



Operation and Maintenance Manual for Pumps and Systems



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1.0 INSPECTION UPON DELIVERY

Check crating or packaging for visible damage that could indicate damage to components of the equipment. Report any damage to delivering carrier immediately to process your claim.

If the equipment is to be stored prior to installation it must be protected from rain and snow to prevent formation of rust on machined surfaces and components.

It is important to verify the material received against the packing list to assure receipt of all of the material ordered. It is routine to include accessory items in cartons strapped to the crate.

1.1 FOR YOUR SAFETY:

Items in this manual that significantly affect safety are identified with the following headings. Please read and understand this manual, paying special attention to items identified with these headings!

DANGER! , **WARNING!**, **CAUTION!** & **NOTICE!** are boxed and displayed in large bold capital letters to call attention to areas of vital concern. They represent different degrees of hazard seriousness, as stated below.



DANGER:

Immediate hazards which will result in severe personal injury or death.



WARNING:

Hazards or unsafe practices that could result in personal injury or death.



CAUTION:

Hazards or unsafe practice which could result in minor personal injury, product or property damage.



NOTICE:

Indicates points of particular interest for more efficient and convenient installation operation.

Each section of this instruction manual, as well as any instructions supplied by manufacturers of supporting equipment, should be read and understood prior to starting the vacuum package. If there are any questions regarding any part of the instructions please call Ohio Medical 1-800-448-0700 before creating a potentially hazardous situation. Life, limb or equipment could be saved with a simple phone call.

1.1 FOR YOUR SAFETY: (Cont)

Air Compressors and Vacuum Pumps are precision high-speed mechanical equipment requiring caution in operation to minimize hazard to personnel and property. Below is a list of safety rules and precautions that must be observed in the operation of this type of equipment.

Transfer of toxic, dangerous, flammable or explosive substances is at user's risk. Turn off and lockout / tag out (per O.S.H.A. Regulation 1910.147) the main power disconnect switch before attempting to perform maintenance on any part of the package.

Do not attempt to service any part of the unit while it is operating.

Per O.S.H.A. Regulation 1910.147 relieve the system of all pressure before attempting to service any part of the package.

Do not remove or paint over any of the instructional materials attached to the unit. Lack of information regarding hazardous conditions can cause personal injury or property damage.

Do not use plastic pipe, rubber hose, or lead-tin soldered joints in any part of the package.

Modifications must not be made to the system without Ohio Medical's approval.

Be sure that all tools, shipping and installation debris have been removed from around the system and installation site prior to starting up.

Do not operate the system in excess of the stated capacity.

Make a general overall inspection of the unit daily and correct any unsafe situations.

Reckless behavior of any kind is dangerous and can cause very serious injury to the participants.

Provisions should be made to have the instruction manual readily available to the operator and maintenance personnel.

Never use a flammable or toxic solvent for cleaning the air filter or any parts.

The owner, leaser or operator of the system is hereby warned that failure to observe the above safety precautions may result in serious injury to personnel and/or damage to property. Ohio Medical neither states as fact or in any way implies that the above list of safety precautions is an all-inclusive list, the observance of which will prevent injury to personnel or damage to property.

Every effort has been made to ensure that complete and correct instructions have been included in this manual. However, possible product updates and changes may have occurred since this printing. Ohio Medical reserves the right to change specification without incurring any obligation for equipment previously or subsequently sold.

**WARNING:**

EXPLOSION HAZARD PRESENT Under no circumstances should a system be used in an area that may be exposed to toxic, volatile, or corrosive atmosphere. Do not store toxic, volatile, or corrosive agents near the system. Rotary vane vacuum pumps are not to be used for evacuation of flammable or explosive products.

**WARNING:**

HOT OIL HAZARD Do not remove the oil fill plug when pump is running, as hot air and oil vapor will escape possibly causing severe burns. Add or check oil only when the pump is off and electrically locked out. Always wear safety glasses.

**WARNING:**

Electric power always exists inside the vacuum/pressure switch whenever the package is connected to a power supply. Be careful not to touch any electrical leads when setting the vacuum/pressure switch.

**WARNING:**

Never exceed the design pressure for the system or overload the motor beyond its Maximum Amp Draw. Full Load Amps x Service Factor = Maximum Amp Draw



WARNING: Never assume a system is safe to work on just because it is not operating. It may be in the automatic standby mode and may restart at any time. Follow all safety precautions outlined under "Stopping for Maintenance".

