OPERATING, MAINTENANCE, PARTS MANUAL

COMPRESSOR MODELS

VHP400CMH
VHP500CMH
VHP550CMH
HP600CMH
XP650CMH

This manual contains important safety information.
Do not destroy this manual.
This manual must be available to the personnel who operate and maintain this machine.

Portable Power
P.O. Box 868
501 Sanford Ave
Mocksville, N.C. 27028
www.portablepower.irco.com

Manual 43212455 (11/03)
Revised (10-12)

Quality Policy

We will supply products and services that consistently meet the requirements of our customers and each other.

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SECTION 1 – SAFETY

General Information

Never operate unit without first observing all safety warnings and carefully reading the operation and maintenance manual shipped from the factory with this machine.

Ensure that the operator reads and understands the decals and consults the manuals before maintenance or operation.

Ensure that maintenance personnel are adequately trained, competent and have read the Maintenance Manuals.

Make sure that all protective covers are in place and that the canopy/doors are closed during operation.

The specification of this machine is such that the machine is not suitable for use in flammable gas risk areas. If such an application is required then all local regulations, codes of practice and site rules must be observed. To ensure that the machine can operate in a safe and reliable manner, additional equipment such as gas detection, exhaust spark arrestors, and intake (shut-off) valves may be required, dependant on local regulations or the degree of risk involved.

A weekly visual check must be made on all fasteners/fixing screws securing mechanical parts. In particular, safety-related parts such as coupling hitch, drawbar components, road-wheels, and lifting bail should be checked for total security.

All components which are loose, damaged or unserviceable, must be rectified without delay.

Air discharged from this machine may contain carbon monoxide or other contaminants which will cause serious injury or death. Do not breathe this air.

This machine produces loud noise with the doors open or service valve vented. Extended exposure to loud noise can cause hearing loss. Always wear hearing protection when doors are open or service valve is vented.

Never inspect or service unit without first disconnecting battery cable(s) to prevent accidental starting.

Do not use petroleum products (solvents or fuels) under high pressure as this can penetrate the skin and result in serious illness. wear eye protection while cleaning unit with compressed
air to prevent debris from injuring eye(s).

Rotating fan blade can cause serious injury. Do not operate without guard in place.

Use care to avoid contacting hot surfaces (engine exhaust manifold and piping, air receiver and air discharge piping, etc.).

Ether is an extremely volatile, highly inflammable gas. When it is specified as a starting aid, use sparingly.

DO NOT USE ETHER IF THE MACHINE HAS GLOW PLUGS OR INLET HEATER STARTING AIDS OR ENGINE DAMAGE WILL RESULT.

Compressed Air

Compressed air can be dangerous if incorrectly handled. Before doing any work on the unit, ensure that all pressure is vented from the system and that the machine cannot be started accidentally.

Ensure that the machine is operating at the rated pressure and that the rated pressure is known to all relevant personnel.

All air pressure equipment installed in or connected to the machine must have safe working pressure ratings of at least the machines safety valve setting.

If more than one compressor is connected to one common downstream plant, effective check valves and isolation valves must be fitted and controlled by work procedures, so that one machine cannot accidentally be pressurized/over pressurized by another.

Compressed air must not be used for a direct feed to any form of breathing apparatus or mask.

High Pressure Air can cause serious injury or death. Relieve pressure before removing filler plugs/caps, fittings or covers.

Air pressure can remain trapped in air supply line which can result in serious injury or death. Always carefully vent air supply line at tool or vent valve before performing any service.

The discharged air contains a very small percentage of compressor lubricating oil and care should be taken to ensure that downstream equipment is compatible.

If the discharged air is to be ultimately released into a confined space, adequate ventilation must be provided.

When using compressed air always use appropriate personal protective equipment.

All pressure containing parts, especially flexible hoses and their couplings, must be regularly inspected, be free from defects and be replaced according to the Manual instructions.

Avoid bodily contact with compressed air.

The safety valve located in the separator tank must be checked periodically for correct operation.

Whenever the machine is stopped, air will flow back into the compressor system from devices or systems downstream of the machine unless the service valve is closed. Install a check valve at the machine service valve to prevent reverse flow in the event of an unexpected shutdown when the service valve is open.

Disconnected air hoses whip and can cause serious injury or death. Always attach a safety flow restrictor to each hose at the source of supply or branch line in accordance with OSHA Regulation 29CFR Section 1926.302(b).

Never allow the unit to sit stopped with pressure in the receiver-separator system.

Materials

The following substances *may* be produced during the operation of this machine:
brake lining dust
engine exhaust fumes

AVOID INHALATION

Ensure that adequate ventilation of the cooling system and exhaust gases is maintained at all times.

The following substances are used in the manufacture of this machine and *may* be hazardous to health if used incorrectly:

- anti-freeze
- compressor lubricant engine lubricant
- preservative grease rust preventative diesel fuel
- battery electrolyte

AVOID INGESTION, SKIN CONTACT AND INHALATION OF FUMES.

Should compressor lubricant come into contact with the eyes, then irrigate with water for at least 5 minutes.

Should compressor lubricant come into contact with the skin, then wash off immediately.

Consult a physician if large amounts of compressor lubricant are ingested.
Consult a physician if compressor lubricant is inhaled.

Never give fluids or induce vomiting if the patient is unconscious or having convulsions.

Safety data sheets for compressor and engine lubricants should be obtained from the lubricant supplier.

Do NOT start or operate this machine in a confined area. Avoid breathing exhaust fumes when working on or near the machine.

This machine may include such materials as oil, diesel fuel, antifreeze, brake fluid, oil/air filters and batteries which may require proper disposal when performing maintenance and service tasks. Contact local authorities for proper disposal of these materials.

Battery

A battery contains sulfuric acid and can give off gases which are corrosive and potentially explosive. Avoid contact with skin, eyes and clothing. In case of contact, flush area immediately with water.

DO NOT ATTEMPT TO SLAVE START A FROZEN BATTERY SINCE THIS MAY CAUSE IT TO EXPLODE.

Exercise extreme caution when using booster battery. To jump battery, connect ends of one booster cable to the positive (+) terminal of each battery. Connect one end of other cable to the negative (-) terminal of the booster battery and other end to a ground connection away from dead battery (to avoid a spark occurring near any explosive gases that may be present). After starting unit, always disconnect cables in reverse order.

Radiator

Hot engine coolant and steam can cause injury. Ensure that the radiator filler cap is removed with due care and attention.

Do not remove the pressure cap from a HOT radiator. Allow radiator to cool down before removing pressure cap.

Transport

When Loading or transporting machines, ensure that the specified lifting and tie down points are used.

When loading or transporting machines, ensure that the towing vehicle, its size, weight, towing hitch and electrical supply are all suitable to provide safe and stable towing at speeds either, up to the legal maximum for the country in which it is being towed or, as specified for the machine model if lower than the legal maximum. Do not exceed gross vehicle weight rating.

Before towing the machine, ensure that:

- Tires and towing hitch are in a serviceable condition. the canopy is secure.
- All ancillary equipment is stored in a safe and secure manner.
- Brakes and lights are functioning correctly and meet necessary road traffic requirements.
- Break-away cables/safety chains are connected to the towing vehicle.

The machine must be towed in a level attitude in order to maintain correct handling, braking and lighting functions. This can be achieved by correct selection and adjustment of the vehicle towing hitch and, on variable height running gear, adjustment of the drawbar.

1. Make sure wheels, tires and tow bar connectors are in safe operating condition and tow bar is properly connected before towing.
2. When parking always use the handbrake and, if necessary, suitable wheel chocks.

Safety chains/connections and their adjustment where fitted:

Ensure that the breakaway cable is securely coupled to the trailer and also to a substantial point on the towing vehicle.

Ensure that the cable length is as short as possible, while still allowing enough slackness for the trailer to articulate without the handbrake being applied.

Loop the chains onto the towing vehicle using the towing vehicle hitch as an anchorage point, or any other point of similar strength. Ensure that the effective chain length is as short as possible while still allowing normal articulation of the trailer and effective operation of the breakaway cable.

IMPORTANT SAFETY INSTRUCTIONS

Look for these signs on machines shipped to markets in North America, which point out potential hazards to the safety of you and others. Read and understand thoroughly. Heed warnings and follow instructions. If you do not understand, inform you supervisor.

DANGER
(Red Background)

Indicates the presence of a hazard which WILL cause serious injury, death or property damage, if ignored.

WARNING
(Orange Background)

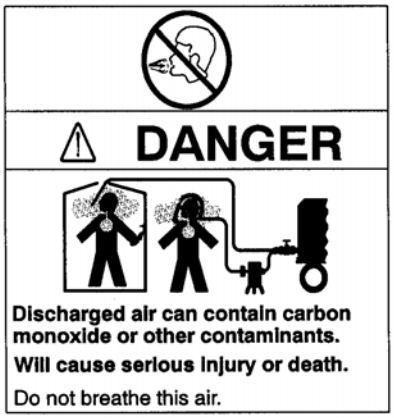
Indicates the presence of a hazard which CAN cause serious injury, death or property damage, if ignored.

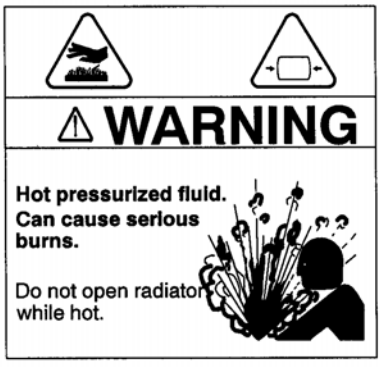
CAUTION
(Yellow Background)

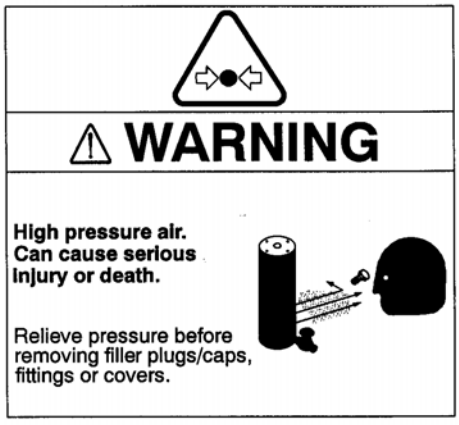
Indicates the presence of a hazard which WILL or can cause injury or property damage, if ignored.

