



## 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.

#### OILLESS OPT/OPS COMPRESSOR

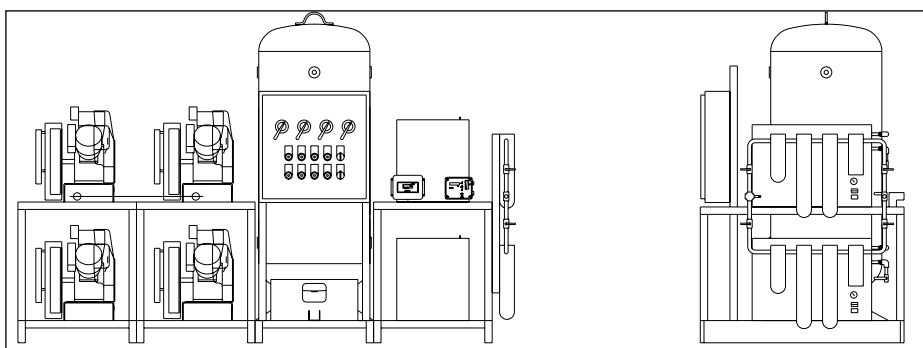
The Powerex oilless reciprocating air compressor has advanced compressor technology through the development of a completely oilless compressor. The Powerex reciprocating compressor is provided in duplex, triplex or quadplex configurations with head unloaders to provide start, stop or continuous operation. 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 120 to 240 gallons. Each receiver is rated at 200 PSIG working pressure. Receivers are provided with sight glass and moisture drain (manual or automatic).

#### CONTROL PANEL

The NEMA 12 control panel is provided in duplex, triplex or quadplex configurations and meets NFPA 99 requirements for medical air. Primary voltage is protected by fusing or circuit breaker. Control transformer power is 110 volts and protected by secondary fusing. Pressure control switches signal the compressors on and off cycle and signal lag compressor(s) to come on if air demand increases. A lag, lag pressure switch or transducer signals a light and audible alarm warning of a low pressure condition which is factory set at 40 PSIG. An acknowledge button is provided for start condition and maintenance. The adjustable timer alternator cycles each compressor so equal run time is maintained. This alternator is factory set to alternate the compressors every 10 minutes. The exterior of the control panel is accessible through the door. The panel disconnects on/off/auto switches run lights, power on lights, run hourmeters, lag pressure light, high



temperature light and overload reset. This control panel is UL listed.

#### DEW POINT MONITOR

The Powerex dew point monitor provides indication of dew point and temperature. It's microprocessor controlled with user programmable output range, alarm and calibration. The NEMA enclosure is protected by a polymer viewing cover.

#### 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 a NEMA 12 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 points are set at 10PPM (low) and 20 PPM (high).

#### AIR COOLED AFTERCOOLER

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

#### AIR DRYER (REFRIGERATED OR DESICCANT)

The Powerex air drying system provides air at 38°F at 100 PSIG for refrigerated units and -40°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-22 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 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.

#### 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.

## Medical Package System

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.*

### Unpacking

#### RECEIVING THE UNIT

Immediately upon receipt of the oilless compressor, inspect for any damage which may have occurred during shipment.

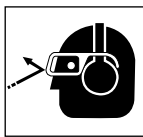
The compressor nameplate should be checked to verify the correct model and voltage as ordered.

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

### General Safety Information

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 in the United States, the 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.
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.

#### ⚠ 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.

### 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.*

#### ⚠ 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 105° F or where humidity is high.
4. Clearance must allow for safe, effective inspection and maintenance.

#### Minimum Clearances

Above	24"
Other sides	36"

5. If necessary, use metal shims or leveling pads to level the compressor. Never use wood to shim the compressor.

### 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

Tank mounted compressors are shipped from the factory with safety valves installed in the tank manifold. The flow capacity of the safety valve is equal to or greater than the capacity of the compressor.

1. The pressure setting of the safety valve must be no higher than the maximum working pressure of the tank.
2. Safety valves should be placed ahead of any possible blockage point in the system, i.e. shutoff valve.
3. Avoid connecting the safety valve with any tubing or piping.
4. Manually operate the 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 picture below 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 chinked.
4. Follow steps 1 to 3 for flex line from dryer package to outlet of receiver tank.

**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.
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.*

### ELECTRICAL WIRING OF MODULES

**⚠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 each temperature switch from the compressors to contacts located in control panel as marked for each temperature switch. Temperature switches shutdown the

compressor when temperature is above 400°F.

3. Connect wiring of unload solenoids to contacts located on control panel. The unload solenoid provides loadless starting of the compressors on off cycle.
4. Connect wiring from differential pressure switch at control panel. Differential switch wired to contacts in control panel provided for remote alarm.
5. Connect wiring from CO Monitor. A wire set is provided for power and the other for alarm. Wiring is marked for easy attachment.
6. Connect wiring from Dew Point Monitor. A wire set is provided for power and the other for alarm. Wiring is marked for easy attachment.
7. 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.

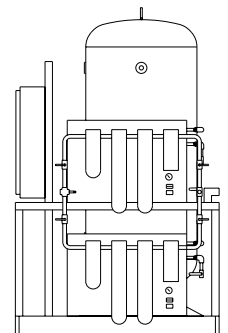
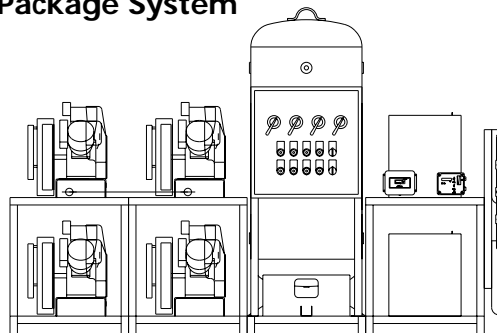
**NOTE:** Units provided with desiccant drying systems are wired directly to the control panel provided.

For questions concerning assembling and start-up, contact Powerex at 1-800-544-0350 for technical assistance.

### Operation

Powerex package medical system operates at a maximum pressure of 100 PSIG. Compressor RPM's are established by Powerex based on horsepower and operating pressure.

### MPD Medical Package System



## Medical Package System

### BEFORE START UP

1. Make sure all safety warnings, labels and instructions have been read and understood before continuing.
2. Remove any shipping materials, brackets, etc.
3. Confirm that the electric power source and ground have been firmly connected.
4. Be sure all pressure connections are tight.
5. Check to be certain all safety relief valves, etc., are correctly installed.
6. Check that all fuses, circuit breakers, etc., are the proper size.
7. Make sure the inlet filter is properly installed.
8. Confirm that the drain valve is closed.
9. Visually check the rotation of the compressor pump. If the rotation is

incorrect, have a qualified electrician correct the motor wiring.

### START-UP AND OPERATION

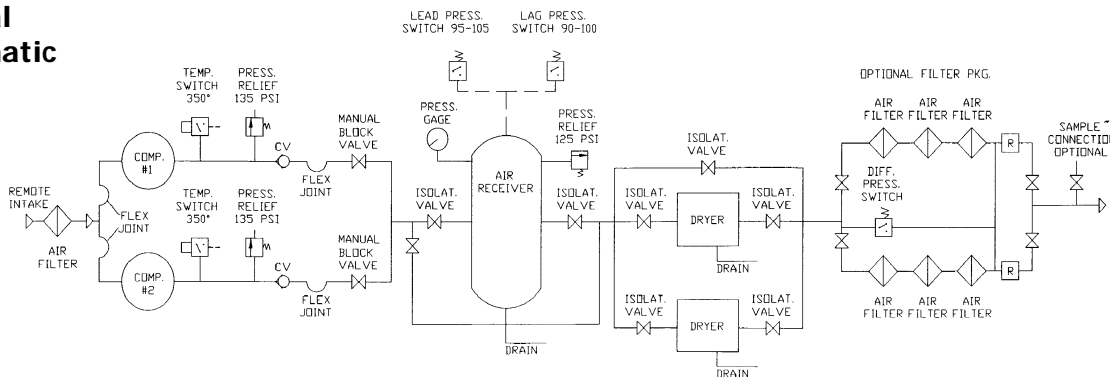
1. Follow all the procedures under "Before start-up" before attempting operation of the compressor.
2. Switch the electric source breaker on.
3. Both dryers should be plugged in and set at the on position.
4. Dewpoint & CO Monitors should be on and the sampling valves open. Calibrate Dewpoint and CO per enclosed manufacturer's instructions.
5. 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.

6. 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.
7. Dryer and filter isolation valves: Valves should be open to one dryer and one filter bank.
8. Close valve leading to the Medical Air System from receiver on the compressor unit.
  - a. Turn both fusible/breaker disconnects to the on position. Low pressure alarm will sound. Silence the alarm by pushing alarm acknowledge button.
  - b. Jog each compressor in the manual position on the selector switch to check for rotation. (Clockwise if

### Medical Air Schematic



### Specifications

#### Medical Package Duplex – Model MPD

MODEL	HP	PHASE	SCFM @ 100 PSIG	SCFM @ 50 PSIG	RPM	VOLTAGE	FULL LOAD AMP/ MOTOR	GALLON TANK	DIMENSION LxWxH	SHIPPING WT. (Lbs.)
MPD0508	5(2)	3	33.4	36.2	870	208/230/460	17.4 / 16.5 / 8.2	120	64 x 65 x 76	1288
MPD0758	7.5(2)	3	52.2	55.1	840	208/230/460	23.4 / 22 / 11	120	64 x 65 x 76	1340
MPD1008	10(2)	3	70	76.3	1070	208/230/460	29 / 33 / 16.5	200	64 x 65 x 80	1510
MPD1508	15(2)	3	108.4	114.1	1250	208/230/460	51 / 48 / 24	200	64 x 65 x 80	1630

