



an EnPro Industries company

QGB Series (20-60 HP)

Belt Drive Air Compressors



Instruction Manual

This manual contains important safety information and should be made available to all personnel who operate and/or maintain this product. Carefully read this manual before attempting to operate or perform maintenance on this equipment.

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- Safety Alert Symbols
- Safety Precautions
- Spare Parts Ordering Information
- Serial/Model Identification Plate
- Standard Warranty

Safety Alert Symbols

IMPORTANT!

Throughout this manual we have identified key hazards. The following symbols identify the level of hazard seriousness:



DANGER!

This symbol identifies immediate hazards which **will** result in severe personal injury, death or substantial property damage.



WARNING!

This symbol identifies hazards or unsafe practices which **could** result in personal injury, death or substantial property damage.



DANGER!

This symbol identifies life threatening electrical voltage levels which **will** result in severe personal injury or death. All electrical work **must** be performed by a qualified electrician.



CAUTION!

Identifies hazards or unsafe practices which **could** result in minor personal injury or property damage.



CAUTION!

This symbol identifies hot surfaces which **could** result in personal injury or property damage.

NOTICE!

Identifies important installation, operation or maintenance information which is not hazard related.

Section I - General Information

Safety Precautions

Read this manual and follow all instructions prior to installing or operating the compressor.

Listed below are some, but not all, safety precautions that must be observed with compressors and compressed air systems.



WARNING!

Failure to follow any of these precautions may result in severe personal injury, death, property damage and/or compressor damage.

- Air from this compressor will cause severe injury or death if used for breathing or food processing. Air used for these processes must meet OSHA 29 CFR 1910.134 or FDA21XDE178.3570 regulations.
- Disconnect and lockout all power supplies to the compressor plus any remote controllers prior to servicing the unit.
- Never assume it is safe to work on the compressor because it is not operating. Many installations have automatic start/stop controls and the compressor may start at any time.
- This compressor is designed for use in the compression of normal atmospheric air only. No other gases, vapors or fumes should be exposed to the compressor intake, nor processed through the compressor.
- Relieve all pressure internal to the compressor prior to servicing. Do not depend on check valves to hold system pressure.
- A properly sized pressure relief valve must be installed in the discharge piping ahead (upstream) of any shutoff valve (block valve), heat exchanger, orifice or any potential blockage point. Failure to install a pressure relief valve could result in the rupturing or explosion of some compressor component.
- Do not change the pressure setting of the pressure relief valve, restrict the function of the pressure relief valve, or replace the pressure relief valve with a plug. Over pressurization of system or compressor components can occur, resulting in death, severe personal injury or property damage.
- Never use plastic pipe, rubber hose, or soldered joints in any part of the compressed air system. Failure to ensure system compatibility with compressor piping is dangerous.
- Never use a flammable or toxic solvent for cleaning the air filter or any parts.
- Do not remove any guards or cabinet panels or attempt to service any compressor part while the compressor is operating.
- Do not operate the compressor at pressures in excess of its rating.
- Observe control panel displays daily to ensure compressor is operating properly.
- Follow all maintenance procedures and check all safety devices on schedule.
- Never disconnect or tamper with the high air temperature (HAT) sensors.
- Compressed air is dangerous, do not play with it.

Spare Parts Ordering Information

- Use the correct fluid at all times.
- Do not rely on the discharge air line check valve.
- Do not override any safety or shutdown devices.
- Keep doors closed during operation. The noise level inside cabinet exceeds 100 decibels (dBA) and the operating temperature of some components is sufficient to burn the skin.

NOTICE!

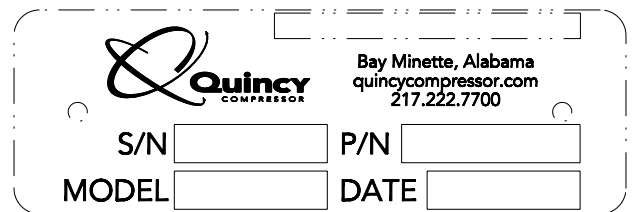
These instructions, precautions and descriptions cover standard Quincy manufactured QGB™ Series air compressors. As a service to our customers, we often modify or construct packages to the customers specifications. This manual may not be appropriate in those cases.

NOTICE!

Every effort has been taken to ensure complete and correct instructions have been included in this manual, however, possible product updates and changes may have occurred since this printing. Quincy Compressor® reserves the right to change specifications without incurring any obligation for equipment previously or subsequently sold. Not responsible for typographical errors.

Quincy Compressor maintains replacement parts for Quincy compressors and accessories. A repair parts list is shipped with all new machines. Order parts from your Authorized Quincy distributor. Use only genuine Quincy replacement parts. Failure to do so may void warranty.

Serial/Model Identification Plate



Reference to the machine MODEL, SERIAL NUMBER and DATE OF ORIGINAL START-UP must be made in all communication relative to parts orders. A model/serial number plate is located on the frame or in the upper right corner of the control panel door.

Section I - General Information



Royal Blue Warranty

Quincy Compressor®

Industrial Screw Products

QGB™ 20-60 HP - Rotary Screw Air Compressors

Seller warrants products of its own manufacture against defects in workmanship and materials under normal use and service, as follows:

QGB™ Packaged Compressors - Twelve (12) months from date of start-up or twenty-four (24) months from date of shipment from the factory, whichever occurs first.

Airend on Packaged Compressors (for service at full-load pressure at or below 150 psig) - Ten years (120 months) from date of startup (not to exceed 126 months from date of shipment from the factory).

Airend on Packaged Compressors (for service at full-load pressure above 150 psig) - Twelve (12) months from date of start-up or twenty-four (24) months from date of shipment from the factory, whichever occurs first.

Air/fluid Reservoir Tank - Five years (60 months) from date of start up (not to exceed 66 months from date of shipment), including parts and labor. In the event of a reservoir tank failure, the parts and labor coverage is limited to the reservoir tank itself and does not cover the separator element(s) or loss of fluid.

Air and Fluid Heat Exchangers - Five years (60 months) from date of start up (not to exceed 66 months from date of shipment), including parts and labor for the first twelve (12) months, parts only after twelve (12) months. In the event of a heat exchanger failure, the parts and labor coverage is limited to the heat exchanger itself and does not cover the loss of fluid.

Drive Motor - Five years (60 months) from date of start up (not to exceed 66 months from date of shipment), including parts and labor. Royal Blue warranty does not cover medium voltage (above 575 volt, 3 phase) motors. Before any motor repairs or replacements are performed, the factory must be contacted at the time of failure in order to approve any further action.

Drive Coupling Element - Five years (60 months) from date of start up (not to exceed 66 months from date of shipment), including parts and labor. (Machine must be installed and operated in accordance with the Operator's Manual.)

Variable Speed Drives (if applicable) - Five years (60 months) from date of start up (not to exceed 66 months from date of shipment), including parts & labor for the first year (12 months), parts only for the remainder of the warranty period. Unit must be installed indoors in a well ventilated environment & a line reactor purchase (from Quincy Compressor) is required.

Remanufactured Airend - Twelve (12) months from date of shipment from the factory.

Parts - Ninety (90) days from date of Distributor sale or one (1) year from date of factory shipment.

With respect to products not manufactured by Seller, Seller will, if practical, pass along the warranty of the original manufacturer.

The terms of coverage for the Royal Blue Warranty are listed below. Failure to follow the terms will invalidate the Royal Blue Warranty.

AUTHORIZED START-UP REQUIRED:

A properly completed start-up report and the Royal Blue Warranty registration form must be submitted by an authorized Quincy distributor to the Quincy Compressor Bay Minette office within thirty (30) days of start-up. Start-up reports must be submitted on Q-Serv.

