

## General Product Manual

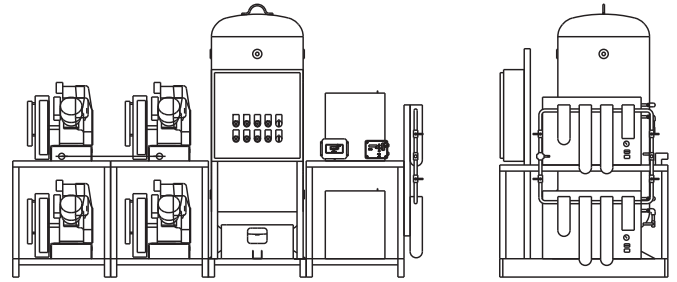
## Medical Package System

Please read and save these instructions. Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage! Retain instructions for future reference.

### Description

The Powerex medical system package is designed to provide medical breathing air for hospital and medical institutes. This system meets NFPA 99 requirements for Level 1 breathing air.

Powerex medical tank mount compressors are designed to be the air compressor and air receiver component of a medical breathing air system for hospitals and medical institutes. When used in conjunction with properly sized dryers that meet dew point and flow specifications, along with an appropriate filter and monitor package, the system can comply with requirements in NFPA 99 for Category 1 applications.



### Safety Guidelines

This manual contains information that is very important to know and understand. This information is provided for SAFETY and to PREVENT EQUIPMENT PROBLEMS. To help recognize this information, observe the following symbols.

**⚠ DANGER** Danger indicates an imminently hazardous situation which, if not avoided, WILL result in death or serious injury.

**⚠ WARNING** Warning indicates a potentially hazardous situation which, if not avoided, COULD result in death or serious injury.

**⚠ CAUTION** Caution indicates a potentially hazardous situation which, if not avoided, MAY result in minor or moderate injury.

**NOTICE** Notice indicates important information, that if not followed, may cause damage to equipment.

**NOTE:** Information that requires special attention.

### Unpacking

Immediately upon receipt of the oilless compressor, inspect for any damage which may have occurred during shipment. The compressor nameplate should be checked to verify the correct model and voltage as ordered.

**⚠ WARNING** Do not operate unit if damaged during shipping, handling or use. Damage could result in bursting and cause injury or property damage.

### General Safety Information

#### CALIFORNIA PROPOSITION 65

**⚠ WARNING** This product or its power cord may contain chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling.



### Specifications

Performance Specifications	See Table 1			
Lubrication	Grease-filled Bearing			
Operating Voltages	3Ø 208 / 230 / 460 Volts, 60 Hz			
Compression Cycle	Oilless Piston Reciprocating			
Motor Overload Protection	Motor protector with adjustable overload			
Overpressure Protection	ASME Safety Valve Factory Set and Sealed			
Outlet Air Connections		MPD	MPT	MPQ
	3	1/2	--	--
	5	1/2	3/4	1
	7.5	3/4	1	1
	10	3/4	1	1-1/2
	15	1	1-1/2	1-1/2
California Ordinance 462 (L) (2)	Meets Requirements of this Ordinance			

### GENERAL SAFETY

Since the air compressor and other components (material pump, filters, lubricators, hoses, etc.) used, make up a high pressure pumping system, the following safety precautions must be observed at all times:

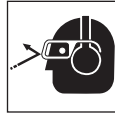
1. Read all manuals included with this product carefully. Be thoroughly familiar with the controls and the proper use of the equipment.
2. Follow all local electrical and safety codes as well as the United States National Electrical Codes (NEC) and Occupational Safety and Health Act (OSHA).
3. Only persons well acquainted with these rules of safe operation should be allowed to use the equipment.
4. Keep visitors away and NEVER allow children in the work area.



## Medical Package Systems

### General Safety Information (Continued)

5. Wear safety glasses and use hearing protection when operating the unit.
6. Do not stand on or use the unit as a handhold.



7. Before each use, inspect compressed air system and electrical components for signs of damage, deterioration, weakness or leakage. Repair or replace defective items before using.
8. Check all fasteners at frequent intervals for proper tightness.

## Performance Specifications - Table 1

### MEDICAL PACKAGE DUPLEX - MODEL MPD

Model	HP	Phase	SCFM		RPM	Voltage	Gallon Tank	Dimension (inches)			Shipping Weight (lbs.)
			@ 100 psig*	@ 50 psig*				L	W	H	
MPD0308	3 (2)	3	10.1	--	1115	208 / 230 / 460	80	66	64	60	970
MPD0508	5 (2)	3	17.2	18.1	800	208 / 230 / 460	120	66	64	73	1288
MPD0608	7.5 (2)	3	21.2	21.5	1040	208 / 230 / 460	120	68	67	77	1300
MPD0758	7.5 (2)	3	26.1	27.55	855	208 / 230 / 460	120	73	64	76	1340
MPD1008	10 (2)	3	35	38.15	1090	208 / 230 / 460	200	73	64	83	1510
MPD1508	15 (2)	3	54.2	57.05	1250	208 / 230 / 460	200	73	64	83	1630

**NOTE:** For system electrical information (including motor FLA ratings), see the wiring diagram shipped with the unit.

**NOTE:** Dimensions shown with desiccant dryers. For dimensions with refrigerated dryers, please consult factory.

\* SCFM listed with one pump in reserve per NFPA 99.

### MEDICAL PACKAGE TRIPLEX - MODEL MPT

Model	HP	Phase	SCFM		RPM	Voltage	Gallon Tank	Dimension (inches)			Shipping Weight (lbs.)
			@ 100 psig*	@ 50 psig*				L	W	H	
MPT0508	5 (3)	3	33.4	36.2	800	208 / 230 / 460	200	96	73	76	1838
MPT0608	7.5 (3)	3	42.4	43.0	1040	208 / 230 / 460	200	68	103	78	1870
MPT0758	7.5 (3)	3	52.2	55.1	855	208 / 230 / 460	200	96	90	83	1980
MPT1008	10 (3)	3	70.0	76.3	1090	208 / 230 / 460	240	96	90	84	2160
MPT1508	15 (3)	3	108.4	114.1	1250	208 / 230 / 460	240	96	90	96	2280

**NOTE:** For system electrical information (including motor FLA ratings), see the wiring diagram shipped with the unit.

**NOTE:** Dimensions shown with desiccant dryers. For dimensions with refrigerated dryers, please consult factory.

\* SCFM listed with one pump in reserve per NFPA 99.

### MEDICAL PACKAGE QUADPLEX - MODEL MPQ

Model	HP	Phase	SCFM		RPM	Voltage	Gallon Tank	Dimension (inches)			Shipping Weight (lbs.)
			@ 100 psig*	@ 50 psig*				L	W	H	
MPQ0508	5 (4)	3	50.1	54.3	800	208 / 230 / 460	240	96	73	95	2388
MPQ0608	7.5 (4)	3	63.6	64.5	1040	208 / 230 / 460	240	90	103	96	2420
MPQ0758	7.5 (4)	3	78.3	82.65	855	208 / 230 / 460	240	96	90	96	2490
MPQ1008	10 (4)	3	105	114.75	1090	208 / 230 / 460	240	96	90	96	2640
MPQ1508	15 (4)	3	162.6	171.15	1250	208 / 230 / 460	240	96	90	96	2735

**NOTE:** For system electrical information (including motor FLA ratings), see the wiring diagram shipped with the unit.

**NOTE:** Dimensions shown with desiccant dryers. For dimensions with refrigerated dryers, please consult factory.

\* SCFM listed with one pump in reserve per NFPA 99.