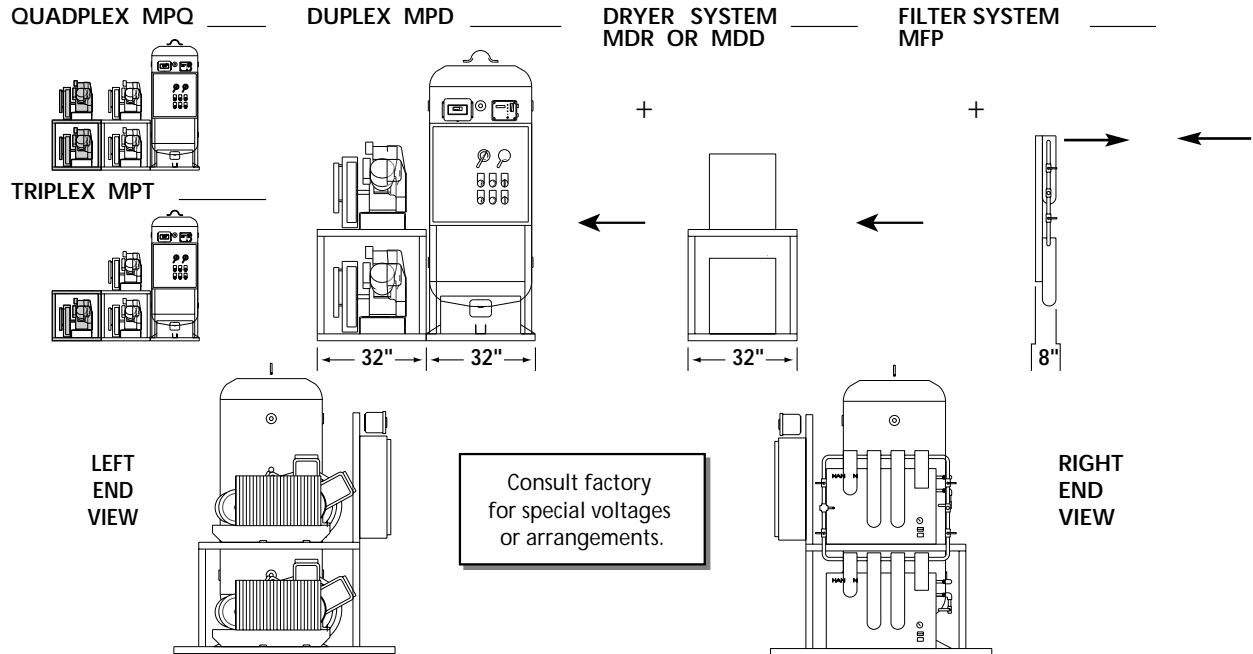
#### Medical Package Triplex – Model MPT

MODEL	HP	PHASE	SCFM @ 100 PSIG	SCFM @ 50 PSIG	RPM	VOLTAGE	FULL LOAD AMP/ MOTOR	GALLON TANK	DIMENSION LxWxH	SHIPPING WT. (Lbs.)
MPT0508	5(3)	3	50.1	54.7	870	208/230/460	17.4 / 16.5 / 8.2	200	96 x 65 x 80	1838
MPT0758	7.5(3)	3	78.8	83.9	840	208/230/460	23.4 / 22 / 11	200	96 x 65 x 80	1980
MPT1008	10(3)	3	105	111.5	1070	208/230/460	29 / 33 / 16.5	240	96 x 65 x 92	2160
MPT1508	15(3)	3	162.6	168	1250	208/230/460	51 / 48 / 24	240	96 x 65 x 92	2280

#### Medical Package Quadplex – Model MPQ

MODEL	HP	PHASE	SCFM @ 100 PSIG	SCFM @ 50 PSIG	RPM	VOLTAGE	FULL LOAD AMP/ MOTOR	GALLON TANK	DIMENSION LxWxH	SHIPPING WT. (Lbs.)
MPQ0508	5(4)	3	66.8	74.9	870	208/230/460	17.4 / 16.5 / 8.2	240	128 x 65 x 92	2388
MPQ0758	7.5(4)	3	104.4	120.2	840	208/230/460	23.4 / 22 / 11	240	128 x 65 x 92	2490
MPQ1008	10(4)	3	140	153	1070	208/230/460	29 / 33 / 16.5	240	128 x 65 x 92	2640
MPQ1508	15(4)	3	216.8	221	1250	208/230/460	51 / 48 / 24	240	128 x 65 x 92	2735

- facing the black fan shroud and counterclockwise if facing the compressor flywheel.)
- c. Set both selector switches to the auto position. Compressors will both run until the lead pressure switch closes.
- d. Open valve at the air receiver leading to Medical Air System.
- e. Check for air leaks at the connections.
9. Check that the compressor operates without excessive vibration, unusual noises or leaks.
10. Check the discharge pressure. Also make sure the air pressure rises to the designated pressure setting by checking the discharge pressure gauge.
11. 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.



## COMPRESSOR MAINTENANCE SCHEDULE

Item	Action needed	500	2500	Operating Hours	5000	10,000	15,000	20,000	Remarks
Tank	Drain moisture	Daily	2500						
Inlet air filter	Replace	●	▲	(Every 2,500 hrs or less)				●	
Blower fan	Clean				●	●	●	●	
Fan Duct	Clean				●	●	●	●	
Compressor Fins	Clean		●	(Every 2,500 hrs or less)					
Bearings	Replace				●	●	●	▲	
Compression rings	Replace				▲	▲	▲	▲	
Wrist pin bearing	Regrease				▲	▲	▲	▲	
Piston set	Replace		●		▲	▲	▲	▲	
V-belt	Inspect, replace	*Note 3	●		▲	▲	▲	▲	
Safety valve	Confirm operation		●	(Every 2,500 hrs or less)					
Pressure gauge	Inspect		●	(Every 2,500 hrs or less)					
Air leaks	Inspect		●		●	●	●	●	
Filters	Replace		▲	▲	▲	▲	▲	▲	(View delta pressure indication)
Moisture drains traps	Inspect	●		●	●	●	●	●	
Suction pressure (refrigerated)		●	●	●	●	●	●	●	
Heat exchanger		●	●	●	●	●	●	●	

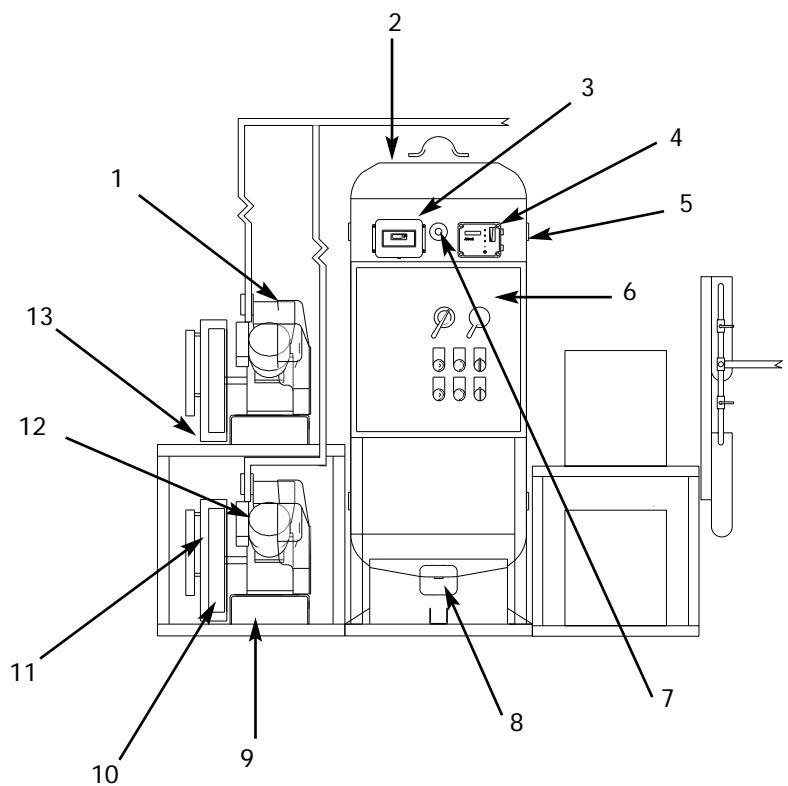
● Inspect ▲ Replace

- Inspect and perform maintenance periodically according to maintenance schedule.
- 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.
- \* The tension of the V-belt should be adjusted during the initial stage and inspected every 1,500 hours afterwards. Proper belt tension for 3/4 to 3 HP units is 12 lbs./5" deflection; for 5 to 20 HP units, 16 lbs./1.5" deflection

# Medical Package System

## Compressor Parts List

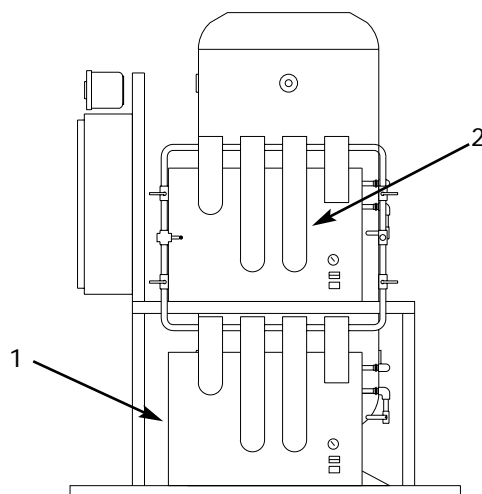
Ref. No.	Description	Part Number	Qty.
1	Compressor Pump:		
	5 HP	OPT050	1
	7-1/2 HP	OPT100	1
	10 HP	OPT100	1
	15 HP	OPT150	1
2	Corrosion Resistant Vertical Tank		
	120 Gal.	Consult factory for number	1
	200 Gal.	Consult factory for number	1
	240 Gal.	Consult factory for number	1
3	Dew Point Monitor/Probe		
	Refrigerated	ACO500100	1
	Dessicant	ACO500200	1
4	Carbon Monoxide Monitor/Sensor	ACO600100	1
5	Safety Relief Valve	Consult factory for number	1
6	Control Panel	Consult factory for parts and availability. Call 1-888-769-7979.	
7	Pressure Gauge	Consult factory for number	1
8	Auto Tank Drain		
	Electric	ACO100100	1
	Float	ACO100200	1
9	Isolation Mounts	Consult factory for parts and availability. Call 1-888-769-7979.	
10	Drive Belts		
	5 HP	BT009900AV	2
	7-1/2 HP	BT011200AV	2
	10 HP	BT009200AV	2
	15 HP	BT010200AV	2
11	Pulley (Motor)		
	5 HP	PU009743AV	1
	7-1/2 HP	PU009775AV	1
	10 HP	PU009716AV	1
	15 HP	PU009758AV	1
12	Motor		
	5 HP	MC022307AV	1
	7-1/2 HP	MC022370AV	1
	10 HP	MC022372AV	1
	15 HP	MC022376AV	1
13	Belt Guard Back		
	5 HP	BG019502AJ	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



## Dryer/Filter Parts List

Ref. No.	Description	Part Number
1	Refrigerated Dryer:	
	20 CFM	ACO200020
	25 CFM	ACO200025
	35 CFM	ACO300035
	45 CFM	ACO000045
	55 CFM	ACO200055
	60 CFM	ACO200060
	70 CFM	ACO200070
	100 CFM	ACO200100
	150 CFM	ACO200150
	200 CFM	ACO200200
2	Filter Packages:	
	1/2" -40 CFM	MFP-040-342
	1/2" -50 CFM	MFP-050-342
	3/4" -60 CFM	MFP-060-362
	1" -70 CFM	MFP-070-382
	1" -100 CFM	MFP-110-382
	1-1/4" -220 CFM	MFP-220-3A2

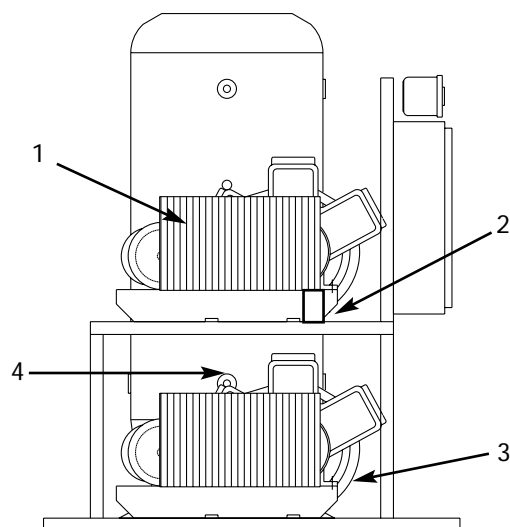
See Filter System Manual for details and replacement elements.