GENUINE PARTS AND FLUIDS

The compressor must be maintained with QuinSyn-PG (8,000 hours maximum), QuinSyn-XP (12,000 hours maximum), QuinSyn-Plus (8,000 hours maximum) or QuinSyn-F fluid (4,000 hours maximum). Maximum fluid change intervals are noted per fluid. Actual fluid change interval is to be determined by fluid sampling report, not to exceed maximum fluid change interval. Fluid samples must be taken every 2,000 hours or as directed by the analysis report.

Only genuine Quincy Compressor maintenance and replacement parts may be used on the compressor.



Royal Blue Warranty

Quincy Compressor®

Industrial Screw Products

QGB™ 20-60 HP - Rotary Screw Air Compressors

Normal rules of warranty apply regardless of coverage length. Inlet valves, fluid pumps and shaft seals are covered by the standard (1 year) warranty terms and are not included in the Royal Blue Warranty program. The Royal Blue Warranty is non-transferable.

The customer and/or Quincy Distributor must keep copies of all maintenance records, parts purchases and sampling reports. The following records will be required for warranty air end replacement and/or warranty claim consideration and should be submitted to the Quincy Compressor Customer Service Department:

- ◆ A completed Air end Failure Information form.
- ◆ A copy of the Royal Blue Warranty Registration/ Agreement form.
- ◆ Copies of all maintenance logs for the unit.
- ◆ Proof of purchase of genuine Quincy parts and fluids.
- ◆ Copies of all fluid analysis reports.

Notice of the alleged defect must be given to Seller in writing with all identifying details including serial number, model number, type of equipment and date of purchase, within thirty (30) days of the discovery of same during the warranty period.

Seller's sole obligation on this warranty shall be, at its option, to repair, replace or refund the purchase price of any product or part thereof which proves to be defective. If requested by Seller, such product or part thereof must be promptly returned to Seller, freight collect for inspection.

Seller warrants factory repaired or replaced parts of its own manufacture against defects in material and workmanship under normal use and service for ninety (90) days or for the remainder of the warranty on the product being repaired, whichever is longer.

This warranty shall not apply and Seller shall not be responsible nor liable for:

- a) Consequential, collateral or special losses or damages;
- b) Equipment conditions caused by fair wear and tear, abnormal conditions of use, accident, neglect or misuse of equipment, improper storage or damages resulting during shipment;
- c) Deviation from operating instructions, specifications, or other special terms of sales;
- d) Labor charges, loss or damage resulting from improper operation, maintenance or repairs made by person(s) other than Seller or Seller's authorized service station.
- e) Improper application of product.

In no event shall Seller be liable for any claims, whether arising from breach of contract or warranty of claims of negligence or negligent manufacture, in excess of the purchase price.

NOTICE!

Quincy Compressor reserves the right to modify or withdraw this Royal Blue Warranty program at any time on units not already covered by this ROYAL BLUE WARRANTY program.

Section II - Description

- General Description
- The Compression Cycle
- Air Flow
- Cooling System
- Capacity Control System
- Electrical System

General Description

The QGB™ line of rotary screw compressors covers a horsepower range of 20 to 60. These belt driven compressors have standard full load pressure ratings of 100, 125 and 150 PSIG. The large, 127mm rotors allow Quincy to operate these compressors at lower speeds than competitive makes.

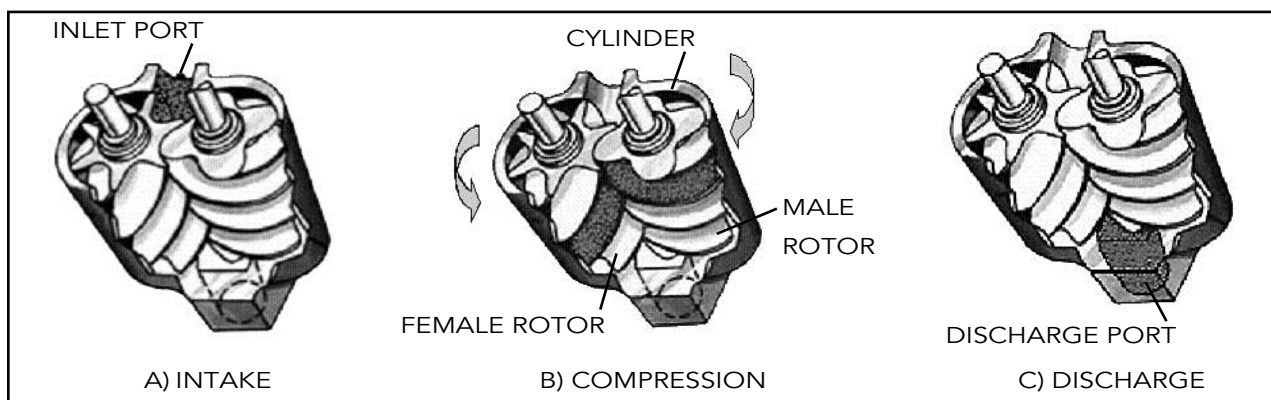
The compressor is a single stage, positive displacement, fluid-flooded rotary screw type unit, consisting of two precision-machined rotors. The drive rotor is driven through a v-belt arrangement.

All components are attached to a heavy-duty steel frame. Controls and indicators are arranged on a control panel. Acoustical cabinets are available to reduce sound levels.

The Compression Cycle

The compression cycle of a rotary screw compressor is a continuous process from intake to discharge with no reciprocating mechanisms starting and stopping as found in reciprocating compressors. The compressor consists of two rotors in constant mesh, housed in a cylinder with two parallel adjoining bores. The male drive rotor has four lobes that mesh with six flutes in the female rotor. All parts are machined to exacting tolerances.

As the rotors rotate, (male-clockwise as viewed from the power input end) air is drawn into the cylinder through the inlet port located at the power input end. A volume of air is trapped as the rotor lobes pass the inlet cut off points in the cylinders. Compression occurs as the male rotor rolls into the female flute, progressively reducing the space thereby raising the pressure. Compression continues until the lobe and flute pass the discharge port. The compressed air is then discharged into the air/fluid reservoir. There are four complete compression cycles for each complete rotation of the male rotor.



Compression Cycle

Air Flow

When the compressor is operating, a partial vacuum is produced at the compressor inlet. Air entering via the air filter flows through the inlet valve into the rotor housing where it is compressed,

then discharged into the air/fluid reservoir. Compressed air passes through the complete system, then through a minimum pressure check valve to the service connection.

Cooling System

Air-cooled Fluid Coolers

The air-cooled fluid cooler and aftercooler are finned aluminum tube design. QGB 20 and 30 horsepower models use a one-piece combination cooler/aftercooler, while QGB 40 thru 60 horsepower models use a two-piece design. Ambient air is forced through the fins by a motor driven fan, cooling the fluid and air in the tubes. To maintain proper compressor operation, the ambient air temperature should not exceed the temperatures listed in Appendix B - Technical Data. The cooler fins must be kept clean at all times. Fluid leaving the receiver passes through a thermal mixing valve before traveling on to the cooler. The purpose of the thermal valve is to maintain a minimum fluid discharge temperature at the compressor of approximately 180°F.

Aftercoolers

Aftercoolers reduce the amount of water in the discharge air. They are used to lower the temperature of the discharge air thereby condensing water vapor from the compressed air. This allows most of the contained water to be trapped and expelled from the unit, reducing water related problems downstream.

Moisture Separator

A combination moisture separator and water trap is provided for collecting and expelling water to the customer's drain.

Section II - Description

Capacity Control System

As the motor starts driving the compressor rotors, air is drawn in, compressed and discharged into the air/fluid reservoir. When the air pressure in the air/fluid reservoir exceeds the set point of the pilot valve (normally 100 PSIG), the valve opens and passes a controlled volume of air to the inlet valve air cylinder.

The air forces a piston to move within the cylinder, closing the inlet valve. The compressor will continue to run, matching air demand with air delivery by constantly adjusting the position of the inlet valve. The inlet valve regulates compressor capacity between 100% and nearly 0% of rated delivery.