## General Safety Information (Continued)

**⚠ WARNING** *Electrical equipment and controls can cause electrical arcs that will ignite a flammable gas or vapor. Never operate or repair in or near a flammable gas or vapor. Never store flammable liquids or gases in the vicinity of the compressor.*



**⚠ WARNING** *An ASME code safety relief valve, with a setting no higher than the tank maximum allowable working pressure, MUST be installed in the air lines or in the tank. The ASME safety valve must have sufficient flow and pressure ratings to protect the pressurized components from bursting. The flow rating can be found in the parts manual.*

**⚠ CAUTION** *Do not operate with pressure switch or pilot valves set higher than the tank maximum allowable working pressure.*

9. Never attempt to adjust ASME safety valve. Keep safety valve free from paint and other accumulations.

**⚠ DANGER** *Never attempt to repair or modify a tank! Welding, drilling or any other modification will weaken the tank resulting in damage from rupture or explosion. Always replace worn, cracked or damaged tanks.*



**NOTICE** *Drain liquid from tank daily.*

10. Tanks rust from moisture build-up, which weakens the tank. Make sure to drain tank regularly and inspect periodically for unsafe conditions such as rust formation and corrosion.
11. Fast moving air will stir up dust and debris which may be harmful. Release air slowly when draining moisture or depressurizing.

## Glossary of Terms

### OILLESS OPT / OPS COMPRESSOR

The Powerex oilless reciprocating air compressor has advanced compressor technology through the development of a completely oilless compressor. The Powerex reciprocating compressor is provided in duplex, triplex or quadplex configurations with solenoid unloaders to provide start/stop operation. Composite piston technology and continuously lubricating bearings provide oil-free air reliability for years to come.

### RECEIVER TANK

The ASME, National Board registered air receiver is provided in sizes from 80 to 240 gallons. Each receiver is rated at 200 psig working pressure. Receivers are provided with sight gauge, moisture drain (manual and electric), and internal lining to prevent corrosion.

### CONTROL PANEL

The NEMA 12 control panel is provided in duplex, triplex or quadplex configurations and meets NFPA 99 requirements for medical air. Control transformer power is 115 volts and protected by primary and secondary fusing. Pressure control switches signal the compressors on and off cycle and signal lag compressor(s) to come on if air demand increases. This alternator is factory set to alternate the compressors every 10 minutes.

### AIR COOLED AFTERCOOLER

Beltguard aftercoolers are sized to provide an approach of 20°F. Constructed of copper tubing and metal headers for a rugged construction.

### DEW POINT MONITOR

The Powerex dew point monitor provides indication of dew point temperature. It's microprocessor controlled with alarm and self-calibration sensor.

Regen dryers paired with the Powerex dew point monitor may be operated in Econ Mode where the dew point monitor would signal the dryer to cease purge if system dew point is below the set point.

### CARBON MONOXIDE MONITOR / ALARM

The carbon monoxide monitor provides warning to the user of air-supplied respirators alarming and metering the presence of carbon monoxide. The monitor is provided in an enclosure. In addition to audio/visual alarm, the meter displays the concentration of CO in the compressed air. The meter operates from a 110 VAC supply. Alarm point is set at 10ppm.

### AIR DRYER (REFRIGERATED OR DESICCANT)

The Powerex air drying system provides air at 38°F at 100 psig for refrigerated units and +20°F dew point for desiccant dryer systems. Each system is connected with bypass capability.

The refrigerated compressed air dryer(s) are noncycling, direct expansion type, using R-134A refrigerant, CFC free. A hot gas bypass valve is provided to maintain 38°F evaporator temperature. The dryer is self-regulating for large load swings. Heat exchangers are made of copper tube construction and insulated.

The regenerative desiccant consists of two (dual) towers filled with desiccant. Each tower is switched on and off stream, alternating the air system stream and then being regenerated. Dry purge air pulls moisture from the desiccant and carries the moisture out of the air.

### MEDICAL FILTER SYSTEM

The medical filter system consists of a duplex series of filters and pressure regulators. Air enters the system and is directed to either bank of filters controlled by ball valve. The first stage filter removes solids and liquid particles. The next stage of filters remove submicronic particles and aerosols. The third and optional final filter is carbon activated to remove unpleasant odors. Maximum operating temperature is 125°F and maximum pressure is 150 psig.

### CONDENSATE DRAIN VALVE

A condensate drain valve must be installed on any tank. This valve removes liquid that collects during compressor operation. Drain liquid from tank daily.

## Installation

**⚠ WARNING** *Disconnect, tag and lock out power source then release all pressure from the system before attempting to install, service, relocate or perform any maintenance.*



**⚠ CAUTION** *Do not lift or move unit without appropriately rated equipment. Be sure the unit is securely attached to lifting device used. Do not lift unit by holding onto tubes or coolers. Do not use unit to lift other attached equipment.*

## Installation (Continued)

**⚠ WARNING** *Installation of inlet / outlet air plumbing from the compressor flange and electrical connection must be in accordance with National Fire Protection Association (NFPA99) Code Compliance for Medical Gas Breathing Air (Level 1).*

### INSTALLATION SITE

1. The oilless compressor must be located in a clean, well lit and well ventilated area.
2. The area should be free of excessive dust, toxic or flammable gases and moisture.
3. Never install the compressor where the surrounding temperature is higher than 104° F or where humidity is high.
4. Clearance must allow for safe, effective inspection and maintenance. Electrical panels may require additional clearance. Consult local NEC codes for proper clearances.
5. If necessary, use metal shims or leveling pads to level the compressor. Never use wood to shim the compressor.

Minimum Clearances	
Above	24 inches
Other sides	36 inches

### VENTILATION

1. If the oilless compressor is located in a totally enclosed room, an exhaust fan with access to outside air must be installed.
2. Never restrict the cooling fan exhaust air. Maintain a minimum of 3 feet of clearance around entire unit.
3. Never locate the compressor where hot exhaust air from other heat generating units may be pulled into the unit.

### WIRING

All electrical hook-ups must be performed by a qualified electrician. Installations must be in accordance with local and national electrical codes. Use solderless terminals to connect the electric power source.

### PIPING

Refer to the general product manual.

1. Make sure the piping is lined up without being strained or twisted when assembling the piping for the compressor.
2. Appropriate expansion loops or bends should be installed at the compressor to avoid stresses caused by changes in hot and cold conditions.
3. Piping supports should be anchored separately from the compressor to reduce noise and vibration.
4. Never use any piping smaller than the compressor connection.
5. Use flexible hose to connect the outlet of the compressor to the piping so that the vibration of the compressor does not transfer to the piping.

### SAFETY VALVES

Medical package systems are shipped from the factory with safety valves installed in the tank assembly. The flow capacity of the safety valve is equal to or greater than the flow capacity of the compressor system. There are also safety valves installed where compressor modules isolate from the system, and safety valves are installed where the air purification system isolates.

1. The pressure setting of the safety valve must be no higher than the maximum working pressure of the tank.
2. Safety valves are placed ahead of any possible blockage point in the system, i.e. shutoff valves.
3. Avoid connecting the safety valve with any tubing or piping.
4. Manually operate each safety valve every six months to avoid sticking or freezing.

## Assembling Modular Medical System

### MODULAR PLACEMENT

1. Unpack each module and discard all wood shipping materials.
2. Locate frame assembly fasteners provided in parts pack [includes: fasteners, filter(s), isolation pads and inlet flex line].
3. Place modules at location designated (see drawings provided with unit for proper arrangement of modules). Provide sufficient clearance around unit for servicing (see minimum clearance section).
4. Install frame assembly fasteners to each frame joining the frames together.
5. Lift corners of each frame assembly and install isolation pads provided.

**NOTE:** Remove shipping brackets painted orange located at the base plate of each compressor module. This will allow spring isolators to free up reducing noise and vibration of the unit.

### CONNECTING PIPING

1. Locate connection for piping at rear of unit for compressors module to receiver tank module.
  2. Remove plastic caps that protect piping against contamination.
  3. Connect flex joint to frame securely making sure flex line is not pinched or kinked.
  4. Follow steps 1 to 3 for flex line from outlet of receiver tank to dryer package.
- NOTE:** All piping is provided and sealed for this portion of installation.
5. Locate and attach intake inline air filter to outside source air or header. Flex line is provided when attaching intake of compressors to rigid piping. Make sure inlet drip legs are installed to prevent moisture from entering the compressor system intake filters.
  6. Connect outlet source from filter package located on dryer module to outlet source piping.