1.2 LOCATION

**CAUTION:**

Indoor installation is recommended. However if it is necessary to install the pump outside, it must be protected from rain and other sources of moisture.

Do not operate the system in ambient temperatures lower than 40°F. In cold climates the system should be installed in a heated building.

Due to standard drive motor limitations, it is recommended that the unit be operated in temperatures under 104°F.

1.3 INSTALLATION

1.3.1 Bare Pump Installation

Install the pump in a horizontal position on a level surface so that the pump is evenly supported on its feet. Leave 12-18" of access around the pump to allow proper cooling and adequate ventilation for the fan, radiator and motor.

Allow access to the oil sight glass in order to inspect the oil level and the exhaust port for easy access to change the exhaust filter. Do not tip the pump over if filled with oil. The pump must be located in a clean, dry, well lighted area with the ambient temperature maintained at 40-104°F.

1.3.2 System Installation

The equipment must be located in a clean dry well lighted area with the ambient temperature maintained at 40-104°F.

Do not operate the pump(s) in ambient temperatures lower than 40°F. In cold climates the system should be installed in a heated building.

Due to standard drive motor limitation, it is recommended that the system be operated in temperatures under 104°F.

Adequate space and ventilation must be provided on all sides of the unit for cooling and accessibility for maintenance of all components.

Inspection and maintenance checks are required daily. Therefore, we recommend a 36" walk way around the package.

Provisions must be made for adequate ventilation to remove the heat of compression (2550 BTU per horsepower) from the area.



CAUTION:

Improper leveling may cause unnecessary wear of the rotating parts such as bearings and couplings. In addition, improper leveling may make completion of the facility piping connections more difficult.

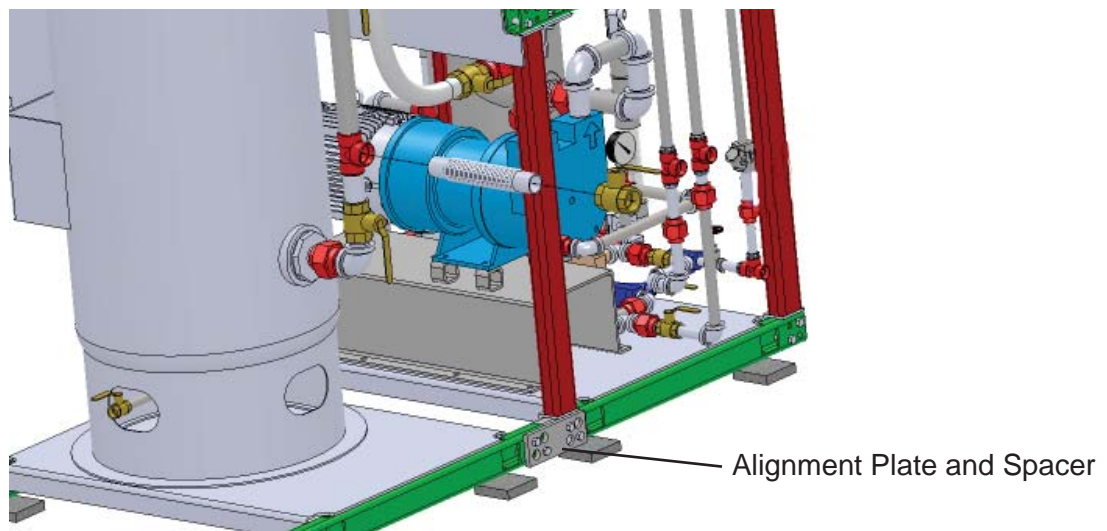
1.4 SETTING IN PLACE

Packages are manufactured in a modular fashion so that the various modules can be separated from each other to allow for transportation and installation limitations. The module bases may be bolted together directly or through base alignment plates. The piping system contains pipe unions to facilitate module separation, when necessary.

If the package modules have been separated prior to installation, they should be rejoined using the supplied base alignment plates to ensure proper re-connection of the piping system.

The package must be securely bolted to a solid stable floor or housekeeping pad utilizing all of the mounting holes provided in the frame. A shim or spacer is recommended to bring the frame level. The frame should not overhang the mounting surface on any side. The object is to make the frame tight and level to absorb and eliminate transient vibrations. The use of spring type mounting devices between the frame and the mounting surface is not recommended.