When maximum pressure (typically 10 PSIG above normal full load pressure) has been obtained in the air system, complete compressor unloading occurs. The pressure switch located in the control panel sends a signal to the control and the solenoid valve opens, venting the residual pressure from the blowdown valve. At the same time, control air from the reservoir check valve is directed through the solenoid to the inlet valve air cylinder. The inlet valve is held in a closed position preventing the intake of air into the compressor and serving as a check valve preventing reverse air/fluid flow through the inlet valve and air filter.

Electronic Control

QGB™ compressors are equipped with an electronic controller which utilizes a microprocessor to control the compressor. Refer to Section IV for operational instructions.



WARNING!

Never assume it is safe to work on a compressor because it is not operating. It may be in standby mode and could restart at any time. Follow all safety instructions in Section V - Maintenance or Service Preparation.

Auto Dual

With the controller set to run in auto dual mode, a solid state timer is activated when the unload pressure is reached. This timer is adjustable within a ten (10) minute range. When the timer reaches the end of its delay period, the compressor will automatically shut down and assume a standby mode. Upon a drop in system air pressure (to the load set point), the compressor will restart automatically. The timer should be set during unit start-up to a minimum of six (6) minutes.

During the unloaded/timing mode, if plant pressure drops, the compressor will continue to operate, resetting the timer and instructing the inlet valve to reopen.

Continuous Run

When set to run in Continuous Run mode, the compressor operates continuously, matching air demand as a differential pilot valve controls the position of the inlet valve. When maximum system pressure is reached, the compressor unloads, venting the air/fluid reservoir and, although the compressor continues to run unloaded, no air is compressed.

Load/No Load

In the Load/No Load mode, the compressor does not modulate the inlet valve. The valve is either fully open or it is closed. If system demands include regular periods of air usage at less than full load, a large compressed air storage capability is required with this type of control. Without adequate storage, rapid cycling may occur. This will cause wide system pressure fluctuations that may affect the performance of equipment using the compressed air. Load/No Load works with Auto Dual control to turn the compressor off during extended periods of no demand.

Electrical System

Electrical system diagrams are shown in the parts manual sent with the compressor. The appropriate diagram is also included in the control panel on all Quincy QGB™ compressors.

NOTICE!

Due to continuous product improvements and updates, it is suggested that the wiring diagram included in the control panel be used when servicing the electrical control.

Standard QGB drive motors are totally enclosed fan-cooled (TEFC), 1800 RPM motors with a maximum ambient temperature rating of 104°F (40°C).

QGB™ series compressors utilize 460V incoming power through a wye-delta starter. A dual output transformer in the control panel reduces this voltage to 120/24 VAC for the various controls on the unit. These controls include the PLC, HMI, high air temperature safety switch and solenoid. Other incoming line voltages are available as options. The compressor is provided with a NEMA 4 enclosure.



DANGER!

High voltage could cause death or serious injury. Disconnect all power supplies before opening or servicing the electrical enclosure.

High Air Temperature Switch

A high air temperature (HAT) switch is standard on QGB™ units. The HAT is located in the discharge line from the compressor to the air/fluid reservoir and protects the unit by sensing unusually high temperatures and shutting the unit down. The HAT is set to trip at approximately 235°F and is nonadjustable.



WARNING!

Never remove, bypass or tamper with the HAT switch. Failure to provide this safety feature could cause death or serious injury and property damage. If the compressor is shutting down due to high temperature, contact a qualified service technician immediately.

Section III - Installation

- Receiving
- Moving the Unit to the Installation Site
- Location
- Piping Connections
- Relief Valves
- Pressure Vessels
- Electrical
- Guards
- Manual Vent and Shutoff Valves
- Compressor Rotation
- Fan Rotation

Receiving

Upon receipt, immediately inspect the compressor for any visible damage that may have occurred during shipment. If visible damage is found, the delivering carrier should make a notation on the freight bill and the customer should request a damage report. If the shipment is accepted and damage is found later, it is classified as concealed damage. Concealed damage should be reported to the delivering carrier within 15 days of delivery. The delivering carrier must

prepare a damage report. Itemized supporting papers are essential to filing a claim.

Read the compressor nameplate to be sure the compressor is the model and size ordered and that optionally ordered items are included.

Check the reservoir and pressure relief valves to be sure they are adequate for the pressure at which you intend to operate.

Moving the Unit to the Installation Site

Forklift slots are provided on both sides of the main frame. Use of chains and slings should be limited to the main frame. Do not attempt to lift the unit by attaching to any components. Optional lifting eyes are available.

NOTICE!

See Appendix A and B for detailed technical information and dimensions.



CAUTION!

Improper lifting may result in component, system damage or personal injury. Follow good shop practices and safety procedures when moving the unit.

Location

Locate the compressor on a level surface in a clean, well-lit and well-ventilated area. Allow sufficient space (four feet of clearance on all sides and top of the compressor) for safe and proper daily inspection and maintenance. The entire length of the frame base must be supported. Shim where necessary but do not use wood.



WARNING!

Under no circumstances should a compressor be installed in an area exposed to a toxic, volatile or corrosive atmosphere, nor should toxic, volatile or corrosive agents be stored near the compressor.

Ambient temperature should not exceed 110°F. High ambient temperatures may result in a high air temperature shutdown. All models are intended for indoor installation, however, it is possible, with certain modifications, to accommodate some outdoor locations. Cabinet models are water-resistant but not water tight. Sheltering from rain, snow and freezing temperatures is mandatory.



WARNING!

Do not operate in temperatures below 32°F or above the limits outlined in Appendix B - Technical Data.

Do not locate the unit where the hot exhaust air from other compressors or heat generating equipment may be drawn into the unit. Never restrict the flow of exhaust air from the fluid cooler or cooling fan. Heated exhaust air must be exhausted outside to prevent high temperature conditions in the compressor room. If the room is not properly ventilated, compressor operating temperatures will increase and cause a high temperature shutdown.



CAUTION!

Clean, fresh air, of sufficient quantity, is required for proper compressor operation.

In high humidity areas, avoid placing the compressor in a basement or other damp locations. Control the compressor temperatures and monitor compressor fluid for signs of water contamination. Fluid and filter changes may need to be increased in high humidity areas. Increased operating temperatures may be required.



CAUTION!

Removal or modification of sound insulation could result in dangerously high sound levels.

Quincy QGB™ compressors are essentially vibration free, however, some customers may choose to bolt the unit to the floor to prevent the accidental breakage of piping or electrical connections as a result of being bumped. Use only lag bolts to secure the unit. Do not pull the bolts down tight. Overtightening the lag bolts may place the frame in a twist or bind causing breakage of fluid coolers, piping and reservoirs.



WARNING!

Removal or painting over safety labels will result in uninformed conditions. This could result in personal injury or property damage. Warning signs and labels shall be provided with enough light to read, conspicuously located and maintained for legibility. Do not remove any warning, caution or instructional material attached.

Section III - Installation

Transit Lock

A transit lock is used to secure the motor platen during shipping to prevent damage to drive components.

The transit lock is a piece of threaded rod located between the motor platen and the compressor sub base. It is marked with a warning label.

NOTICE!

Once the compressor has been located and secured at the installation site, the transit lock must be removed before operating the unit.

To remove the transit lock, remove the nuts on the threaded rod and remove the threaded rod from the mounting tabs provided on the motor platen and the compressor sub base.

Piping Connections

Never join pipes or fittings by soldering. Lead-tin solders have low strength, a low creep limit, and may, depending on the alloy, start melting at 360°F. Silver soldering and hard soldering are forms of brazing and should not be confused with lead-tin soldering. Never use plastic, PVC, ABS pipe or rubber hose in a compressed air system.