## Aftercooler/Drain

Ref. No.	Description	Part Number
1	Aftercooler:	
	5 HP	ACO700015
	7-1/2 -10 HP	ACO700020
	15 HP	ACO700025
2	Drain Trap:	
	5 - 15 HP	Consult factory for number
3	Piping Braided Flex:	Consult factory for size and length.
	5 HP - 1/2 in.	
	7-1/2 HP - 1/2 in.	
	10 HP - 3/4 in.	
	15 HP - 3/4 in.	
4	Temperature Switches	
	400° N/O Switch	

Left-End View





## Oilless Reciprocating Air Compressor Pumps

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.

### Descriptions

#### GENERAL

Powerex utilizes cutting-edge compressor technology to provide the most advanced oilless reciprocating air compressor in the industry. The Powerex reciprocating compressor is available in single and two stage models. Continuously lubricated, sealed bearings provide oil-free compressed air and long compressor life. The onboard fan, finned flywheel and temperature reducing composite piston create lower operating temperatures.

#### DRY TYPE INLET FILTER

The inlet filter on the oilless compressor assures 99% of particulate free air, down to 10 micron, is admitted to the unit. Change every 2500 hours or more often in dirty locations (See Figure 5).

#### PISTON AND PISTON RINGS

The Powerex oilless reciprocating compressor pistons are made of a high-strength, self-lubricating composite using the most advanced technology available. These heat reducing pistons eliminate the effect of excessive grease leakage at the wrist pin bearing.

Teflon® rings reduce wear and provide self lubrication. Piston rings should be replaced every 10,000 hours of operation (See Figure 12).

#### BEARING REGREASE

The wrist pin bearings of the OPS and OPT oilless compressors are needle bearings protected by two outer lip seals. This needle bearing becomes impacted and requires regreasing at 5,000 hours (See Figure 15).

#### BEARING SEALS

The wrist pin bearing lip seals prevent the lubricating grease from leaking from the bearing area. The two lip seals on each connecting rod require replacement every 10,000 hours (See Figure 16-22 or page 9).

### Installation

#### 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 ambient temperature is higher than 105° F or where humidity is high.

### **⚠ DANGER**

#### **Breathable Air Warning**

This compressor/pump is NOT equipped and should NOT be used "as is" to supply breathing quality air. For any application of air for human consumption, you must fit the compressor/pump with suitable in-line safety and alarm equipment. This additional equipment is necessary to properly filter and purify the air to meet minimal specifications for Grade D breathing as described in Compressed Gas Association Commodity Specification G 7.1 - 1966, OSHA 29 CFR 1910. 134, and/or Canadian Standards Associations (CSA).

#### **DISCLAIMER OF WARRANTIES**

In the event the compressor/pump is used for the purpose of breathing air application and proper in-line safety and alarm equipment is not simultaneously used, existing warranties are void, and Powerex disclaims any liability whatsoever for any loss, personal injury or damage.

### Specifications

Model	HP	Max. PSIG	SCFM @ 100 PSIG	RPM	No. of Cyl.	Bore	Stroke	Flywheel O.D.	Drive	Weight (lbs.)
OPS 010	1	145	3.6	625	1	2.56	2.56	11.2	1 GR-A	28
	1.5		5.3	885						
OPS 030	2	145	6.6	845	2	2.56	2.36	13.8	1 GR-B	53
	3		10.1	1115						
OPT 050	5	145	17.2	860	2	4.31 x 2.95	3.35	16.9	2 GR-B	110
OPT 100	7.5	145	27.5	855	3	3.54 x 2.95	3.35	18.3	2 GR-B	165
	10		35.0	1090						
OPT 150	15	145	47.0	1140	3	4.13 x 2.95	3.35	19.6	2 GR-B	170

# Oilless Reciprocating Air Compressor Pumps

4. Clearance must allow for safe, effective inspection and maintenance.

## Minimum Clearances

Above	24"
Drive belt side	12"
Other sides	20"

5. If necessary, use metal shims or leveling pads to level the compressor. Never use wood to shim the compressor.

## 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.
3. Never locate the compressor where hot exhaust air from other heat generating units may be pulled into the unit.

## WIRING

Refer to the general safety guidelines manual. 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 safety guidelines 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. Make

sure the flexible hose is rated for proper pressure and temperature before installing.

## SAFETY VALVES

Tank mounted compressors are shipped from the factory with safety valves installed in the tank manifold. The flow capacity of the safety valve is equal to or greater than the capacity of the compressor.

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

## HOURLMETER

The hourmeter on the oilless compressor indicates the actual number of hours the unit has been in operation. The hourmeter is also used to determine maintenance and service timing.

**An hourmeter must be installed with every oilless compressor.**

## CONDENSATE DRAIN VALVE

A condensate drain valve must be installed on any tank to allow removal of the liquid which will collect during compressor operation.

## NOTICE

*Drain liquid from tank daily.*

## Operation

Powerex oilless single stage compressors operate at a maximum pressure of 125 PSIG. Two stage compressors operate at a maximum of 145 PSIG and are equipped for continuous run operation. Compressor RPM's are established by Powerex based on horsepower and operating pressure.

## BEFORE START UP

1. Make sure all safety warnings, labels and instructions have been read and understood before continuing.
2. Remove any shipping materials, brackets, etc.
3. Confirm that the electric power source and ground have been firmly connected.
4. Be sure all pressure connections are tight.
5. Check to be certain all safety relief valves, etc., are correctly installed.
6. Check that all fuses, circuit breakers, etc., are the proper size.
7. Make sure the inlet filter is properly installed.
8. Confirm that the drain valve is closed.
9. Visually check the rotation of the compressor pump. If the rotation is incorrect, have a qualified electrician correct the motor wiring.

## START-UP AND OPERATION

1. Follow all the procedures under "Before start-up" before attempting operation of the compressor.
2. Switch the electric source breaker on.
3. Open the tank discharge valve completely.
4. Check that the compressor operates without excessive vibration, unusual noises or leaks.
5. Close the discharge valve completely.
6. Check the discharge pressure. Also make sure the air pressure rises to the designated pressure setting by checking the discharge pressure gauge.
7. 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.

Switch the breaker OFF if the compressor is not to be used for a long period of time.

## NOTICE

*These units are equipped with head unloaders for continuous run operation.*

## Oilless Reciprocating Air Compressor Pumps

### Dimensions (inches)

Model No.	HP	A	B	C	D	E	F	G (Diameter)	H (O.D. Flywheel)
OPS 010	1 - 1½	6.7	3.2	11.7	16.2	7.5	4.2	.38	Ø11.2 Ax1
OPS 030	2 - 3	8.3	3.7	13.4	17.8	18.9	6.4	.43	Ø13.8 Bx1
OPT 050	5	11.4	5.3	18.3	21.9	25.9	7.9	.43	Ø16.9 Bx2
OPT 100	7½ - 10	12.2	6.3	20.0	21.6	29.7	8.4	.55	Ø18.3 Bx2
OPT 150	15	12.2	6.3	20.0	21.6	29.7	8.4	.55	Ø19.6 Bx2

