

OPERATION, MAINTENANCE MANUAL



**VHP40RMH-OPEN
VHP40RHM-CLOSED**

COMPRESSOR MODULE MODELS



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.

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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.

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



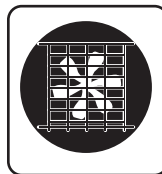
Parking Brake



No open flame



Diesel Fuel.
No open flame



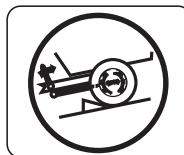
Do not operate the machine
without guard being fitted.



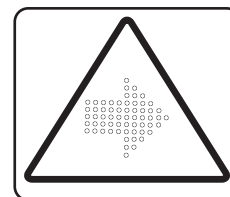
Lifting point.



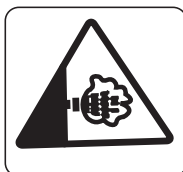
WARNING - Flammable liquid



When parking use prop stand,
handbrake and wheel chocks



Air/gas flow or Air discharge.



WARNING - Hot and harmful
exhaust gas.



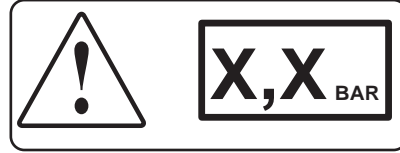
Tie down point



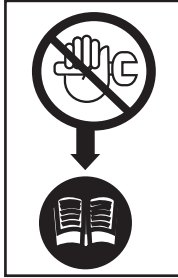
Do not breathe the compressed
air from this machine



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



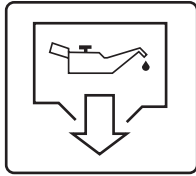
On (power).



Off (power).



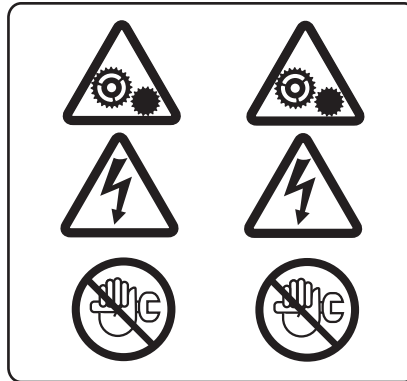
Emergency stop



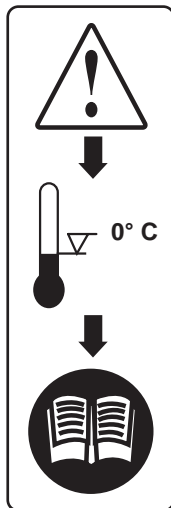
Oil Drain



Do not exceed the speed limit.



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



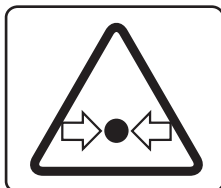
WARNING - For operating temperature below 0° C, consult the operation and maintenance manual



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



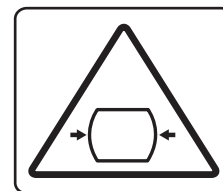
Do not remove operating and maintenance manual and manual holder from this machine.



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.



(Red Background)

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



(Orange Background)

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



(Yellow Background)

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



(Blue Background)

Indicates important set-up, operating or maintenance information.

FREE SAFETY DECALS

Do not paint over safety warnings or instructional decals. If safety warning decals become illegible, immediately order replacements from the factory. 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 your Local OEM. The order should contain only Safety Decals. Help promote safety! Assure that decals are present on the machines. Replace decals that are not readable.




! 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 covers.





! 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.

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

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


! WARNING

**Falling of machine.
Can cause serious injury or death.**
Access lifting bail from inside machine. 





! WARNING

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



! 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. 




CAUTION

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



! 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 off at 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 necessary to reach "COLD" level.



Installation

Installation

System Description - General

The CM air compressors are semi-packaged, air cooled units designed for hydraulic 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 General Data Decal supplied with each unit.

The unit includes a 2-stage 2-cylinder reciprocating air compressor, a compressor inlet system, a compressor lubricating oil system, a compressor discharge system, and hydraulic oil cooling system as well as basic instrumentation. The compressor inlet system includes an air intake cleaner with a service indicator. The hydraulic oil cooling system includes an air-cooled type oil cooler. The oil cooler is of the fin and tube-type construction that requires forced draft cooling air, which is provided by an included 12 VDC fan.

Basic instrumentation includes compressor discharge air pressure, hourmeter, and air restriction indicator.

