Onboard Power Solutions™

Operation & Maintenance Manual

Compressor Models

VHP40RMD - Diesel Drive
VHP40RMG - Gasoline Drive

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.

Ingersoll Rand Company
P.O. Box 868
501 Sanford Ave
Mocksville, NC 27028 USA

Book: 23221138 (12/07) Rev A

Revised (01-13)

QUALITY POLICY

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

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Safety

Safety

Safety Precautions

General Information

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

Ensure that the Operation and Maintenance manual, and the manual holder if equipped, are not removed permanently from the machine.

Ensure that maintenance personnel are adequately trained, competent and have read the manuals. Make sure that all protective covers are in place.

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.

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

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 or over pressurized by another.

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

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 valves located in the discharge pipe and connected receiver tank must be checked periodically for correct operation.Avoid bodily contact with compressed air.

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

Never operate the driver engine of this machine inside a building without adequate ventilation. Avoid breathing exhaust fumes when working on or near the machine. Do not alter or modify this machine.

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.

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.

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.

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.

This machine produces loud noise. Extended exposure to loud noise can cause hearing loss. Always wear hearing protection when operating this unit.

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.).

Never operate unit with guards, covers or screens removed. Keep hands, hair, clothing, tools, blow gun tips, etc. well away from moving parts

Hazardous Substance Precaution

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

Precaution: Avoid ingestion, skin contact and breathing fumes for the following substances: Compressor Oil, Preservative Grease, Rust Preventative, Hydraulic Fluid.

Safety Labels

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

Corrosion risk

Hot surface

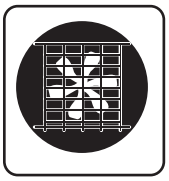
Lifting point.

WARNING: Electrical shock risk

Parking Brake

No open flame

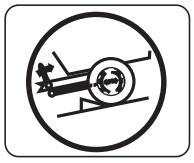
Diesel Fuel.
No open flame



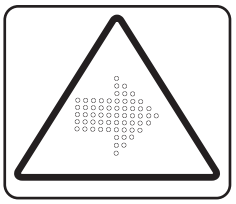
Do not operate the machine without guard being fitted.

Lifting point.

WARNING - Flammable liquid



When parking use prop stand, handbrake and wheel chocks



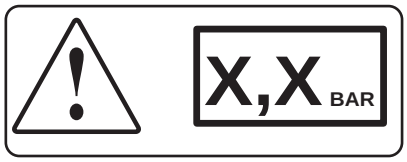
Air/gas flow or Air discharge.

WARNING - Hot and harmful exhaust gas.

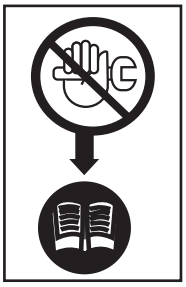
Tie down point

Do not breathe the compressed air from this machine

Read the Operation and Maintenance manual before operation or maintenance of this machine is undertaken.



WARNING - Maintain correct tire pressure (Refer to the *GENERAL INFORMATION* section of this manual.



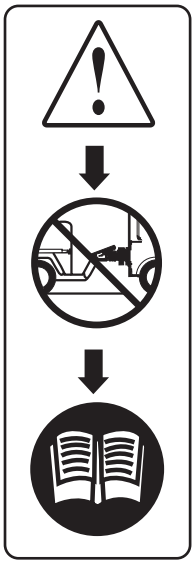
WARNING - Consult the operation and maintenance manual before commencing any maintenance.

Rough Service Designation
Wet Location Operation

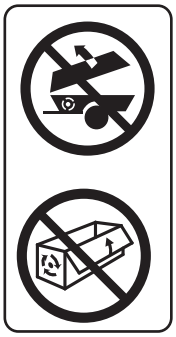
Do not stack.

Do not use fork lift truck from this side.

Replace any cracked protective shield.



WARNING - Before connecting the tow bar or preparing to tow, consult the operation and maintenance manual.

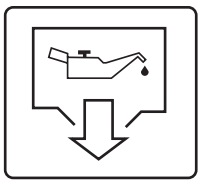


Do not operate with the doors or enclosure open

On (power).

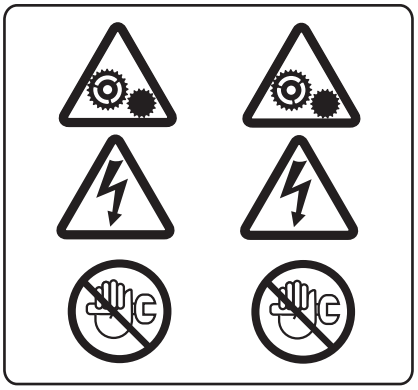
Off (power).

Emergency stop

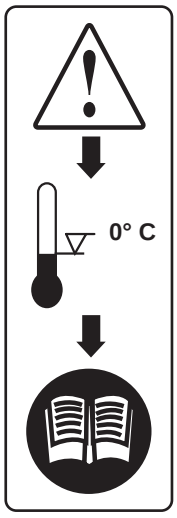


Oil Drain

Do not exceed the speed limit.



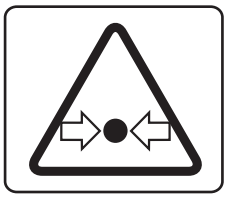
WARNING - Do not undertake any maintenance on this machine until the electrical supply is disconnected and the air pressureis totally relieved.



WARNING - For operating temperature below 0° C, consult the operation and maintenance manual

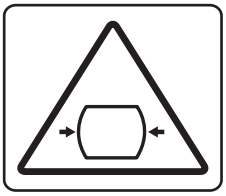
Read the Operation and Maintenancemanual before operation or maintenance of this machine is undertaken.

Do not remove operating and maintenance manual and manual holder from this machine.