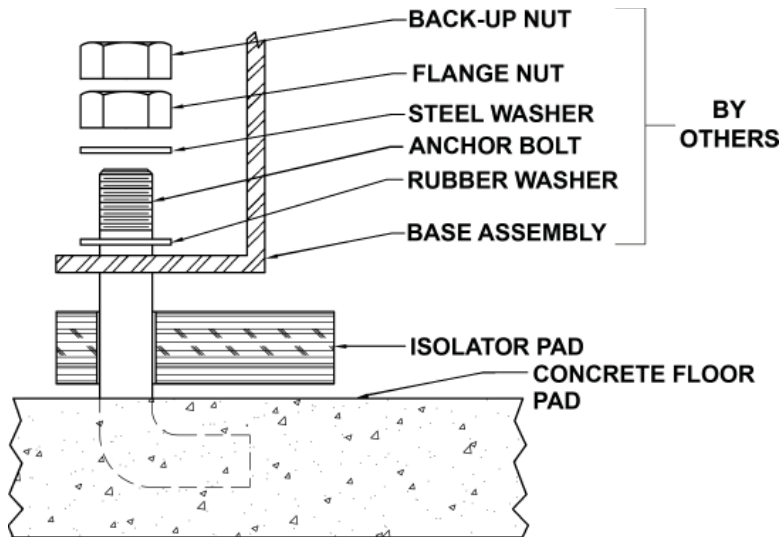
When possible, the unit should be installed on the ground or lower level machinery space.



After the installation is complete, the module base alignment plates and spacers should be removed to provide optimal vibration control.

1.5 MOUNTING, ANCHORING

Proper mounting of the vacuum package is crucial to the safe operation and longevity of the equipment. The installation requires a flat and level concrete floor or pad. Satisfactory results can usually be obtained by mounting the package on the vibration isolating pads supplied with the vacuum package. The size and quantity of the vibration isolators supplied with the package meet or exceed the entire load. Over tightened pads can cause severe vibrations resulting in cracked welds or fatigue failure. Using 1/2" or 3/4" bolts, tighten bolts and torque to 50 lbs/sq. in. See figure below



1.6 NOISE

Sound levels of 67-78 DbA are to be expected.

1.7 PIPING CONNECTIONS

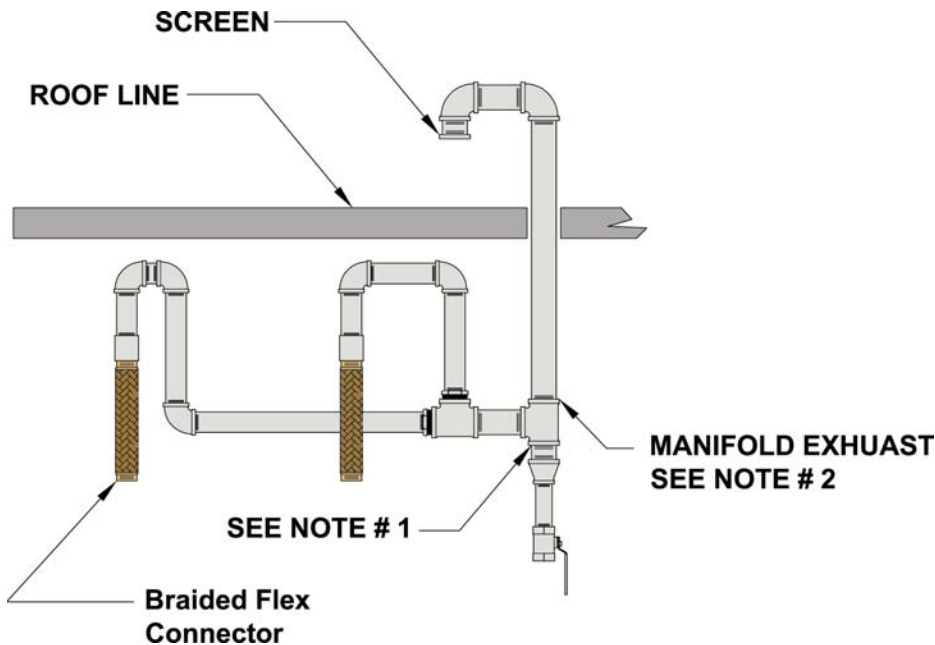
All connecting piping must be in strict accordance with local codes and applicable engineering drawings.

