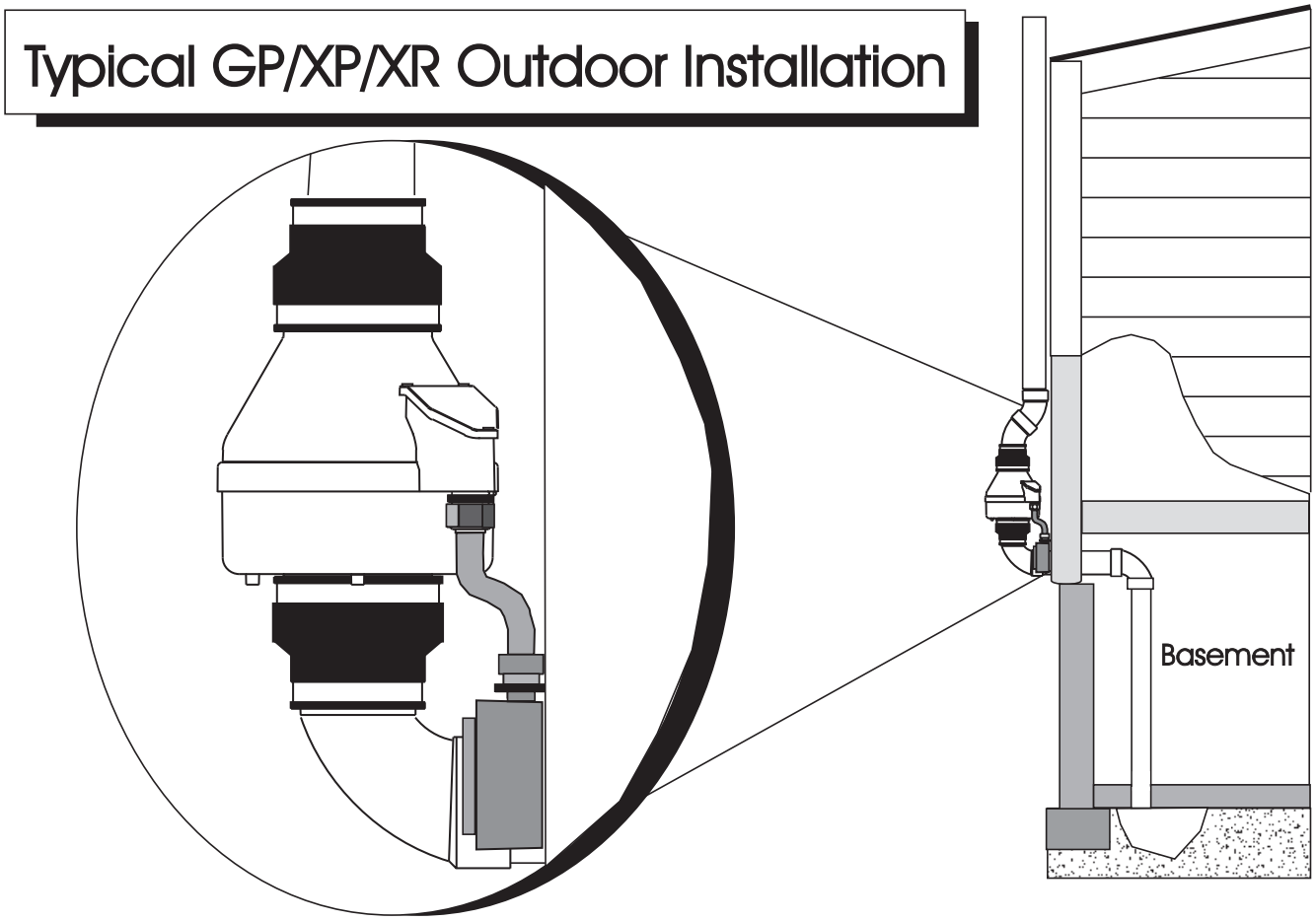
Association's (NFPA)"National Electrical Code, Standard #70"-current edition for all commercial and industrial work, and state and local building codes. All wiring must be performed by a qualified and licensed electrician. Outdoor installations require the use of a U.L. listed watertight conduit.

1.9 SPEED CONTROLS

The GP/XP/XR Series Fans are rated for use with electronic speed controls ,however, they are generally not recommended.