NOTICE
(Blue Background)

Indicates important set-up, operating or maintenance information.







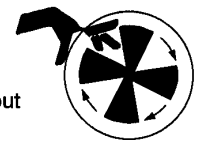
⚠ WARNING

Improper operation of this equipment. Can cause serious injury or death.
Read Operator's Manual supplied with this machine before operation or servicing.

Modification or alteration of this machine. Can cause serious injury or death.
Do not alter or modify this machine without the express written consent of the manufacturer.

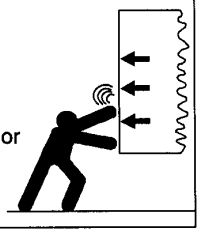
⚠ WARNING

Rotating fan blade.
Can cause serious injury.
Do not operate without guard in place.



⚠ WARNING

Door under pressure.
Can cause serious injury.
Use both hands to open door when machine is running.



CAUTION

DO NOT WELD.
ELECTRONIC DAMAGE WILL OCCUR.
This engine is equipped with an electronic engine controller and other electronic components.

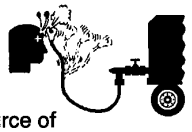
⚠ WARNING

Falling off machine.
Can cause serious injury or death.

Access lifting bail from inside machine.

⚠ WARNING

Disconnected air hoses whip.
Can cause serious injury or death.

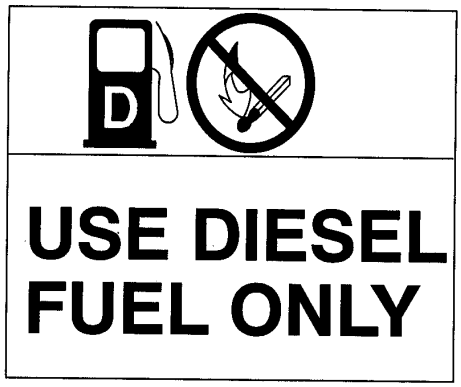


When using air tools attach safety device (OSHA Valve) at source of air supply for each tool.

⚠ WARNING

Combustible gas.
Can cause serious burns, blindness or death.

Keep sparks and open flames away from batteries.



FREE SAFETY DECALS!

To promote communication of Safety Warnings on products manufactured by the Portable Compressor Division in Mocksville, N.C., Safety Decals are available **free** of charge. Safety decals are identified by the decal heading: **DANGER, WARNING or CAUTION.**

Decal part numbers are on the bottom of each decal and are also listed in the compressor's parts manual. Submit orders for Safety Decals to the Mocksville Parts Service Department. The no charge order should contain only Safety Decals. Help promote product safety! Assure that decals are present on the machines. Replace decals that are not readable.

SECTION 2 - WARRANTY

Ingersoll-Rand, through its distributors, warrants to the initial user that each portable air compressor manufactured by it, will be free of defects in material and workmanship for a period of the earlier of twelve (12) months from shipment to or the accumulation of 2,000 hours of service by the initial user.

Portable compressor airends will be free of defects in material and workmanship for a period of the earlier of twenty four months from shipment to or the accumulation of 4,000 hours of service by the initial user. The warranty against defects will include replacement of the complete airend, provided the original airend is returned assembled and unopened.

Portable Compressor Airend Limited Optional Warranty - The earlier of sixty (60) months from shipment to or the accumulation of 10,000 hours of service. The optional warranty is limited to defects in rotors, housings, bearings and gears and provided all the following conditions are met:

1. The original air end is returned assembled and unopened.
2. Continued use of genuine Ingersoll-Rand parts, fluids, oil and filters.
3. Maintenance is performed at prescribed intervals.

Oil-Free airends are fee-based and may require a maintenance agreement. Formal enrollment is required.

Ingersoll-Rand will provide a new part or repaired part, at its election, in place of any part, which is found upon its inspection to be defective in material and workmanship during the period prescribed above. Such part will be repaired or replaced without charge to the initial user during normal working hours at the place of business of an Ingersoll-Rand distributor authorized to sell the type of equipment involved or other establishment authorized by Ingersoll-Rand. User must present proof of purchase at the time of exercising warranty.

The above warranty does not apply to failures occurring as a result of abuse; misuse, negligent repairs, corrosion, erosion and normal wear and tear, alterations or modifications made to the product without express written consent of Ingersoll-Rand; or failure to follow the recommended operating practices and maintenance procedures as provided in the product's operating and maintenance publications.

Accessories or equipment furnished by Ingersoll-Rand, but manufactured by others, including, but not limited to, engines, shall carry whatever warranty the manufacturers have conveyed to Ingersoll-Rand and which can be passed on to the initial user.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED, (EXCEPT THAT OF TITLE),AND THERE ARE NO WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE.

SECTION 3 - WARRANTY REGISTRATION

Complete Machine Registration

Machines shipped to locations within the United States do not require a warranty registration unless the machine status changes (i.e. change of ownership).

Machines shipped outside the United States require notification be made to initiate the machine warranty.

Fill out the Warranty Registration Form in this section, keep a copy for your records and mail form to:

Ingersoll-Rand Company
Portable Compressor Division
P.O. Box 668
Mocksville, North Carolina 27028

Attn: Warranty Department

Note: Completion of this form validates the warranty.

Engine Registration:

No engine registration required. Must present Proof of Purchase whenever engine warranty service is required.

INGERSOLL-RAND®
AIR COMPRESSORS

Warranty Registration Form

Completion of this form validates the warranty

WARRANTY REGISTRATION

Selling Distributor	**Servicing Distributor**	
Name _____	Name _____	Owner/User Name _____
Address _____	Address _____	Address _____
City _____	City _____	City _____
County _____	County _____	County _____
State _____	State _____	State _____
Zip Code _____	Zip Code _____	Zip Code _____
Telephone _____	Telephone _____	Telephone _____

Complete the Applicable Blocks

Owner/User Type of Business (check one only)

☐ Construction-Heavy (highway, excavation, etc.)	☐ Asphalt Contractor	☐ Coal Mining	☐ Other Mining
☐ Construction-Light (carpentry, plumbing, pools mason, etc.)	☐ Government (municipal, state, county, etc.)	☐ Quarry	☐ Shallow Oil & Gas
☐ Rental (rental center, rental fleet, etc.)	☐ Building Contractor	☐ Waterwell	☐ Utility Company (gas, electric, water, etc.)
☐ Industrial (plant use)	☐ Other specify _____	☐ Exploration	☐ Utility Contractor

Model	**Unit S/N**	**Engine S/N**	**Date Delivered**

Unit-Hours	**Airend S/N**	**Truck S/N**	**Truck Engine S/N**

SERVICING DISTRIBUTOR/USER ACKNOWLEDGMENT

1 The Purchaser has been instructed and/or has read the manual and understands proper preventative maintenance, general operation and safety precautions.
2. The warranty and limitation of liability has been reviewed and understood by the owner/user.
3. In the event that this unit is to be used within a nuclear facility, the owner/user shall notify Ingersoll-Rand of such use so that Ingersoll-Rand may arrange for appropriate nuclear liability protection from the owner-licensee of the facility.
4 Ingersoll-Rand reserves the right to make design changes or modifications of Ingersoll-Rand products at anytime without incurring any obligation to make similar changes or modifications on previously sold units.

I hereby acknowledge acceptance of above.

Owner/User _____ **Date** _____

I hereby certify that the above is accurate and complete.

Distributor/I-R Rep. _____ **Date** _____

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Ingersoll-Rand Company
Portable Compressor Division
P. O. Box 868
Mocksville, NC 27028

Attention: Warranty Department

SECTION 4 – SYSTEM DESCRIPTION

General

The CMH air compressors are semi-packaged, air cooled units designed for power take-off applications. Each unit is designed to operate at ambient temperatures from - 10°F to 125°F (-23.3°C to 51.7°C). For the actual delivery of each unit at its rated operating pressure, refer to the typical General Data Decal supplied with each unit, and to the table in Section 5.

The unit includes an oil flooded, rotary, screw-type air compressor, a compressor inlet system, a capacity control system, a compressor lubricating oil system, a compressor discharge system as well as basic instrumentation. The compressor inlet system includes an air intake cleaner with a service indicator. The capacity control system includes a pressure regulator linked to a compressor inlet unloader valve. The compressor lubricating oil system includes an air-cooled type oil cooler, an oil filter, and oil control valve and an oil separator tank and air receiver. The oil cooler is of the fin and tube-type construction that requires forced draft cooling air. Basic instrumentation includes compressor discharge air pressure and temperature gauges, and air cleaner restriction indicator.

The enclosure cabinet, in which most of the components are mounted, is of heavy gauge sheet steel and is equipped with easy opening access panels for performing routine maintenance functions. Most routine service can be performed without removing any panels.

Compression in the screw-type air compressor is created by the meshing of two sets of helical rotors (male and female) on parallel shafts enclosed in a heavy-duty cast iron housing with air inlet and outlet ports located at opposite ends. The male rotor has four lobes, 90 degrees apart and the female rotor has six grooves 60 degrees apart. The grooves of the female rotor mesh with and are driven by the male rotor. Thrust taper roller bearings at the rear of the air end prevent longitudinal movement of the rotors. As rotation of the compressor occurs, the rotors unmesh and free air is drawn into the cavities or pockets between the male rotor lobes and the grooves of the female rotor. The air is trapped in these pockets and follows the direction of rotation of each rotor. As soon as the inlet port is closed, the compression cycle begins and the trapped air is directed to the opposite or discharge side of the rotor housing. As the rotors mesh, the normal free volume of air is decreased and the pressure increased until the closing pocket reaches the discharge port. Cooled lubricating oil is admitted to the compressor by being injected, in metered amounts, directly into the rotor housing so that it passes on with the air being compressed. This removes the heat of compression to a large degree and results in a relatively low, final discharge air temperature.