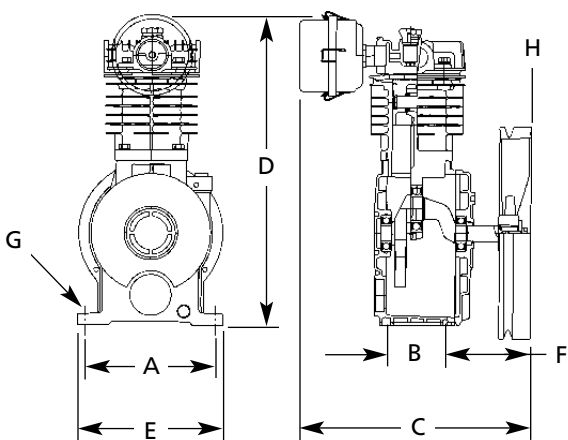


Figure 1 - Model OPS 010

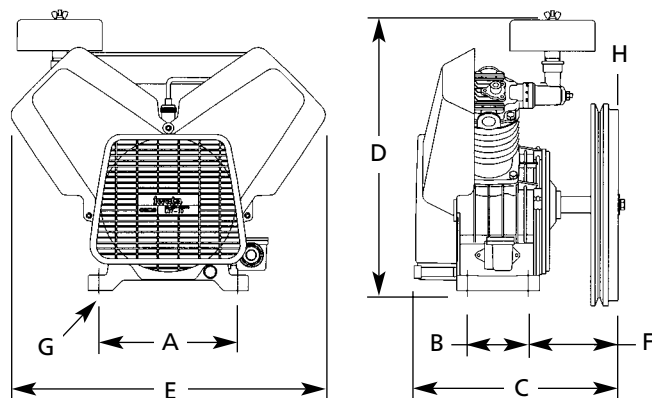


Figure 2 - Model OPS 030

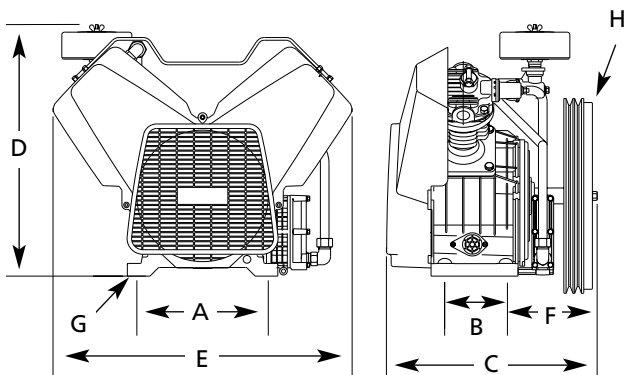


Figure 3 - Model OPT050

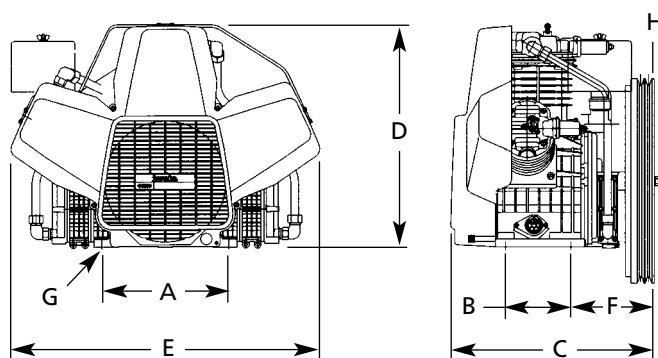


Figure 4 - Models OPT 100 and OPT 150

# Oilless Reciprocating Air Compressor Pumps

## Maintenance Schedule

Item	Action needed	500	2500	Operating Hours				Remarks
				5000	10,000	15,000	20,000	
Tank	Drain moisture	Daily						Drain tank daily
Inlet Air Filter	Replace	●	▲	(Every 2,500 hrs or less)				
Blower Fan	Clean			●	●	●	●	
Fan Duct	Clean			●	●	●	●	
Compressor Fins	Clean		●	(Every 2,500 hrs or less)				
Bearings	Replace				●		▲	
Compression Rings	Replace			●	▲	●	▲	
Wrist Pin Bearing	Regrease	*Note 4		▲	▲	▲	▲	
Piston Set	Replace				▲		▲	
Cylinder	Inspect			●	●	●	●	
Unloader Set	Replace			●	▲	●	▲	
Gasket Set	Replace				▲		▲	
Bearing Seal Wrist Pin	Replace				▲		▲	
V-belt	Inspect, replace	*Note 3	●	▲	▲	▲	▲	
Pressure Switch	Confirm operation				●		●	
Magnetic Starter	Inspect				●		●	Replace if contact points deteriorated
Safety Valve	Confirm operation		●	(Every 2,500 hrs or less)				
Pressure Gauge	Inspect		●	(Every 2,500 hrs or less)				
●	Inspect							
▲	Replace							

### NOTES:

1. Inspect and perform maintenance periodically according to maintenance schedule.
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.
3. The tension of the V-belt should be adjusted during the initial stage (500H) and inspected every 2,500 hours afterwards. Proper belt tension for 1 to 3 HP units is 2-3 lbs./1.5" deflection; for 5 to 15 HP units, 4-6 lbs./1.5" deflection.
4. See page 8.

## Air Filter Replacement

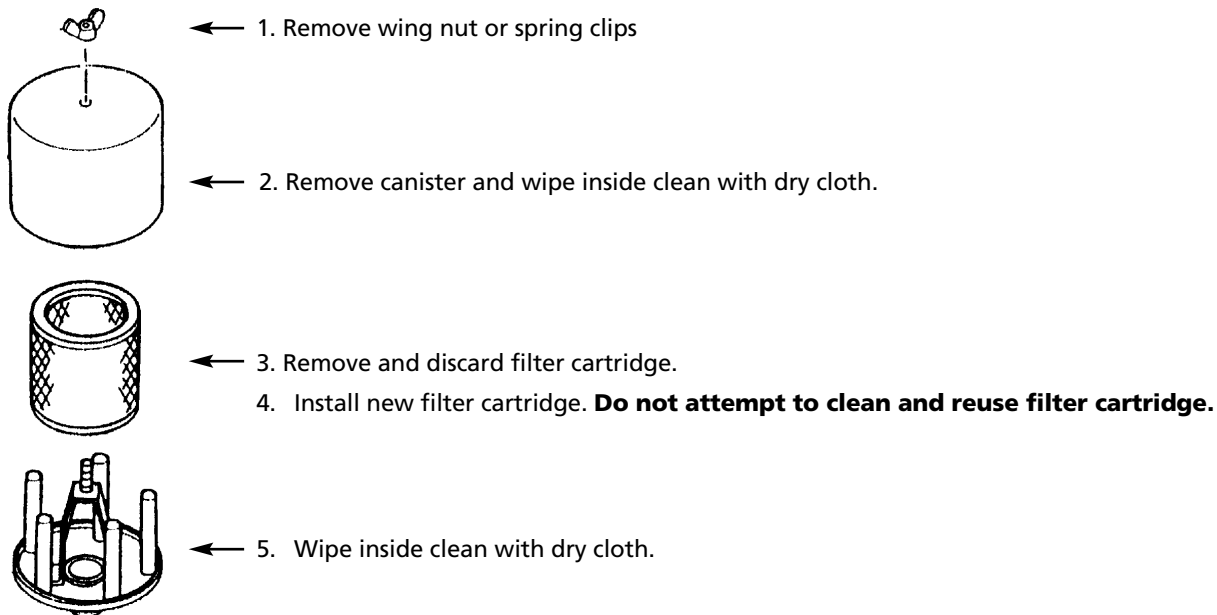


Figure 5 - Air Filter Replacement

## Oilless Reciprocating Air Compressor Pumps

### Valve Inspection/ Replacement (Inspect Every 5,000 Hours)

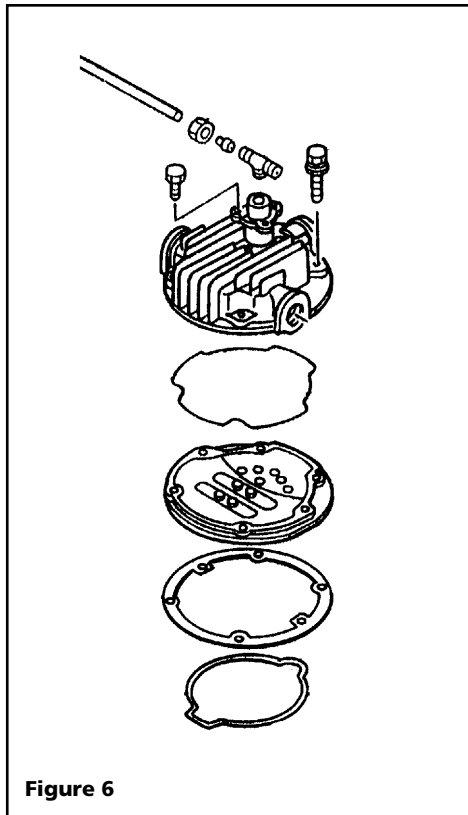


Figure 6

#### INSPECT VALVE SET

1. Remove head bolts from cylinder head. Head bolts for some models are used also as cylinder bolts, which penetrates crankcase (See Figure 7).
2. Remove cylinder head and valve set. If it is difficult to remove by hand, insert screwdriver between cylinder and valve set and remove.

#### INSPECTION AND MAINTENANCE

1. Check if exhaust valve (A) sticks to seat or is damaged (See Figure 8).
2. Check if there is breakage, gouge or damage to appearance of intake valve (B).
3. Lift intake valve by 10 mm and check if there is peeling and wear on coating surface of valve spacer (C).

#### CAUTION

*Lifting intake valve too much can cause damage to intake valve.*

4. Replace with intake valve if valve plate and valve spacer are worn or wear is over 0.5 mm in depth. If exhaust valve rises upwards, clean seat surface if foreign matter sticks.
5. Clean the whole valve set taking care not to damage seat surface and remove dust.
6. If viton seals (upper and lower) reach inspection time, replace them. Even if its not time to inspect, be sure to replace if they do not protrude from groove for seal or seal has hardened or been damaged.
7. Be sure to replace plastic seat in cylinder.
8. Fit valve set while paying attention to black plastic seat of intake valve fitted to cylinder (so that you do not drop seat or insert tip of valve under seat).
9. Fit cylinder cover and tighten fitting bolt with designated torque.

#### NOTES:

- When using valve set again, replace upper and lower viton seals.
- When replacing valve set, replace with upper and lower viton seals (valve set with packing set). You cannot reuse disassembled valve set.

We are not responsible for any problems caused by reuse of disassembled valve set.

#### REASSEMBLY

Assemble in reverse order of disassembling. Tighten each section with designated tightening torque (See Chart on page 6).

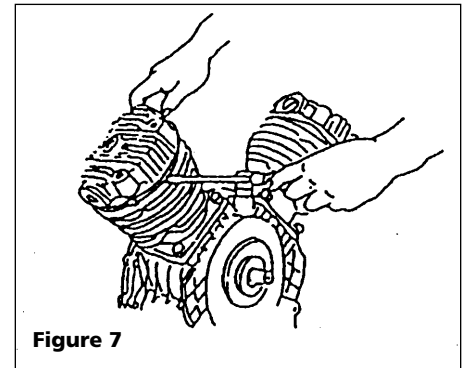


Figure 7

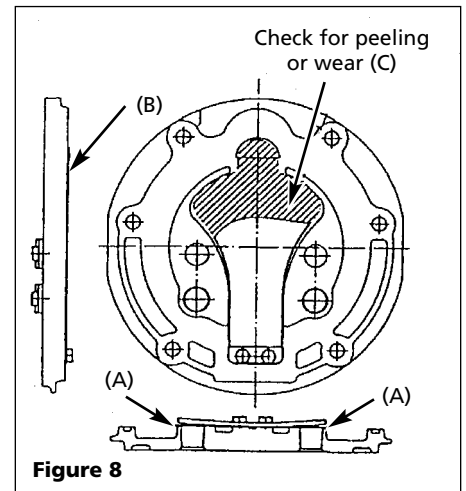


Figure 8

# Oilless Reciprocating Air Compressor Pumps

## Cylinder Inspection/Replacement

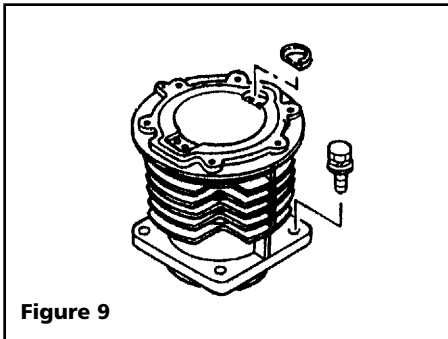


Figure 9

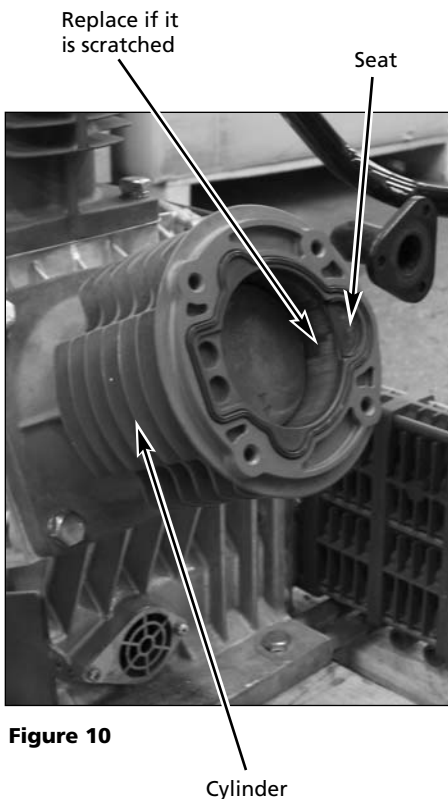


Figure 10

1. Remove cylinder head and valve set. Pay attention not to lose semicircular (black plastic) seat inserted at top surface of cylinder.