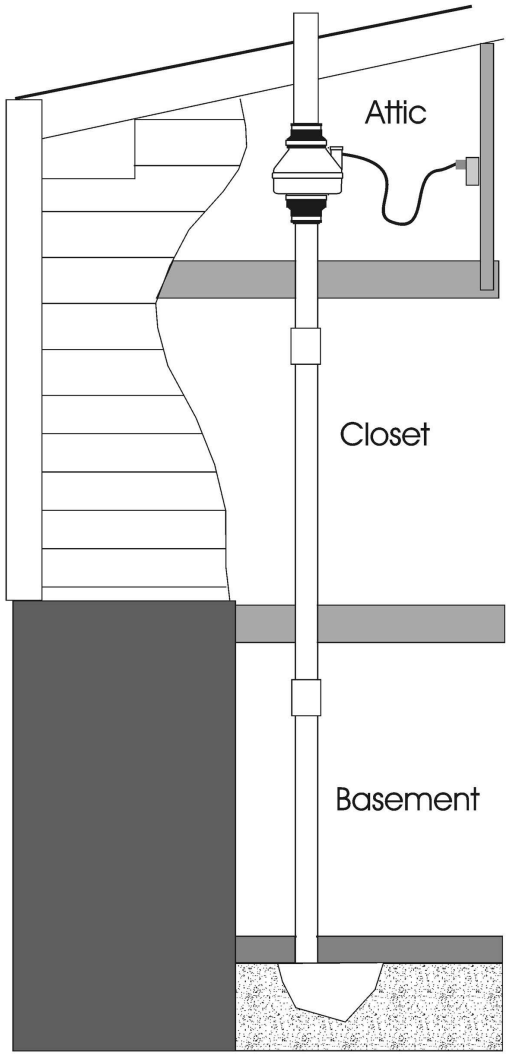
2.0 INSTALLATION

The GP/XP/XR Series Fan can be mounted indoors or outdoors. (It is suggested that EPA recommendations be followed in choosing the fan location.) The GP/XP/XR Series Fan may be mounted directly on the system piping or fastened to a supporting structure by means of optional mounting bracket.



2.1 MOUNTING

Mount the GP/XP/XR Series Fan vertically with outlet up. Insure the unit is plumb and level. When mounting directly on the system piping assure that the fan does not contact any building surface to avoid vibration noise.



2.2 MOUNTING BRACKET (optional)

The GP/XP/XR Series fan may be optionally secured with the integral mounting bracket on the GP Series fan or with RadonAway P/N 25007-2 mounting bracket for an XP/XR Series fan. Foam or rubber grommets may also be used between the bracket and mounting surface for vibration isolation.

2.3 SYSTEM PIPING

Complete piping run, using flexible couplings as means of disconnect for servicing the unit and vibration isolation.

2.4 ELECTRICAL CONNECTION

Connect wiring with wire nuts provided, observing proper connections:

Fan Wire	Connection
Green	Ground
Black	AC Hot
White	AC Common

2.5 VENT MUFFLER (optional)

Install the muffler assembly in the selected location in the outlet ducting. Solvent weld all connections. The muffler is normally installed at the end of the vent pipe.

2.6 OPERATION CHECKS

_____ **Verify** all connections are tight and **leak-free**.

_____ **Insure** the GP/XP/XR Series Fan and all ducting is secure and vibration-free.

_____ **Verify** system vacuum pressure with manometer. **Insure** vacuum pressure is **less than** maximum recommended operating pressure

(Based on sea-level operation, at higher altitudes reduce by about 4% per 1000 Feet.)
(Further reduce Maximum Operating Pressure by 10% for High Temperature environments)
See Product Specifications. If this is exceeded, increase the number of suction points.

_____ **Verify Radon levels by testing to EPA protocol.**

XP/XR SERIES PRODUCT SPECIFICATIONS

The following chart shows fan performance for the XP & XR Series Fan:

Typical CFM Vs Static Suction "WC									
	0"	.25"	.5"	.75"	1.0"	1.25"	1.5"	1.75"	2.0"
XP101	125	118	90	56	5	-	-	-	-
XP151	180	162	140	117	78	46	10	-	-
XP201	150	130	110	93	74	57	38	20	-
XR161	215	175	145	105	75	45	15	-	-
XR261	250	215	185	150	115	80	50	20	-

Maximum Recommended Operating Pressure*		
XP101	0.9" W.C.	(Sea Level Operation)**
XP151	1.3" W.C.	(Sea Level Operation)**
XP201	1.7" W.C.	(Sea Level Operation)**
XR161	1.3" W.C.	(Sea Level Operation)**
XR261	1.6" W.C.	(Sea Level Operation)**

**Reduce by 10% for High Temperature Operation*
***Reduce by 4% per 1000 feet of altitude*

Power Consumption @ 120 VAC	
XP101	40 - 49 watts
XP151	45 - 60 watts
XP201	45 - 66 watts
XR161	48 - 75 watts
XR261	65 - 105 watts

XP Series Inlet/Outlet: 4.5" OD (4.0" PVC Sched 40 size compatible)

XR Series Inlet/Outlet: 5.875" OD

Mounting: Mount on the duct pipe or with optional mounting bracket.

Recommended ducting: 3" or 4" Schedule 20/40 PVC Pipe

Storage temperature range: 32 - 100 degrees F.

Normal operating temperature range: -20 - 120 degrees F.

Maximum inlet air temperature: 80 degrees F.