Since the CMH Series compressor is of the positive displacement type, an air flow control system must be provided to regulate the volume of air passing through the compressor to match the amount of service air required by the customer.

Constant speed control unloads the compressor at a predetermined pressure while the driving unit continues to operate at full speed. This is accomplished by an air operated regulator closing off the intake to the compressor in an infinitely variable or stepless manner through the inlet unloader valve.

The discharge air pressure can be controlled between 77 and 200 psig (531 to 1379 kPa) by simple readjustment of the speed and pressure regulator adjusting screw.

SECTION 5 - INSTALLATION

Location

After the type of drive is determined, satisfactory installation depends upon the ability of the installer. Refer to the appropriate foundation plan for the dimensions of the compressor package and the appropriate separator foundation plan for the dimensions of the combination primary oil separator tank-air receiver and the secondary separator tank (hereafter called the receiver separator).

Choose a clean, relatively cool location for the compressor package, and provide ample space around the unit for general accessibility and to ensure effective heat dissipation. Extreme care must be taken in locating an air-cooled unit of this type so there is an unrestricted supply of air to the cooling fan, which pulls air over the oil cooler core. The fan discharge air must flow away from the unit so that it may be readily dissipated to atmosphere without recirculating hot air to the fan intake. Any recirculation of the cooling air may result in an excessively high compressor operating temperature. The compressor package must be located so the compressor discharge temperature gauge and the air cleaner service indicator will be fully visible. Included with the compressor package is a compressor discharge pressure gauge and a discharge temperature gauge.

For the installation of the receiver separator, choose a location that is on the same level as or lower than the compressor package. Ample space must be provided around the receiver to ensure the proper installation of all piping connections. In addition, the receiver separator must be located so that the separator element may be removed for inspection and service. Refer to the appropriate separator foundation plan.

A condensate drain valve is factory supplied with the receiver separator. When installing the receiver separator, provision should be made for easy access to this drain valve as it will be necessary to drain the condensate daily before starting the unit.

NOTE

The condensate drain valve and line must be located as the lowest point in the lubricating and cooling oil system for proper condensate removal.

The valve may also be used as a service valve for draining the lubricating and cooling oil at periodic change intervals.

Exact level is not absolutely necessary, but it is recommended the unit be leveled with a sight glass or a carpenter's level set on the compressor housing. Leveling may be accomplished by shimming the unit near the unit's bolting holes. Be sure to use steel shims. Mounting holes are provided on the bottom of the base and weld nuts are provided on the sides of the frame. Either may be used for mounting.

Inlet Piping

Each unit is supplied with standard air cleaners to protect the compressor from normal air-borne dust and dirt. If necessary, the air cleaners may be removed and remotely mounted for ease in accessibility.

PIPING

General

As CMH Series compressors are comprised of two modules (compressor and separator), there is necessarily interconnecting piping between the two. These hoses are not provided with the units, as the required lengths of the hoses are dependent on the relative location of the two modules in their installed location. It is left to the installer to obtain hoses of the correct type and length for each installation.

The following hoses will be needed:

LOCATION	SIZE	HOSE TYPE
Compressor Module to Oil Temp Bypass Valve Outlet (Filter)	-12 JIC	Parker-Hannifin 213, or Aeroquip FC350, or equivalent
Compressor Module to Hydraulic Supply	-12 JIC	Parker-Hannifin 301 or equivalent
Compressor Module to Hydraulic Return	-12 JIC	Parker-Hannifin 301 or equivalent
Compressor Module to Case Drain Return	-6 JIC	Parker-Hannifin 213, or Aeroquip FC350, or equivalent
Compressor Module to Separator Scavenge	-4 JIC	Parker-Hannifin 213, or Aeroquip FC350, or equivalent
Compressor Module to Air Pressure Regulator Outlet	-6 JIC	Parker-Hannifin 213, or Aeroquip FC350, or equivalent
Compressor Module to Separator Discharge	-6 JIC	Parker-Hannifin 213, or Aeroquip FC350, or equivalent
Compressor Module to Oil Cooler Drain	-6 JIC	Parker-Hannifin 213, or Aeroquip FC350, or equivalent
Oil Cooler to Oil Temp Bypass Valve Port “B”	-24 JIC	Parker-Hannifin 206, or Aeroquip FC300, or equivalent
Oil Cooler to Oil Temp Bypass Valve Port “C”	-24 JIC	Parker-Hannifin 206, or Aeroquip FC300, or equivalent
Airend Discharge to Receiver/Separator Inlet	-32 JIC	Parker-Hannifin 206, or Aeroquip FC300, or equivalent

NOTES:

1. All hoses terminate at marked bulkhead fittings on drive end of machine, except oil cooler connections, which are on the cooler side of the compressor module.
2. All hoses terminate in Type I (SAE J516 female swivel straight), 37° JIC flare fittings on each end.
3. Ports “B” and “C” on oil temperature bypass valve can be connected to either port on the oil cooler. Oil cooler performance is not sensitive to flow direction.
4. 2 inch NPT to –32 JIC adapter and fitting for airend discharge pipe is customer supplied.

Compressor Discharge Piping

The connection between the compressor package and the receiver separator must be furnished by the customer. It is recommended the customer use a flexible line with an inside diameter of the same size, or larger than the compressor package discharge connection. All piping must be certified safe for the pressures and temperatures involved.

Receiver separator Discharge Piping

The receiver separator discharge piping must be furnished by the customer. Refer to the appropriate separator fitting location for a typical piping arrangement for these units. A minimum pressure valve and a manual shut-off valve is supplied with each unit and must be piped into the customer's system as indicated. The minimum pressure valve is supplied to maintain approximately 77 pisg (531 kPa) in the air receiver tank to ensure proper oil circulation and also to prevent excessive oil carryover into the customer's air service system. The manual shut-off valve must be installed between the minimum pressure valve and the customer's air service system to serve as an isolation valve.

In addition, whenever this unit is connected to a high volume customer's service air system, a terminal check valve must also be installed downstream of the minimum pressure valve and the isolation valve to prevent air from the system from bleeding back into the compressor system on shutdown.

Wiring

The compressor is protected against overheating by a thermal-type discharge air temperature switch located in the compressor discharge piping. A "normally-closed" type thermal switch, factory set at 248°F (120°C), is supplied as standard equipment on these units. This switch is supplied for 12/24 volt DC. As an option, this switch may be supplied for 125 volt AC. A thermal sensor switch, also set at 248°F (120°C), normally closed, is provided as extra protection in the receiver separator. It is to be wired in series with the airend temperature switch by the user. This switch is supplied for 12/24 volts DC, with optional AC switches available as an option.

Driver

The installation of a CMH Series Compressor with any drive such as a power take-off drive or a hydraulic motor drive is very flexible. The proper rotation of the compressor is clockwise when viewed from the driver end.

NOTE

Because the compressor is of the axial screw type, the rotation cannot
bchanged.

MODELS	CAPACITY		TORQUE REQUIRED		POWER REQUIRED		INPUT
	CFM	M^3/MIN.	POUND – FEET	N·M	BHP	KILOWATTS	RPM
VHP400CMH	400	11.3	454	616	147	110	1700
VHP500CMH	500	14.2	460	624	184	137	2100
VHP550CMH	550	15.6	483	654	193	144	2100
VHP550CMH	550	15.6	441	598	193	144	2300
HP600CMH	600	17.0	413	560	181	135	2300
XP650CMH	650	18.4	376	510	179	133	2500

This unit is normally driven by a hydraulic motor directly mounted to the SAE adapter attached to the airend. The standard interface is for 1.75", 13 tooth, 8-16 DP/30° splined shaft. Mounting flange is SAE "D". Alternatively, SAE "C" is available.

A drive shaft from the source of power take-off can alternatively be used to drive the compressor. It is extremely important that the angularity of the drive shaft, including the universal joints, be within the limits specified by the manufacturer. The power take-off shaft and the compressor rotor drive shaft must always be parallel. This gives the same angle at each universal joint and prevents excessive wear. The forks of the universal joint on the drive end must be installed parallel to the forks on the driven and universal. There are many types of universal joints that can be used. However, a constant velocity universal joint as previously described will reduce the possibility of torsional vibration. If a slip joint or spline is used on the drive system, it should be placed between the two universal joints for best results.

Regulation

The standard regulation system supplied with CMH Series Compressors is designed to provide capacity control for the compressor only. Variable speed control of a driver engine is possible with additional equipment. Consult Ingersoll-Rand Company, Specialty Products Department for technical assistance for these applications.

The adjustment and operation of the standard regulation system is described in Section 6, Operating Instructions.

SECTION 6 - OPERATING INSTRUCTIONS

SETTING-UP

- Place the unit in an open, well-ventilated area. Position as level as possible. The design of these units permits a 15 degree limit on out-of-level operation.

- When the unit is to be operated out-of-level, it is important to have the compressor oil level gauge show no more than mid-scale (with the unit running at full load). Do not overfill either the engine crankcase or the compressor lubricating oil system.

PROCEDURE FOR AIREND OIL PRIMING

(TO BE PERFORMED PRIOR TO INITIAL START-UP)

AIREND SIZE	QUANTITY OF OIL INJECTED (GALLONS/LITERS)	
	METHOD A	METHOD B
85MM	0.5 / 2	1.0 / 4
CF75	0.5 / 2	1.0 / 4
100MM	0.5 / 2	1.0 / 4
CF90	0.5 / 2	1.0 / 4
127.5MM	0.5 / 2	1.0 / 4
178.5MM	1.0 / 4	2.0 / 8
226MM	1.8 / 7	3.6 / 14
285MM	3.0 / 11	6.0 / 23
350MM	4.0 / 15	8.0 / 30

Notes:

1. All airends are to be primed with oil before the first start of the unit. The prime oil quantity is part of the total fill quantity of the unit.