### INSPECTION

1. Surface treated layer is worn and metal is exposed. Replace worn piston and piston ring.
2. Scuffing (damage) due to foreign matter. Replace if it is swollen by scuffing the aluminum cylinder.
3. Replace if several vertical scratches are side by side at a narrow distance.

**NOTE:** Blackish streaks you can feel with your nail or finger are not damage but sliding marks of piston and piston ring. You do not need to replace the piston set or cylinder even if there are several marks on the whole diameter of the cylinder.

### REASSEMBLY

1. Assemble in reverse order of disassembling cylinder.
2. Direction of cylinder is set so that semicircular spot facing, to which seat (black plastic) is inserted, faces toward flywheel side.
3. Tighten cylinder bolt with designated torque (refer to chart below).

## Cylinder Bolt Torque

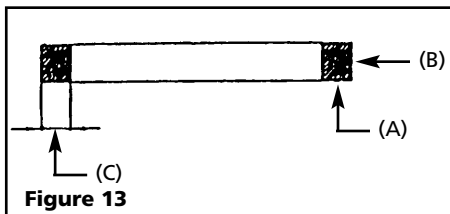
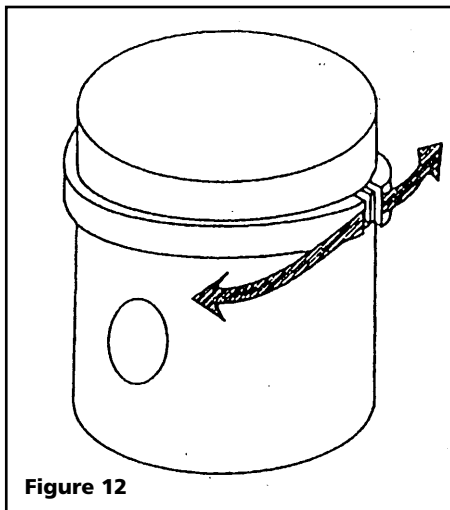
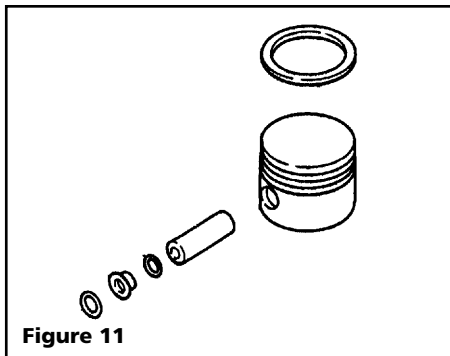
OPS010 OPS030	OPT050, OPT150 OPT100
156 in. lb.	295 in. lb.

## Head Bolt Torque

OPS010, OPS030, OPT050, OPT100, OPT150
156 in. lb.

## Oilless Reciprocating Air Compressor Pumps

### INSPECT PISTON AND PISTON RING (INSPECT EVERY 5,000 HOURS)



1. Remove cylinder head and cylinder.
2. Do not use tool to remove the ring.

**NOTE:** Expanding ring too much and deforming can cause wear and leakage. (See Figure 12). Mark upper surface (not lower surface) of removed ring for easy distinction.

3. Inspect lower surface (A) and outer side surface (B) of ring (See Figure 13). Measure thickness (C) of ring with calipers. Replace if foreign matter enters (A, B) or deep damage is found or (C) dimension is less than 2.5 mm at any point around the rings circumference.

**NOTE:** Clean the whole ring and ring groove with soft clean cloth.

#### **CAUTION**

*Ring and piston dust build up in the ring groove can cause knocking. This is sometimes mistaken for bad valve or bearing.*

**REASSEMBLE:** Pay attention to the fit of the piston and wrist pin fit. There should be no axial play or looseness in the wrist pin area.

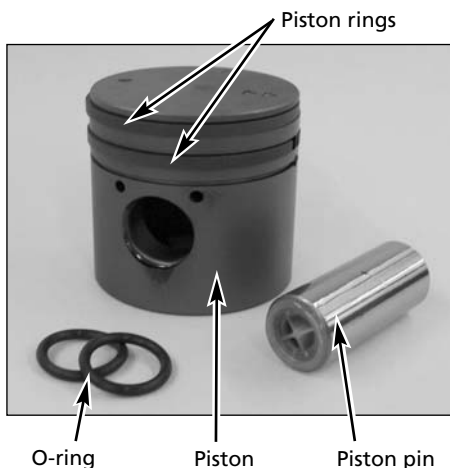
**NOTE:** Do not separate piston from connecting rod when inspecting piston or ring. If you remove piston from connecting rod, you may damage oil seal of connecting rod and needle bearing.

### PISTON REPLACEMENT

1. Inspect for appearance if there is deep damage or crack on top of piston or at pin boss.
2. Remove piston ring and inspect for breakage or droop of ring land.
3. Remove o-rings on both sides of piston pin.
4. Push piston pin to one side.


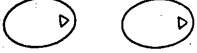
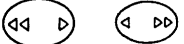


**NOTE:** Install bearing retention sleeve in grease kit/piston set. The retention sleeve is to prevent the needle bearing from falling out of the bearing area. On the HP cylinder only.

5. Remove piston pin.



# Oilless Reciprocating Air Compressor Pumps

## PISTON ORIENTATION CHART FOR OILLESS OPS/OPT SERIES

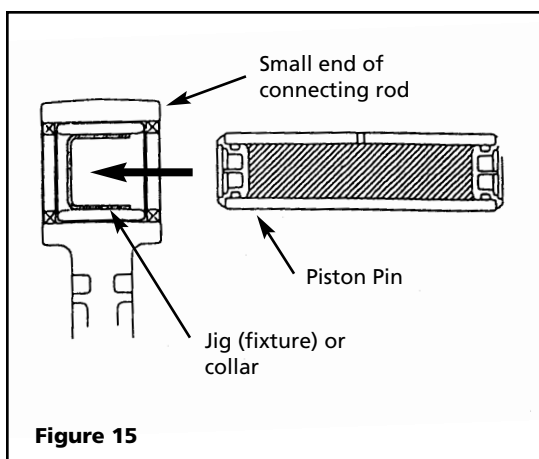
Pump Compressor Model	Bore	No. Cylinders	No. of Piston Rings per Piston	Mark on Top of Piston
OPS010	65 mm	1	1	<p>Flywheel side</p>  <p>Fan side</p>
OPS030	65 mm	1	1	<p>Flywheel side</p>  <p>Fan side</p>
OPT050	LP 105 mm	1	1	<p>Flywheel side</p>  <p>Fan side</p>
	HP 75 mm	1	2	
OPT100	LP 90 mm	2	1	<p>Flywheel side</p>  <p>Fan side</p>
	HP 75 mm	1	2	
OPT150	LP105	2	1	<p>Flywheel side</p>  <p>Fan side</p>
	HP75	1	2	

**NOTE:** The orientation in which the pistons are reinstalled is very important. Improper placement will cause premature wear of the ring and piston.

**NOTE:** When removing HP piston on two-stage pumps, remove piston and then insert retention sleeve having the same diameter of piston pin or piston to small end of connecting rod. If not, you may drop or lose needles from the bearing, as HP needle bearing does not have support.

**CAUTION** Fit piston by referring to  $\Delta$  marking on the top of the piston surface and list on above chart.

**NOTE:** Gradually insert piston pin while turning it. Inserting with force can damage oil seal of needle bearing.



Powerex Oilless  
Reciprocating  
Grease  
6 Grams  
#IP634500AV



**\* FOR LOW PRESSURE PISTON ONLY**

## Oilless Reciprocating Air Compressor Pumps

### WRIST PIN BEARING SEAL REPLACEMENT (REPLACE EVERY 10,000 HOURS)

#### Replacing Oil Seal

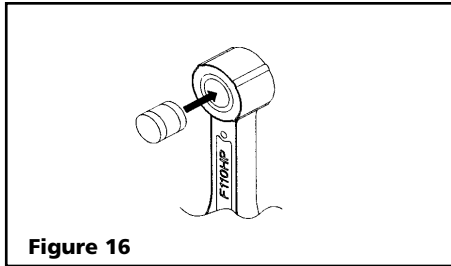


Figure 16

1. Insert the plastic retention sleeve which protects the needle bearing from dropping out.

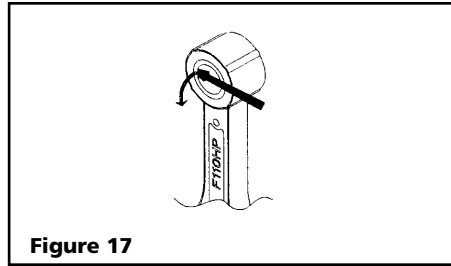


Figure 17

2. Remove the two oil seals by using a screwdriver.

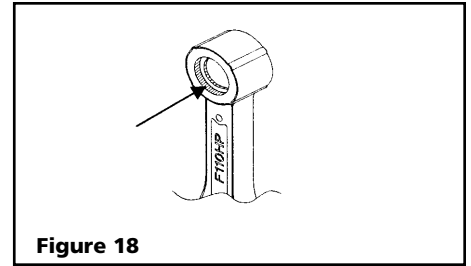


Figure 18

3. Clean both surfaces where oil seals are removed.

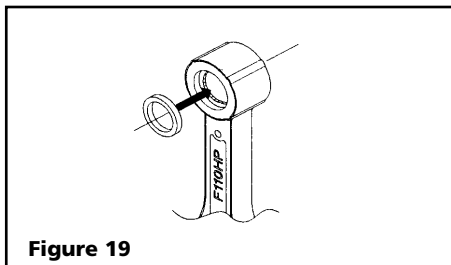


Figure 19

4. Push the oil seal into the small bearing end horizontally.

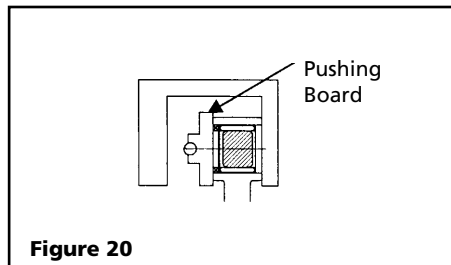


Figure 20

5. Press the oil seal with a C-clamp into the small bearing end.

6. Repeat on opposite side.

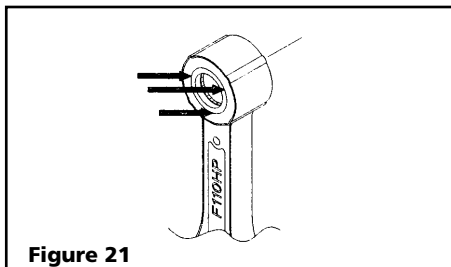


Figure 21

7. Apply a small volume of adhesive at several points.

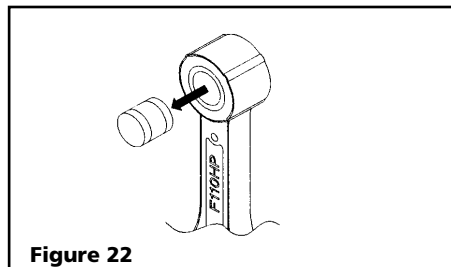


Figure 22

8. Remove the retention sleeve inserted at the first step.

**NOTE:** You may use a "C" clamp or two large washers and bolt with nut through the bearing. Then apply pressure to install the seals. This makes it easy to replace the seals without removing the crankshaft.