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 a high efficiency gear-type hydraulic motor which drives the air compressor pump via a pair of "B" section belts. Depending on the model selected, the motor may be of the "open center" or "closed center" type construction. The "open center" motor is the simpler of the two, and is used whenever the unit is to be driven by a fixed displacement hydraulic pump. The "closed center" motor includes a load sense outlet used to send a control signal to a variable displacement hydraulic pump.

All supplied hydraulic motors, regardless of type, have built into them a hydraulic relief valve set at 3000 psig, an over-running check valve for the purpose of allowing the unit to coast smoothly to a stop when the unit is shut down, and a solenoid operated bypass valve that controls the ON / OFF function to the motor via a customer supplied switch. In addition, the "closed center" construction includes the sense port. All motors also have a case drain line serving to protect the shaft seal in cold weather conditions.

The simplicity of including these features into the hydraulic motor increases the system reliability by eliminating several hydraulic connections, and reduces the overall size and complexity of the complete system.

The compressor pump is a high efficiency, air cooled manufactured two stage reciprocating unit, with duplicate low pressure and a high pressure stages on either side of twin banks in a "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 tensioning bolt, which is turned after loosening the four bolts that secure the motor bracket.

The compressor pump, hydraulic motor, 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 insulates 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.

A pneumatic pressure cut-out switch cuts the pump off when the air pressure reaches the high setting, and back on when it reaches the low setting. The nominal settings from the factory are off at 175 psig and on at 145 psig. The cut off pressure is adjustable at the switch from 175 psig to 115 psig. The off-to-on differential of 30 psi is not adjustable, and is constant regardless of cut-out setting.

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.

Sufficient space must be provided at the discharge end and cooler side to service the air cleaner and to check and change oil. 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. 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 gage / switch port on the compressor. The purpose of this line is to provide a relatively pulsation free, cool, and stable pressure signal for use by the pressure switch and the discharge pressure gage. 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.



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.

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.

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Receiver Tank Installation

American Hydraulic Compressor does not offer receiver tanks at this time. Please contact your local OEM or truck upfitter for more info. Units are designed to be installed with a minimum of 10 gallon air receiver.

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 Hydraulic Supply	-8 JIC	5/8" (-10)	Parker-Hannifin 301 or equivalent
Compressor Module to Hydraulic Tank Return	-8 JIC	3/4" (-12)	Parker-Hannifin 301 or equivalent
Compressor Module to Air Receiver	1/2" FNPT	1/2"	Parker-Hannifin 213, or Aeroquip FC350, or equivalent
Motor Case Drain	-4 JIC	1/4" (-4)	Parker-Hannifin 301 or equivalent
Load Sense Port to Pump	-4 JIC	1/4" (-4)	Parker-Hannifin 301 or equivalent
Gauge/Switch port to receiver	-4 JIC	1/4" (-4)	Parker-Hannifin 213, or Aeroquip FC350, or equivalent

All hoses terminate at marked bulkhead fittings.

Hose sizes shown are minimum acceptable. Larger hoses reduce pressure drops, especially in cold weather. All hoses terminate in Type 1 SAE J516 (female swivel), 37° JIC flare fittings.

NOTE: While hydraulic connectors on module are -8, it is recommended customers obtain -10 (5/8") (supply) and -12 (3/4") (return) hoses terminated at compressor end with -8 fittings for optimum performance and low hydraulic pressure drop. Pump suction hose should be 1" (-16).

Wiring

The compressor must be electrically connected to the 12 VDC electrical system of the vehicle via a supplied 4-wire pigtail. The pigtail plugs into a weather resistant plug at the discharge end of the module. The red wire connects to (+) 12VDC at a point that is energized when the truck is running. The brown wire is connected to chassis ground. The yellow wire is connected to a customer supplied SPST switch, which in turn connects to a point that is (+) 12VDC when the vehicle is running. Turning this switch on signals the compressor to run by sending hydraulic fluid through the motor instead of bypassing it, assuming the hydraulic pump is operating. The blue wire is used at the customer's option to energize the coil of a customer-supplied relay, which in turn controls an engine speed control device. This allows the engine to operate at a proper increased speed when the compressor pump is running, and drop back to idle when the pressure switch turns the pump off. ***If this option is not used, the blue wire must be tied off and not connected to anything.***

When the compressor is operating, the electrical system unit will operate at approximately 17 amps. 15 amps are used by the fan and the remaining two amps are consumed by the solenoid valve and the relays.