   The priming of single stage airends can be done by either of the two following methods:

   A) Disconnect main oil supply hose that goes from the oil filter outlet to the airend and inject oil directly into this hose to the airend.

   B) Disconnect the separator tank scavenge hose that leads to the oil filter and inject oil into the filter.

2. The chart shows minimum fill requirements.

3. –HR2: Disconnect the hose going to the seal and inject 7 gallons (26L) into the manifold tubing.

   --HR2.5: Remove cap on manifold tube between pump and filter and inject 7 gallons (26L) into the manifold tubing.

BEFORE STARTING

CAUTION

Do not connect the air discharge on this unit into a common header with any other unit of any description, or any other source of compressed air, without first making sure a check valve is used between the header and the unit. If this unit is connected in parallel with another unit of higher discharge pressure and capacity, a safety hazard could occur in a back-flow condition.

Safety valve setting is 250 psig (1724 kPa). Assure external air system is safe under all operating conditions to prevent serious hazard to operations personnel.

WARNING

Unrestricted air flow from a hose will result in a whipping motion of the hose which can cause severe injury or death. A safety device must be attached to the hose at the source of supply to reduce pressure in case of hose failure or other sudden pressure release. Reference: OSHA regulation 29 CFR Section 1926.302 (b).

- Open manual blow-down valve to ensure pressure is relieved in receiver separator system. Close valve in order to build up full air pressure and ensure proper oil circulation.

- Check the compressor lubricating oil level. The proper oil level is mid-way on the sight gauge. Add oil if the level falls to the bottom of the sight gauge. Do not overfill.

WARNING

This machine produces loud noise. Extended exposure to loud noise can cause hearing loss. Wear hearing protection when valve(s) are open.

Always operate this equipment with all enclosure panels installed to avoid recirculation of hot air.

This will maximize the life of the compressor. Be sure no one is IN or ON the compressor unit.

WARNING

Do NOT operate machine with guards removed.

CAUTION

Do NOT operate machine with safety shutdown switches bypassed.

STARTING/OPERATING

- Close service valve.
- Engage hydraulic fan.
- Engage main driver.
- Allow compressor to run unloaded five (5) to ten (10) minutes.
- Compressor is now ready to furnish compressed air when service valve is opened.

STOPPING

- Close air service valve(s).
- Allow the unit to run at "no load" for 3 to 5 minutes to reduce the compressor temperature.
- Disengage main driver.
- Disengage hydraulic fan.

NOTE: Once the drive motor stops, the automatic blow-down valve will begin to relieve all pressure from the receiver separator system.

CAUTION

1).Never allow the unit to sit stopped with pressure in the receiver separator system. As a precaution, after the automatic blow-down period (2 minutes), open the manual blow-down valve.

EQUIPMENT PROTECTION

NOTE: Do NOT wire around or bypass a shutdown sensor or switch.

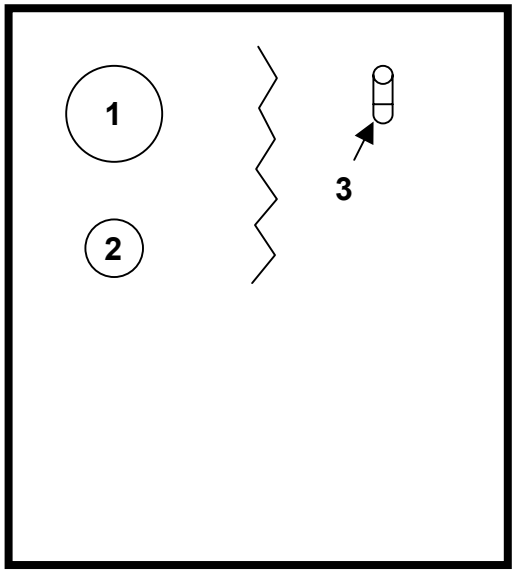
This unit is protected by two (2) shutdown switches at the following locations:

High Discharge Air Temperature-

(1) At the airend outlet.

(2) In the safety valve connection on the separator tank.

GAUGE PANEL



Operating Instruments

1. Compressor Discharge Pressure Gauge

Indicates pressure in receiver tank, psig (kPa).

2. Discharge Air Temp. Gauge

Indicates discharge air temperature in °F and °C. Normal operating range: 185°F/85°C to 248°F/120°C.

3. Air Filter Restriction Indicator

Indicates compressor air cleaner restriction. Normal operation (<25 in. H_2O), green flag Needs service, (≥25 in. H_2O), red flag.

PRESSURE REGULATION ADJUSTING INSTRUCTIONS

Before Starting Unit:

1. Atop separator cover at pressure regulator (PR) loosen locknut (A) counterclockwise. Turn adjusting screw (B) counterclockwise one full turn.

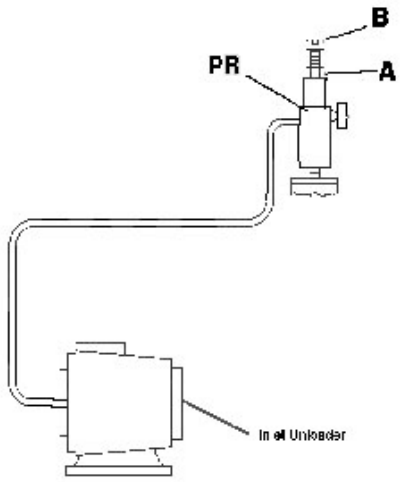
After Starting Unit:

2. Allow unit to warm up.

3. Operate compressor at rated speed with service valve closed. Loosen locknut A. Adjust screw B. until discharge pressure gauge reads rated pressure + 20 psi (138kPa). Turn B. clockwise to *increase* pressure, counter clockwise to *decrease* pressure.

4. At pressure regulator (PR) tighten locknut (A).

5. To obtain maximum CFM at any pressure between 77 PSI (531kPa) and the rated operating pressure. Proceed as in step 3, substituting desired pressure for rated pressure, adding 20 psi (138kPa) as before. Always lock and protect pressure setting of adjusting screw (B) with locknut (A).



TROUBLESHOOTING

INTRODUCTION

Troubleshooting for a portable air compressor is an organized study of a particular problem or series of problems and a planned method of procedure for investigation and correction. The troubleshooting chart that follows includes some of the problems that an operator may encounter during the operation of a portable compressor.

The chart does not attempt to list all of the troubles that may occur, nor does it attempt to give all of the answers for correction of the problems. The chart does give those problems that are most apt to occur. To use the trouble shooting chart:

A. Find the "complaint" depicted as a bold heading.

B. Follow down that column to find the potential cause or causes. The causes are listed in order (1,2,3 etc.) to suggest an order to follow in trouble shooting.

ACTION PLAN

A. Think Before Acting

Study the problem thoroughly and ask yourself these questions:

(1) What were the warning signals that preceded the trouble?

(2) If the compressor will still operate, is it safe to continue operating it to make further checks?

(3) Has similar trouble occurred before?

(4) What previous maintenance work has been done?

B. Do the Simplest Things First

Most troubles are simple and easily corrected.

Always check the easiest and most obvious things first; following this simple rule will save time and trouble.

C. Double Check Before Disassembly

The source of most compressor troubles can be traced not to one component alone, but to the relationship of one component with another. Too often, a compressor can be partially disassembled in search of the cause of a certain trouble and all evidence is destroyed during disassembly. Check again to be sure an easy solution to the problem has not been overlooked.

D. Find And Correct Basic Cause

After a mechanical failure has been corrected, be sure to locate and correct the cause of the trouble so the same failure will not be repeated. A complaint of "premature breakdown" may be corrected by repairing any improper wiring connections, but something caused the defective wiring. The cause may be excessive vibration.

TROUBLESHOOTING CHART

Bold Headings depict the COMPLAINT - Subheadings depict the CAUSE

Note: Subheadings suggest order to follow in cause of troubleshooting.

Short Air Cleaner Life:

Dirty Operating Conditions
Inadequate Element Cleaning
Defective Service Indicator
Incorrect Stopping Procedure
Wrong Air Filter Element

Excessive Oil In Air:

High Oil Level
Out of Level > 15 degrees
Clogged Scavenge Orifice
Scavenge Tube Blocked
Defective Scavenge Check Valve
Sep. Tank Blown Down Too Quickly
Defective Minimum Pressure Valve

Will Not Unload:

Leaks in Regulator Piping
Incorrect Pressure Regulator Adjustment
Malfunctioning Pressure Regulator
Malfunctioning Inlet Unloader/Butterfly Valve
Ice in Regulation Lines/Orifice

Oil In Air Cleaner:

Incorrect Stopping Procedure

Safety Valve Relieves:

Leaks in Regulator Piping
Incorrect Pressure Regulator Adjustment
Malfunctioning Pressure Regulator
Malfunctioning Inlet Unloader/Butterfly Valve
Defective Separator Element
Ice in Regulation Lines/Orifice

Excessive Compressor Oil Temperature:

Ambient Temperature Too High
Out of Level > 15 degrees
Low Oil Level
Dirty Cooler
Dirty Operating Conditions
Operating Pressure Too High
Malfunctioning Thermostat
Defective Minimum Pressure Valve
Blocked or Restricted Oil Lines
Airend Malfunctioning
Compressor Oil Cooler Fan Running Too Slowly

Excessive Vibration:

Out of Balance Fan
Airend Malfunctioning
Damaged Motor to Airend Coupling

Low CFM:

Low Motor RPM
Dirty Air Filter
Incorrect Pressure Regulator Adjustment
Malfunctioning Inlet Unloader/Butterfly Valve
Defective Minimum Pressure Valve
Defective Separator Element

Unit Shutdown:

Compressor Oil Temp. Too High
Loose Wire Connection
Defective Discharge Air Temp. Switch
Airend Malfunctioning
Compressor Drive Motor Malfunctioning
Compressor Oil Cooler Fan Not Running or Running Too Slowly

Won't Start/Run

Malfunctioning Start Switch
Compressor Oil Temp. Too High
Compressor Drive Motor Malfunctioning
Airend Malfunctioning

SECTION 7 – GENERAL DATA

Models:

VHP400CMH	VHP500CMH	VHP550CMH	VHP550CMH	HP600CMH	XP650CMH

Rated Delivery – CFM (litres/sec.)