Piping Fit-up

Care must be taken to avoid assembling the piping in a strain with the compressor.

Piping should line up without having to be sprung or twisted into position. Adequate expansion loops or bends should be installed to prevent undue stress at the compressor resulting from the changes between hot and cold conditions. Pipe supports should be mounted independently of the compressor and anchored, as necessary, to limit vibration and prevent expansion strains. Piping should never be of smaller size than the connection on the compressor unit.

Pressure Vessels

Air receiver tanks should be in accordance with ASME Boiler and Pressure Vessel Code Section VIII.



CAUTION!

ASME coded pressure vessels must not be modified, welded, repaired, reworked or subjected to operating conditions outside the nameplate ratings. Such actions will negate code status, affect insurance status and may cause death, serious injury and property damage.

Relief Valves

Pressure relief valves are sized to protect the system. Never change the pressure setting or tamper with the valve. Only the relief valve manufacturer or an approved representative is qualified to make such a change.



DANGER!

Relief valves are to protect system integrity in accordance with ANSI/ASME B19 safety standards. Failure to provide properly sized relief valves will result in death or serious injury.

Relief valves are to be placed ahead of any potential blockage point that includes, but is not limited to, such components as shutoff valves, heat exchangers and discharge silencers. Ideally, the relief valve should be threaded directly into the pressure point it is sensing, not connected with tubing or pipe and pointed away from any personnel. Always direct discharge from relief valves to a safe area away from personnel.



Relief Valve

Electrical

Before installation, the electrical supply should be checked for adequate wire size and capacity. During installation, a suitable fused disconnect switch or circuit breaker should be provided. Any unreasonable voltage unbalance (5%) between the legs must be eliminated and any low voltage corrected to prevent excessive current draw. The installation, electric motor, wiring and all electrical controls must be in accordance with National Electric Code, and all state and local codes. A qualified electrician should perform all electrical work. **Air compressors must be grounded in accordance with applicable codes.** See control panel for the proper wiring diagram.

Quincy would like to emphasize the importance of providing adequate grounding for air compressors. The common practice of grounding units to building structural steel may not actually provide adequate grounding protection, as paint and corrosion buildup may exist.



CAUTION!

NEMA electrical enclosures and components must be appropriate to the area in which they are installed.

Section III - Installation

Pneumatic Circuit Breakers or Velocity Fuses

Pneumatic safety devices are designed to prevent hoses from whipping, which could result in a serious or fatal accident.

The Occupational Safety and Health Act, Section 1926.303 Paragraph 7 published in Code of Federal Regulations 29 CFR 1920.1 (revised 07/01/1982), states "all hoses exceeding 1/2" inside diameter shall have a safety device at the source of supply or branch line to reduce pressure in case of a hose failure."

Guards

All mechanical action or motion is hazardous in varying degrees and needs to be guarded. Guarding shall comply with OSHA Safety and Health Standards 29 CFR 1910.219 in OSHA manual 2206 (revised 11/07/1978) and any state or local codes.



WARNING!

Cabinet panels and drive guards must be fastened in place before starting the machine and never removed before lock out/tag out of the main power supply.

Manual Vent and Shutoff Valve

Install a manual valve to vent the compressor and the compressor discharge line to atmosphere. If the air receiver tank services a single compressor, the manual valve can be installed in the receiver. When a manual shutoff valve (block valve) is used, a manual valve should be installed upstream from the valve, and a pressure relief valve installed upstream from the manual vent valve. These valves are to be designed and installed to permit maintenance to be performed in a safe manner. Never substitute a check valve for a manual shutoff valve (block valve) if the purpose is to isolate the compressor from a system for servicing.



WARNING!

Relieve compressor and system air pressure by opening the appropriate manual relief valve prior to servicing. Failure to relieve all system pressure could result in death or serious injury and property damage.

Compressor Rotation

Compressor rotation must be checked prior to start-up. Proper rotation is clockwise (as viewed from the power-input end). The power-input end of the compressor is marked with an arrow noting the proper rotation. Operating the compressor in incorrect rotation will result in extreme damage to the compressor and warranty coverage will be voided. To check for proper rotation, jog the starter button, allowing the motor to turn 2 or 3 revolutions. Observe the drive element for correct direction. If incorrect rotation is observed, lock out power supply, reverse electrical leads L_1 and L_3 at the motor starter. Recheck for correct rotation.

Fan Rotation

Check the fan rotation at the same time the compressor rotation is being checked. Fan airflow should be outward, that is, pushing the air through the coolers on air-cooled units or out of the cabinet on water-cooled units with cabinets.

Section IV - Operating Procedures

- Prior to Starting
- Starting the Compressor
- Stopping the Compressor
- HMI Control Panel Operation

Prior to Starting



CAUTION!

Provisions should be made to have the instruction manual readily available to the operator and maintenance personnel. If, for any reason, any parts of the manual become illegible or if the manual is lost, have it replaced immediately. The instruction manual should be read periodically to refresh one's memory. This may prevent a serious accident.

Before starting the compressor, review Sections II and III of this manual. Be certain that all installation requirements have been met and that the purpose and use of the controls are thoroughly understood. Before placing the compressor into operation, do the following:

- Remove all loose items and tools from around the compressor.
- Check fluid level in the air/fluid reservoir. See Compressor Fluid Section.
- Check the fan and fan mounting for tightness.
- Manually rotate the compressor through enough revolutions to be certain there are no mechanical interferences.
- Check all pressure connections for tightness.
- Check to make sure all relief valves are in place.
- Check to make sure all panels and guards are in place and securely mounted.
- Check fuses, circuit breakers and thermal overloads for proper size.
- Close the main power disconnect switch and jog the starter switch button to check the rotational direction of the compressor.
- Check the fan rotation.
- Check for proper belt tension. (Reference V-belt Drive Maintenance in Section VI.)

Starting the Compressor

- Secure all enclosure panels on compressor.
- Open the service valve to the plant air distribution system.
- Select the mode of operation and start the compressor.
- Watch for excessive vibration, unusual noises or air/fluid leaks. If anything unusual develops, stop the compressor immediately and correct the condition.
- Control settings have been adjusted at the factory; however, they should be checked during start-up and readjusted, if necessary. Some applications may require a slightly different setting than those provided by the factory. Refer to Section VI - Servicing. Never increase air pressure settings beyond factory specifications.
- Observe compressor operation closely for the first hour of operation and frequently for the next seven hours. Stop and correct any noted problems.
- Check for proper belt tension after 24 hours and adjust if necessary. (Reference V-belt Drive Maintenance in Section VI.)

Stopping the Compressor

Normal Operation

Close the service valve to the plant air distribution system. Allow the pressure to build within the reservoir and the compressor to fully unload. Press the stop button.

NOTICE!

Always close the service valve when the compressor is not being used to prevent the system's air pressure from leaking back into the compressor if the check valve leaks or fails.

Emergency

Press the emergency stop button or cut the power at the main disconnect switch or panel.

Section IV - Operating Procedures

HMI Control Panel Operation

The main display (HOME) shows the current status of the compressor.



The main display (HOME) shows the current status of the compressor. The display is green and shows the following information: PRESS 99, TEMP 171, and UNIT STOPPED. The display is surrounded by various control buttons: START (green), STOP (red), HOURS (clock icon), MODE (house icon), HOME (factory icon), ALARM (triangle icon), MENU (document icon), LOG (list icon), ESCAPE (red), and ENTER (green). There are also up and down arrow buttons on the right side of the display.

START Press START to start the compressor. If the pressure is above the load point, the compressor will enter an A/D (auto-dual) standby mode and will not start until the pressure lowers.

STOP Press STOP to stop and blowdown the compressor.

Main Display (HOME)

HOURS:

HOURS Press this button to view the time remaining on the various filter elements, separators and fluid.