All connection piping must be self-supporting to prevent stressing of the equipment. Flexible connectors must be used on all system connections to provide vibration control and system serviceability.

All connection piping must be clean and free of dirt or scale.

Exhaust piping should be terminated outside the building with the discharge line turned down and screened. For medical installations, this configuration is a requirement of NFPA 99®. For further instructions on exhaust piping, contact Ohio Medical's Engineering Department.

Compressor intake piping shall be installed according to Section 5 of NFPA 99 standards.



NOTE 1:

Exhaust piping and fittings shown in gray, are to be furnished and installed by the Contractor.

NOTE 2:

Exhaust from oil reservoir shall be collected to a single stack, run to outside air with the discharge line turned down and screened.

Do not use plastic pipe or rubber hose or lead tin soldered joints in any part of the system.

1.8 ELECTRICAL CONNECTIONS

Electrical connection should be performed by a qualified electrician with knowledge of the National Electrical Code (N.E.C.[®]), O.S.H.A.[®] code and or any local or state codes having precedence. Note this unit must be grounded. Check to ensure that proper electrical service has been made available.

Make sure the electrical supply, control cabinet and the motor nameplate data are the same.

Do not connect electrically if they are not the same.

Where the unit is on the emergency power source, make sure the normal power and the emergency power are in phase.

Electrical connections must be checked and tightened when necessary.

Before installation, the electrical supply should be checked for adequate wire size and transformer capacity. A suitable circuit breaker or fused disconnect switch should be provided. When a 3-phase motor is used to drive the unit, any unreasonable voltage imbalance between the legs must be eliminated and any low voltage corrected to prevent excessive current draw.

The installation, electric motor, wiring and all electrical controls must be in accordance with NFPA 70[®] 1993 National Electric Code, National Electric Safety Code, state and local codes. Failure to abide by the national, state and local codes may result in physical harm and or property damage.



DANGER:

High voltage may cause personal injury or death. Disconnect and lockout/tagout per O.S.H.A. Regulation 1910.147 all electrical power supply before opening the electrical enclosure or servicing.



CAUTION:

NEMA electrical enclosures and components must be appropriate to the area installed.

1.9 INITIAL START UP

Initial start-up assistance by factory authorized personnel is available. Call our Service Department at 1-800-448-0770 ext: 6279 for details.

1.9.1 PRE START-UP CHECK LIST

Never assume the system is safe to work on just because it is not operating. It could restart at any time. Follow all safety precautions outlined in “Stopping for Maintenance”.



WARNING:

Failure to perform the pre-start up check list may result in mechanical failure or property damage, serious injury or even death.

The following items should be performed prior to connecting the unit to a power source. If any conditions of the checklist are not satisfied, make the necessary adjustments or corrections before starting the unit.

Remove all installation tools from the unit and check for installation debris.

Check final leveling or shimming of the base and that the correct tightness has been applied to the vibration pads.

1.9.2 Check Electrical Service

Verify that the facility power breaker is turned “OFF”.

Check to ensure that the proper electrical service has been made available. Make sure the electrical supply and the control panel and motor nameplate data are the same.

Verify the facility power breaker and the supply wire size is correct per N.E.C.

Check fuses, circuit breakers, and thermal overload for proper size.

All electrical connections both inside and outside the control cabinet must be checked and tightened when necessary.

Check all safety overloads to confirm they are set correctly for the current rating of the motor.

Check all conduit connections leaving the panel to ensure they are tight.

Verify that all motor disconnects and HOA switches are in the “OFF” position.

After all of the above conditions have been satisfied, the unit can be connected to the proper power source.

1.9.3 Check Pump Rotation

Turn the motor disconnect “ON”. Jog the motor to ensure the correct rotation by momentarily turning the H-O-A switch to the “H” (hand) position, then quickly returning the switch to the “O” (off) position. The correct direction of rotation is marked by an arrow on the motor housing. Facing the fan motor cover, the correct direction of rotation is counter clockwise. If the rotation is not correct, for 3 phase units, switch any two of the three electrical service lines coming into the control panel.

Each pump should be individually started, run and adjusted.

1.9.4 STOPPING FOR MAINTENANCE

The following procedures should be followed when stopping the system for maintenance or service. Per OSHA Regulation 1910.147, The Control of Hazardous Energy Source (Lockout/Tagout): Disconnect and lockout the main power source. Display a sign in clear view at the main power switch stating that the vacuum system is being serviced.