400 (189)	500 (236)	550 (260)	550 (260)	600 (283)	650 (307)

Input Power Requirements:

Horsepower
Speed (RPM)

152	189	198	198	186	184
1700	2100	2100	2300	2300	2500

Rated Pressure – PSI (kPa).....200 (1400)
Compressor Lube Capacity (Refill) – U.S. gal. (litres).....10 (37.9)

Compressor Oil Filter Element.....36860336
Compressor Oil Separator Element.....36845469
Air Cleaner Element (Primary).....35326230
Air Cleaner Element (Safety).....35377696
Overall Length (Compressor Module) – inch (mm).....51.0 (1295)
Overall Height (Compressor Module) – inch (mm).....42.0 (1067)
Overall Width (Compressor Module) – inch (mm).....40.3 (1024)
Overall Length (Air Receiver Module) – inch (mm).....25.0 (635)
Overall Height (Air Receiver Module) – inch (mm).....88.6 (1234)
Overall Width (Air Receiver Module) – inch (mm).....22.5 (572)

Weight (Compressor Module) – pounds (kilograms).....1540 (699)
Weight (Air Receiver Module) – pounds (kilograms).....260 (118)
Weight (System with lubricants) – pounds (kilograms).....1875 (850)

Mounting Interface – SAE “D” Flange

- 1.75 inch 13 tooth
- -8-16 DP/30° PA Splined Shaft

Cooling Fan Power Requirements:
Hydraulic - 13.2 GPM @ 600 PSI (4.7 HP @ 1750 R.P.M.)

- (50.0 L.P.M. @ 4140 kPa)

Built by INGERSOLL-RAND® Company, Mocksville, N.C. 27028 USA

SECTION 8 - MAINTENANCE

CAUTION

Any unauthorized modification or failure to maintain this equipment may make it unsafe and out of factory warranty.

WARNING

If performing more than visual inspections, disconnect driver engine battery cables and open manual blow-down valve.

Use extreme care to avoid contacting hot surfaces (heat exchange and piping, air receiver and air discharge piping, etc.).

Never operate this machine with any guards removed.

Inch and metric hardware was used in the design and assembly of this unit. Consult the parts manual for clarification of usage.

GENERAL

In addition to periodic inspections, many of the components in this unit require periodic servicing to provide maximum output and performance. Servicing may consist of pre-operation and post-operation procedures to be performed by the operating or maintenance personnel. The primary function of preventive maintenance is to prevent failure, and consequently, the need for repair. Preventive maintenance is the easiest and the least expensive type of maintenance. Maintaining your unit and keeping it clean at all times will facilitate servicing.

SCHEDULED MAINTENANCE

The maintenance schedule is based on normal operation of the unit. In the event unusual environmental operating conditions exist, the schedule should be adjusted accordingly.

COMPRESSOR OIL LEVEL

The oil level should be checked before the unit is operated. The optimum operating level is midway of the sight tube on the side of the receiver tank. See the decal beside the sight tube. If the oil level is not in the “OK” range, make appropriate corrections (Add or Drain). A totally filled sight tube in which the level is not visible indicates an over-full condition and requires that oil be drained.

AIR CLEANER

This unit is equipped with AIR FILTER RESTRICTION INDICATOR on the front panel, serving both compressor inlet air cleaners.

This should be checked daily during operation. If the indicator shows (red) with the unit operating at full speed, servicing of the cleaner element is necessary.

Also weekly, squeeze the rubber valve (pre-cleaner dirt dump) on each air cleaner housing to ensure that they are not clogged.

If flagged, the air filter restriction indicator must be reset after unit is shut down and the air cleaners are serviced. Reset by pushing button on top of indicator.

To service the air cleaners on all units proceed as follows:

1. Loosen outer wing nut and remove cover. Remove element.
2. Inspect air cleaner housing for any condition that might cause a leak and correct as necessary.
3. Wipe inside of air cleaner housing with a clean, damp cloth to remove any dirt accumulation, especially in the area where the element seals against the housing.
4. Inspect element by placing a bright light inside and rotating slowly. If any holes or tears are found in the paper, discard this element. If no ruptures are found, the element can be cleaned.
5. If a new air filter element is to be used check it closely for shipping damage.

6. Install cleaned or new elements in the reverse order to the above. Tighten wing nuts firmly and replace cotter pin.

7. Inspect to ensure that the end cap seals tightly 360 degrees around the air cleaner body.

In the event that the filter element must be reused immediately, compressed air cleaning (as follows) is recommended since the element must be thoroughly dry. Direct compressed air through the element in the direction opposite to the normal airflow through the element.

Move the nozzle up and down while rotating the element. Be sure to keep the nozzle at least one inch (25.4mm) from the pleated paper.

NOTE: To prevent damage to the element, never exceed a maximum air pressure of 100 psi (700 kPa).

In the event the element is contaminated with dry dirt, oil or greasy dirt deposits, and a new element is not available, cleaning can be accomplished by washing, using the air cleaner element manufacturer's recommendations.

NOTE: It is recommended that replacement elements be installed in the unit. The elements just removed for cleaning can be washed and stored as future replacement elements.

In addition, the air cleaner system (housing and piping) should be inspected every month for any leakage paths or inlet obstructions. Make sure the air cleaner mounting bolts and clamps are tight. Check the air cleaner housing for dents or damage which could lead to a leak. Inspect the air transfer tubing from the air cleaner to the compressor and the engine for leaks.

Make sure that all clamps and flange joints are tight.

GAUGES

The instruments or gauges are essential for safety, maximum productivity and long service life of the machine. Inspect the gauges prior to start-up. During operation observe the gauges for proper functioning. Refer to Operating Instructions, for the normal readings.

COMPRESSOR OIL COOLERS

The compressor lubricating and cooling oil is cooled by means of two fin and tube-type oil coolers. The lubricating and cooling oil, flowing internally through the core section, is cooled by the air stream from the cooling fan flowing past the core section. When grease, oil and dirt accumulate on the exterior surfaces of the oil cooler, its efficiency is impaired.

Each month it is recommended that the oil coolers be cleaned by directing compressed air which contains a nonflammable safety solvent through the core of the oil cooler. This should remove the accumulation of grease, oil and dirt from the exterior surfaces of the oil cooler cores so that the entire cooling area can transmit the heat of the lubricating and cooling oil to the air stream.

In the event foreign deposits, such as sludge and lacquer, accumulate in the oil coolers to the extent that cooling efficiency is impaired, a resulting high discharge air temperature is likely to occur, causing shut down of the unit.

To correct this situation it will be necessary to clean the coolers using a cleaning compound in accordance with the manufacturer's recommendations.

HOSES

Each month it is recommended that all of the intake lines to and from the air cleaners and flexible hoses used for air and oil be inspected.

To ensure freedom from air leaks, all rubber hose joints and the screw-type hose clamps must be absolutely tight. Regular inspection of these connections for wear or deterioration is necessary.

Premature wear of the compressor is ASSURED whenever dust-laden air is permitted to enter the compressor intake.

The flexible hoses used in the oil and air lines on these units are primarily used for their ability to accommodate relative movement between components. It is important they be periodically inspected for wear and deterioration. It is also important the operator does not use the hoses as convenient hand holds or steps. Such use can cause early cover wear and hose failure.

NOTICE

Piping systems operating at less than 150 psi (1050 kPa) may use a special nylon tubing. The associated fittings are also of a special "push-in" design. If so, features are as follows:

Pulling on the tubing will cause the inner sleeve to withdraw and compress, thus tightening the connection. The tubing can be withdrawn only while holding the sleeve against the fitting. The tubing can be removed and replaced numerous times without losing its sealing ability.

To install the nylon tubing, make a mark (with tape or grease pencil) approximately 7/8 inch from the end of the tubing. Insert the tubing into the sleeve and "push-in" past the first resistance to the button. The mark should be approximately 1/16 inch from the sleeve, for the 3/8 inch O.D. tubing; 1/8 inch for the 0.25 inch O.D. tubing. This will ensure that the tubing is fully engaged in the sealing mechanism.

NOTICE

The oil filter must be replaced every 500 hours of operation or three (3) months, whichever comes first. On new or overhauled units, replace the element after the first 50 and 150 hours of operation; thereafter, service the oil filter every 500 hours.

To service the oil filters it will first be necessary to shut the unit down. Wipe off any external dirt and oil from the exterior of the filter to minimize any contamination from entering the lubrication system. Proceed as follows:

WARNING

High pressure air can cause severe injury or death from hot oil and flying parts. Always relieve pressure before removing caps, plugs, covers or other parts from pressurized air system.

- Open the service air valve(s) to ensure that system is relieved of all pressure. Close the valve(s).
- Turn the spin-on filter element counterclockwise to remove it from the filter housing. Inspect the filter.

NOTICE

If there is any indication of formation of varnishes, shellacs or lacquers on the oil filter element, it is a warning the compressor lubricating oil has improper characteristics and should be immediately changed.

- Inspect the oil filter head to be sure the gasket was removed with the oil filter element. Clean the gasket seal area on the oil filter head.

NOTICE

Installing a new oil filter element when the old gasket remains on the filter head will cause an oil leak and can cause property damage.

- Lubricate the new filter gasket with the same oil being used in the machine.
- Install new filter by turning element clockwise until gasket makes initial contact. Tighten an additional ½ to ¾ turn.
- Start unit and allow to build up to rated pressure. Check for leaks before placing unit back into service.