SE Hr8000 FF Hr1000
AF Hr2000 FL Hr8000

SE is the separator element, FF is the fluid filter, AF is the air filter and FL is the fluid.

When any of these times reaches zero (0), a message will be displayed on the main display. Press ENTER to clear the message and reset the counter to the preset values (these are set in the MENU section).

Press HOURS, then ▲ or ▼ to display the loaded, unloaded and total running hours of the compressor.



LOADED Hr 0
UNLOADED Hr 0
TOTAL HOURS: 0

ALARM:



Press the ALARM button to access the alarm log which shows the cause of the current shutdown.



Press ENTER to remove the alarm once the condition that caused the alarm has been corrected.

NOTICE!

All shutdown alarms must be cleared before the compressor will load. Press ALARM, then ENTER to clear an alarm.



NO ALARMS ACTIVE indicates that all conditions which would inhibit starting the compressor have been cleared.



Many of the following menus require a password to allow alteration of the values. If the screen shown to the left is displayed, enter password '0000'. Once entered, the password is active, allowing changes to be made without re-entering the password. If no operator input occurs for 2 minutes, the password is released.

MODE:



Press the MODE button to access the operating conditions of the compressor. There are six (6) menus in this section. Press MODE, then ▲ or ▼ to scroll through the menus. To change the values on any of these menus, press ENTER, then ▲ or ▼ to set the value, then ENTER again.

NOTICE!

If the ▲ or ▼ buttons are pressed and held, the selected value will change very rapidly. If a value is set outside the acceptable range, it will automatically revert to the default setting when ENTER is pressed.



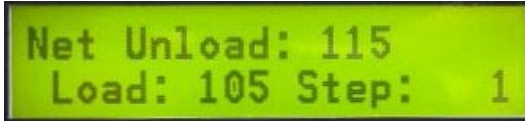
AUTO-DUAL TIME is the time (in minutes) that the compressor will run unloaded before the motor will shutdown. When the motor shuts down, the compressor will be in standby mode and will restart when the pressure falls to the LOAD point.

AUTO_RESTART restarts the compressor following a power interruption. A setting of 0.0 turns this feature off. This timer is in seconds and can be set from 60 to 120 seconds.



Use this menu to set the load and unload pressure settings (psig) for auto-dual or continuous run mode. There must be at least 10 psi difference between these pressure settings.

Section IV - Operating Procedures



```
Net Unload: 115
Load: 105 Step: 1
```

Use this menu to set the load and unload pressure settings (psig) for compressors in network mode. *(These values should be 0 if the compressor is not running in network mode.)*

The values entered are for the base or lead compressor. The pressure settings for each compressor in the network sequence will be reduced (step down) by the step value. The step value can be set from one (1) to ten (10) psig.



```
Network Rotation
Time: 24 (hrs)
```

In network mode, use this menu to set the time period for auto-rotation of the compressors. At the end of the selected time period, the current lead compressor will be placed at the end of the operating sequence list.

NOTICE!

The accuracy of this timer depends on the accuracy of the PLC's internal clock.



```
OPERATING SEQUENCE
ABCDEF Edit: A
```

An operating sequence must be entered for compressors to run properly in network mode. The first compressor ID in the sequence is the BASE load compressor, and the last compressor ID in the sequence is the trim compressor.

Acceptable values for this menu are 'A' to 'F'. *If a value less than 'A' is entered, the last letter in the sequence is deleted and 'A' is placed in the edit space. If a value greater than 'F' is entered, 'F' will be placed in the edit location.*



```
Network Run Mode 0
0=LIFO 1=AutoRotate
```

There are two operating modes in network mode: LIFO and AutoRotate.

Select zero (0) for LIFO (last in, first out), which is a fixed sequence type. The networked compressors operate in the selected sequence.

Select one (1) for AutoRotate, which activates a rotation timer. When the timer reaches zero (0), the current base compressor is moved to the trim position.

MENU:



Press this button to access the setup menus for the compressor. There are 8 menus in this section. These include the service intervals, sensor calibration etc. Press MENU, then ▲ or ▼ to scroll through the menus. To change the values on any of these menus, press ENTER, then ▲ or ▼ to set the value, then ENTER again.

```
OPERATING MODE
0A/D 1Cont 2Net    0
```

There are three operating modes available: auto-dual, continuous run and network mode. Select zero (0) for auto-dual mode, one (1) for continuous run mode, or two (2) for network mode.

Service hours are preset to default values but can be changed here, if desired.

```
AIR FILTER SERV. 2000
FLUID SERV. Hrs 8000
```

```
SEP SERVICE Hrs 8000
FF SERVICE Hrs 1000
```

These are count down timers and are used as service reminders. A message will be displayed on the main running menu when any of these timers reaches zero.

```
PRES. XDUC. SCALE 300
ZERO (ENTER)      0
```

The pressure transducer range is 0 to 300 psi. To calibrate the pressure transducer, disconnect the pressure line to the sensor, and vent to atmosphere to zero (the number on the screen has no effect on the calibration; it is just a dummy value. Press ENTER to set the zero).

```
TEMP SCALE HIGH 300
TEMP SCALE LOW  0
```

The standard temperature scale is 0 to 300°F.

```
TEMP. CALIBRATE: 0
(match probe temp)
```

To calibrate the temperature, press ENTER, then ▲ or ▼ to match the temperature at the probe.

Shutdown temperature is a preset value. During start-up, the compressor will automatically raise this setting to 250° for 2 minutes to handle overshoots.

```
SHUTDOWN TEMP. 235
Y/D TIME       2.0
```

The shutdown temperature can be altered at this menu, however, this should only be done as a last resort.

The Y/D time is the time (in seconds) that the motor remains in reduced voltage start mode before transitioning to run mode. Too large a value can cause the motor to bog-down on start. A correct value, will give a fairly smooth transition to run mode.

```
NETWORK ID :    A
UNIT HP.       50
```

Each compressor in the network must have a compressor ID (a unique letter of 'A' to 'F') to run in network mode.

The HP setting, along with other compressor data, is transmitted to other compressors on the network.

Section IV - Operating Procedures

HOME:



Press the HOME button to return to the main display from any screen.

LOG:



Press the LOG button, then ▲ or ▼ to view a log of recent faults or messages. This log records up to eight messages/faults with the most recent being 1 and the oldest 8.



Advanced Operations

ESC:



Use the ESC button to access the control panel setup menus. These menus allow adjusting the time clock and other parameters that affect the control panel operation.



From this screen, press ESC again to access the internal menus. ENTER will return to the main screen (HOME).



Once at this screen, use ▲, ▼ and ENTER to navigate through these menus. (ESC will return to the previous menu.)

Use the OPERATOR MENU to set the control panel clock and the display language (English or Spanish).



Communication parameters are set in the DIAGNOSTIC MENU, with respect to the PLC. If the PLC of the control panel is changed, the settings need to agree in order for them to communicate.



Press ENTER to go to the DIAGNOSTIC MENU, then ENTER again at TD 200 SETUP.



Press ▼, then ENTER to access the BAUD RATE section.



The BAUD Rate should be 187K, for communications with the PLC.



NOTICE!

If a new control panel is being installed, the default BAUD RATE may not match and will need to be set. The keypad layout is 'soft', so the keys on the new control panel are not in the same locations as shown on page 18. Use the keypad overlay that comes with the replacement control panel to assist in the setup. Once communication is established with the PLC, the keypad will match the proper key locations.

Network Connections

Be sure to set the compressor ID (page 21) for each compressor in the network before connecting the compressors with a network cable.

Next, verify the time and date settings. If they need to be changed, follow the instructions on page 22. If operating in a network, the time and date must be set on each compressor. Time and date are only used to date stamp errors for the shutdown logs.