**⚠ WARNING** *Attach all inlet and outlet source piping in accordance with NFPA 99 for Medical Gas.*

### CONNECTING WIRING

**⚠ CAUTION** *Provide electrical power in accordance to NEC and local codes. Connection of wiring should be performed by a qualified electrician.*

1. Connect wiring and flex conduit provided from each motor junction box to correct hole in bottom of control panel and starter.
2. Connect the temperature switch from each compressor to contacts located in the control panel as marked for each temperature switch. Temperature switches shutdown the compressor when the temperature is above 425°F.
3. Connect unloader solenoid to wiring contacts located in the control panel. The unloader solenoid provides loadless starting of each compressor on/off cycle.
4. Connect wiring from CO Monitor. A wire set is provided for power and the other for alarm. Wiring is marked for easy attachment.
5. Connect wiring from Dew Point Monitor. A wire set is provided for power and the other for alarm. Wiring is marked for easy attachment.



## Installation (Continued)

- Refrigerated dryer(s) need a separate properly protected power supply for each dryer. Standard voltage is 110 Volts. Other voltages are available. Check for voltage of dryer supplied and current rating provided on data plate of dryer.

**NOTE:** Units provided with desiccant drying systems are wired directly to the control panel provided.

- Connect the incoming power to the incoming terminal blocks inside of the main electrical control panel. Make sure this is performed by a qualified electrician, following all NEC, OSHA, and local codes. Make sure the unit ground is secured to the earth ground.

For questions concerning assembling and start-up, contact Powerex at 1-888-769-7979 for technical assistance.

## Operation

Powerex package medical systems operate at a maximum pressure of 115 psig. Compressor RPM's are established by Powerex based on horsepower and operating pressure.

### BEFORE START UP

- Make sure all safety warnings, labels and instructions have been read and understood before continuing.
- Confirm that the electric power source and ground have been firmly connected.
- Be sure all pressure connections are tight.
- Check to be certain all safety relief valves, etc., are correctly installed.
- Check that all fuses, circuit breakers, etc., are the proper size.
- Make sure the inlet is properly connected.
- Confirm that the tank drain valve is closed.

### START-UP AND OPERATION

- Follow all the procedures under "Before start-up" before attempting operation of the compressor.
- Switch the electric source breaker on.
- Both dryers should be plugged in and set at the on position (Refrigerated).
- Dewpoint & CO Monitors should be on and the sampling valves open. Calibrate CO per enclosed manufacturer's instructions.

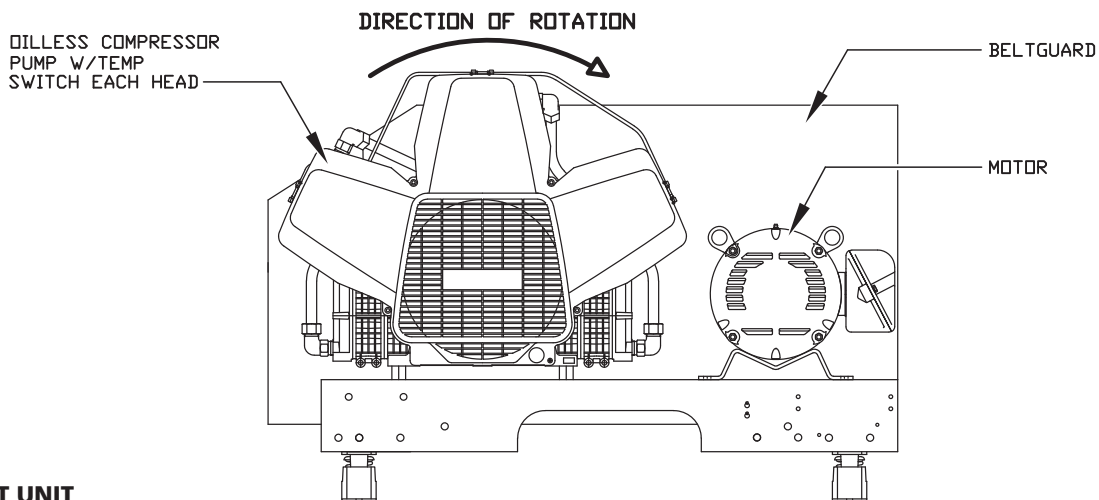
- Ensure water lines are properly installed to water-cooled aftercoolers. Turn on water.

**IMPORTANT:** This is not a standard option. Check to see if water-cooled aftercoolers were provided.

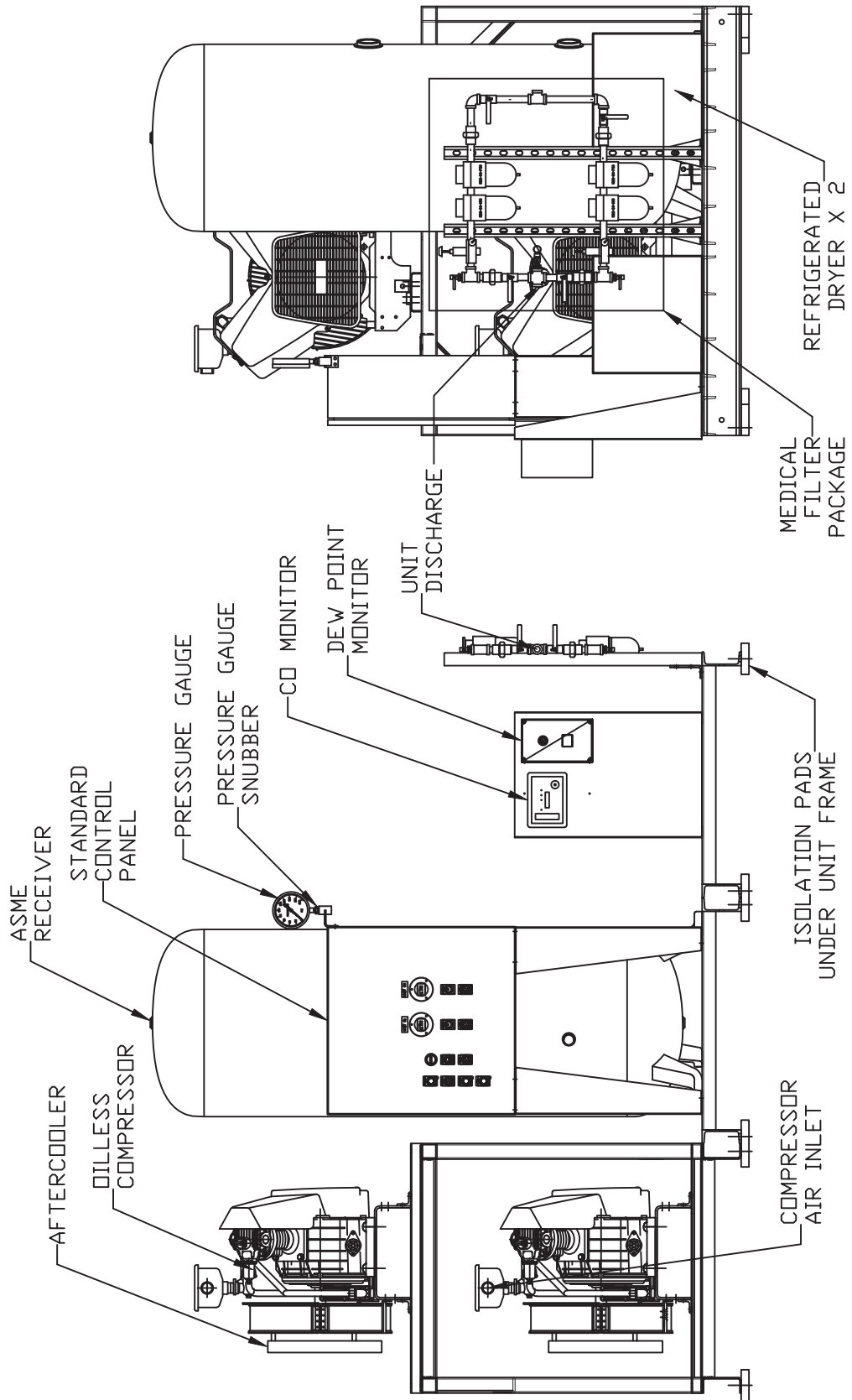
- Compressor unit isolation valves are preset at the factory in the open position except for tank by-pass which must remain closed during normal operation.
- Dryer and filter isolation valves: Valves should be open to one dryer and one filter bank.
- Close the valve leading to the Medical Air System from receiver on the compressor unit.