Pressurized vessel.

Use fork lift truck from this side only



Pressurized component or system.

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

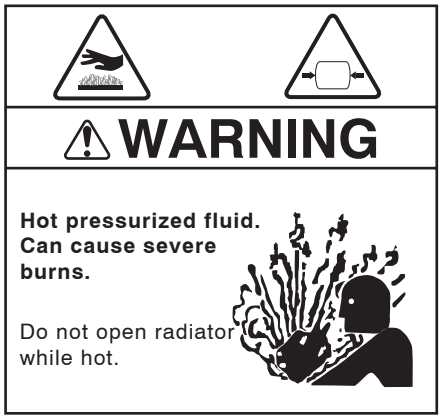
Indicates the presence of a hazard which WILL or can cause injury or property damage, if ignored.

NOTICE
(Blue Background)

Indicates important set-up, operating or maintenance information.


DANGER
Discahrged air can contain carbon monoxide or other contaminants. Will cause serious injury or death.
Do not breathe this air.


WARNING
Trapped air pressure. Can cause serious injury or death
Close service valve and operate tool to vent trapped air before performing any service


WARNING
Hot pressurized fluid. Can cause severe burns.
Do not open radiator while hot.


WARNING
High pressure air. Can cause serious injury or death.
Relieve pressure before removing filler plugs/caps, fittings or coverrs.

⚠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 alternation of this machine.
Can cause serious injury or death.

Do not alter modify this machine without the express written consent of the manufacturer.

⚠WARNING

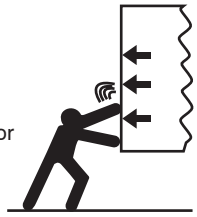
Rotating fan blade.
Can cause serious injury.

Do not operate without guard on 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.

105 km/h

⚠WARNING

Collapsing jackstand.
Can cause serious injury.

Insert locking pin completely.

Excessive towing speed.
Can cause serious injury or death.

Do NOT exceed 65 mph (105 km/hr.)

⚠WARNING

Falling of machine.

Can cause serious injury or death.

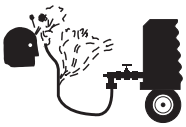
Access lifting bail from inside machine.

⚠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.

CAUTION

DO NOT USE ETHER.

ENGINE DAMAGE WILL OCCUR.

This engine is equipped with an electric heater starting aid.

USE DIESEL FUEL ONLY

NOTICE

COOLANT FILL INSTRUCTIONS

Adding:

Do NOT remove radiator cap. Top offat overflow reservoir. Use same anti-freeze mixture as in radiator.

Replacing:

With system cool, remove radiator cap. Drain coolant and close drain. At radiator, refill system. Replace radiator cap. At reservoir, fill to "HOT" level. Run for 30 minutes. Stop and allow to cool. At reservoir, add coolant as necesary to reach "COLD" level.

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 order 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.

Warranty

Warranty/Registration

Ingersoll Rand Company warrants that the equipment manufactured by it and delivered hereunder shall be free of defects in material and workmanship for the following period:

Standard Warranty

Standard warranty is for a period of twelve (12) months from the date of placing the equipment in operation or eighteen (18) months from the date of shipment, whichever shall occur first. The foregoing warranty shall apply to all equipment.

One-Year Extended Warranty

Standard warranty is for a period of twelve (12) months from the date of placing the equipment in operation or eighteen (18) months from the date of shipment, whichever shall occur first. The foregoing warranty shall apply to all equipment.

To extend the warranty, the purchaser must continually use All Season Select brand synthetic lubricant, use genuine Ingersoll Rand parts, and demonstrate the product was maintained based on the recommended procedures per the Operator Manual. The foregoing extended warranty period shall apply to the bare compressor pump only and excludes package related components.

Replacement Parts

Ingersoll Rand genuine replacement parts will be warranted for six (6) months from the date of shipment.

Should any failure to conform to this warranty be reported in writing to Ingersoll Rand Company within said period, Ingersoll Rand Company shall, at its option, correct such nonconformity by suitable repair to such equipment, or furnish a replacement part F.O.B. point of shipment, provided the purchaser has installed, maintained and operated such equipment in accordance with good industry practices and has complied with specific recommendations of Ingersoll Rand Company.

Accessories or equipment furnished by Ingersoll Rand Company, but manufactured by others, shall carry whatever warranty the manufacturer conveyed to Ingersoll Rand Company and which can be passed on to the purchaser.

Ingersoll Rand Company shall not be liable for any repairs, replacements, or adjustments to the equipments or any costs of labor performed by the purchaser without Ingersoll Rand Company's prior written approval.

Ingersoll Rand Company makes no performance warranty unless specifically stated within its proposal and the effects or corrosion, erosion and normal wear and tear are specifically excluded from Ingersoll Rand Company's warranty. In the event performance warranties are expressly included, Ingersoll Rand Company's obligation shall be to correct in the manner and for the period of time provided above.

INGERSOLL RAND COMPANY MAKES NO OTHER WARRANTY OF REPRESENTATION OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE HEREBY DISCLAIMED.

Correction by Ingersoll Rand Company non-conformities, whether patent or latent, in the manner and for the period of time provided above shall constitute fulfillment of all liabilities of Ingersoll Rand Company and its distributors for such non-conformities whether based on contract, warranty negligence, indemnity, strict liability or otherwise with respect to or arising out of such equipment. The purchaser shall not operate equipment that is considered to be defective, without first notifying Ingersoll Rand Company in writing of its intention to do so. Any such use of equipment will be at Purchaser’s sole risk and liability.

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 868
Mocksville, North Carolina 27028

Attn: Warranty Department

NOTE: Completion of this form validates the warranty.