The yellow wire should be protected by a customer-supplied fuse rated at 5 to 10 amps.

When installing the pigtail wiring harness into the vehicle, it is very important that excess lengths of the red and brown wires (which carry the bulk of the current) be removed. Do not just bundle the excess up and attach the existing ends. Removing the excess lowers the voltage drop to the fan, which in turn ensures maximum fan speed and the best possible cooling for the compressor and the hydraulic system.

The compressor is protected against overheating by a thermal-type discharge air temperature switch located in the compressor discharge manifold. A "normally-closed" type thermal switch, factory set at 480° F (250° C), is supplied as standard equipment on these units. This switch is supplied for 12 volt DC.

The safety shutdown function of the unit is completely internal to the module, and operates by de-energizing the hydraulic diverter valve to force the hydraulic flow to bypass the motor.

Hydraulic Cooling Requirements

Every hydraulic system generates waste heat due to normal mechanical (friction) and volumetric (slippage) losses. In a typical circuit used to operate the air compressor, losses occur in the compressor hydraulic motor, customer's hydraulic pump used to drive the motor, and the piping pressure drops.

These losses can be reduced by specifying efficient (both mechanically and volumetrically for pumps and motors) components for the hydraulic system. The compressor motor was chosen in great part due to high efficiency. Using large hoses helps (-10 or -12 hoses instead of -8.)

The configuration of this compressor module allows for the possibility of cooling the hydraulic oil circuit even when the compressor is not running. If another hydraulic consumer is connected to the same circuit as the compressor (i.e uses the same hydraulic pump) and is located upstream of the compressor, the heat load from this device can be extracted by the compressor mounted hydraulic cooler.

In order to accomplish this, the compressor must be started, allowed to pressurize the system to the pressure switch setting, at which time the compressor will turn off. The compressor cooling fan will continue to run, however, as long as the compressor ON / OFF switch is in the on position. The compressor hour meter will not run as long as the pump is not running. After this point, the other consumer in the circuit can be operated. The hydraulic oil will bypass the compressor motor but pass through the oil cooler, allowing the heat extraction.

The cooler in the VHP40RMH can handle an external heat load of approximately 29,000 BTU/hr assuming a maximum oil temperature of 75° F. above ambient temperature. For the VHP30RMH, the rating is approximately 19,000 BTU/hr.

When operating the compressor, depending on the efficiency of the customer hydraulic pump, piping sizes used, and the capacity of the hydraulic oil reservoir, the oil temperature at stable full load operation can be expected to be about 60° F above ambient for the 40 CFM model.

Hydraulic Oil Requirements

Most premium grade petroleum based hydraulic fluids can be used. Optimum operating viscosity is in the range of 16 - 40 cSt (74 - 185 SSU). Minimum operating viscosity is 10 cSt (59 SSU). Maximum operating viscosity is 750 cSt (3409 SSU). Maximum cold start viscosity is 2000 cSt (9240 SSU). Fluids should be chosen based on starting viscosity at lowest anticipated oil temperature. Normally, ISO 32 grade fluids are a good choice as they are usable for starting down to -10° F, and can operate up to about 175° F, which covers the range of hydraulic temperature on a 100° F day. For sustained operation in high ambient temperatures, ISO grade 46 fluid is a good choice.

The motor in the compressor can operate continuously at 200° F. and intermittently at 221° F. However, as previously stated it is desirable to limit the oil temperature to no more than 175° F. This will enhance the life of the hydraulic system, and less speed drop-off will occur at high ambient temperature.