- With all the compressor HOA switches in the OFF position, turn the electric power source to the ON position. The low pressure alarm will sound. Silence the alarm by pushing **Alarm Acknowledge** button.
- Jog each compressor in the manual position with the HOA switch to check for rotation. (Clockwise if facing the black fan shroud and counterclockwise if facing the compressor flywheel.) Visually check the rotation of each compressor pump. If the rotation is incorrect, have a qualified electrician correct the motor wiring.
- Set all selector switches to the AUTO position. Each compressor will run until the lead pressure setting is met.
- Open valve at the air receiver leading to Medical Air System.
- Check for air leaks at the connections.

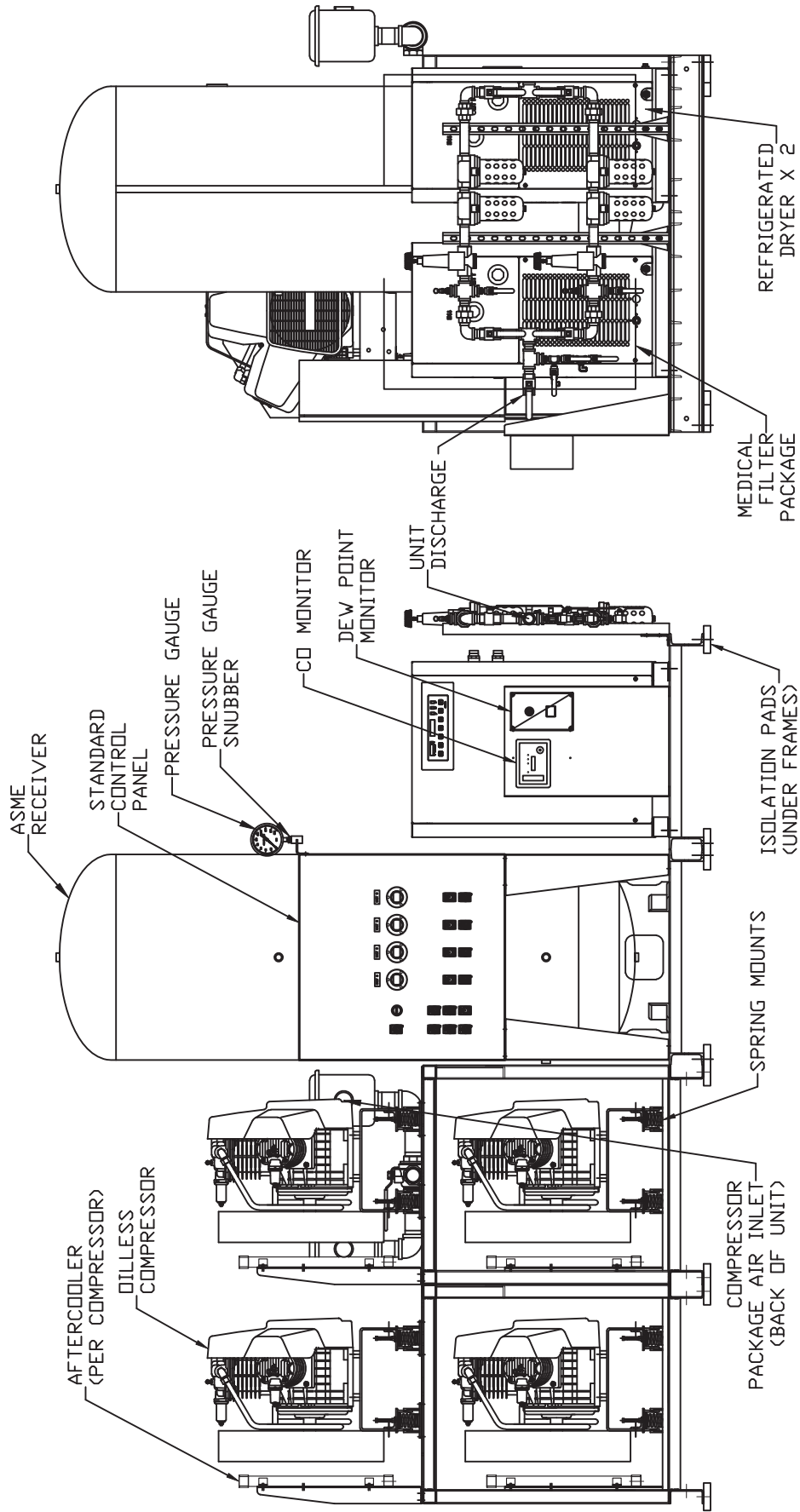
- Check that the unit operates without excessive vibration, unusual noises or leaks.
- Check the discharge pressure. Also make sure the air pressure rises to the designated pressure setting by checking the discharge pressure gauge.
- Check the operation of the pressure switch or the pilot valve for continuous run units by opening the stop valve and confirming the compressor starts or reloads as pressure drops.