Size: 9.5H" x 8.5" Dia. **Weight**: 6 lbs. (XR261 - 7 lbs)

Continuous Duty **Thermally protected**

Class B Insulation **3000 RPM**

Residential Use Only **Rated for Indoor or Outdoor use**

LISTED Electric Fan ETL® Tested to UL Std. 507

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GP SERIES PRODUCT SPECIFICATIONS

The following chart shows fan performance for the GPx01 Series Fan:

Typical CFM Vs Static Suction "WC	1.0"	1.5"	2.0"	2.5"	3.0"	3.5"	4.0"
GP501	95	87	80	70	57	30	5
GP401	93	82	60	38	12	-	-
GP301	92	77	45	10	-	-	-
GP201	82	58	5	-	-	-	-

Maximum Recommended Operating Pressure*		
GP501	3.8" W.C.	(Sea Level Operation)**
GP401	3.0" W.C.	(Sea Level Operation)**
GP301	2.4" W.C.	(Sea Level Operation)**
GP201	1.8" W.C.	(Sea Level Operation)**

**Reduce by 10% for High Temperature Operation*

***Reduce by 4% per 1000 feet of altitude*

Power Consumption @ 120 VAC	
GP501	70 - 140 watts
GP401	60 - 110 watts
GP301	55 - 90 watts
GP201	40 - 60 watts

Inlet/Outlet: 3.5" OD (3.0" PVC Sched 40 size compatible)

Mounting: Fan may be mounted on the duct pipe or with integral flanges.

Weight: 12 lbs.

Size: 13H" x 12.5" x 12.5"

Recommended ducting: 3" or 4" Schedule 20/40 PVC Pipe

Storage temperature range: 32 - 100 degrees F.

Normal operating temperature range: -20 - 120 degrees F.

Maximum inlet air temperature: 80 degrees F.

Continuous Duty

Class B Insulation

3000 RPM

Thermally protected

Rated for Indoor or Outdoor Use

GP301C / GP501C Rated for Commercial Use

LISTED Electric Fan ETL® Tested to UL Std. 507

77728

IMPORTANT INSTRUCTIONS TO INSTALLER

Inspect the GPx01/XP/XR Series Fan for shipping damage within 15 days of receipt. Notify RadonAway of any damages immediately. Radonaway is not responsible for damages incurred during shipping. However, for your benefit, Radonaway does insure shipments.

There are no user serviceable parts inside the fan. **Do not attempt to open.** Return unit to factory for service.

Install the GPx01/XP/XR Series Fan in accordance with all EPA standard practices, and state and local building codes and state regulations.

WARRANTY

Subject to any applicable consumer protection legislation, RadonAway warrants that the GPX01/XP/XR/RP Series Fan (the "Fan") will be free from defects in materials and workmanship for a period of 90 days from the date of purchase (the "Warranty Term").

RadonAway will replace any Fan which fails due to defects in materials or workmanship. The Fan must be returned (at Owner's cost) to the RadonAway factory. Any Fan returned to the factory will be discarded unless the Owner provides specific instructions along with the Fan when it is returned regardless of whether or not the Fan is actually replaced under this warranty. Proof of purchase must be supplied upon request for service under this Warranty.

This Warranty is contingent on installation of the Fan in accordance with the instructions provided. This Warranty does not apply where any repairs or alterations have been made or attempted by others, or if the unit has been abused or misused. Warranty does not cover damage in shipment unless the damage is due to the negligence of RadonAway.

5 YEAR EXTENDED WARRANTY WITH PROFESSIONAL INSTALLATION.

RadonAway will extend the Warranty Term of the fan to 5 years from date of manufacture if the Fan is installed in a professionally designed and professionally installed radon system or installed as a replacement fan in a professionally designed and professionally installed radon system. Proof of purchase and/or proof of professional installation may be required for service under this warranty. Outside the Continental United States and Canada the extended Warranty Term is limited to one (1) year from the date of manufacture.

RadonAway is not responsible for installation, removal or delivery costs associated with this Warranty.

EXCEPT AS STATED ABOVE, THE GPx01/XP/XR/RP SERIES FANS ARE PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

IN NO EVENT SHALL RADONAWAY BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR RELATING TO, THE FAN OR THE PERFORMANCE THEREOF. RADONAWAY'S AGGREGATE LIABILITY HEREUNDER SHALL NOT IN ANY EVENT EXCEED THE AMOUNT OF THE PURCHASE PRICE OF SAID PRODUCT. THE SOLE AND EXCLUSIVE REMEDY UNDER THIS WARRANTY SHALL BE THE REPAIR OR REPLACEMENT OF THE PRODUCT, TO THE EXTENT THE SAME DOES NOT MEET WITH RADONAWAY'S WARRANTY AS PROVIDED ABOVE.

For service under this Warranty, contact RadonAway for a Return Material Authorization (RMA) number and shipping information. No returns can be accepted without an RMA. If factory return is required, the customer assumes all shipping cost to and from factory.

RadonAway
3 Saber Way
Ward Hill, MA 01835
TEL. (978) 521-3703
FAX (978) 521-3964

Record the following information for your records:

Serial No._____
Purchase Date_____