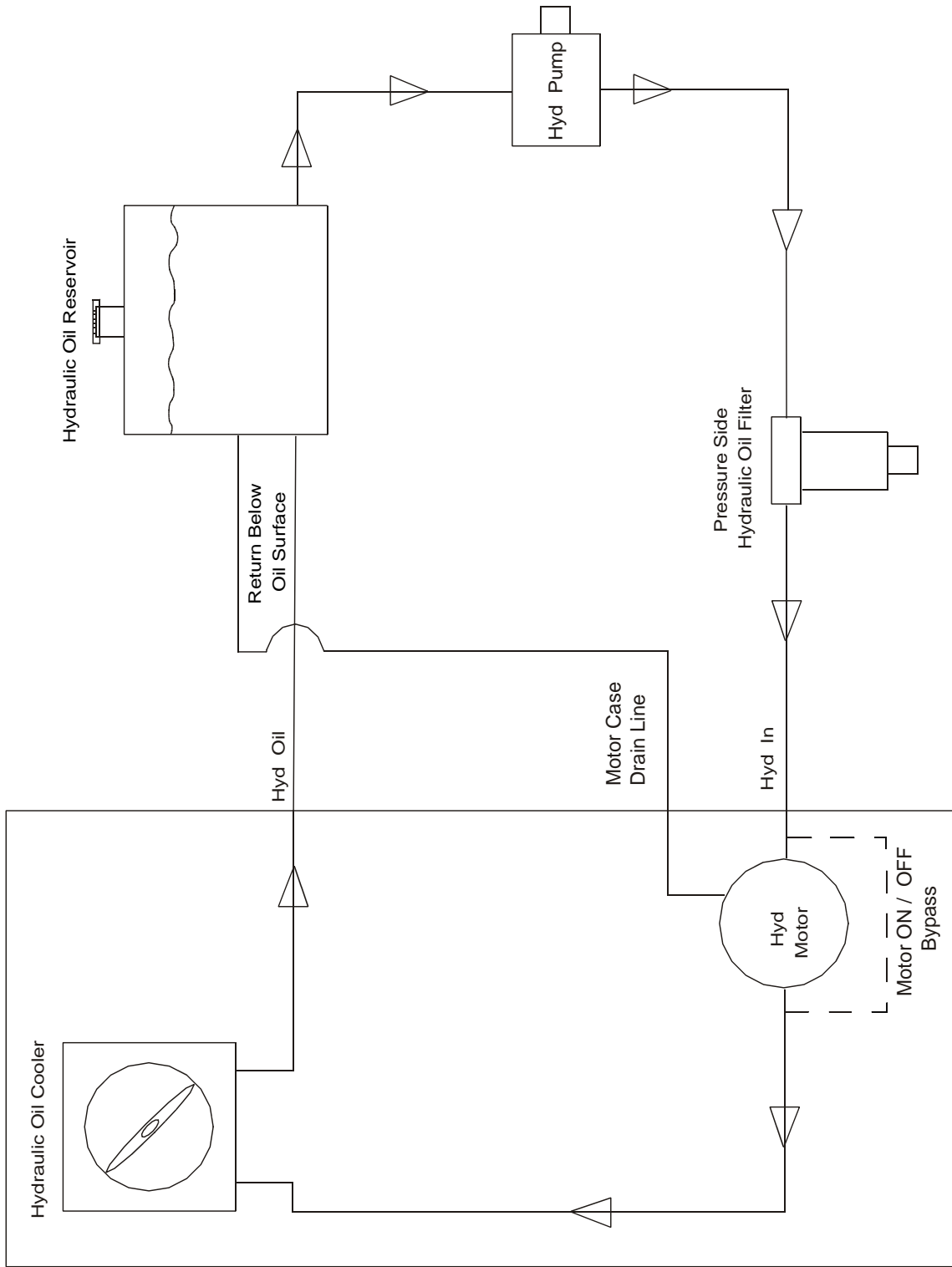
Some speed decrease at higher temperatures is normal due to reduced volumetric efficiency of the pump and motor as they handle lower viscosity oil. This can be minimized by using higher viscosity grades of hydraulic oil for high ambient operation.