Selling Distributor	Servicing Distributor	WARRANTY
Name _____	_____	_____
Address _____	_____	_____
City _____	_____	_____
County _____	_____	_____
State _____	_____	_____
Zip code _____	_____	_____
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	☐ Water well	☐ Utility Company (gas, electric, water, etc.)
☐ Industrial (plant use)	☐ Other specify _____	☐ Exploration	☐ Utility Contractor

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

SERVICING DISTRIBUTOR/USER ACKNOWLEDGEMENT

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.

fold

Attention: Warranty Department

Ingersoll Rand Company
Portable Compressor Division
P.O. Box 868
Mocksville, North Carolina 27028

Installation

Installation

System Description - General

The VHP40RMD and VHP40RMG units are semi-packaged, or (optionally) totally self-contained utility mount, reciprocating type, engine driven, air cooled air compressors. Each unit is designed to operate at ambient temperatures from -10° F to 125° F (-23.3° C to 51.7° C).

Each model includes a 2-stage, 4-cylinder reciprocating air compressor, either a diesel or gasoline driven engine with attached radiator and fan, compressor and engine air inlet systems, a compressor lubricating oil system, a compressor discharge system, belt drive system, electric compressor cooling fan, as well as basic instrumentation. An electric starter with onboard battery) is standard equipment. Separate air cleaners for the engine and each bank of the compressor are installed, and a service reminder is fitted on the engine air cleaner.

Basic instrumentation includes compressor discharge air pressure gauge, hour meter, warning lights for engine oil pressure, engine coolant temperature, and alternator output. There is a safety shutdown system that monitors and stops the compressor in the case of high engine coolant temperature, high compressor discharge temperature, or low engine oil pressure. A starting bypass switch is provided in order to bypass the shutdown system during starting until the engine oil pressure is high enough to activate the engine oil pressure switch.

The enclosure cabinet, in which the components are mounted, is of heavy gauge sheet steel and is equipped with easy opening access panels for performing routine maintenance functions.

The compressor module includes either a three cylinder gasoline engine or a three cylinder diesel engine driving the air compressor pump via a double Powerband type "B" section belt type construction.

The drive belt system includes a heavy-duty tension-side idler pulley, the purpose of which is to reduce vibration and pulsation in the belt.

The compressor pump is a high efficiency, air cooled Ingersoll Rand manufactured two stage reciprocating unit, with duplicate low pressure and a high pressure stages on either side of twin banks in a 90 degree “V” layout. The pump features intercooling for both banks. Valve durability is increased through the use of travel limiters on all intake and exhaust stainless steel reed-type valves. Lubrication is splash type with mandatory use of synthetic oil. Construction is heavy duty cast iron throughout.

Belt tension is adjustable using a convenient pair of tensioning bolts, which are adjusted after loosening the four bolts that secure the motor bracket and air pump.

The compressor pump, engine, and drive system are fixed rigidly within relation to one another on a sub-base. This sub-base is mounted on four vibration isolators, which in turn are attached to the main base. This insolates shock and vibration from the main base and housing of the unit, and in turn from the vehicle to which the unit is mounted. This provides simplicity of mounting the compressor to the vehicle, as the rigid frame can be bolted directly to the body.

The discharge pressure of the compressor can be operated anywhere between 0 and 175 psig. Cooling for both the compressor and the hydraulics is sufficient for continuous operation at full load.

An unloader valve triggers when the maximum set discharge pressure is reached, causing the engine to throttle back and the reduced compressor output to be discharged overboard at very low pressure. The nominal settings from the factory are unload at 175 psig and load at 145 psig. The unload pressure is adjustable at the unloader valve from 175 psig to 100 psig.

Mounting Unit

Satisfactory installation depends upon the ability of the installer. Refer to the appropriate foundation plan for the dimensions of the compressor package.

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 into the package. The air exiting the package 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.

⚠ CAUTION

Do NOT mount the unit with either the fan or cooler side of the machine facing forward on a vehicle such that unrestricted airflow from motion of the vehicle may enter the unit. Mounting the unit this way will cause wind milling of the fan that can damage it. Mounting with this orientation must be done behind a cab or other wind blocking structure.

The compressor package must be located so the instrument panel will be fully visible. If desired the instrument cluster may be moved to the opposite side of the compressor. To move, switch the gauges with the hole covers on the opposite side.

Exact level is not absolutely necessary, but it is recommended the unit be leveled with a carpenter's level set on the compressor housing. Leveling may be accomplished by shimming the unit near the unit's bolting holes. Use only steel shims. Mounting holes are provided on the bottom of the base.

The mounting hole pattern of the compressor base and the optional fuel tank / receiver tank module is identical, so that the tank module can be mounted later without drilling more holes or separately using the same template.

Sufficient space must be provided at all service openings to provide ready access for service and maintenance. For installations such as under the bed of a truck, it may be desirable to provide a sliding mount tray for the compressor to facilitate servicing. For this type mounting, care must be exercised to provide adequate piping and wiring slack to allow the unit to move for service.

Compressor Discharge Piping

The connection between the compressor package and the receiver must be furnished by the customer, unless the optional fuel tank/receiver tank module is supplied. It is recommended the customer use a flexible line of ½" or larger. All piping must be certified safe for the pressures and temperatures involved.

This unit utilizes a sense line that is connected from the receiver tank to the gauge / switch port on the compressor. This port is located next to the compressed air discharge on the end of the compressor. The purpose of this line is to provide a relatively pulsation free, cool, and stable pressure signal for use by the discharge pressure gauge. The receiver is thus used as a pulsation damper. This ensures smooth, accurate operation of the gage and the switch and extends the life of these components. This line must be connected for the unit to function.

⚠ CAUTION

Do NOT install a cutoff valve of any type between the discharge of the compressor module and the receiver tank. Dead-heading the pump can cause severe internal damage to the pump, drive, or other components.