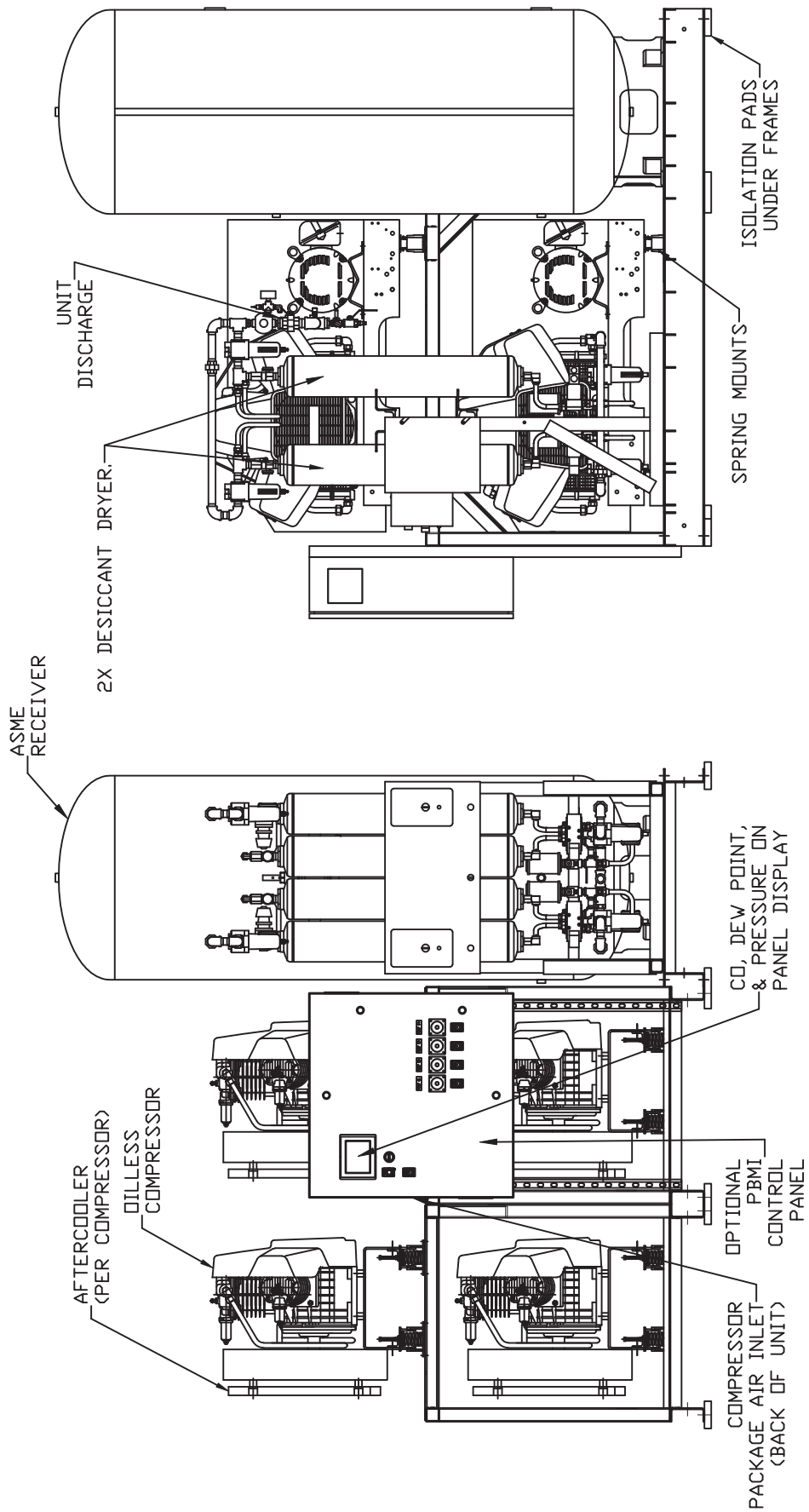
BASEMOUNT UNIT



DUPLEX MEDICAL UNIT - REFRIGERATED

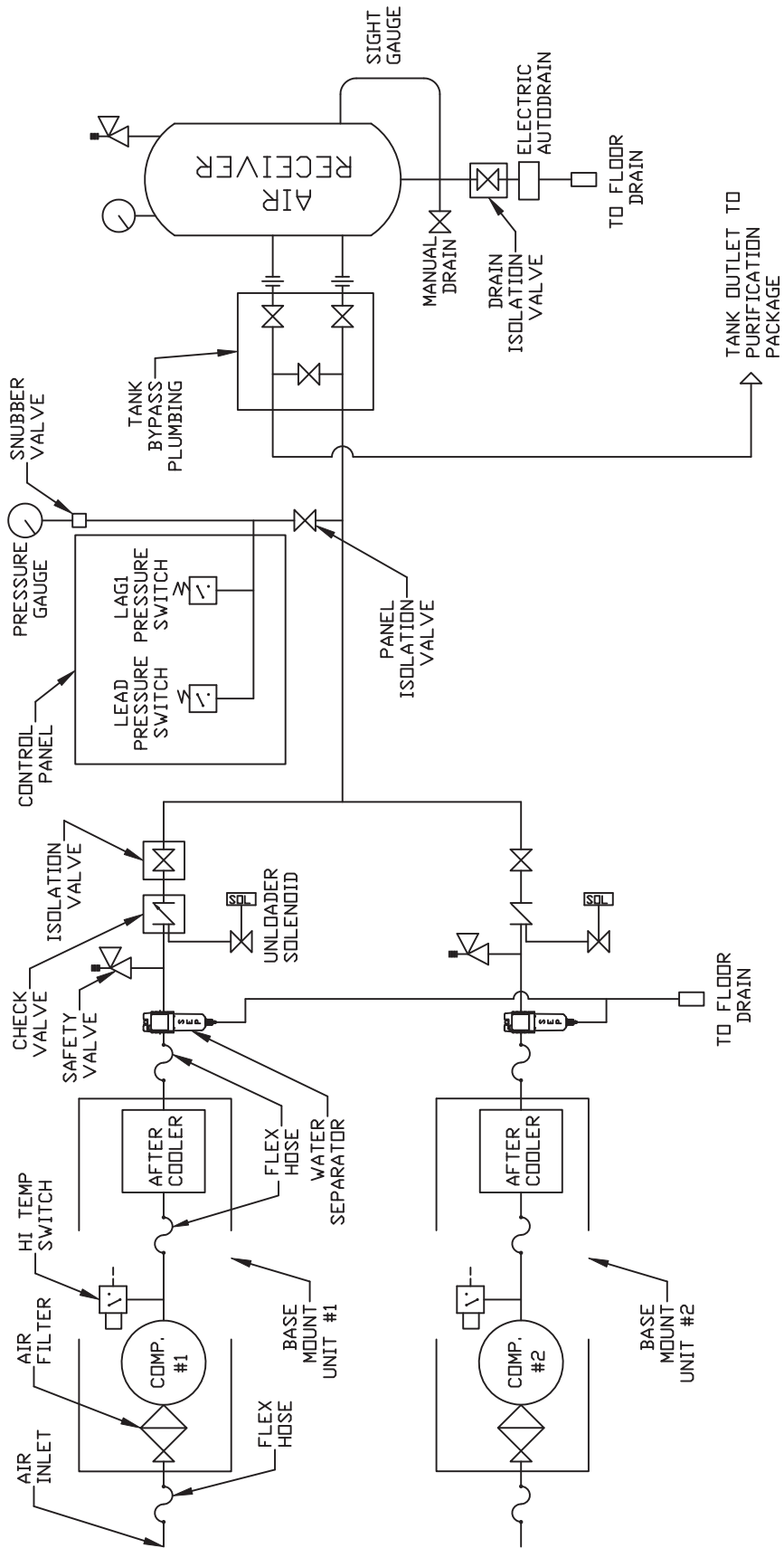


QUAD MEDICAL UNIT - STANDARD PANEL REFRIGERATED DRYERS

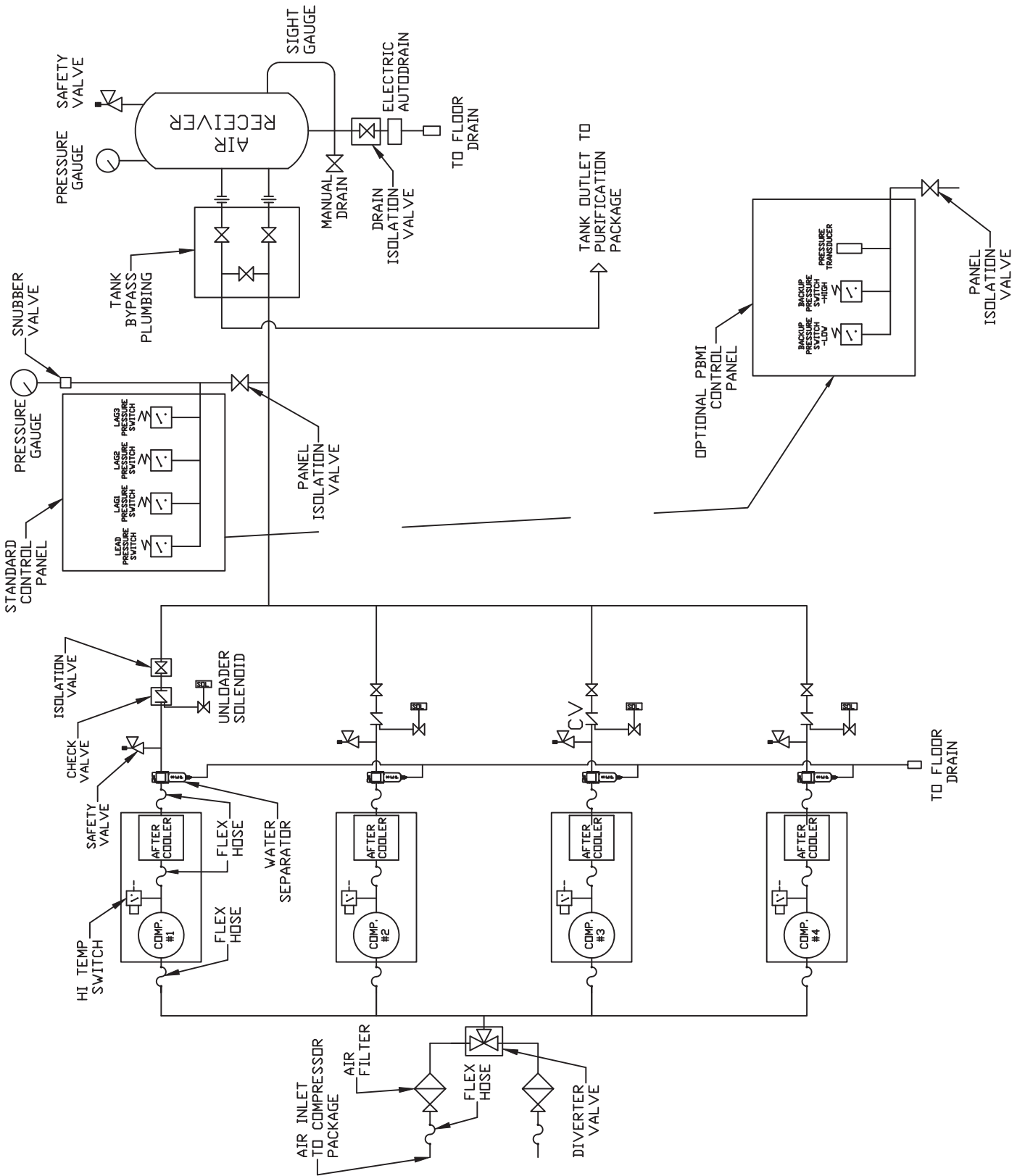


QUAD MEDICAL UNIT - PBMI PANEL DESICCANT DRYERS

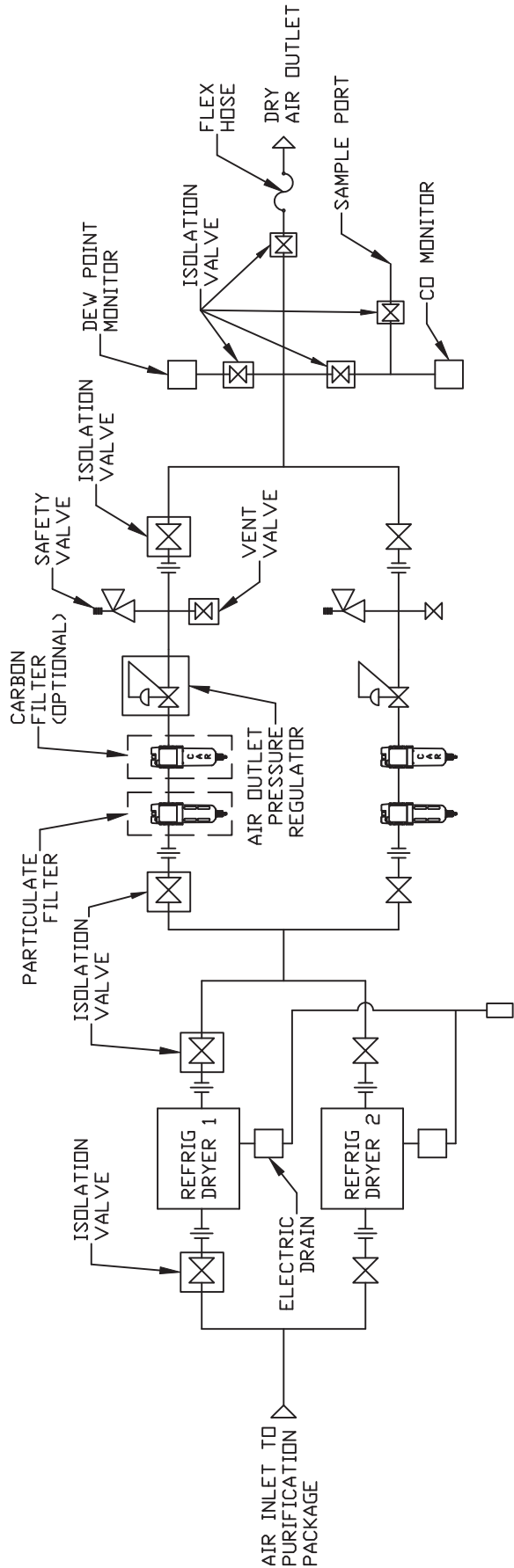




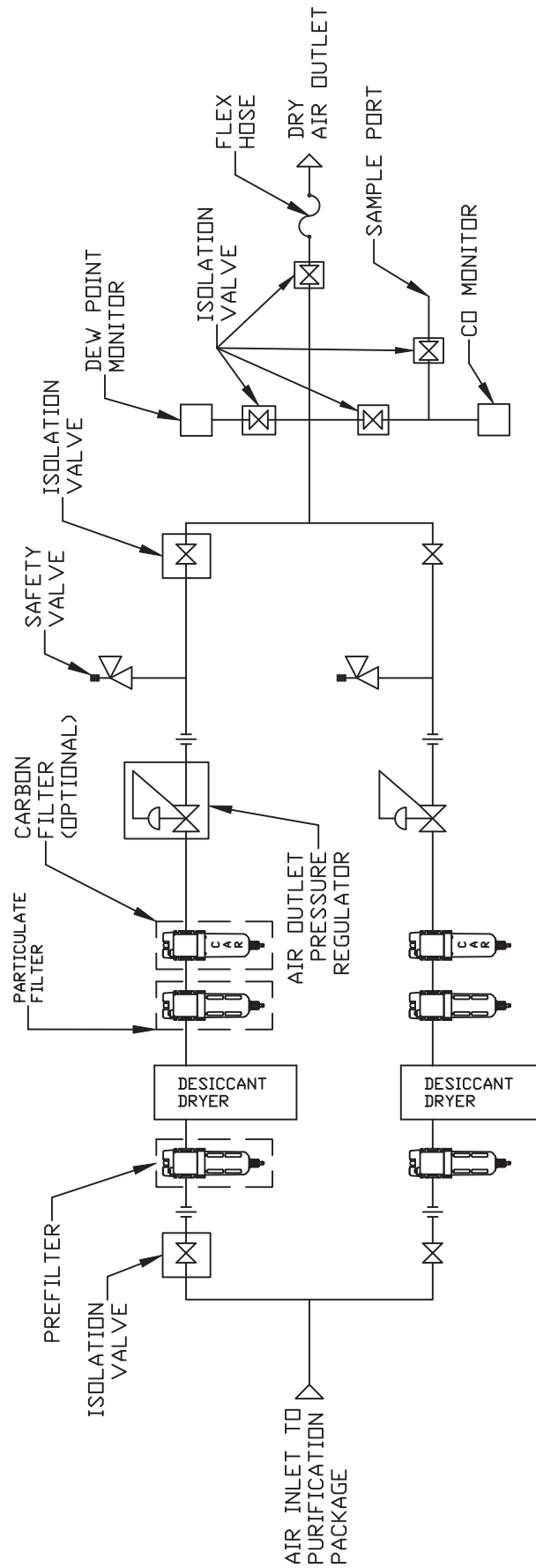
DUPLEX MEDICAL FLOW SCHEMATIC



QUAD MEDICAL FLOW SCHEMATIC



REFRIGERATED PURIFICATION PACKAGE



DESICCANT PURIFICATION PACKAGE

## Compressor Parts List

Description	Part Number	Qty.	Description	Part Number	Qty.
Compressor Pump:			Isolation Mounts		
3 HP	OPT030	1	Consult factory for parts and availability. Call 1-888-769-7979.		
5 HP	OPT050	1	Drive Belts		
7-1/2 HP	OPT050	1	3 HP	BT008500AV	1
7-1/2 HP	OPT100	1	5 HP	BT022100AV	2
10 HP	OPT100	1	7-1/2 HP	BT008500AV	2
15 HP	OPT150	1	7-1/2 HP	BT011200AV	2
Corrosion Resistant Vertical Tank			10 HP	BT009200AV	2
80 Gal.	Consult factory for number	1	15 HP	BT010200AV	2
120 Gal.	Consult factory for number	1	Pulley (Motor)		
200 Gal.	Consult factory for number	1	3 HP	PU009777AV	1
240 Gal.	Consult factory for number	1	5 HP	PU202634AV	1
Dew Point Monitor / Probe (Specify Dryer to be used on)			7-1/2 HP	PU202631AV	1
Refrigerated	PDPM1001AJ	1	7-1/2 HP	PU009775AV	1
Dessicant	PDPM1001AJ	1	10 HP	PU009772AV	1
Carbon Monoxide Monitor/Sensor	ACO600105	1	15 HP	PU009758AV	1
Safety Relief Valve	Consult factory for number	1	Motor		
Control Panel	Consult factory for parts and availability. Call 1-888-769-7979.		3 HP	MC303301AV	1
Pressure Gauge	Consult factory for number	1	5 HP	MC303303AV	1
Snubber for Pressure Gauge	ST189003AV	1	7-1/2 HP	MC033600AV	1
Auto Tank Drain			7-1/2 HP	MC303308AV	1
Electric	ACO300100	1	10 HP	MC303310AV	1
Float	ACO400100	1	15 HP	MC303312AV	1
			Belt Guard Back		
			3 HP	BG012802AV	1
			5 HP	BG012802AV	1
			7-1/2 HP	BG012802AV	1
			7-1/2 HP	BG218400AV	1
			10 HP	BG218400AV	1
			15 HP	BG218400AV	1
			Belt Guard Front		
			7-1/2 HP	BG218500AV	1
			10 HP	BG218500AV	1
			15 HP	BG218500AV	1

## Aftercooler / Drain Parts List

Description	Part Number	Qty.
Aftercooler and Tubing:		
3 - 5 HP	ACO700015	1
7-1/2 - 10 HP	ACO700020	1
15 HP	ACO700075	1
Drain Trap:		
3 - 15 HP	Consult factory for number	
Piping Braided Flex:		
3 HP - 1/2 inch	Consult factory for size and length.	
5 HP - 1/2 inch	Consult factory for size and length.	
7-1/2 HP - 1/2 inch	Consult factory for size and length.	
10 HP - 3/4 inch	Consult factory for size and length.	
15 HP - 3/4 inch	Consult factory for size and length.	
Temperature Switches	AM003011AV	
425° N/C Switch		

## Medical Package Systems

### Dryer / Filter Parts List

Description	Part Number	Qty.	Description	Part Number	Qty.
Refrigerated Dryer:			Desiccant Dryer:		
25 CFM	ACO013025	1	6.4 CFM	PMD07000AJ	1
35 CFM	ACO013035	1	12.0 CFM	PMD10000AJ	1
50 CFM	ACO013050	1	19.9 CFM	PMD17000AJ	1
75 CFM	ACO013075	1	28.9 CFM	PMD30000AJ	1
100 CFM	ACO013100	1	43.4 CFM	PMD45000AJ	1
150 CFM	ACO013150	1	57.9 CFM	PMD55000AJ	1