## Oilless Reciprocating Air Compressor Pumps

### Inspect Connecting Rod, Wrist Pin and Crankshaft

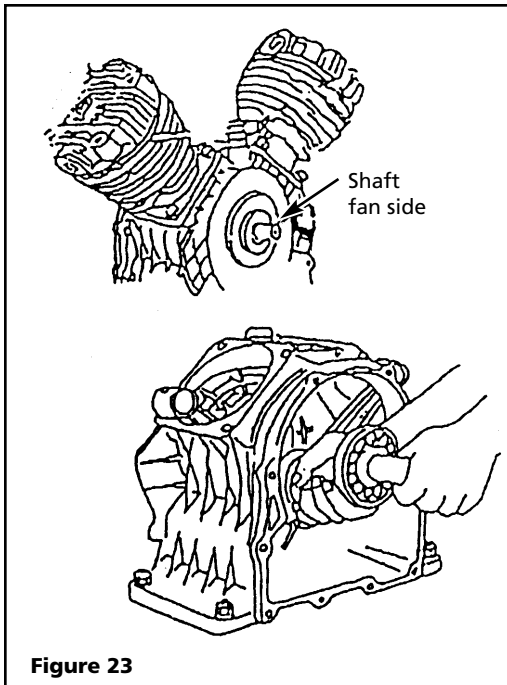


Figure 23

#### REPLACE CONNECTING ROD SET AND CRANKSHAFT AS A SET

Pressing bearing into connecting rod and connecting rod set into crankshaft requires special fixtures. Without such fixtures, the squareness and parallelism of each part will be affected.

#### DISASSEMBLE AND REMOVE CYLINDER COVER, CYLINDER AND PISTON IN THIS ORDER

1. Bearing at large end of connecting rod: Replace if it does not move or feels stuck holding and moving small end of connecting rod.
2. Bearing of crankshaft: Replace if you feel some resistance when slowly turning shaft.
3. Bearing at wrist pin: Check for breakage of needle bearing and damage of cage.

#### DISASSEMBLING: CRANKSHAFT SET

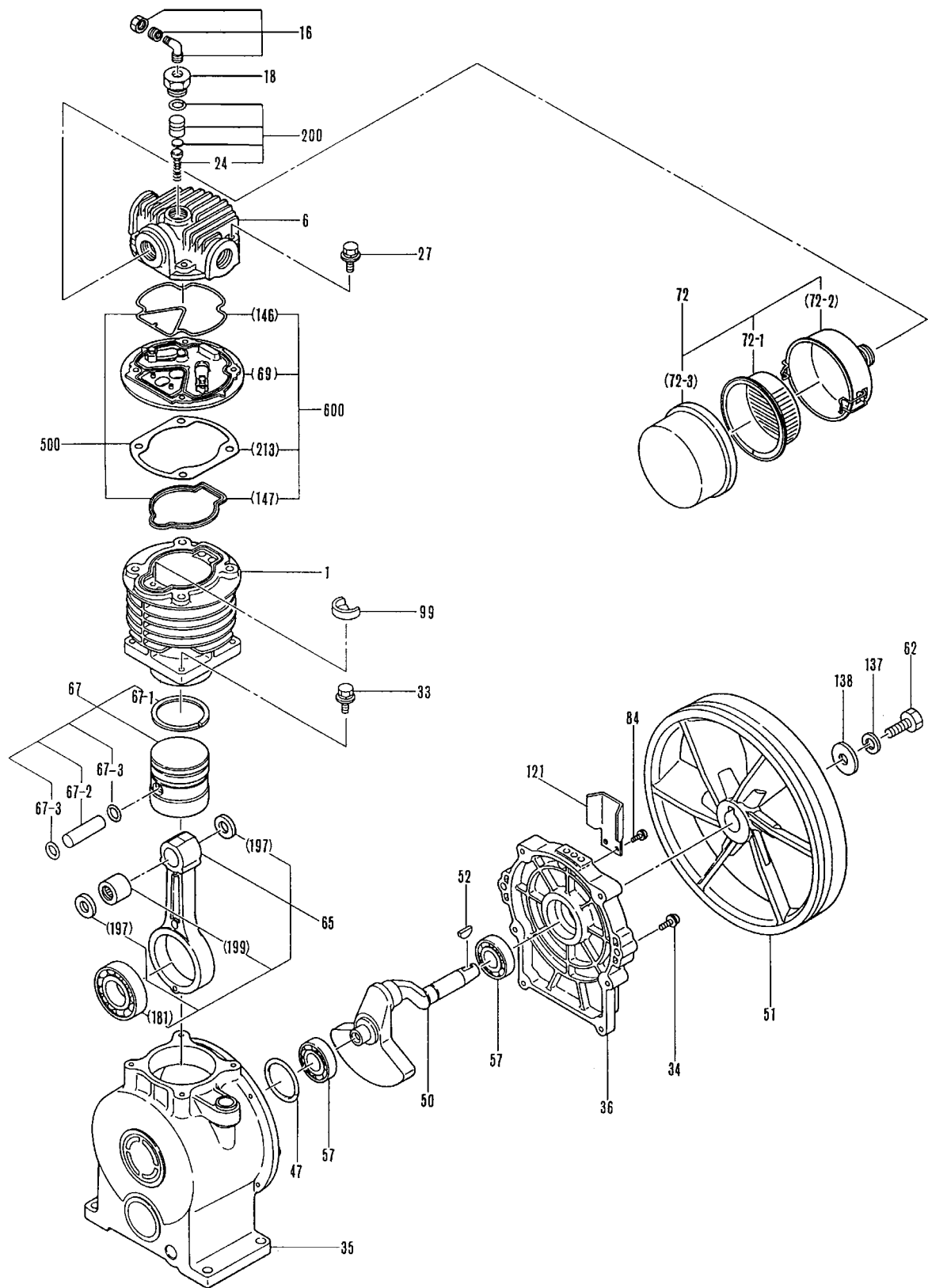
1. Disassemble cylinder head, cylinder and piston.
2. Remove bolts from bearing cap and remove bearing cap.
3. Lightly tap shaft fan side with non-shock hammer (avoid metal hammer) and remove crankshaft. After bearing leaves the crankcase bore, pull connecting rod out as illustrated and remove it from crankcase (See Figure 23).

#### REASSEMBLY

1. Heat bearing housing of crankcase with industrial dryer or simple burner just the same as disassembling.
2. Insert crankshaft set into crankcase in reverse order of disassembling and insert bearing into housing.
3. Tap shaft from pulley side with non-shock hammer and insert it inwards.
4. Fit bearing case. Grease bearing housing of bearing case.

[illegible]

**Oilless Reciprocating Air Compressor Pumps**



**Figure 24 - Replacement Parts Illustration for OPS010**

## Oilless Reciprocating Air Compressor Pumps

Ref. No.	Description	Part Number for model OPS010	Qty
1	Cylinder	91000560	1
6	Cylinder head	91002630	1
16	Elbow (Unloader)	06800261	1
18	Unloader cap	01052041	1
24	Spring guide set	91932560	1
27	Bolt (cylinder head)	06137835	4
33	Bolt (cylinder)	06137825	8
34	Bolt (bearing cap)	06137620	8
35	Crankcase	91100630	1
36	Bearing cap	91101630	1
47	O-ring	01146550	1
50	Crank shaft	▲	1
51	Flywheel pulley	91201551	1
52	Parallel pin	01271550	1
57	Ball bearing (bearing cap)	▲	2
62	Hex blot (fan, flywheel)	06992857	1
65	Connecting rod w/bearings	▲	1
67	Piston set	91903640	1
67-1	Piston ring	91237640	1
72	Intake filter set	91906630	1
72-1	Intake filter	91348550	1
84	Screw (dust cover)	06131508	2
99	Seat (intake valve)	01301560	1
121	Dust cover	91383630	1
197	Lip seals wrist pin	97191000	2
200	Unloader set	91931560	1
500	Gasket set	91936640	1
600	Valve set with gasket	91933640	1
▲	Crank shaft set (Includes 50, 57 and 65)	91918630	1