1.10 PRESSURE SETTINGS

Number of Pumps		Rotary Vane		Dry Running		Liquid Ring		Air Compressor	
		Cut In In Hg	Cut Out In Hg	Cut In In Hg	Cut Out In Hg	Cut In In Hg	Cut Out In Hg	Cut In In Hg	Cut Out In Hg
Duplex	Lead	22	26	19	23	21	25	90	100
	Lag	21	25	18	22	19	23	80	90
Triplex	Lead	22	26	19	23	21	25	90	100
	Lag-1	21	25	18	22	19	23	80	90
	Lag-2	20	24	17	21	17	21	70	80-
Quadruplex	Lead	22	26	N/A	N/A	21	25	90	100
	Lag-1	21	25	N/A	N/A	19	23	80	90
	Lag-2	20	24	N/A	N/A	17	21	70	80
	Lag-3	19	23	N/A	N/A	15	19	60	70

**For 24/7 Technical Support,
Call 1-847-855-6234 for Assistance**



**OHIO MEDICAL®
VACUUM AND COMPRESSED AIR SYSTEMS
LIMITED WARRANTY**

1. Ohio Medical warrants to the original purchaser its Vacuum and Compressed Air Systems to be free from functional defects in material and workmanship for a period of (30) thirty months from the date of shipment, or for a period of (24) twenty-four months from the date of start-up, whichever comes first.
 - a. Ohio Medical recommends that start-up should only be done by an authorized representative of Ohio Medical.
2. In the event there is a functional defect either in material or workmanship Ohio Medical will only repair or replace any part or component which is proven to be defective.
 - a. System Components sold as individual items are not warranted to include job site installation and wiring, and the warranty set forth in Paragraph 1 is limited to complete units which include all factory installed components and interconnected piping and wiring.
 - b. Labor on site is limited to functional defects in workmanship found to be defective at the time of start-up.
 - c. The replacement of normal wearing or maintenance items (including but not limited to packings, mechanical seals, oil seals, piston rings, contacts, coils, fuses, etc.) made in connection with normal maintenance services are not covered by this warranty.
3. To obtain service within the warranty period, first contact your authorized Ohio Medical dealer or the Ohio Medical Service Department. Ohio Medical's responsibility under this warranty shall be limited to providing at Ohio Medical's sole discretion new or similar rebuilt replacement parts to replace any component found to be defective within the warranty period.
 - a. Labor to repair any part or component proved to be defective within the warranty period will be provided at no charge for any item returned to our factory adequately packaged and insured with shipping costs prepaid. Standard surface freight shipping cost and return of the repaired part or component will be paid by Ohio Medical.
 - b. Before returning any part or component to the factory for warranty consideration, proper return authorization and warranty claim form must first be obtained from Ohio Medical Customer Support or Service Department. A Purchase Order must be supplied by the claimant in the event that repairs or products returned for warranty consideration are determined to be of a Non-Warranty status.
 - c. The user will be required to issue a Purchase Order for replacement items. Upon receipt of the defective items, Ohio Medical will issue a credit to the user in the amount equal to the purchase order.
4. The warranty is valid only when the product has been properly installed according to Ohio Medical specifications, used in a normal manner and serviced according to factory recommendations. It does not cover failure due to damage which occurs in shipment or failures which result from accidents, misuse, abuse, neglect, mishandling, alteration, misapplication or damage that may be attributable to acts of God. Similarly, this warranty does not apply to units that are re-sold or rented to others by the purchaser.
5. Ohio Medical shall not be liable for incidental or consequential damages resulting from the use of this product. There are no expressed or implied warranties which extend beyond the warranty of fitness for a particular purpose to the equipment and/or to its parts and components.
6. THE CONDITIONS OF THE BUYER'S RESPONSIBILITY ARE:
 - 6.1 The equipment is stored properly before installation.
 - 6.2 The equipment is installed according to Ohio Medical specifications and installation procedures.
 - 6.3 The room where the equipment is installed meets stated operating temperatures.
 - 6.4 The equipment is placed into initial operation by an authorized representative of Ohio Medical.
 - 6.5 The equipment is properly maintained and is not repaired or altered unless by an authorized representative of Ohio Medical.