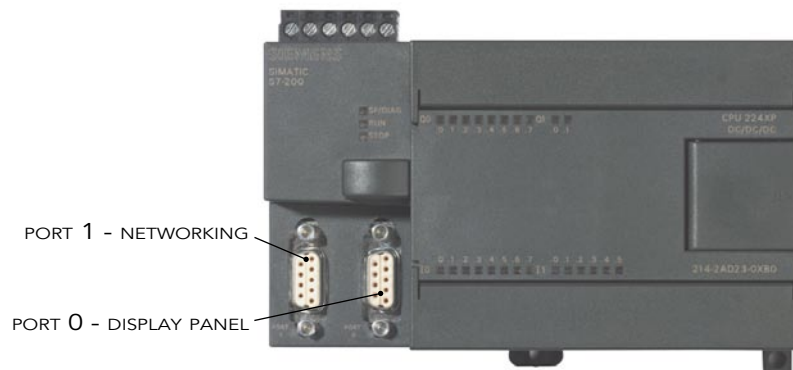
NOTICE!

If power is removed from the PLC for more than 120 days, verify the time and date settings, and reset if lost. No other data will be lost due to periods of inactivity, as they are stored in EEPROM.

Once each compressor in the network has been configured, the PROFIBUS cable may be connected. The maximum recommended cable length is 150 feet. That distance may be extended only if the compressor's PLC's are 'bonded' with an eqi-potential wire in addition to the networking cable (the 'M' terminals of the PLC's should be connected to balance the DC connections).

Greater lengths may be connected using isolated repeaters. Network connection can be extended up to 3000' with their use.

All network parameters should be entered through the 'A' compressor. This will be the main 'master'. For communications, the PLC's take the 'master' position briefly to send data to the others, then relinquish the network, giving the appearance of a multi-master system.



Section V - Integrated Dryer (option)

- General Information
- Inspection
- Safety
- Installation
- Start-up & Operation
- Maintenance
- Automatic Drains

General Information

The Quincy Air Drying System is designed to cool and remove moisture from compressed air. When properly installed, the unit requires little maintenance or adjustments.



WARNING!

DO NOT install, operate, maintain, adjust or service this unit without thoroughly reading this manual.

Inspection

Inspect equipment. Any concealed shipping damage must be reported to the carrier immediately. Damage claims should be filed by the consignee with the carrier.

Safety

When using air compressors and compressed air accessories, basic safety rules and precautions must always be followed, including the following:

- 1) Read all instructions fully.
- 2) Wiring, breakers and other electrical equipment must conform to local and national electrical codes. Do not operate this unit with damaged wiring or after the unit or air handling parts have been dropped or damaged in any manner. Notify authorized service facility for examination, repair or other adjustments.
- 3) Use suitable parts & accessories. Do not use air pressurized accessories or parts in the air system not suitable for the maximum air pressure.

- 4) Release air pressure slowly. Fast moving air will stir up dust and debris, which may be harmful. Release air pressure slowly when depressurizing your system to avoid bodily injury.
- 5) Secure drain lines. Fasten drain lines to floor or drain. Pressurized air may periodically pass through drain lines, which will cause an unsecured line to whip and may cause bodily injury.



WARNING!

Air from the compressor and from Quincy Air Drying System, as equipped, is not safe for human respiration (breathing).

Section V - Integrated Dryer (option)

To provide safe, breathable air, compressor must be capable of producing at least Grade D breathing air as described in Compressed Gas Association Commodity Specification G7.1-1966. Special filtering, purifying and associated alarm equipment must be used to convert compressed air to "Breathing Air." Other special precautions must also be taken. Refer to OSHA 29 CFR 1910.134.

DISCLAIMER OF WARRANTY If this unit is used to produce breathing air, the special equipment and precautions expressed in OSHA 29 CFR 1910.134 for specifications of the necessary equipment and special precautions to make Breathing Air **MUST BE** used or any warranties are **VOID** and manufacturer disclaims any liability whatsoever for loss, personal injury or damage.

Installation

Electronic timer operated auto drains are installed on integrated dryers. Auto drains include a particle strainer upstream from the drain valve. To clean, close the shut-off valve and depressurize the drain line. All drain outlets may be combined for condensate disposal. Dispose the condensate in compliance with local and federal government requirements.



WARNING!

Drain outlet tubing will periodically contain pressurized air. An unsecured drain tube will whip around potentially causing bodily injury.



CAUTION!

Do not combine any two or more drain inlet lines through one single automatic drain valve. This will reduce or eliminate the proper drainage.



WARNING!

Wiring to the dryer must meet the national (NEC) and local code requirements. Check the voltage specified on the nameplate to the electrical power connecting to the dryer. Electrical connections must be made by an electrician.

Section V - Integrated Dryer (option)

Start-up & Operation

The non-cycling design of the refrigerated dryer assures proper dew point control at all load conditions. The refrigerant compressor runs continuously when the dryer is "ON". All dryers are installed with fan cycling switch. These fans will cycle with respect to the load changes, ambient temperature fluctuations, and the cleanliness of the condenser. Standard units are designed to operate under the following conditions:

- 1) Inlet Air Temperature - 100°F design
120°F maximum
- 2) Inlet Air Pressure - 100 PSIG design
175 PSIG maximum
- 3) Ambient Air Temperature - 40°F
minimum 110°F maximum

NOTICE!

At temperatures above the 100°F design, refrigeration capacity will decrease. Operating air pressures below the 100 PSIG design will reduce system capacity.

Start-up Procedure

Air dryers with three-phase power supply are equipped with a compressor crankcase heater. This heater must be energized by closing the disconnect switch or circuit breaker a minimum of 6 to 10 hours before start-up. Power to the air dryer can be left on to energize the crankcase heater for the off-cycle, during evening or weekend shutdowns.



CAUTION!

STARTING THE DRYER WITHOUT ENERGIZING THE CRANKCASE HEATER WILL CAUSE PREMATURE FAILURES OF THE REFRIGERANT COMPRESSOR. Failure to comply with procedure of energizing crankcase heater before start-up may void warranty.

Operating Range & Control Settings (R-134a refrigerant)

- 1) Suction Pressure: 25 to 33 PSIG
- 2) Discharge Pressure: 100 to 160 PSIG
- 3) Low Pressure Switch: CUT OUT: 20 PSIG
CUT IN: 45 PSIG
- 4) High Pressure Switch: 250 PSIG
- 5) Fan Control: CUT OUT: 110 PSIG
CUT IN: 150 PSIG

Shutdown Procedure

Turn the power switch to the OFF position.



CAUTION!

Contact factory before authorizing any warranty refrigeration service on the air dryer. Identify the dryer by model and serial numbers when calling factory.

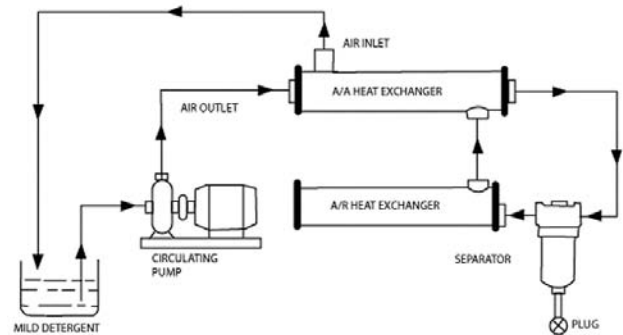
Maintenance

The dryer is factory tested before shipping. All controls are calibrated for automatic operation. If the dryer is installed in clean surroundings, within the temperature limits of the specified ambient, the dryer will run trouble-free for a very long time. Routine maintenance procedures recommended are the following:

- 1) Check the fan motor(s) for proper operation to maintain the cooling air to be drawn through the condenser and blown over the refrigerant compressor.
- 2) Clean the condenser periodically to maintain the proper heat transfer on the condenser coil. Dirty condenser will raise the head pressure of the refrigeration system and trip the compressor "off" at the overload control. Running the compressor on high head pressures may cause premature failures. Check the ambient temperature limits to be maintained at the installation.
- 3) Pressure drop across the dryer may increase slowly as the particulate material coming through the air

stream plugs up the internals of the heat exchanger. A back-flush procedure is recommended to clean the air system.