FASTENERS

Visually check entire unit in regard to bolts, nuts and screws being properly secured. Spot check several capsrews and nuts for proper torque. If any are found loose, a more thorough inspection must be made. Take corrective action.

COMPRESSOR OIL

The lubricating and cooling oil must be replaced every 1000 hours of operation or six (6) months, whichever comes first.

RECEIVER SEPARATOR SYSTEMS

WARNING

High pressure air can cause severe injury or death from hot oil and flying parts. Always relieve pressure before removing caps, plugs, covers or other parts from pressurized air system.

- **Open service valve.**
- **Ensure pressure is relieved, with BOTH:**

  Discharge air pressure gauge reading zero (0).
  No air discharging from service valve.

When draining oil, open valve at bottom of separator tank.

When adding oil, remove and replace (make tight) plug on side of separator tank.

In the compressor lubricating and cooling system, separation of the oil from the compressed air takes place in the receiver separator tank. As the compressed air enters the tank, the change in velocity and direction drop out most of the oil from the air.

Additional separation takes place in the oil separator element, which is located in the top of the tank.

Any oil accumulation in this separator element is continuously drained off by means of a scavenge tube which returns the accumulated oil to the system.

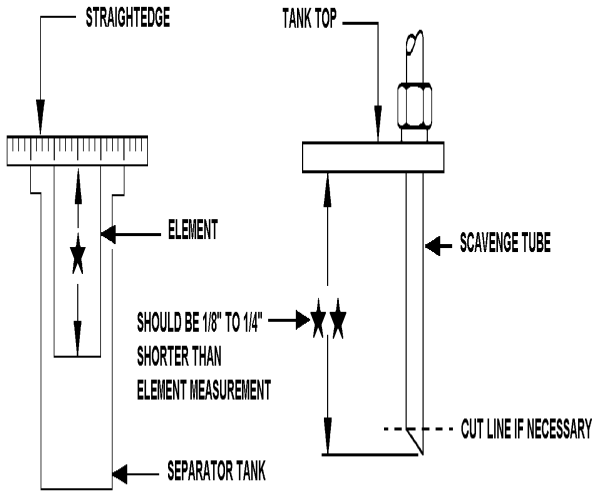
The life of the oil separator element is dependent upon the operating environment (soot, dust, etc.) and should be replaced every twelve months or 2000 hours. To replace the element proceed as follows:

- Ensure the tank pressure is zero.
- Disconnect the hose from the scavenge tube.
- Remove scavenge tube from tank cover.
- Disconnect service line from cover.
- Remove cover mounting screws.
- Remove cover and element.
- Remove any gasket material left on cover or tank.
- Install new element.

NOTICE: Do not remove staples from the element/gasket connection.

- Place a straightedge across top of element and measure from bottom of straightedge to bottom of element. (See drawing below)

- Replace scavenge tube in cover (cover is still off of tank).



- Measure from bottom of cover to end of scavenge tube. Measurement should be from 1/8" to ¼" less than the element measurement. If not, cut to size.

- Remove scavenge tube.
- Reposition cover (use care not to damage gaskets).

- Replace cover mounting screws:

- Tighten in a crisscross pattern.
- Reconnect service line. Replace scavenge tube. Reconnect hose.

- Close service valve. Start unit and look for leaks.

When replacing the element, the scavenge lines, orifice, filter and check valve should be thoroughly cleaned and the oil changed.

SCAVENGE LINE

WARNING

High pressure air can cause severe injury or death from hot oil and flying parts. Always relieve pressure before removing caps, plugs, covers or other parts from pressurized air system.

The scavenge line originates at the receiver separator tank cover and terminates at the compressor airend through an orifice. Once a year or every 2000 hours of operation, whichever comes first, remove this line and the orifice, thoroughly clean, then reassemble.

Excessive oil carry-over may be caused by an oil-logged separator element. Do not replace element without first performing the following maintenance procedure:

1. **Check the oil level. Maintain as indicated earlier in this section.**
2. **Thoroughly clean scavenge line, any orifice and check valve.**
3. **Assure minimum pressure valve (if so equipped) has proper setting.**
4. **Run unit at rated operating pressure for 30 to 40 minutes to permit element to clear itself.**

EXTERIOR FINISH CARE

The unit was painted and heat cured at the factory with a high quality, thermostat polyester powder coating. The following care will ensure the longest possible life from this finish.

1. **If necessary to remove dust, pollen, etc. from housing, wash with water and soap or dish washing liquid detergent. Do not scrub with a rough cloth, pad, etc.**
2. **If grease removal is needed, a fast evaporating alcohol or chlorinated solvent can be used.**
3. **If the paint has faded or chalked, the use of a commercial grade, non-abrasive car wax may partially restore the color and gloss.**

Note: This may cause some dulling of the paint finish.

Field Repair of Texture Paint

1. The sheet metal should be washed and clean of foreign material and then thoroughly dried.
2. Clean and remove all grease and wax from the area to be painted using Duponts 3900S Cleaner prior to sanding.
3. Use 320 grit sanding paper to repair any scratches or defects necessary.
4. Scuff sand the entire area to be painted with a red scotch brite pad.
5. Wipe the area clean using Duponts 3900S.
6. Blow and tack the area to be painted.
7. Apply a smooth coat of Dupont 1854S Tuffcoat Primer to all bare metal areas and allow to dry.
8. Apply 2 medium, wet coats of Dupont 222S Adhesion Promoter over the entire area to be painted, with a 5 minute flash in between coats.
9. To apply the texture coat, use Dupont 1854S Tuffcoat Primer. The proper technique to do this is to spray the Tuffcoat Primer using a pressure pot and use about 2-5 pounds of air pressure. This will allow the primer to splatter causing the textured look. Allow the texture coat to flash for about 20 minutes or until dry to touch.
10. Apply any of Dupont's Topcoat Finishes such as Imron™ or Centari™ according to the label instructions.

NOTE: To re-topcoat the texture surfaces when sheet metal repairs are not necessary, follow steps 1,2,4,5,6,8 and 10.

PREVENTIVE MAINTENANCE SCHEDULE

If operating in extreme environments (very hot, cold, dusty or wet), these time periods should be reduced.

	Daily	Weekly	Monthly	500 hrs /3 mos.	1000 hrs /6 mos.	2000 hrs /12 mos.
Compressor Oil Level	C					
Gauges/Lamps	C					
*Air Cleaner Service Indicators	C					
Air Cleaner Precleaner Dumps		C				
Hoses (Oil, Air, Intake Hydraulic)			C			
Automatic Shutdown System Test			C			
Air Cleaner System Visual			C			
Compressor Oil Cooler Exterior			C	Clean		
Fasteners				C		
Air Cleaner Elements				WI		
Compressor Oil Filter Element				R		
Compressor Oil					R	
Shutdown Switch Settings Test						C
Scavenger Orifice & Related Parts						Clean
Oil Separator Element						R

* Disregard if not appropriate for this particular machine

Unit_____ Date _____

Hours_____ Serviceman_____

R = Replace C = Check (adjust or replace if necessary)
L = Lubricate WI = Or when indicated

LUBRICATION

Both compressor lubrication and cooling are accomplished by the compressor lubricating oil. The oil is forced from the oil storage reservoir, under system pressure, through an oil cooler and an oil filter directly to the compressor. When the compressor is operating at low capacity, some of the oil may bypass the cooler through a thermostatically controlled bypass valve. This valve bypasses varying amounts of oil, depending upon the temperature, until the oil being circulated reaches a temperature of 185°F (85°C) thus maintaining a higher average oil temperature thereby reducing the possibility of water vapor condensation in the oil.

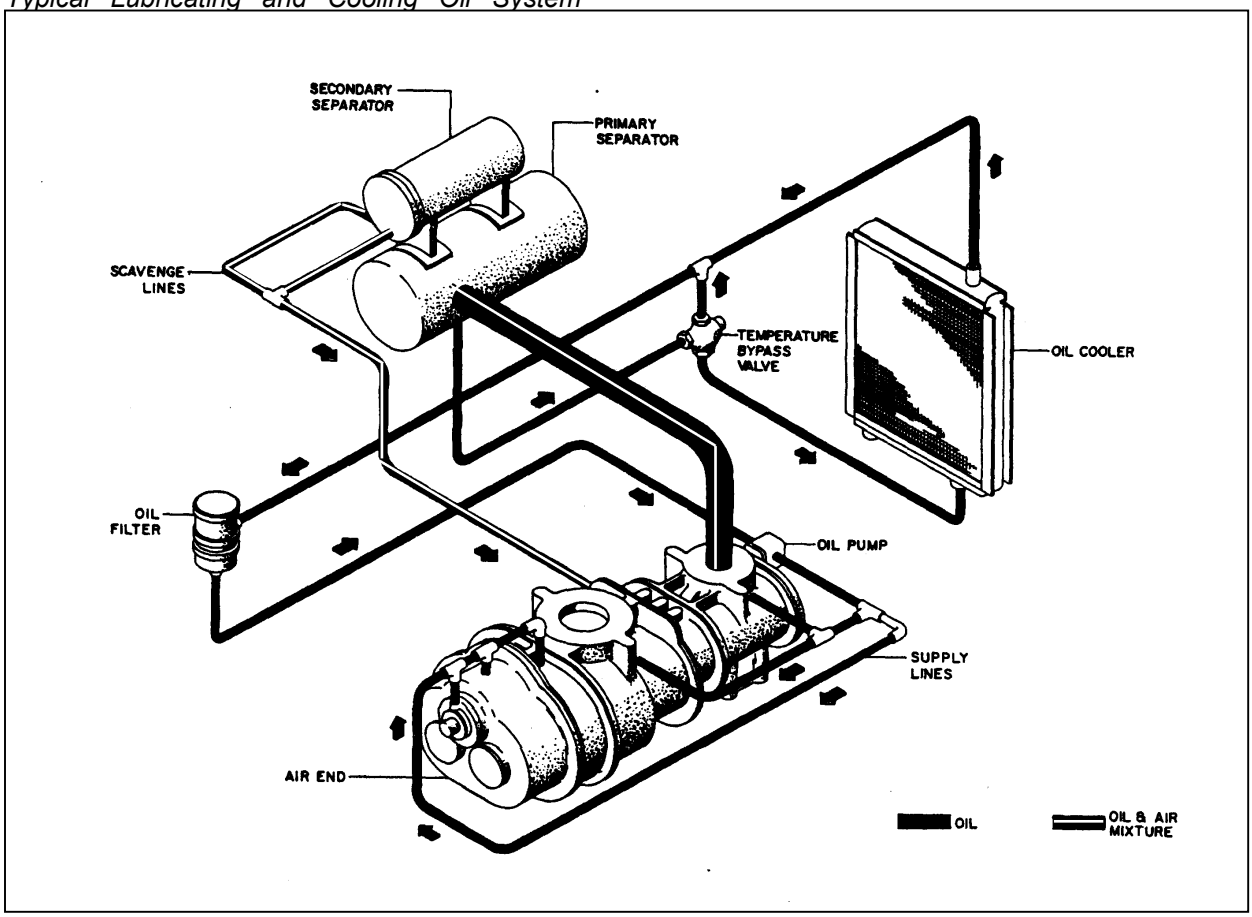
Relatively cool lubricating oil is admitted under pressure to the compressor bearings and is also injected in metered amounts, directly to the rotor chamber. All of the oil thus introduced mixes with, and passes on with the air being compressed, thus removing the heat of compression to a large degree. On its way to the final discharge connection, the air passes through a receiver/separator. A scavenger line returns any remaining separated oil back to the inlet of the compressor.