Producers of Ohmeda Suction and Oxygen Therapy Devices, Aeros® Instruments Portable Suction Machines, Healthcair® MedGas Pipeline Equipment, Healthcair®, Labcair® & Selector® brand of Vacuum Systems and Air Compressor Packages



PUMPS - COMPRESSORS LIMITED WARRANTY

1. Ohio Medical warrants to the original purchaser its Vacuum Pumps and Air Compressors to be free from functional defects in material and workmanship for a period of twelve (12) months from the date of shipment.
2. In the event there is a functional defect either in material or workmanship Ohio Medical will only repair or replace any part or component which is proven to be defective.
 - a. System components sold as individual items are not warranted to include job site installation and wiring.
 - b. The replacement of normal wearing or maintenance items (including but not limited to packing, mechanical seals, oil seals, piston rings, contacts, coils, fuses, etc.) made in connection with normal maintenance services are not covered by this warranty.
3. To obtain service within the warranty period, first contact your authorized Ohio Medical dealer or the Ohio Medical Service Department. Ohio Medical's responsibility under this warranty shall be limited to providing, at Ohio Medical's sole discretion, new or similar rebuilt replacement parts to replace any component found to be defective within the warranty period.
 - a. Labor to repair any part or component proved to be defective within the warranty period will be provided at no charge for any item returned to our factory adequately packaged and insured with shipping costs prepaid. Standard surface freight shipping cost and return of the repaired part or component will be paid by Ohio Medical.
 - b. Before returning any part or component to the factory for warranty consideration, proper return authorization, and warranty claim form must first be obtained from the Ohio Medical Service Department. A Purchase Order must be supplied by the claimant in the event that repairs or products returned for warranty consideration are determined to be of a Non-Warranty status.
 - c. The user will be required to issue a Purchase Order for replacement items. Upon receipt of the defective items, Ohio Medical will issue a credit to the user in the amount equal to the purchase order.
4. The warranty is valid only when the product has been properly installed according to Ohio Medical specifications, used in a normal manner and serviced according to factory recommendations. It does not cover failure due to damage which occurs in shipment or failures which result from accidents, misuse, abuse, neglect, mishandling, alteration, misapplication or damage that may be attributable to acts of God. Similarly, this warranty does not apply to units that are re-sold or rented to others by the purchaser.
5. Ohio Medical shall not be liable for incidental or consequential damages resulting from the use of this product. There are no expressed or implied warranties which extend beyond the warranty of merchantability fitness for a particular purpose to the equipment and/or to its parts and components.
6. THE CONDITIONS OF THE BUYER'S RESPONSIBILITY ARE:
 - a. The equipment is stored properly before installation;
 - b. The equipment is installed according to Ohio Medical specifications and installation procedures;
 - c. The room where the equipment is installed meets stated operating temperatures.
 - d. The equipment is properly maintained and is not repaired or altered unless by an authorized representative of Ohio Medical.

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Pre-Start Up Check list

SO#:	_____	Date:	_____
Facility:	_____	Contact Person:	_____
Address:	_____	Company:	_____
City:	_____	Signature:	_____
State:	_____	Phone:	_____
Zip:	_____		

Air & Vacuum System(s)

	System	#1	#2	#3
Model#	_____	_____	_____	_____
Serial#	_____	_____	_____	_____
		Yes/No/NA	Yes/No/NA	Yes/No/NA
System is properly anchored to housekeeping pad:		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Electrical wiring is complete and power is available:		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Piping connections are complete with "flex connectors":		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water connections are complete with "pressure reducing valves":		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dew Point and/or CO Monitors are installed and ready for power:		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Gas Manifold System(s)

	System	#1	#2	#3
Model#	_____	_____	_____	_____
Serial#	_____	_____	_____	_____
		Yes/No/NA	Yes/No/NA	Yes/No/NA
Manifold is properly anchored to floor and/or wall:		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Electrical wiring is complete and power is available:		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gas cylinders are in place and installed on the manifold:		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Master & Area Alarms

All sensors & switches monitoring gas pressures are wired and piped.

Type	Location	Yes/No
Master		
Master		
Area		
Area		
Area		
Area		
Area		
Area		
Area		

Type	Location	Yes/No
Area		
Area		
Area		
Area		

Note: Start-up & In-service Training of systems will be scheduled during normal business hours between 8:00am & 4:30pm. Incomplete installation or personnel not available for training will result in rescheduling and an additional charge will apply.

Sign & Date

Signature Required



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