Hydraulic Reservoir

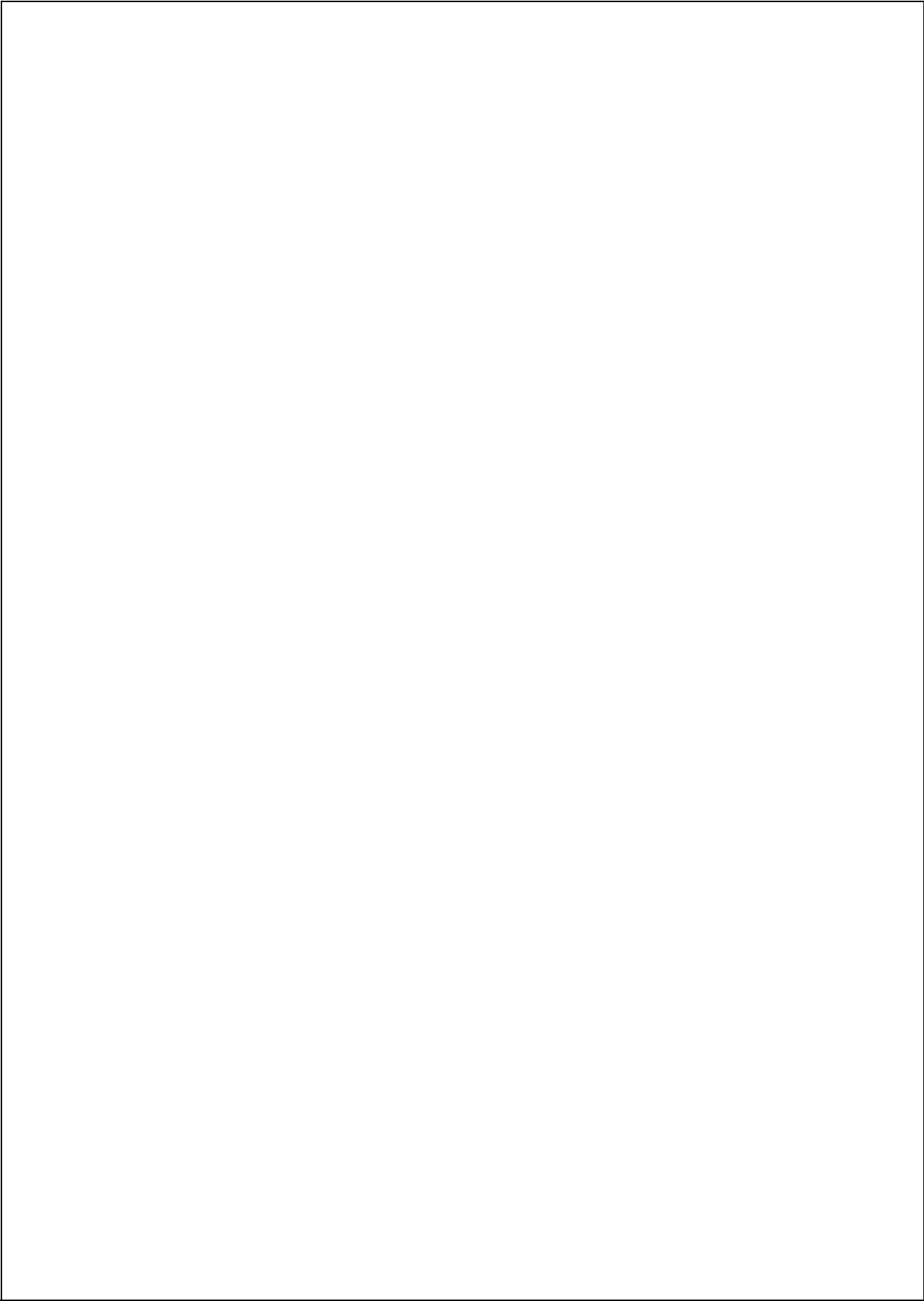
Hydraulic reservoir for the compressor alone should be a minimum of 20 gallons for the VHP40RMH, and larger if space and weight considerations allow. If other motors feed simultaneously from the same tank, it should be sized proportionately larger to handle the additional flow. Follow established design practice for tank layout. Inlet and outlet connections should be well separated, and tank should be baffled. It is desirable that an outlet strainer be fitted. A cut off valve for service should be included, along with a clean out port. Tank must be vented to atmosphere and should include adequate expansion volume.

Hydraulic Filtration

In addition to a tank strainer, a hydraulic filter must be fitted either in the return line or in the pressure line. We highly recommend pressure side filtration to better protect the motor from any particles that get through the tank strainer or are generated in the pump. Filter should have a nominal rating of 5-10 micron. Specifically, Absolute Rating per ISO 16889 (new) should be 5-10 for Bx(c)>200. Flow rating should be for a minimum of 15 GPM. Connect the filter inline with the pressure line going to the hydraulic oil inlet of the compressor. As an alternative, low pressure return line filtration is acceptable.



VHP30-40RMH Hydraulic Flow Schematic





General Data

General Data

Unit Models

Unit Model	VHP40RMH	VHP30RMH
Rated Delivery cfm (litres/sec)40(19)	30 (14)
Rated Pressure psi (kPa)	175(1207)	175 (1207)

Input Power Requirements @ full load (Theoretical Hydraulic):

Horsepower(kW)16.7(12.5)	10.6 (7.9)
Pump Speed (RPM)	1750.....	1300

Hydraulic Motor Requirements (at full load):

GPM @ psi	12.7(2250)	8.6 (2100)
LPM at kPa	48.1 (15517)	32.6 (14,483)

Cooling Fan Power Requirements:

12VDC Fan unit at 15 amps

Compressor Lube Capacity fl.oz. (litres):

Compressor Lube Capacity fl.oz. (litres)	50 (1.5)
--	----------

Unit Measurements/Weights:

Overall Length - inch (mm)	28.1 (714)
Overall Height - inch (mm)	19.1 (485)
Overall Width - inch (mm)	21.7 (551)
Weight - (system with lubricants) - pounds (kilograms)	360 (160)

Service Parts:

Air Cleaner Element	10000037
Compressor Oil -IR All Season Select	10000014 (liter)



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.