Fill the oil storage reservoir in the receiver/separator with new oil before operating the unit. Recharge the compressor by first removing the air filter and pouring about two gallons (7.57 liters) of oil into the compressor inlet.

NOTE

Recharging of the compressor with oil is absolutely necessary on units that have been placed in extended storage (6 months or more).

Typical Lubricating and Cooling Oil System



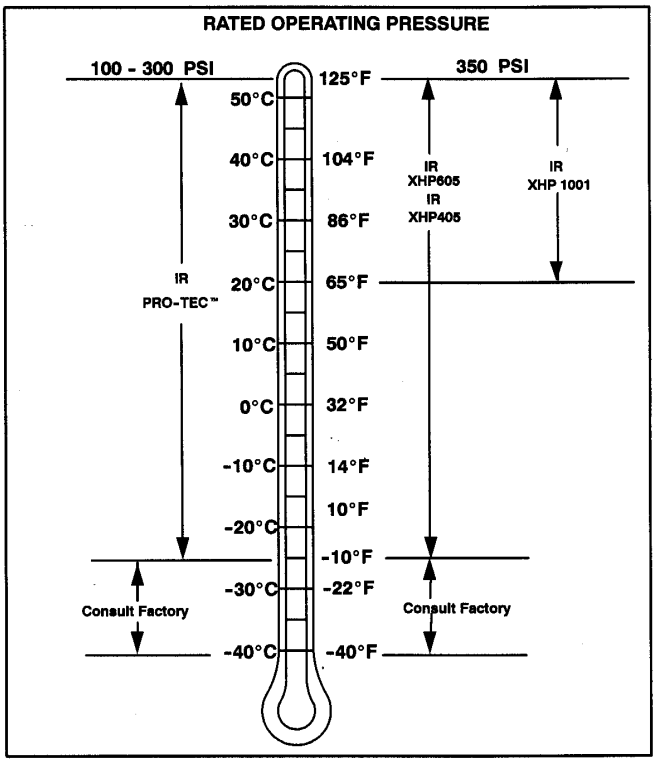
Portable Compressor Fluid Chart

Refer to these charts for correct compressor fluid required. Note that the selection of fluid is dependent on the design operating pressure of the machine and the ambient temperature expected to be encountered before the next oil change.

Note: Fluids listed as "preferred" are required for extended warranty.

Compressor oil carryover (oil consumption) may be greater with the use of alternative fluids.

Design Operating Pressure	Ambient Temperature	Specification
100 psi to 300 psi	-10°F to 125°F (-23°C to 52°C)	Preferred: **IR Pro-Tec™** Alternate: ISO Viscosity Grade 46 with rust and oxidation inhibitors, designed for air compressor service.
350 psi	(-23°C to 52°C) -10°F to 125°F	Preferred: **IR XHP 605** Alternate: IR XHP405 ISO Viscosity Grade 68 Group 3 or 5 with rust and oxidation inhibitors designed for air compressor service.
	65°F to 125°F (-18°C to 52°C)	Preferred: **XHP605** **IR XHP1001**



Preferred Ingersoll-Rand Fluids - Use of these fluids with original I-R filters can extend airend warranty. Refer to operator's manual warranty section for details or contact your I-R representative.

Ingersoll-Rand Preferred Fluids	1 gal. (3.8 Litre)	5 gal. (19.0 Litre)	55 gal. (208.2Litre)	220 gal. (836 litre)
Preferred:				
IR Pro-Tec™	36899698	36899706	36899714	36899722
IR XHP605	-	22252076	22252050	22252068
IR XHP1001	-	35612738	35300516	-
XHP405	-	22252126	22252100	22252118
Engine Oil	54480918	36875938	36866903	

If the unit has been operated for 1,000 hours, it should be completely drained of oil. If the unit has been operated under adverse conditions or under long shutdown periods, an earlier change may be necessary as oil deteriorates with time as well as by operating conditions. Complete replacement of the old oil with clean oil every 500 to 1,000 hours, depending upon operating conditions, not only is desirable, but is good insurance against the accumulation of dirt, sludge or oxidized oil products.

Completely drain the receiver/separator and the piping. If the oil is drained immediately after the unit has been run for some time, most of the sediment will be in suspension and will drain more readily.

CAUTION

Shorter oil change intervals may be necessary if unit is operated under adverse conditions.

WARNING

Do not, under any circumstances, open any drain cocks, remove any plugs or the oil filler plug from the compressor lubricating and cooling oil system without making sure the air receiver system had been completely relieved of all air

CAUTION

pressure.

Some oil mixtures are incompatible with each other and result in the formation of varnishes, shellacs or lacquers, which may be insoluble. Such deposits can cause serious trouble including clogging of the filter. Where possible, try to avoid mixing oils of the same type but different brands. A brand change is best made at the time of a complete oil change. Refer to the **Fluids & Lubrication Table** for oil recommendation.

SECTION 9 - PARTS ORDERING

GENERAL

This publication, which contains an illustrated parts breakdown, has been prepared as an aid in locating those parts which may be required in the maintenance of the unit. All of the compressor parts, listed in the parts breakdown, are manufactured with the same precision as the original equipment. For the greatest protection always insist on genuine Ingersoll-Rand Company parts for your compressor.

The unit covered by the manual has been custom designed and built to satisfy our customer's unique specifications by the Portable Compressor Division (PCD) Customer 1 Process Team.

Some of the unique, special order components may not be included in the illustrated parts breakdown. Supplemental pages with photo illustrations have been added to assist in identifying special order parts when required for service orders.

Contact the PCD Parts Department for assistance when ordering these special parts. Include the unit serial number with all orders.

NOTICE

Ingersoll-Rand Company can bear no responsibility for injury or damages resulting directly from the use of non-approved repair parts.

Ingersoll-Rand Company service facilities and parts are available worldwide. There are Ingersoll-Rand Company Construction Equipment Group Sales Offices and authorized distributors located in the principal cities of the United States. In Canada our customers are serviced by the Canadian Ingersoll-Rand Company, Limited. There are also Ingersoll-Rand International autonomous companies and authorized distributors located in the principal cities throughout the free world.

Special order parts may not be included in this manual. Contact the Mocksville Parts Department with the unit serial number for assistance with these special parts.

DESCRIPTION

The illustrated parts breakdown illustrates and lists the various assemblies, subassemblies and detailed parts which make up this particular machine. This covers the standard models and the more popular options that are available.

A series of illustrations show each part distinctly and in location relative to the other parts in the assembly. The part number, the description of the part and the quantity of parts required are shown on each illustration or on adjacent page.

The quantities specified are the number of parts used per one assembly and are not necessarily the total number of parts used in the machine. Where no quantity is specified the quantity is assumed to be one.

Each description of a part is based upon the "noun first" method, i.e., the identifying noun or item name is always the first part of the description. The noun name is generally followed by a single descriptive modifier. The descriptive modifier may be followed by words or abbreviations such as upper, lower, inner, outer, front, rear, RH, LH, etc. when they are essential.

In referring to the rear, the front or to either side of the unit, always consider the **drive end** of the unit as the **front**. Standing at the rear of the unit facing the drive end (front) will determine the right and left sides.

FASTENERS

Both SAE/inch and ISO/metric hardware have been used in the design and assembly of these units. In the disassembly and reassembly of parts, extreme care must be taken to avoid damaging threads by the use of wrong fasteners. In order to clarify the proper usage and for exact replacement parts, all standard fasteners have been identified by part number, size and description. This will enable a customer to obtain fasteners locally rather than ordering from the factory. These parts are identified in tables that will be found at the rear of the parts illustrations. Any fastener that has not been identified by both part number and size is a specially engineered part that must be ordered by part number to obtain the exact replacement part.

MARKINGS AND DECALS

NOTICE

Do not paint over safety warnings or instructional decals. If safety warning decals become illegible, immediately order replacements from the factory.

Part numbers for original individual decals and their mounting locations are shown within Parts List. These are available as long as a particular model is in production.

Afterwards, service sets of exterior decals and current production safety warning decals are available. Contact the Product Support Group at Mocksville for your particular needs and availability.

HOW TO USE PARTS LIST

a. Turn to Parts List Section.

b. Locate the area or system of the compressor in which the desired part is used and find illustration page number.

c. Locate the desired part on the illustration by visual identification and make note of part number and description.