Receiver Tank Installation

Ingersoll Rand offers two different size receiver tank options for the reciprocating compressor modules. These tanks are intended to be remote mounted either under the vehicle or in a service body compartment. The 10-gallon tank is supplied with band clamps for mounting to the truck's frame rail, but it can be mounted elsewhere if needed. The 22-gallon tank has mounting flanges and isolators for mounting the tank on installer-provided brackets somewhere in or on the body of the truck.

These tank kits are designed for installation versatility. Depending on the application, some of the components are interchangeable. This feature allows the tanks to be installed in a number of different configurations.

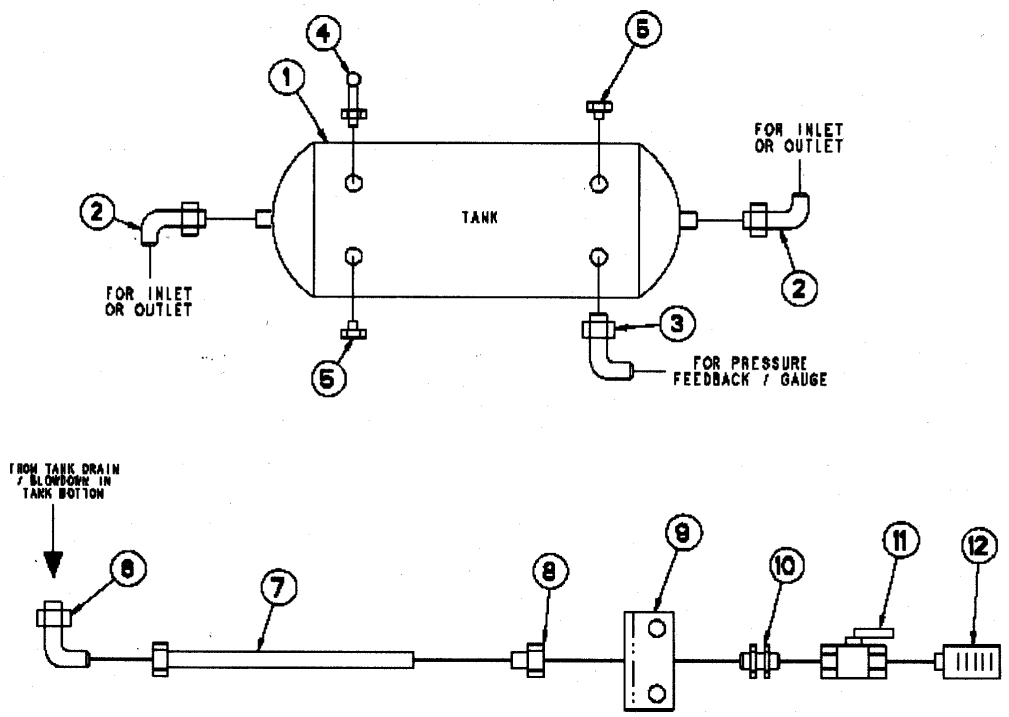
The compressor discharge air should be piped to the tank inlet. Any service air connections should be taken from the tank outlet. See the tank piping diagrams for further piping information.

Piping - General

CM Series Compressors will require customer provided piping from the compressor module to the hydraulic supply and the air service piping. These hoses are not provided with the units, as the required lengths of the hoses are dependent on the relative locations of module in its installed location. It is left to the installer to obtain hoses of the correct type and length for each installation.

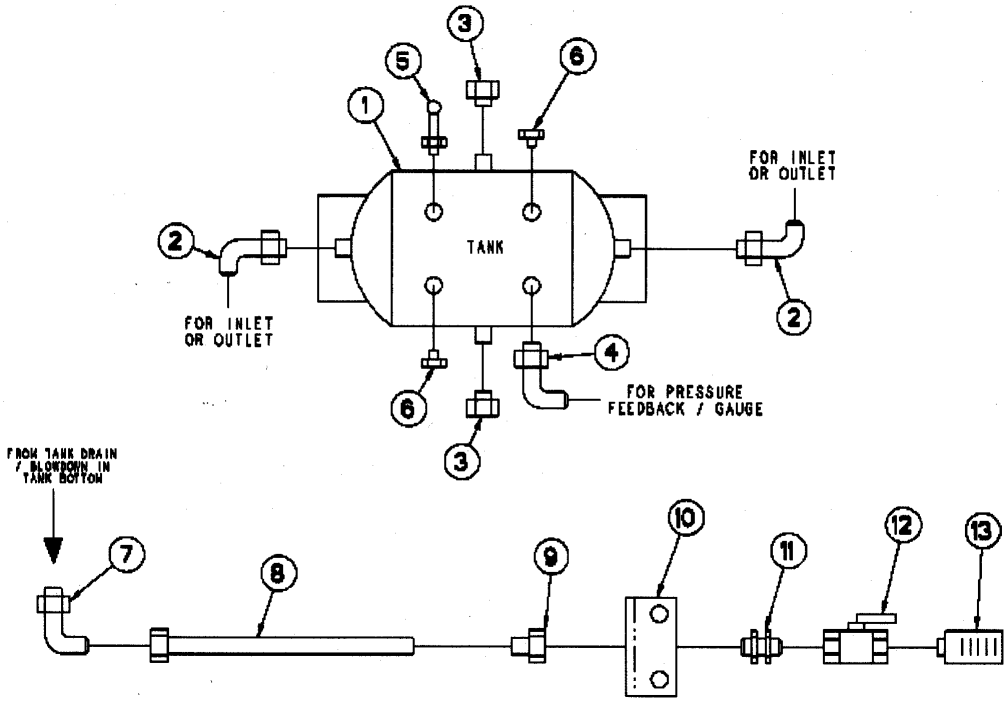
Case drain hose must connect to hydraulic reservoir directly, not to hydraulic oil return line.