Starting/Operating

- Engage hydraulic pump at lowest possible driver speed.

 **CAUTION**

Do NOT engage compressor motor at driver speed above idle. Damage to compressor motor, pump, or other driveline components can occur.

- Turn compressor operating switch on.
- Increase driver speed to compressor operation rated speed.
- Compressor is now ready to furnish compressed air.

Stopping

- Turn compressor operating switch off.
- Disengage hydraulic pump.

 **CAUTION**

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

Automatic Start and Stop Control

The compressor is equipped with Automatic Start and Stop Control. When the receiver tank pressure reaches the factory pre-set maximum pressure, the pressure switch stops the compressor pump (hydraulic motor goes into bypass mode). When the receiver tank pressure drops below the factory pre-set minimum, the switch resets and restarts the pump. The pressure switch is located in the corner of the machine and is accessible through the removable service cover on the discharge end of the machine.

The pressure switch cover can be removed by removing the single screw on the top cover. This provides access to the pressure adjusting screw.

Pressure Switch Adjustment

The compressor pump will cut-in and cut-out at factory preset pressure settings. Adjust the pressure switch only if necessary.

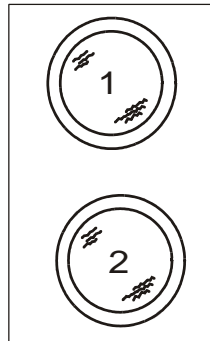
Adjustments are to be carried out with the switch pressurized.

Adjust the cut-out (maximum) pressure by turning the screw between the four terminals under the switch cover. Turning the screw clockwise will increase the pressure; turning it counterclockwise will reduce the pressure. The cut-in pressure is fixed at 30 psi less than the cut-out pressure. This differential is not adjustable. Adjusting the cut-out pressure up or down will change the cut-in pressure by the same amount.



Do not adjust the pressure to exceed 175 psig.