HOW TO ORDER

The satisfactory ordering of parts by a purchaser is greatly dependent upon the proper use of all available information. By supplying your nearest sales office, autonomous company or authorized distributor, with complete information, you will enable them to fill your order correctly and to avoid any unnecessary delays.

In order that all avoidable errors may be eliminated, the following instructions are offered as a guide to the purchaser when ordering replacement parts:

a. Always specify the model number of the unit as shown on the general data decal attached to the unit.

b. Always specify the serial number of the unit. THIS IS IMPORTANT. The serial number of the unit will be found stamped on a plate attached to the unit.

c. Always specify the number of the parts list publication.

d. Always specify the quantity of parts required.

e. Always specify the part number, as well as the description of the part, or parts, exactly as it is given on the parts list illustration.

In the event parts are being returned to your nearest sales office, autonomous company or authorized distributor, for inspection or repair, it is important to include the serial number of the unit from which the parts were removed.

TERMS/CONDITIONS ON PARTS ORDERS

Acceptance: Acceptance of an offer is expressly limited to the exact terms contained herein. If purchaser's order form is used for acceptance of an offer, it is expressly understood and agreed that the terms and conditions of such order form shall not apply unless expressly agreed to by Ingersoll-Rand Company ("Company") in writing. No additional or contrary terms will be binding upon the Company unless expressly agreed to in writing.

Taxes: Any tax or other governmental charge now or hereafter levied upon the production, sale, use or shipment of material and equipment ordered or sold is not included in the Company's price and will be charged to and paid for by the Purchaser.

Delivery: Shipping dates are approximate. The Company will use best efforts to ship by the dates specified; however, the Company shall not be liable for any delay or failure in the estimated delivery or shipment of material and equipment or for any damages suffered by reason thereof.

Shipping dates shall be extended for delays due to acts of God, acts of Purchaser, acts of Government, fires, floods, strikes, riot, war, embargo, transportation shortages, delay or default on the part of the Company's vendors, or any other cause beyond the Company's reasonable control.

Should Purchaser request special shipping instruction, such as exclusive use of shipping facilities, including air freight when common carrier has been quoted and before change order to purchase order can be received by the Company, the additional charges will be honored by the Purchaser.

Warranty: The Company warrants that parts manufactured by it will be as specified and will be free from defects in materials and workmanship. The Company's liability under this warranty shall be limited to the repair or replacement of any part which was defective at the time of shipment provided Purchaser notifies the Company of any such defect promptly upon discovery, but in no event later than three (3) months from the date of shipment of such part by the Company. The only exception to the previous statement is the extended warranty as it applies to the special airend exchange program.

Repairs and replacements shall be made by the Company F.O.B. point of shipment. The Company shall not be responsible for costs of transportation, removal or installation.

Warranties applicable to material and equipment supplied by the Company but wholly manufactured by others shall be limited to the warranties extended to the Company by the manufacturer which are able to be conveyed to the Purchaser.

The company makes no other warranty or representation of any kind whatsoever, expressed or implied, except that of title, and all implied warranties, including any warranty of merchantability and fitness for a particular purpose, and hereby disclaimed.

Limitation of Liability:

The remedies of the Purchaser set forth herein are exclusive, and the total liability of the Company with respect to this order whether based on contract, warranty, negligence, indemnity, strict liability or otherwise, shall not exceed the purchase price of the part upon which such liability is based.

The Company shall in no event be liable to the Purchaser, any successors in interest or any beneficiary of this order for any consequential, incidental, indirect, special or punitive damages arising out of this order or any breach thereof, or any defect in, or failure of, or malfunction of the parts hereunder, whether based upon loss of use, lost profits or revenue, interest, lost goodwill, work stoppage, impairment of other goods, loss by reason of shutdown or non-operation, increased expenses of operation or claims of customers of Purchaser for service interruption whether or not such loss or damage is based on contract, warranty, negligence, indemnity, strict liability or otherwise.

AIREND EXCHANGE PROGRAM

The objective of the airend exchange program is to provide a variety of solutions to our customers and promote the sale of Ingersoll-Rand remanufactured airends with competitive advantages:

- **Quality:** Remanufactured airends are built by trained and certified craftsman.
- **Reliability:** All airends are tested to original factory specifications.
- **Performance:** All airends are upgraded with newest technology to insure optimum performance.
- **Availability:** Majority of airends are kept in stock to insure minimal compressor downtime.
- **Warranty:** 5 year extended warranty available.
- **Support:** Aftermarket technical support. Second to none.

The airend exchange program is a three-tier solution structure. When an airend needs to be replaced, the customer has three alternative solutions:

1. New Airend.
2. Remanufactured airend.
3. Airend rebuild kit-rebuilt in field.

Portable Power will exchange any used airend, including a non-IR airend, for a remanufactured or new airend regardless of condition of the returned airend.

Ingersoll-Rand Warranty
A) Ingersoll-Rand Airends:

1) Standard Warranty on new Ingersoll-Rand airends is 2 years or 4000 hours of operation.

2) Standard Warranty on remanufactured Ingersoll-Rand airends is one year or 2000 hours of operation.

3) Extended Warranty of 5 years or 10,000 hours of operation is available on new airend remanufactured IR airends provided the following conditions are met:

- Continued use of Ingersoll-Rand genuine lubricants, filters and parts.
- Compressor maintenance is performed at prescribed scheduled intervals.
- Proper installation of airend.

B) Competitive (Non-IR) Airends:
1) Standard Warranty of 1 year or 2000 hours of operation.
2) Extended Warranty of 5 years or 10,000 hours of operation is available on remanufactured non-IR airends provided the following conditions are met:

- Continued use of Ingersoll-Rand supplied filters and fluids for non-IR airends
- Compressor maintenance is performed at prescribed scheduled intervals
- Proper installation of airend

C) 6 months standard parts warranty on Ingersoll-Rand airend rebuild kits.

C) 6 months standard parts warranty on Ingersoll-Rand airend rebuild kits.

Airend Pricing and Procedure
• All new and remanufactured airends will have 30% discount of list price (0.7multiplier) if a used airend is to be returned for exchange. If no airend is to be returned, then the discount is 10% of list (0.9 multiplier).
• Call Ingersoll-Rand Customer Service for assistance when replacing competitive (non-IR) airend with an Ingersoll-Rand remanufactured or new airend (especially in drill and OEM applications). The normal 30% discount still applies on IR remanufactured or new airends.
• For rebuilding competitive (non-IR) airends, contact Customer Service for pricing, leadtimes, and application engineering assistance.

• **Return of Used Airends:**
• **US and Canada,** all used airends must be returned to IR-Mocksville within 60 days from date of order. Failure to return old airends within 60 days will result in a surcharge invoiced to the distributor / equipment store equal to 20% of the airend list.
• **Latin America,** used airends, at IR discretion, can be either returned to closest IR location or held at distributor location.
• **AP,** used airends, at IR discretion, can be either returned to IR-Singapore within 60 days from date of order, or held at distributor location. Failure to return old airends within 60 days will result in a surcharge invoiced to the distributor / equipment store equal to 20% of the airend list.

Ingersoll-Rand Distributor / Equipment Store can place order directly on CDS / GBS for replacement airend. Use Airend Exchange Price schedule to identify airend or call your customer service representative (CSR) for help.

The order must contain:

- Returned airend serial number.
- Airend Exchange return authorization numbers which is assigned prior to shipment of airend by your CSR.
- Returned airend must be tagged with the return authorization number and shipped **prepaid** to the factory.
- Warranty registration cards are shipped with each rebuilt exchange airend. These must be filled out and returned or faxed to the Field Service Department.
- Do not seek an Exchange airend to satisfy a warranty claim. Contact a Field Service representative to process your warranty claim.
- Ingersoll-Rand reserves the right to ship new or rebuilt airends to satisfy both warranty claims and exchanges.
- Drive coupling are not included with airends in this program.
- Airends will be shipped collect or prepaid, with charges added to the invoice.

To help insure warranty, these measures should be followed:

AIREND REPLACEMENT PRECAUTIONS

When replacing any airend with either a new or rebuilt airend, it is essential that certain precautionary measures be taken before, during, and after installation-no matter what the reason for the failure.

I. BEFORE REPLACEMENT AIREND IS INSTALLED:

A. Drain the entire lubrication oil system completely.

B. Remove the old oil filter element. Discard.

C. Flush all components in the system separately; i.e. valves, switches, manifolds, piping and/or hose, oil cooler and separator tank. If necessary, remove component, flush, and replace if either inner or outer covering is visibly damaged.

D. Check condition of all compressor airend oil hoses and replace if either inner or outer covering is visible damaged.

E. Remove separator cover and inspect separator element. If element shows any signs of excessive hear, varnish coating, or has collapsed, replace element.

II. DURING INSTALLATION:

Take every precaution to prevent foreign material of any kind from entering any opening of the installed airend. If at all possible, the airend should be replaced in dust and moisture free surroundings.

III. AFTER INSTALLATION:

A. Install new oil filter.

B. Refill system with recommended oil.

To validate extended warranty:

- Use IR Protective lubricants and filters.
- Use Ingersoll-Rand Pro-Tec Fluid for machines designed to operate at 300 psi and below.
- Use Ingersoll-Rand XHP505 for machines designed to operate at 350 psi.

Ingersoll-Rand Performance 500 Fluid may be used in all pressure applications depending on ambient of -40F to 65F (-40C to 18C).

Proof that IR Protective lubricants and filters have been used for the life of the airend is required when submitting warranty claims for extended coverage.

C. Pour one gallon of oil into intake to aid lubrication on initial start up (This applies to screw airends only).

D. Run unit for one our. Replace oil filter element.

E. Replace oil filter element again after initial 50 and 150 operating hours and thereafter every 500 operating hours, or when oil filter service indicator show need for element change, whichever comes first.

F. Resume normal maintenance.