Location	Fitting Size	Hose Size	Hose Type
Compressor Module to Air Receiver	½" FNPT	½"	Parker-Hannifin 213, or Aeroquip FC350, or equivalent
Fuel Supply and return hoses	5/16” barb	5/16”	Gates 4219G or equivalent
Gauge/Switch port to receiver	-4 JIC	¼" (-4)	Parker-Hannifin 213, or Aeroquip FC350, or equivalent



Notes: 1. Components 3, 4 and 5 are interchangeable per application.

ITEM No.	PART No.	DESCRIPTION
1	22456222	Tank, Air Receiver 10 gallon
2	95937637	Elbow, 90° .75 Tube x .75 NPT
3	35283464	Elbow, 90° .25 NPT x .25 SAE
4	39588074	Valve, Pressure Relief
5	95954038	Plug, .25 NPT
6	35309210	Elbow, 90° .50 Tube x .50 NPT
7	22459697	Hose, .50 Tube x 6.0 Ft Long
8	22459689	Swivel, Reusable .50 Tube
9	22455711	Bracket, Tank Blowdown
10	95149969	Conn, Bulkhead .50 NPT x .75 SAE
11	35581792	Valve, Ball .50 NPT
12	35132299	Silencer, Blowdown EPA



Notes: 1. Components 2 and 3 are interchangeable per application.
2. Components 4, 5 and 6 are interchangeable per application.

ITEM No.	PART No.	DESCRIPTION
1	22473474	Tank, Air Receiver 22 gallon
2	95937637	Elbow, 90° .75 Tube x .75 NPT
3	95947149	Plug, .75 NPT
4	35283464	Elbow, 90° .25 NPT x .25 SAE
5	39588074	Valve, Pressure Relief
6	95954038	Plug, .25 NPT
7	35309210	Elbow, 90° .50 Tube x .50 NPT
8	22459697	Hose, .50 Tube x 6.0 Ft Long
9	22459689	Swivel, Reusable .50 Tube
10	22455711	Bracket, Tank Blowdown
11	95149969	Conn, Bulkhead .50 NPT x .75 SAE
12	35581792	Valve, Ball .50 NPT
13	35132299	Silencer, Blowdown EPA

Wiring

Both the VHP40RMD and VHP40RMG are electrically self-contained, and no interface wiring to a vehicle onto which it may be mounted is necessary. The exception to this occurs if the user wished to connect the compressor to the 12VDC battery of the vehicle. If this is done, the compressor battery, battery cables, and battery heat shield should be removed. Depending on their length, larger gage battery cables than supplied with the compressor will probably be required. The new cables should be terminated at the same locations as the supplied cables. Care must be taken to provide sufficient strain relief in the external cables and to ensure that they do not chafe on any sharpe edges.

The compressor is protected against overheating by a thermal-type discharge air temperature switch located in the compressor discharge manifold. A “normally-open” type thermal switch, factory set at 482°F (250°C), is supplied as standard equipment on these units. Similarly, the engine is protected against overheating with a thermal switch situated in the thermostat housing, sensing engine coolant temperature as it is discharged to the radiator.

The safety shutdown function of the unit is completely internal to the module, and operates by de-energizing the fuel solenoid on the gasoline engine and de-energizing a solenoid that holds the fuel control on the fuel injection pump open on the diesel powered unit.

General Data

General Data

Unit Models

Unit Model	VHP40RMD	VHP40RMG
Rated Delivery cfm (litres/sec)	.40(19)	40 (19)
Rated Pressure psi (kPa)	175(1207)	175 (1207)

Engine Types and Ratings	Kubota	Kubota
Model	.D722	WG572
Displacement	.719L	.740L
Type	4-cycle, 3 cylinder diesel	4-cycle, 3 cylinder gasoline
Net Power, BHP (kW)	15.9 (11.9)	21.7 (16.2)
Rated speed (RPM)	3000	3000
Idle speed (RPM)	2000	2000
Starting aid	Glow plugs	NA
Crankcase Capacity, Quarts (Liters)	3.34 (3.15)	3.44 (3.25)
Engine Coolant Capacity, Gallons (Liters)	TBD	TBD

Air Pump

Model	IR TS-10
Type	2-stage, 4-cyl
Compressor Lube Capacity fl.oz (liters)	50 (1.5)
Lube Type	IR All Season Select

Unit Measurements/Weights:

Overall Length - inch (mm)	47.75 (1213)
Overall Height - inch (mm)	30.0 (762)
Overall Width - inch (mm)	22.0 (559)
Weight - (system with lubricants) - pounds (kilograms)	725 (329)

Service Parts:

Air Cleaner Element - engine	36890135
Air Cleaner Element - (2 required) - air pump	32970979
Compressor Oil - IR All Season Select	32498560 (qt)
Compressor Oil - IR All Season Select	32319758 (gal)
Battery, 12 V (BCI Group Size UI, 400 CCA)	22660567
Engine Oil Filter	TBD
Engine Fuel Filter (Diesel unit only)	36870566
Engine Fuel Pre-Filter (Diesel unit only)	36845493
Engine Fuel Filter (gasoline unit only)	TBD
Engine Oil, IR Pro-Tec Engine Fluid, 15W-40	64480918 (1 gal)

Operating Instructions

Operating Instructions

Set-Up

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

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.

⚠ WARNING

Unrestricted air flow from a hose will result in a whipping motion of the hose which can cause serious 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).

Check the compressor oil level. The proper level exists if it is visible in the upper half of the sight glass with the unit level. It is advisable to add if the level is below the mid-point of the sight glass. Do not overfill - the top of the sight glass is the full mark.