To back-flush, disconnect air dryer, plug the drain line and fill the air system with the detergent water solution. Hold it for 4-6 hours. Circulate the detergent from air outlet to air inlet with a pump. Flush the system with warm water. If pressure-drop still exists, contact factory.



Back-flush Flow Diagram

Section V - Integrated Dryer (option)

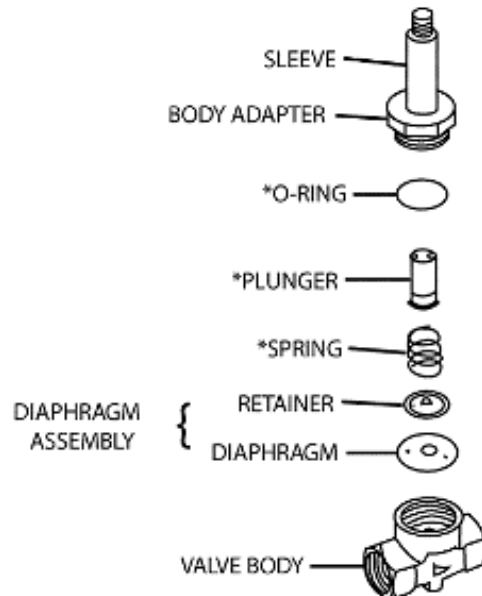
Automatic Drains

The recommended settings for the drain time are determined by the dryer moisture load. The cycle time should be adjusted to approximately 2 minutes. The drain time should be set 3-5 seconds, so the drain expels all of the liquid and then a short burst of air. These adjustments may be refined by trial and error method.

Periodically check the automatic drains for proper drainage. If the drains are not functioning, the condensed moisture will be re-entrained downstream of the air dryer. Electronic solenoid operated drains may be manually tested periodically for proper operation.

Drain Valve Clean Up Procedure

- A) Depressurize the drain valve.
- B) Disconnect the power source.
- C) Remove the valve from the compressed air system.
- D) Remove the solenoid coil.
- E) Remove the stainless steel sleeve from valve body.
- F) Clean the valve body internals, and all other components.
- G) Replace diaphragm as needed. The valve rebuild kit is available.
- H) Assemble the valve parts.
- I) Connect the solenoid coil.
- J) Install the drain valve in the system.



Drain Valve

Recommended Operation and Maintenance for the Particle Strainer

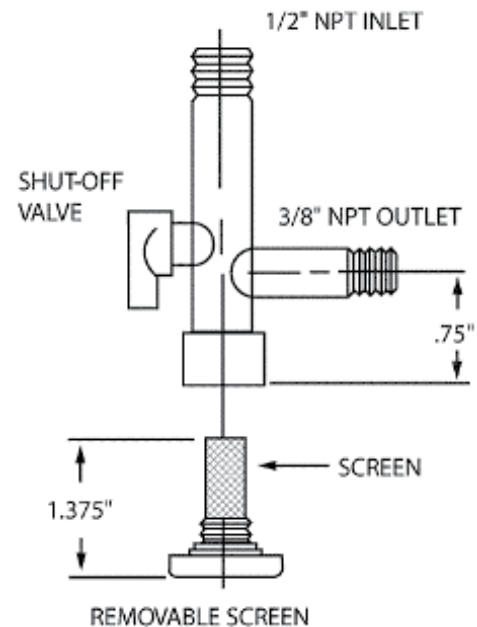
The particle strainer should be cleaned once every week or as needed.

- 1) Close the shut-off valve on the particle strainer.
- 2) Depressurize the drain by pressing the drain PRESS TO TEST on DRAIN TEST key.
- 3) Unscrew bottom of the particle strainer and clean the screen.



CAUTION!

Failure to depressurize may cause bodily injury.



Particle Strainer

Compressor

Refrigerant compressors normally do not need any maintenance. The compressor will unload or adjust for different load conditions with the refrigeration controls. Any time power is applied to the compressor, and the suction pressure is higher than the specified readings, the compressor is either not pumping or failed electrically, or tripped "off" at the overload protection. If the compressor does not automatically reset within a few minutes, it requires servicing. Service must be performed by a qualified refrigeration technician.

Expansion Valve

Integrated air dryers are equipped with a thermostatic expansion valve, factory set to maintain a superheat of 8 to 10°F. These valves do not need adjustment in normal operation. Generally, superheat adjustments are needed only at the time of valve replacement. Expansion valve service must be performed by a qualified refrigeration technician.

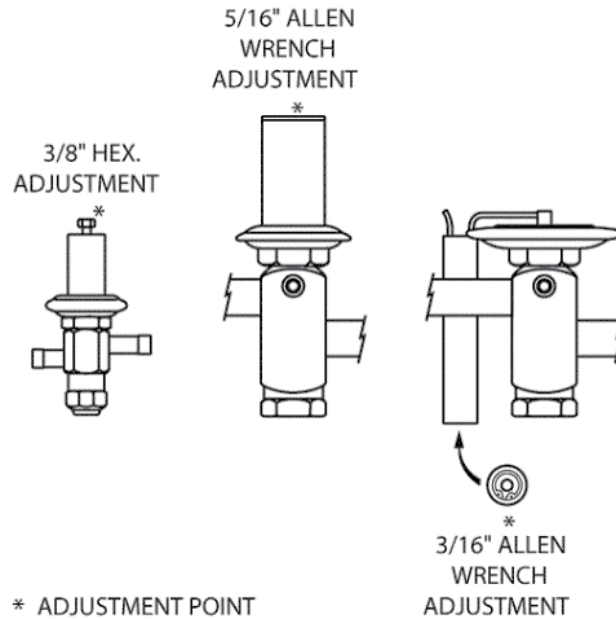
Dual Pressure Switch

This safety switch protects the refrigeration system. If the refrigerant pressure falls below or above the normal operating range, this switch trips the compressor. Manually reset the switch after rectifying the fault to run the dryer again.

Section V - Integrated Dryer (option)

Hot Gas Bypass Valve

Integrated air dryers come equipped with modulating hot gas bypass valves. This valve maintains the refrigerant suction pressure in varying load conditions. The dryer will run from no load to full load conditions without freeze-up. The operation of this valve is automatic. If the valve needs adjustment, turn the adjusting stem clockwise to raise the suction pressure, and counterclockwise to lower the suction pressure. This adjustment should be made under a no-load condition. When the adjustment is made, turn one quarter of a turn at a time, and wait 3 to 5 minutes between adjustments. Once the adjustment is complete, secure the adjusting stem with the locknut that is provided. Careful adjustment of this valve is necessary for normal operation of the air dryer. Hot gas bypass valve adjustment may be made by maintenance personnel.



Hot Gas Bypass Valve Adjustments

Troubleshooting

NOTICE!