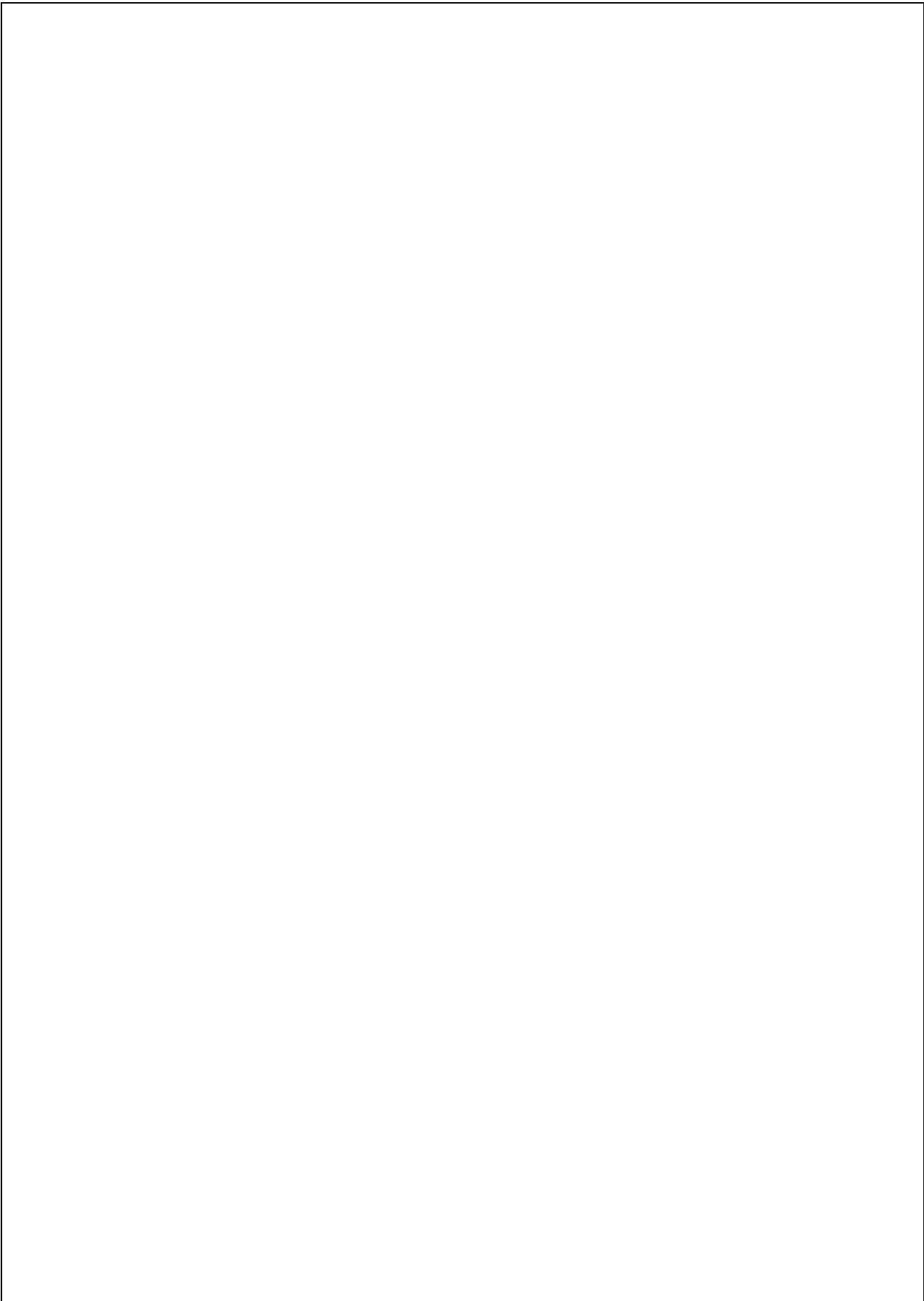
Gauge Panel



Operating Instruments

On Panel

1. **Compressor Discharge Pressure Gauge** - Indicates pressure in receiver tank, psig (kPa).
2. **Hourmeter** - Indicates cumulative compressor pump operating time. Cooling fan can operate without hourmeter running.





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 1000 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. American Hydraulic COmpressor 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

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

1. Remove top cover of housing.
2. Remove air cleaner top by turning counterclockwise 1/4 turn. 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. Always replace with a new element
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.

Hydraulic Oil Cooler

The hydraulic oil is cooled by means of the fin and tube-type oil cooler. The hydraulic 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 hydraulic oil cooler 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 cooler core so that the entire cooling area can transmit the heat of the hydraulic oil to the air stream.

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	Monthly	3 MOS. 500 hrs.	6 MOS. 1000 hrs	12 MOS. 2000 hrs.
Compressor Oil Level	C				
Gauges/Lamps	C				
*Air Cleaner Service Indicators		C Bimonthly			
Hoses (oil, air, intake, hydraulic, etc.)		C			
Automatic Shutdown System Test		C			
Air Cleaner System Visual		C			
Hydraulic Oil Cooler Exterior		C	Clean		
Fasteners			C		
Air Cleaner Elements			WI		
*Compressor Oil				R	
Shutdown Switch Setting Test					C
Drive Belt Tension				C**	C
* Disregard if not appropriate for this particular machine.					
** Check at first 6 months/1000 hour; 12 months/2000 hours thereafter.					
R = replace, C = check (adjust if necessary), WI = OR when indicated, L = Lubricate					

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. Remove the cover over the head of the adjuster bolt.
4. Loosen the belt tension adjuster locknut.
5. Turn the bolts clockwise to increase tension. Check tension with gage; adjust until tension is within specification.
6. Ensure pulleys are aligned. Rotate motor bracket slightly if necessary.
7. Tighten bracket bolts and tensioner lock nut.
8. Replace tensioner hole cover and roof.