## Oilless Reciprocating Air Compressor Pumps

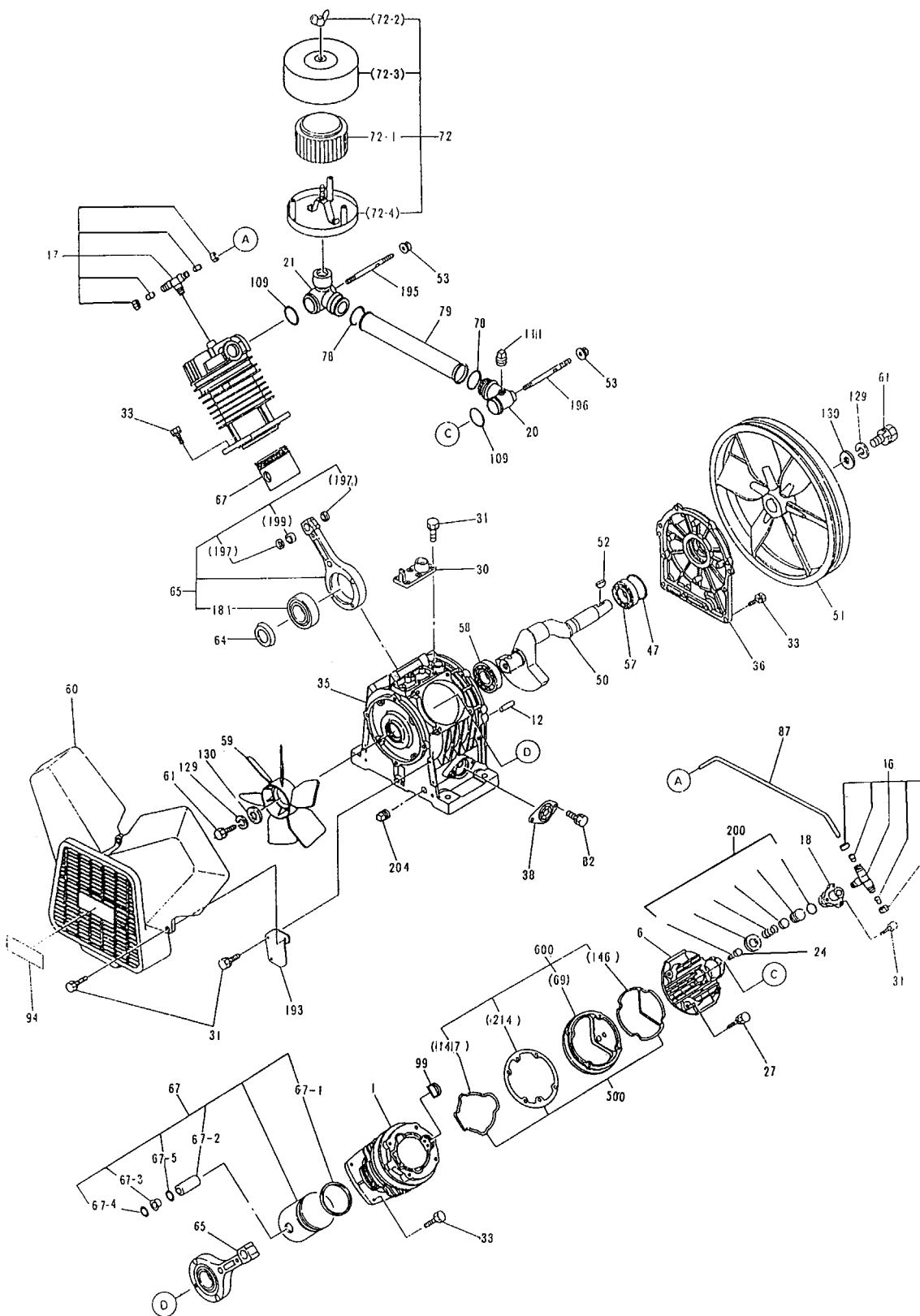
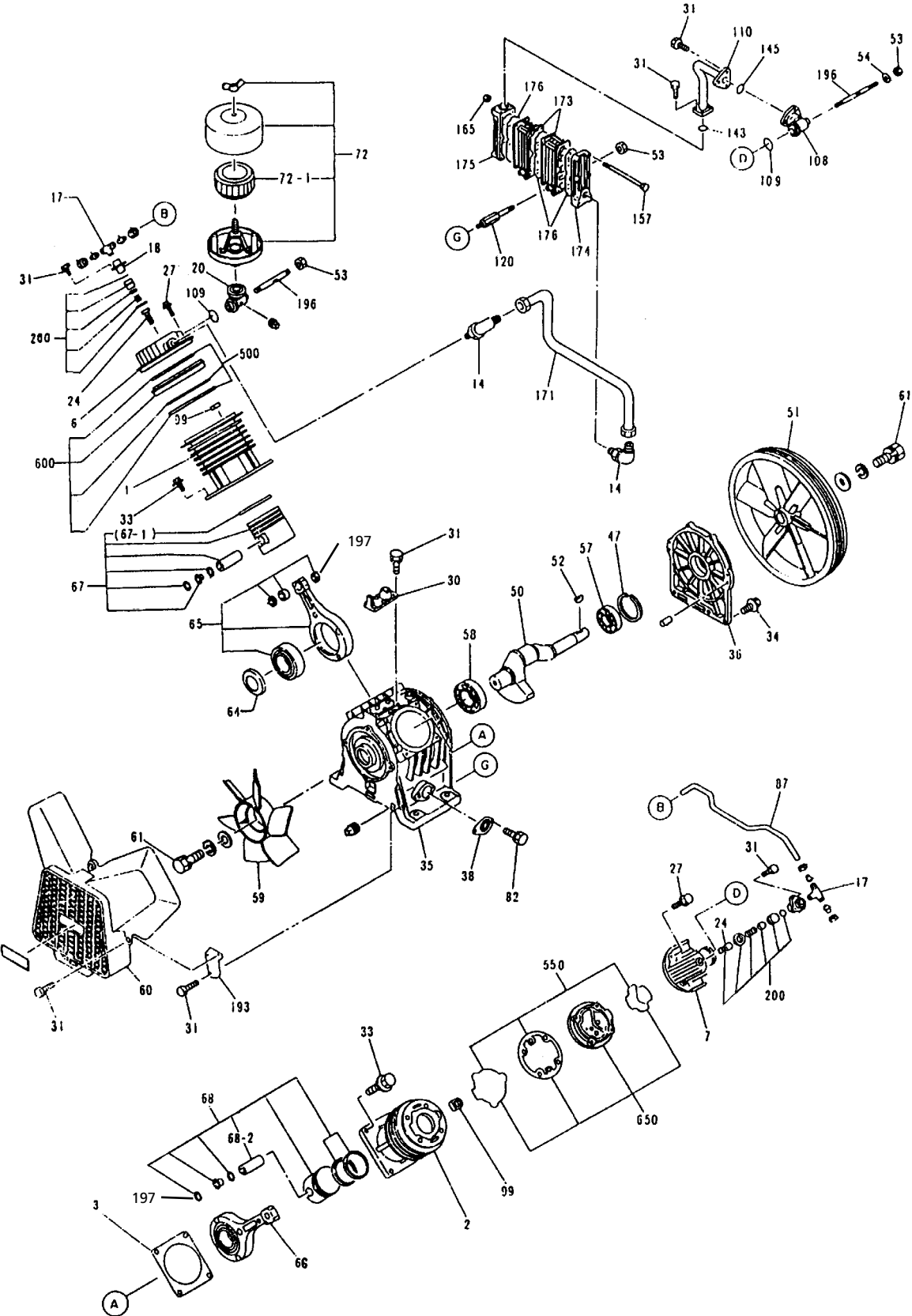


Figure 25 - Replacement Parts Illustration for OPS030

## Oilless Reciprocating Air Compressor Pumps

Ref. No.	Description	Part Number for model OPS030	Qty
1	Cylinder	91000560	2
6	Cylinder head	91002640	2
16	Elbow (unloader)	06800261	1
17	Tee union assembly	06803261	1
20	Intake joint (1)	91345561	1
21	Intake joint (2)	91346571	1
24	Spring guide set	91932560	2
27	Bolt (cylinder head)	06137835	8
30	Flange (breather)	91176660	1
31	Bolt	06995831	20
33	Bolt (cylinder)	06137825	8
34	Bolt (bearing cap)	06137620	8
35	Crank case	91100640	1
36	Bearing cap	91101560	1
38	Filter (crank case)	91348690	1
47	O-ring	01146560	1
50	Crank shaft	▲	1
51	Flywheel pulley	91202560	1
52	Woodruff key	06600013	1
53	Hex nut	06994016	2
57	Ball bearing (bearing cap)	▲	1
58	Ball bearing (crank case)	▲	1
59	Fan	91220560	1
60	Cover (fan)	91134560	1
61	Hex bolt (fan, flywheel)	06992857	2
64	Liner (connecting rod)	01480640	1
65	Connecting rod w/bearing	▲	2
67	Piston set	91903640	2
67-1	Piston ring	91237640	2
72	Intake filter set	91907570	1
72-1	Intake filter	91353660	1
78	O-ring	06630032	2
79	Intake pipe	91407560	1
82	Screw (filter)	06131508	2
87	Tube	01909400	1
99	Seat (intake valve)	01301560	2
109	O-ring (intake joint)	06639906	2
193	Fan guard	91135560	2
195	Bolt (intake joint 1)	01095570	1
196	Bolt (intake joint 2)	01095560	1
197	Lip seals wrist pin	97191000	4
200	Unloader set	91931560	2
500	Gasket set	91936640	2
600	Valve set with gasket	91933640	2
▲	Crankshaft set (includes part #'s 50, 57, 58 and 65)	91918640	1



## Oilless Reciprocating Air Compressor Pumps

Ref. No.	Description	Part Number for model OPT050	Qty	Ref. No.	Description	Part Number for model OPT050	Qty
1	Cylinder (LP)	91000680	1	145	O-Ring (Connecting Pipe)	06632835	1
2	Cylinder (HP)	91947680	1	157	Hex. Bolt (Intercooler)	06996460	6
3	Liner	91177680	2	165	Nut (Intercooler)	06994015	6
6	Cylinder Head (LP)	91002691	1	171	Connecting Pipe Set	91914661	1
7	Cylinder Head (HP)	91002680	1	173	Intercooler	91404690	2
14	Elbow (Intercooler)	01415690	2	174	Intercooler Flange (1)	91405690	1
17	Tee Union Ass'y	06803261	2	175	Intercooler Flange (2)	91406690	1
18	Unloader Cap	01052451	2	176	Gasket (Intercooler)	01432690	3
20	Intake Joint	91345660	1	193	Fan Guard	91144660	2
24	Spring Guide Set	91949694	2	196	Bolt (Intake Joint)	01344690	2
27	Bolt (Cylinder Head)	06137850	10	197	Lip seals wrist pin	97191000	4
30	Flange (Breather)	91176660	1	200	Unloader Set	91932681	2
31	Bolt (Unloader Cap)	06995831	26	500	Gasket Set (LP)	91936680	1
33	Bolt (Cylinder)	06137130	8	550	Gasket Set (HP)	91937681	1
34	Bolt (Bearing Cap)	06137830	10	600	Valve Set with Gasket (LP)	91933681	1
35	Crank Case	91100660	1	650	Valve Set with Gasket (HP)	91934683	1
36	Bearing Cap	91101580	1	▲	Crank Shaft Set (50, 57, 58, 65, 66)	91918660	1
38	Filter (Crank Case)	91348690	1				
47	O-ring	01146430	1				
50	Crank Shaft	▲	1				
51	Flywheel Pulley	91201660	1				
52	Woodruff Key	06600016	1				
53	Hex Nut	06994016	4				
54	Washer	06991512	1				
57	Ball Bearing (Brg. Cap)	▲	1				
58	Ball Bearing (Crank Case)	▲	1				
59	Fan	91220690	1				
60	Cover (Fan)	91134660	1				
61	Hex Bolt (Fan, Flywheel)	06992817	2				
64	Liner (Connecting Rod)	91472690	1				
65	Connecting Rod Set	▲	1				
66	Connecting Rod Set	▲	1				
67	Piston Set (LP)	91903680	1				
67-1	Piston Ring (LP)	91236681	1				
68	Piston Set (HP)	91910670	1				
68-1	Piston Ring (HP)	91930680	2				
68-2	Wrist Pin (Prepacked)	91924680	1				
72	Intake Filter Set	91907660	1				
72-1	Intake Filter	91353660	1				
82	Screw (Filter)	06235304	2				
87	Unloader Tube	91420660	1				
99	Seat (Intake Valve)	01301691	2				
108	Intercooler Flange	91403690	1				
109	O-ring (Intake joint)	06639906	2				
110	Connecting Pipe	91400660	1				
120	Bolt (Intercooler)	01435692	2				
143	O-Ring (Connecting Pipe)	06632825	1				