200 CFM	ACO013200	1	72.0 CFM	PMD71000AJ	1
Filter Packages for Refrigerated Dryers:			106.0 CFM	PMD11100AJ	1
1/2 inch - 40 CFM	MFP-040-342	1	135.0 CFM	ACO20802AV	1
1/2 inch - 50 CFM	MFP-050-342	1	156.0 CFM	ACO20803AV	1
3/4 inch - 60 CFM	MFP-060-362	1	211.0 CFM	ACO20804AV	1
1 inch - 70 CFM	MFP-070-382	1			
1 inch - 100 CFM	MFP-110-382	1			
1-1/4 inch - 220 CFM	MFP-220-3A2	1			

See Filter System Manual for details and replacement elements.

### Maintenance

Item	Action needed	Operating Hours						Remarks
		500	2500	5000	10,000	15,000	20,000	
Tank	Drain moisture	Daily						
Inlet Air Filter	Inspect, Replace	●	▲					Every 2500 Hours or less
Cooling Fan	Clean			●	●	●	●	
Compressor Fins	Clean		●					Every 2500 Hours or less
Compression Rings	Replace				▲		▲	} Reference pump manual
Wrist Pin Bearing	Regrease			▲	▲	▲	▲	
Piston Set	Replace						▲	
V-belt	Inspect, Replace	<b>Note 3</b>	●	▲	▲	▲	▲	
Safety Valve	Confirm operation		●					Every 2500 Hours or less
Pressure Gauge	Inspect		●					Every 2500 Hours or less
Air Leaks	Inspect		●		●		●	
Medical Filter System Elements	Replace		▲	▲	▲	▲	▲	View delta pressure indication
Moisture Drains traps	Inspect	●		●		●		
Dryer Pressure (Refrigerated)		●	●	●	●	●		
Heat Exchanger	Inspect, Clean	●	●	●	●	●		

● - Inspect    ▲ - Replace

Note 1: Inspect and perform maintenance periodically according to maintenance schedule.

Note 2: The maintenance schedule relates to the normal operating conditions. If the circumstances and load condition are adverse, shorten the cycle time and do maintenance accordingly.

Note 3: The tension of the V-belt should be adjusted during the initial stage and inspected every 1,500 hours afterwards. Proper belt tension for 3 HP units is 12 lbs. / 0.5 inch deflection; for 5 to 15 HP units, 16 lbs. / 1.5 inch deflection



## Troubleshooting Chart

PROBLEM	CAUSE	CORRECTIVE ACTION
Panel power <b>ON</b> light does not appear	<ol style="list-style-type: none"> <li>1. Main disconnect is not ON</li> <li>2. Blown fuse or circuit breaker at customer provided power supply</li> <li>3. Blown fuse at primary side of transformer</li> </ol>	<ol style="list-style-type: none"> <li>1. Switch disconnect to <b>ON</b></li> <li>2. Inspect for any fault replace fuse or trip disconnect to <b>ON</b></li> <li>3. Replace fuse on primary side be sure use same type and size</li> </ol>
Power On light is on but unit will not start	<ol style="list-style-type: none"> <li>1. Blown fuse on secondary side of transformer</li> <li>2. Motor overload has tripped</li> <li>3. Wrong or low voltage</li> <li>4. Starter has failed</li> <li>5. Motor has failed</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace fuse on secondary side be sure use same type and size</li> <li>2. See last entry of Troubleshooting Guide</li> <li>3. Check incoming power supply and unit power rating</li> <li>4. Replace contactor assembly</li> <li>5. Replace motor</li> </ol>