⚠ WARNING

This machine produces loud noise. Extended exposure to loud noise can cause hearing loss. Wear hearing protection.

Always operate this equipment with all enclosure panels installed to avoid recirculation of hot air and loss of flow through the oil cooler. This will maximize the life of the compressor.

⚠ WARNING

Do NOT operate machine with guards removed.

⚠ CAUTION

Do not operate machine with safety shutdown switch bypassed.

Before Starting

- Check battery for proper connections and condition.
- Check engine coolant level.

⚠ WARNING

Do not remove pressure cap from a HOT radiator. Allow radiator to cool down before removing pressure cap. Use extreme care when removing a pressure cap from a liquid cooling system for the engine. The sudden release of pressure from a heated cooling system can result in a loss of coolant and possible severe personal injury.

- Check the engine oil level. Maintain per marks on dipstick.
- Check the fuel level. Add only CLEAN fuel for maximum service from the engine.
- Check the compressor lubricating fluid level between top and midway of the sight glass on the compressor sump sight glass.

⚠ WARNING

This machine produces loud noise with service valve open. Extended exposure to loud noise can cause hearing loss. Wear hearing protection when valve is open.

- Close all service panels to maintain a cooling air path and to avoid recirculation of hot air. This will maximize the life of the engine and compressor.
- Be sure no one has any body part in the machine.

Starting/Operating

NOTICE

Exercise extreme caution when using a booster battery to start. To jump start: Connect the ends of one booster cable to the positive (+) terminals of each battery. Then connect one end of the other cable to the negative (-) terminal of the booster battery and the other end to the engine block. NOT TO THE NEGATIVE (-)TERMINAL OF THE WEAK BATTERY.

Diesel Unit

NOTICE

Engine is equipped with glow plugs for cold starting aid. Do not use ETHER/starting fluid.

- IF the receiver is pressurized OR the engine is cold, activate the hand unloader valve accessible through the hand hole in the side panel under the radiator. The aluminum toggle should be flipped so as to pull the valve rod outward.
- Insert key into power switch. Turn key counter-clockwise to "PREHEAT" position and hold for 10 -15 seconds. Note: More or less preheat time is needed depending on ambient temperature and time passage since unit was last run.
- Depress and hold bypass switch.
- Turn power switch fully clockwise to "START" position to crank engine. Hold switch in "START" position for approximately 5 seconds after engine starts.
- Return switch to "RUN" position.
- Release bypass switch after engine attains full speed.

NOTICE

Do not operate the starter motor for more than 10 seconds without allowing at least 30 seconds cooling time between start attempts.

- Allow engine to warm up about 5 minutes.
- Flip hand unloader toggle valve back to the run position.
- Unit is now ready to supply service air.

Gasoline Unit

- IF the receiver is pressurized OR the engine is cold, activate the hand unloader valve accessible through the hand hole in the side panel under the radiator. The aluminum toggle should be flipped so as to pull the valve rod outward.
- Pull choke know all the way out.
- Insert key into power switch.
- Turn power switch fully clockwise to "START" position to crank engine. Hold switch in "START" position for approximately 5 seconds after engine starts.
- Return switch to "RUN" position.
- Release bypass switch after engine attains full speed.
- Slowly push choke knob all the way in until engine runs smoothly.

NOTICE

Do not operate the starter motor for more than 10 seconds without allowing at least 30 seconds cooling time between start attempts.

- Allow engine to warm up about 5 minutes.
- Flip hand unloader toggle valve back to the run position.
- Unit is now ready to supply service air.

Unloader Pressure Adjustment

- The pressure regulation is accomplished by adjustment available on the unloader valve. The factory setting is 175 psig, but the end user if desired can lower this.
- At the set pressure, the unloader opens to divert flow from the air pump overboard. At the same time, pressure to the engine throttle control air cylinder is provided to bring the engine to idle speed.
- When the unit is unloaded and the discharge pressure reduces as service air is consumed, the pressure reduces to a point that the unloader valve returns to the load sense. This closes the diverter valve and re-establishes the airflow through the normal discharge port. The pressure at which this occurs is approximately 30 psi less than the unload pressure, and this regulation range is not reset table by the end user.
- To reset the unload pressure, loosen the lock nut that secures the adjusting screw just under the hand unloader toggle. Turn the adjusting screw outward (ccw) to reduce the pressure. Turn the screw inward (cw) to increase pressure.

⚠ CAUTION

Do not set the pressure at above 175 psig.

- Adjustments can be made with the unit off, loaded, or unloaded, but must be checked by allowing the unit to unload and noting the pressure at which this occurs. If necessary, readjust and repeat until desired pressure is achieved.

Need Instrument Panel Drawing

Operating Instruments

1. **Compressed Discharge Pressure Gauge** - indicates pressure in receiver tank, psig (kPa).
2. **Hour Meter** - indicates cumulative compressor operating time.
3. **Bypass Switch** - Push to bypass engine oil pressure switch during starting. Also for system reset following a engine automatic fault shutdown.
4. **Start/Preheat Switch** - Used to start and stop unit. On diesel units ONLY, used to activate glow plugs for starting preheat.
5. **Oil Pressure Lamp** - lights if unit shuts down due to low engine oil pressure.
6. **Alternator Lamp** - Lights if charging system malfunctions. Not a unit shutdown function.
7. **Water Temp Lamp** - Lights if unit shuts down due to excessive engine coolant temperature. Will also light if unit shuts down due to high air pump discharge temperature.
8. **Choke** - Engine choke for starting on gasoline powered units ONLY

Inside

Air Filter Restriction Indicator - indicates engine air cleaner restriction. Normal operation (<20 in. H20), green flag. Needs service (>20 in. H20), red flag.