## Oilless Reciprocating Air Compressor Pumps

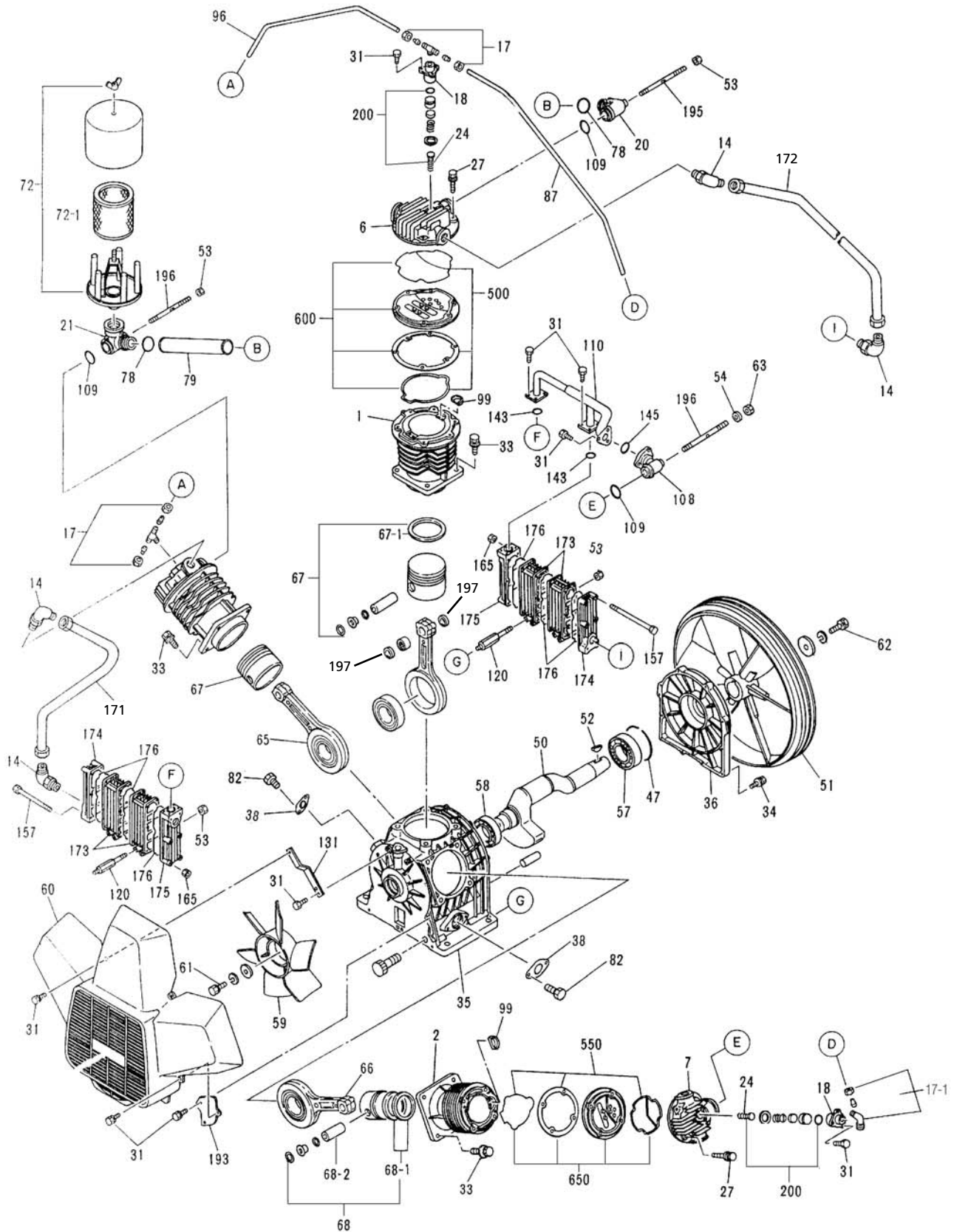


Figure 27 - Replacement Parts Illustration for OPT100 and OPT150

## Oilless Reciprocating Air Compressor Pumps

Ref. No.	Description	Part Numbers For Models		Qty
		OPT100	OPT150	
1	Cylinder (LP)	91000670	91000680	2
2	Cylinder (HP)	91947680	91947680	1
6	Cylinder head (LP)	91002691	91002691	2
7	Cylinder head (HP)	91002680	91002680	1
14	Elbow (Intercooler)	01415690	01415690	4
17	Tee union assembly	IP010400AV	IP010400AV	2
17-1	Elbow union assembly	96800261	96800261	1
18	Unloader cap	01052451	01052451	3
20	Intake joint (1)	01345691	01345691	1
21	Intake joint (2)	01346690	01346690	1
24	Spring guide set	91949694	91949694	3
27	Bolt (Cylinder head)	06137850	06137850	16
31	Bolt (Unloader cap)	06995831	06995831	30
33	Bolt (Cylinder)	06137130	06137130	12
34	Bolt (Bearing cap)	06137830	06137830	10
35	Crank case	91100680	91100680	1
36	Bearing cap	91101690	91101690	1
38	Filter (Crank case)	91348690	91348690	1
47	O-ring (Bearing cap)	01146690	01146690	1
50	Crank shaft	▲	▲	1
51	Flywheel pulley	01201590	91201690	1
52	Woodruff key	06600016	06600016	1
53	Hex nut	06994016	06994016	6
54	Washer (Intercooler)	06991512	06991512	1
57	Ball bearing (Bearing cap)	▲	▲	1
58	Ball bearing (Crank case)	▲	▲	1
59	Fan	91220690	91220690	1
60	Fan cover	91134690	91134690	1
61	Hexagon bolt (Fan)	06992817	06992817	1
62	Hexagon bolt (Flywheel)	06992833	06992833	1
63	Hexagon nut (Intake joint)	06382086	06382086	1
65	Connecting rod (LP)	▲	▲	2
66	Connecting rod (HP)	▲	▲	1
67	Piston set (LP)	91903670	91903680	2
67-1	Piston ring (LP)	91236671	91236681	2
68	Piston set (HP)	91910670	91910670	1
68-1	Piston ring (HP)	91930680	91930680	2
68-2	Wrist pin set (prepacked)	91924680	91924680	1
72	Intake filter set	91907590	91907690	1
72-1	Intake filter	91353690	91353690	1
78	O-ring (Intake pipe)	06630032	06630032	2
79	Inlet pipe	01407690	01407690	1
82	Bolt (Crankcase filter)	06131508	06131508	4
87	Unloader tube	01420690	01420690	1
96	Unloader tube	01419600	01419600	1
99	Wear pad, valve	01301691	01301691	3
108	Intercooler Joint	91403690	91403690	1
109	O-ring ( Intercooler Joint )	06639906	06639906	3
110	Connecting Pipe	91402680	91402680	1
120	Bolt ( Intercooler )	01435692	01435692	4
131	Cover Bracket	01413690	01413690	2
143	O-ring ( Connecting Pipe )	06632825	06632825	2
145	O-ring ( Connecting Pipe )	06632835	06632835	1
157	Hex bolt ( Intercooler )	06996460	06996460	6
165	Nut ( Intercooler )	06994015	06994015	6
171	Connecting Pipe Set ( 1 )	01914590	01914690	1
172	Connecting Pipe Set ( 2 )	01915590	01915690	1
173	Intercooler	91404690	91404690	4
174	Intercooler Flange ( 1 )	91405690	91405690	2
175	Intercooler Flange ( 2 )	91406690	91406690	2
176	Gasket ( Intercooler )	01432690	01432690	6
193	Fan Guard	01135690	01135690	2
195	Bolt ( Intake Joint 1 )	01343690	01343690	1
196	Bolt ( Intake Joint 2 )	01344690	01344690	2
197	Lip seals wrist pin	97191000	97191000	6
200	Unloader Set	91932681	91932681	3
500	Gasket Set ( LP )	91936670	91936680	2
550	Gasket Set ( HP )	91937681	91937681	1
600	Valve Set with Gasket ( LP )	91934691	91933681	2
650	Valve Set with Gasket ( HP )	91934683	91934683	1
▲	Crank shaft set (Includes 50, 57, 58, 65 & 66)	91917680	91917680	1

### Powerex Limited Warranty

**POWEREX 3 YEAR / 10,000 HOUR EXTENDED PARTS LIMITED WARRANTY** - Powerex warrants each Compressor Pump or Scroll Air-End against defects in material or workmanship from the date of purchase for a period of **Three years or 10,000 hours**, whichever may occur first. This warranty applies to the exchange of part(s) of the compressor pump or air-end found to be defective by an Authorized Powerex Service Center.

**POWEREX 1 YEAR / 5,000 HOUR INLET TO OUTLET LIMITED WARRANTY** - Powerex warrants each Compressor Unit, System, Pump, or Air-End against defects in material or workmanship from the date of purchase for a period of **One Year or 5,000 Hours**, whichever may occur first. This warranty applies to the exchange of defective component part(s) and labor performed by an Authorized Powerex Service Center.

**Coverage.** The above mentioned warranty applies to Powerex manufactured units or systems only. Items listed in the operator's manual under routine maintenance are not covered by this or any other warranty. Failure to complete maintenance as stated in the maintenance schedule will void this warranty.

THERE IS NO OTHER EXPRESS WARRANTY. IMPLIED WARRANTIES, INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED TO ONE YEAR FROM THE DATE OF PURCHASE: AND TO THE EXTENT PERMITTED BY LAW, ANY AND ALL IMPLIED WARRANTIES ARE EXCLUDED. THIS IS THE EXCLUSIVE REMEDY AND LIABILITY FOR CONSEQUENTIAL DAMAGES UNDER ANY AND ALL WARRANTIES IS EXCLUDED TO THE EXTENT EXCLUSION IS PERMITTED BY LAW.

**Limitation of Liability.** To the extent allowable under applicable law, Powerex's liability for consequential and incidental damages is expressly disclaimed. 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 merchandise in this schedule, 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 merchandise 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 merchandise 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.