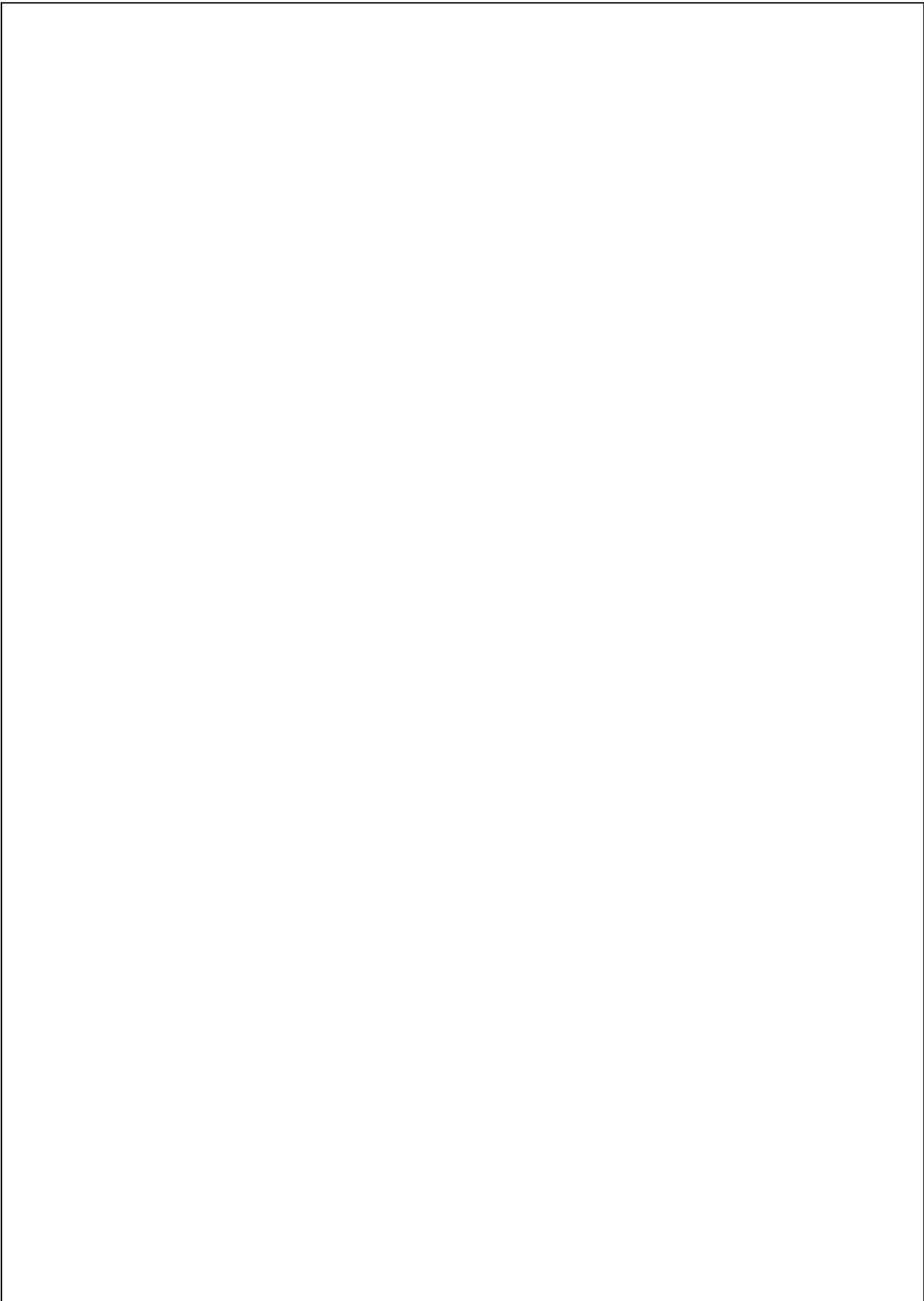
NOTE: Use tension gage in combination with straight edge placed on top of one of the belts. At the center of the span, perpendicular to the belt and midway of the free span, apply pressure to the gage until the deflection shown in the table is read. Check the force reading on the gage and compare to table. Reading must be within the specification.

Application	Deflection, inches (mm)	MIN.Tension, lbs (kg)	MAX. Tension, lbs (kg)
Re-tension	0.158 (4.0)	4.2 (1.9)	4.5 (2.0)
Checking Used Belt	0.158 (4.0)	3.7 (1.7)	4.5 (2.0)

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.





Trouble Shooting

Troubleshooting

Introduction

Troubleshooting 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 operation.

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 troubleshooting 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 troubleshooting.

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

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
 Out of Level > 15 degrees
 Low oil Level
 Wrong Lub Oil
 Dirty Cooler
 Dirty Operating Conditions
 Restricted cooling air flow
 Malfunction Fan
 Airend Malfunctioning
 Defective shutdown switch

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)
 Wrong compressor oil

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 too Fast
 Discharge pressure too High

Will Not Start/Run:

Compressor Discharge Temp. Too High
 Compressor Drive Motor Malfunctioning
 Airend Malfunctioning
 Defective motor solenoid valve
 Defective wiring



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