Compressor is running but will not maintain pressure	<ol style="list-style-type: none"> <li>1. Drive belts came off or too loose</li> <li>2. Clogged intake filter element</li> <li>3. Solenoid unloader open</li> <li>4. Electric tank drain is open continuously</li> <li>5. Discharge air is leaking</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace drive belts and (or) tighten</li> <li>2. Replace intake filter element</li> <li>3. Replace solenoid unloader</li> <li>4. Replace tank drain</li> <li>5. Check discharge piping</li> </ol>
Excessive noise or vibration	<ol style="list-style-type: none"> <li>1. Drive belt has separated or flat spot</li> <li>2. Motor has failed</li> <li>3. Pump is damaged</li> <li>4. Cooling air fan is touching fan guard</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace drive belt</li> <li>2. Replace motor</li> <li>3. Fix or replace pump</li> <li>4. Check air fan daily</li> </ol>
Compressor shuts down on high temperature	<ol style="list-style-type: none"> <li>1. Room temperature is above 104°F</li> <li>2. Aftercooler fins clogged</li> <li>3. Intake filter clogged</li> <li>4. Compressor is dirty</li> </ol>	<ol style="list-style-type: none"> <li>1. Add ventilation or air conditioning to room</li> <li>2. Clean aftercooler</li> <li>3. Check intake filter</li> <li>4. Clean unit</li> </ol>
Compressor turns on/off rapidly	<ol style="list-style-type: none"> <li>1. Receiver tank has high level of water</li> <li>2. Defective pressure switch</li> <li>3. Tank has been by-passed</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace electric tank drain; drain water from tank</li> <li>2. Replace pressure switch</li> <li>3. Open proper ball valve</li> </ol>
Safety valve blows off	<ol style="list-style-type: none"> <li>1. Pressure switch has failed to open</li> <li>2. Motor starter contacts welded shut</li> <li>3. Pump selector switch in <b>HAND</b> position</li> <li>4. Pump isolation ball valve is <b>CLOSED</b> position</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace pressure switch</li> <li>2. Replace motor starter</li> <li>3. Move pump selector switch to <b>AUTO</b> position</li> <li>4. Open ball valve to proper position</li> </ol>
Motor Overload has tripped	<ol style="list-style-type: none"> <li>1. Pump has failed</li> <li>2. Motor has failed</li> <li>3. Improper wiring</li> <li>4. Wrong overload setting</li> <li>5. Low voltage</li> <li>6. Contactor or overload bad</li> </ol>	<ol style="list-style-type: none"> <li>1. Fix or replace pump</li> <li>2. Replace motor</li> <li>3. Check wiring</li> <li>4. Check overload setting</li> <li>5. Check incoming power supply</li> <li>6. Replace contactor or overload</li> </ol>
Solenoid unloader constantly bleeds after compressor shuts off	Check valve has failed	Replace check valve
CO monitor in alarm	High CO alarm	Check compressor inlet / route inlet away from CO source
Dew point monitor in alarm	<ol style="list-style-type: none"> <li>1. High dew point</li> <li>2. Dryer pre-filter drain failure</li> </ol>	<ol style="list-style-type: none"> <li>1. Check dryer operation</li> <li>2. Replace pre-filter drain</li> </ol>