Speed Pressure Regulator

Need pressure regulation drawing

Speed Regulator Adjustment Instructions:

The engine idle and full speed setting are set and sealed at the factory, and should not be adjusted. Serious injury may result if the full speed is increased. Removal of the seals without authorization could affect the warranty. If speed settings are lost due to engine fuel pump service or other repairs, the speed settings can be reset as follows:

1. The unloader pressure regulation should be adjusted within the pressure range described under “Unloader Pressure Adjustment”.
2. Close service valve.
3. Inspect throttle arm (G) on engine governor to see the arm is resting against the governor full speed stop (Diesel unit.) For gasoline powered unit, rod (D) should extend about 1.25 inches (32 mm) from cylinder. Loosen jam nut (B) on air actuating cylinder (A) and then turn cylinder rod (C) until throttle arm (G) is forced against the governor full speed stop (Diesel) or until rod extends proper distance (Gasoline).

After Starting Unit

4. With the service valve closed, adjust IDLE speed (*). Adjust speed using adjusting rod (D). Tighten jam nut (H).
5. Open the service valve and adjust the discharge pressure to 100 psi (700 kPa). Now turn adjusting rod (C) until the proper engine FULL speed setting (*) is reached. Tighten jam nuts (B & J).
6. To obtain maximum CFM at any pressure between 80 psi (550 kPa) and maximum pressure rating (*), make adjustment at the pressure regulator to obtain desired discharge pressure at FULL engine speed. Lock adjusting screw.

* See General Data Specifications.

Maintenance/Lubrication

Maintenance/Lubrication

⚠ 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.

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

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 these units 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

The lubricating oil must be replaced every 2000 hours of operation or twelve (12) months, whichever comes first.

Compressor Lubrication

The oil level should be checked before the unit is operated. The proper level is between half and full sight glass with the unit level. If the oil level is not in the correct range, make appropriate corrections (add or drain).

Oil Consumption

It is normal for compressor pumps to consume some oil. A rule of thumb for compressors in this horsepower class is consumption of approximately one fl.oz. oil per 5 hours of operation. The difference between the low oil level (mid-sight glass) and full (oil at top of sight glass) is about 16 fl.oz.

Operation for extended periods of time at low discharge pressure will increase oil consumption.

Oil consumption for new or rebuilt pumps will be higher during the first 100 hours of operation as the piston rings seat. After that time the consumption should stabilize.

Do not operate the compressor with low or no oil. Severe damage to the pump will result. Note: It is NOT possible to accurately read oil level while compressor is running.

Oil Change Procedure

NOTE: Note: Pump refill capacity is 50 fl.oz. (1.5 L.)

1. Oil drain will be faster and more thorough if done after oil is warmed by operating compressor.
2. Remove the oil drain plug and allow the oil to drain into a suitable container.

⚠ CAUTION

Do not remove the oil filler plug while the compressor is running.

3. Replace the oil drain plug. Hand tighten only.
4. Re-fill compressor with oil to near top of sight glass.
5. Dispose of used oil in responsible manner.

⚠ CAUTION

Do not operate without lubricant or with inadequate lubricant. Ingersoll Rand is not responsible for compressor failure caused by inadequate lubrication.

We recommend ALL Season Select synthetic compressor lubricant. Units are factory filled with this oil.

You may use a petroleum-based lubricant that is premium quality, does not contain detergents, contains only anti-rust, anti-oxidation, and anti-foam agents as additives, has a flashpoint of 440° F(227° C) or higher, and has an auto-ignition point of 650° F(343° C) or higher.

See the petroleum lubricant viscosity table below. The table is intended as a general guide only. Heavy-duty operating conditions require heavier oil viscosity. Refer specific operating conditions to your dealer for recommendations.

Synthetic oils meeting the specifications are preferred over petroleum-based lubricants.

Temperature Around Compressor		Viscosity @ 37.8° C (100° F)		Viscosity Grade	
° F	° C	SUS	Centistokes	ISO	SAE
<40	<4.4	150	32	32	10
40-80	4.4-26.7	500	110	100	30
80-104	26.7-40	750	165	150	40

NOTE: If you use a petroleum-based compressor lubricant and decide to convert to All Season Select lubricant later, the compressor valves must be thoroughly decarbonized and the crankcase must be flushed before conversion.

⚠ 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 system without making sure the air receiver system has been completely relieved of all air pressure.

⚠ CAUTION

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. Where possible, try to avoid mixing oils of the same type but different brands. A brand change is best made at the time of complete oil change.

Air Cleaner

This unit is equipped with an AIR FILTER RESTRICTION INDICATOR on the clean air side of the compressor air inlet.

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.

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 cleaner on all units proceed as follows:

1. Remove access cover on end of housing.
2. Remove air cleaner top by unlatching two clips. Remove element.
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 the 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. Check new air filter elements for any shipping damage.
6. Install cleaned or new elements in the reverse order to the above.

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 air flow through the element.

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

The air cleaner system (housing and piping) should be inspected every month for any leakage paths or inlet obstructions. Check the air cleaner housing for damage, which could lead to a leak.

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.

Hoses

Each month it is recommended that the air cleaner clamps be checked for tightness.

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

The flexible hoses, 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.

NOTICE

Piping systems operating at less than 200 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 bottom. 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.

Fasteners

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

Exterior Finish Care

This unit was painted and heat cured at the factory with a high quality, thermoset 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. Note: This may cause some dulling of the paint finish.

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.

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 Duponts 1854S Tuffcoat Primer to all bare metal areas and allow to dry.

⚠ WARNING

If performing more than visual inspections, disconnect battery.

Never operate this machine with any guards removed.

⚠ CAUTION

Use extreme care to avoid contacting hot surfaces.