### Powerex Limited Warranty

#### **Warranty and Remedies.**

**(a) General.** Powerex warrants each Compressor System, Vacuum System, Vacuum Pump, Compressor Air-End, or Powerex branded Accessory (collectively "Products", individually each a "Product") to be free from defects in material and workmanship ("Defects") at the date of shipment. EXCEPT AS SET FORTH BELOW, NO OTHER WARRANTY, WHETHER EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, SHALL EXIST IN CONNECTION WITH THE SALE OR USE OF SUCH PRODUCTS. TO THE EXTENT PERMITTED BY LAW, ANY AND ALL IMPLIED WARRANTIES ARE EXCLUDED. All claims under this warranty must be made in writing and delivered to Powerex, or such claim shall be barred. Upon timely receipt of a claim, Powerex shall inspect the Product claimed to have a Defect, and Powerex shall repair, or, at its option, replace, free of charge, any Product which it determines to have had a Defect at the time of shipment from Powerex; provided, however, that if circumstances are such as to preclude the remedying of Defect by repair or replacement, Powerex shall, upon return of the Product, refund to buyer any part of the purchase price of such Products paid to Powerex. Freight for returning Products to Powerex for inspection shall be paid by buyer. The warranties and remedies herein are the sole and exclusive remedy for any breach of warranty or for any other claim based on any Defect, or non-performance of the Products, whether based upon contract, warranty or negligence.

**(b) Initial Period of Warranty – Parts and Labor.** Powerex warrants and represents all Products shall be free from Defects for the first twelve (12) months from the date of shipment by Powerex, or five thousand (5,000) hours of use, whichever occurs first. During such warranty period, Powerex shall be fully liable for all Defects in the Products (the "Product Defects"), i.e., all costs of repair or replacement, which may include "in and out" charges, so long as the Products are located in the continental United States, and the Products are reasonably located and accessible by service personnel for removal. "In and out" charges include the costs of removing a Product from buyer's equipment for repair or replacement.

**(c) Additional Period of Warranty – Parts Only (No Labor).** In addition to the above, Powerex warrants each Powerex branded Compressor Air-End, and Vacuum Pump shall be free of Defects for a period of thirty-six months from the date of shipment of Product, or 10,000 hours of use, whichever occurs first. Supplier's repair or replacement of any Product shall not extend the period of any warranty of any Product. This warranty applies to the exchange of part(s) found to be defective by an Authorized Powerex Service Center only.

**(d) Coverage.** The above mentioned warranty applies to Powerex manufactured units or systems only.

**(e) Exceptions.** Notwithstanding anything to the contrary herein, Powerex shall have no warranty obligations with respect to Products:

- (i) that have not been installed in accordance with Powerex's written specifications and instructions;
- (ii) that have not been maintained in accordance with Powerex's written instructions;
- (iii) that have been materially modified without the prior written approval of Powerex; or
- (iv) that experience failures resulting from operation, either intentional or otherwise, in excess of rated capacities or in an otherwise improper manner.

**(f)** The warranty provided herein shall not apply to: (i) any defects arising from corrosion, abrasion, use of insoluble lubricants, or negligent attendance to or faulty operation of the Products; (ii) ordinary wear and tear of the Products; or (iii) defects arising from abnormal conditions of temperature, dirt or corrosive matter; (iv) any OEM component which is shipped by Powerex with the original manufacturer's warranty, which shall be the sole applicable warranty for such component.

**Limitation of Liability.** TO THE EXTENT ALLOWABLE UNDER APPLICABLE LAW, NOTWITHSTANDING ANYTHING TO THE CONTRARY HEREIN, UNDER NO CIRCUMSTANCES SHALL POWEREX BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL, PUNITIVE, SPECULATIVE OR INDIRECT LOSSES OR DAMAGES WHATSOEVER ARISING OUT OF OR IN ANY WAY RELATED TO ANY OF THE PRODUCTS OR GOODS SOLD OR AGREED TO BE SOLD BY POWEREX TO BUYER. TO THE EXTENT ALLOWABLE UNDER APPLICABLE LAW, POWEREX'S LIABILITY IN ALL EVENTS IS LIMITED TO, AND SHALL NOT EXCEED, THE PURCHASE PRICE PAID.

**Warranty Disclaimer.** Powerex has made a diligent effort to illustrate and describe the Products in this literature accurately; however, such illustrations and descriptions are for the sole purpose of identification, and do not express or imply a warranty that the Products are merchantable, or fit for a particular purpose, or that the Products will necessarily conform to the illustrations or descriptions.

**Product Suitability.** Many jurisdictions have codes and regulations governing sales, construction, installation, and/or use of Products for certain purposes, which may vary from those in neighboring areas. While Powerex attempts to assure that its Products comply with such codes, it cannot guarantee compliance, and cannot be responsible for how the product is installed or used. Before purchase and use of a Product, please review the Product applications, and national and local codes and regulations, and be sure that the Product, installation, and use will comply with them.

**Claims.** Claims pertaining to the Products, with the exception of warranty claims, must be filed with Powerex within 6 months of the invoice date, or they will not be honored. Prices, discounts, and terms are subject to change without notice or as stipulated in specific Product quotations. All agreements are contingent upon strikes, accidents, or other causes beyond our control. All shipments are carefully inspected and counted before leaving the factory. Please inspect carefully any receipt of Products noting any discrepancy or damage on the carrier's freight bill at the time of delivery. Discrepancies or damage which obviously occurred in transit are the carrier's responsibility and related claims should be made promptly directly to the carrier. Returned Products will not be accepted without prior written authorization by Powerex and deductions from invoices for shortage or damage claims will not be allowed.

**UNLESS OTHERWISE AGREED TO IN WRITING, THESE TERMS AND CONDITIONS WILL CONTROL IN ANY TRANSACTION WITH POWEREX** any different or conflicting terms as may appear on any order form now or later submitted by the buyer. All orders are subject to acceptance by Powerex.