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

Maintenance Schedule

	Daily	Weekly	Monthly	3 MOS. 250 hrs.	6 MOS. 500 hrs	12 MOS. 2000 hrs.
Compressor Oil Level	C					
Engine Oil Level	C					
Radiator Coolant Level	C					
Gauges/Lamps	C					
Air Cleaner Service Indicators	C					
Fuel Tank (Fill at end of day)	C				Drain	
Oil Leaks	C					
Fuel Leaks	C					
Coolant Leaks	C					
Radiator Filler Cap	C					
Air Cleaner Pre-Cleaner Dumps		C				
Fan/Alternator Belts		C				
Battery Connections/Electrolte		C				
Hoses (oil, air intake, etc)			C			
Automatic Shutdown System Test			C			
Air Cleaner System Visual			C			
Compressor Oil Cooler Exterior			C	Clean		
Engine Radiator Exterior			C	Clean		
Fasteners, Guards				C		
Air Cleaner Elements					WI	
Drive Belt Tension					C ***	C
Compressor Oil						R
Engine Oil Change (initial change @ 50 hrs)				R-non IR fluids	R *	
Engine Oil Filter (initial change @ 50 hrs)				R-non IR fluids	R *	
Engine Coolant Test					C	R
Fuel Filter Element					R	
Injection Valve Pressure						C
Shutdown Switch Settings Test						C
Injection Pump (check & adjust) **						C @ 3000 hr
Adjust Intake and Exhaust Valves						C @ 800 hrs
* Applies only when using IR ProTec™						
** Diesel Model Only						
*** Check at first 6 months/ 500 hours; 12 months / 2000 hours thereafter						
R = replace, **C** = check (adjust if necessary), **WI** = OR when indicated						

Belt Checking and Adjustment Procedure

Access for measuring or adjusting belt tension is via removal of the roof panel. Check belt tension occasionally, especially if looseness is suspected.

A belt tension measurement device can be used to determine the tension of the belt.

To tension the belt, follow these steps:

1. Remove the roof panel.
2. Loosen the four (4) bolts that hold the motor bracket to the sub-base.
3. Turn the tension bolts clockwise to increase tension. Check tension with gage; adjust until tension is within specification.
4. Ensure pulleys are aligned. Rotate motor bracket slightly if necessary.
5. Tighten bracket.

NOTE: Use tension gage in combination with straight edge placed at bottom of pulley faces along side of the slack side of belt (longest unsupported span, opposite of span with idler pulley). At the center of the span, perpendicular to the belt and midway of the free span, apply pressure to the gage until the deflection shown in the table is read. Check the force reading on the gage and compare to table. Reading must be within the specification.

Application	Deflection, inches (mm)	MIN.Tension, lbs (kg)	MAX. Tension, lbs (kg)
New Belt	0.316 (8.0)	10.16 (4.6)	10.82 (4.9)
Checking Used Belt	0.316 (8.0)	8.86 (4.0)	9.50 (4.3)

⚠ CAUTION

Improper pulley/sheave alignment and belt tension can result in motor overload, excessive vibration, and premature belt and/or bearing failure.

To prevent these problems from occurring, ensure the pulley and sheave are aligned and belt tension is satisfactory after installing new belts or tensioning existing belts.

Always use Ingersoll Rand Replacement parts!

Trouble Shooting

Trouble Shooting

Introduction

Trouble shooting 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 trouble shooting 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. Has a similar trouble occurred before?
3. What previous maintenance work has been done?
4. If the compressor will still operate, is it safe to continue operating it to make further checks?

B. Do the Simplest Things First

Most troubles are simple and easily corrected. For example, most complaints are “low capacity” which may be caused by too low an engine speed or “compressor over-heats” which may be caused by low oil level.

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

NOTE: For trouble shooting electrical problems, refer to the Wiring Diagram Schematic.

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.

Trouble Shooting Chart

Bold Headings depict the COMPLAINT - Subheadings suggest the CAUSE

NOTE: Subheadings suggest sequence to follow troubleshooting.

Short Air Cleaner Life:
Dirty Operating Conditions
Inadequate Element Cleaning
Defective Service Indicator
Wrong Air Filter Element

Excessive Oil in Air:
High Oil Level
Out of Level > 15 degrees
Excessive operation at low discharge pressure
Worn piston rings
Worn cylinder bores
Wrong compressor oil

Safety Valve Relives:
Operating Pressure Too High
Defective Safety Valve
Pressure Switch set too high

Fan(s) Will Not Run:
Clogged with ice, snow, debris
Defective Relay
Defective Wiring
Blown Fuse
Defective Fan Motor
Defective or open circuit breaker

Excessive Discharge Temperature:
Ambient Temperature Too High
Airend Malfunctioning
Defective shutdown switch
Malfunction Fan
Restricted cooling air flow
Out of Level > 15 degrees
Low oil Level
Wrong Lub Oil
Dirty Cooler
Dirty Operating Conditions

Excessive Vibration:
Defective Fan
Airend malfunctioning
Belts too loose
Belts too loose
Loose pump or motor mounting bolts

Low CFM:
Belts too loose
Low Motor RPM
Dirty Air Filter
Damaged airend valves
Worn airend (rings; cylinder bores)

Unit Shutdown:
Compressor Discharge Temp. too High
Loose Wire Connection
Defective Discharge Air Temp. Switch
Airend Malfunctioning
Cooling Fan Not Running or
Running Too Slowly
Unit Running to Fast
Discharge pressure too High
Low Engine Oil Pressure
High Engine Coolant Temperature
Defective Shutdown Relay
Defective Shutdown Relay
Out of Fuel

Will Not Start/Run:
Compressor Discharge Temp. Too High
Compressor Drive Motor Malfunctioning
Airend Malfunctioning
Defective motor solenoid valve
Defective wiring
Out of Fuel
Engine Malfunction

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