The alarm indication light (red) signifies the refrigerant compressor is not running. The reasons can be:

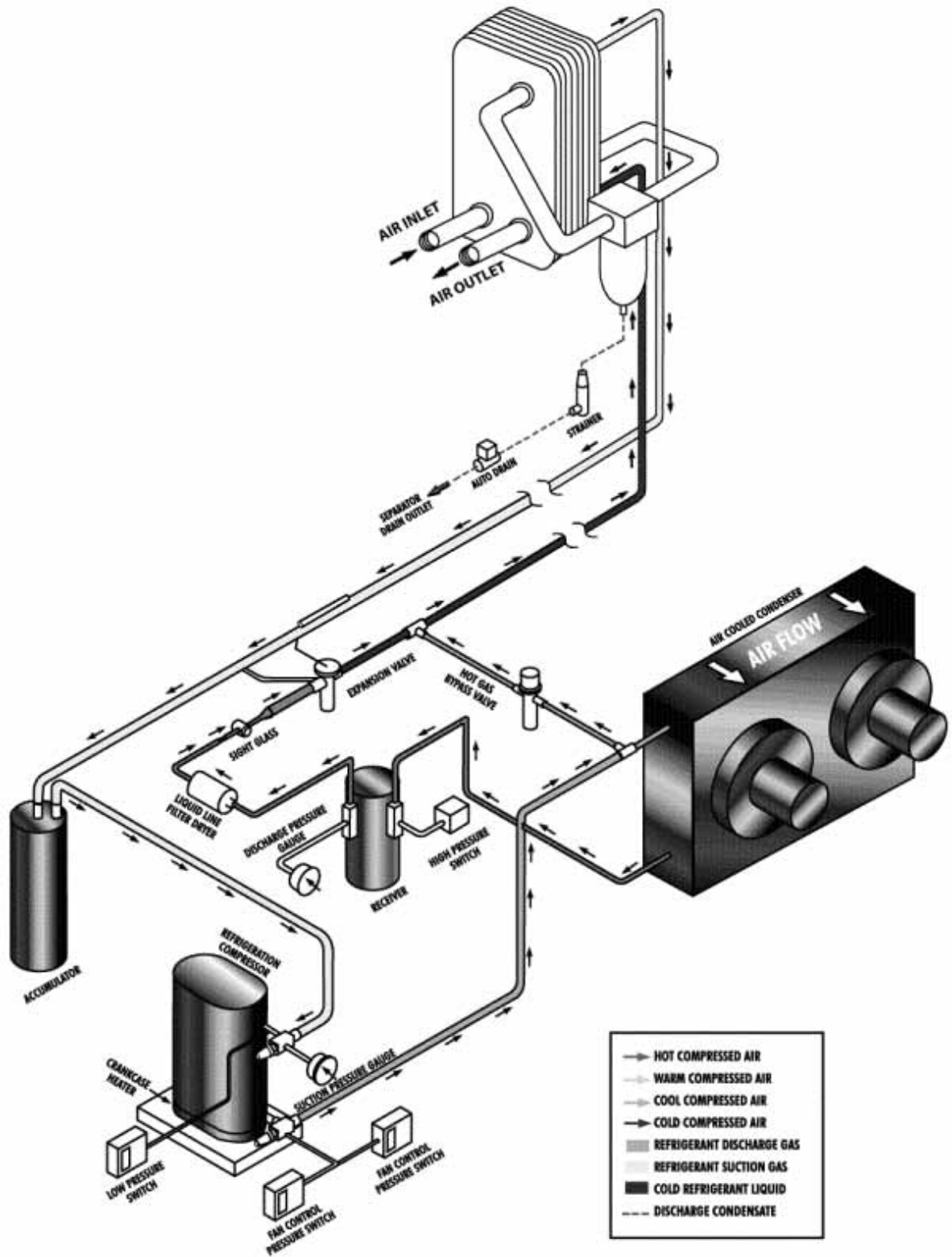
- Low suction pressure
- High discharge pressure
- Electrical problems
- Loss of refrigerant
- Dirty condenser
- Leaking evaporator, etc.

Refer to the Troubleshooting section for problem analysis and remedy. Call the factory if further assistance is required.

The following conditions can cause abnormal operation or malfunction of the air dryer:

- High inlet air temperatures
- Dirty condenser
- Low ambient temperatures
- Malfunctioning automatic drains at aftercooler, or dryer
- Refrigerant overcharge
- Leaky evaporator
- Electrical power supply more than $\pm 10\%$ of the rated voltage
- Low inlet air pressures
- High ambient temperatures
- Compressed air flow greater than rated capacity
- Undersized fuses
- Refrigerant undercharge

If any of these symptoms are noticed, refer to Section VIII - Troubleshooting.



Flow Diagram

Section VI - Servicing

- Preparing for Maintenance or Service
- Safety
- Maintenance Schedule
- Water Removal
- Air/Fluid Separator Element
- Air Filter
- Shaft Seal
- Differential Pilot Valve
- Pressure Setting
- V-belt Drive Maintenance
- Belt Replacement
- Electronic Control
- Air and Fluid Tubing
- O-ring Fittings

Preparing for Maintenance or Service

The following procedure should be followed for maximum safety when preparing for maintenance or service:

- 1) Disconnect and lockout the main power switch and hang a sign at the switch of the unit being serviced.
- 2) Close shutoff valve (block valve) between receiver and plant air system to prevent any backup of air flow into the area to be serviced. NEVER depend upon a check valve to isolate the system.
- 3) Open the manual vent valve and wait for the pressure in the system to be completely relieved before starting service. DO NOT close the manual vent valve at any time while servicing.



WARNING!

Never assume the compressor is ready for maintenance or service because it is stopped. The automatic dual control may start the compressor at any time. Death or serious injury could result.

Safety



NOTICE!

Maintenance should be performed by trained and qualified technicians only.

Safety procedures while servicing the compressor are important to both the service personnel and to those who may be around the compressor and the system it serves. Listed below are some, but not all, procedures that should be followed:

- Wait for the unit to cool before starting service. Temperatures may exceed 180°F when the compressor is operating.
- Clean up fluid spills immediately to prevent slipping.
- Loosen, but do not remove, flange or component bolts. Carefully pry apart to be sure there is no residual pressure before removing bolts.
- Never use a flammable solvent such as gasoline or kerosene for cleaning air filters or compressor parts.
- Safety solvents are available and should be used in accordance with their instructions.



CAUTION!

Unusual noise or vibration indicates a problem. Do not operate the compressor until the source has been identified and corrected.

Maintenance Schedule

This Schedule is intended to be used as a guideline only. Depending on the specific operating conditions of your QGB compressor, maintenance requirements may vary. The instructions in this section will give more details about determining when specific service should be performed.

PERIODICALLY/DAILY (8 HOURS MAXIMUM):	MONITOR ALL GAUGES AND INDICATORS FOR NORMAL OPERATION. CHECK FLUID LEVEL. DRAIN WATER FROM AIR/FLUID RESERVOIR. OBSERVE FOR FLUID LEAKS. OBSERVE FOR UNUSUAL NOISE OR VIBRATION.
MONTHLY:	REPLACE AIR FILTER. (DAILY OR WEEKLY SERVICE MAY BE REQUIRED UNDER CERTAIN CONDITIONS.) CLEAN FLUID COOLER FINS (AIR-COOLED). WIPE DOWN ENTIRE UNIT TO MAINTAIN APPEARANCE.
EVERY 6 MONTHS OR 1000 RUNNING HOURS:	TAKE FLUID SAMPLE. REPLACE FLUID FILTER. INSPECT CONTROL LINE FILTER(S) AND REPAIR AS NEEDED.
PERIODICALLY/YEARLY:	REPLACE AIR/FLUID SEPARATOR ELEMENTS. CHECK ALL BOLTS FOR TIGHTNESS. LUBRICATE MOTORS. CHECK SAFETY (HAT) SHUTDOWN SYSTEM. TEST PRESSURE RELIEF VALVE FOR PROPER OPERATION. CONTACT A QUALIFIED SERVICEMAN.
EVERY 8000 RUNNING HOURS:	REPLACE FLUID.



CAUTION!

Unusual noise or vibration indicates a problem. Shutdown the compressor and do not restart until the source has been identified and corrected.

 **NOTICE!**

Reference pages 32 thru 42 for more specific instructions on performing general maintenance. Reference Section VII - Compressor Fluids for instructions regarding taking fluid samples and selecting an appropriate fluid for your machine.

 **NOTICE!**

Failure to follow these maintenance and service recommendations may adversely affect your warranty. Maintain accurate and complete maintenance records to ensure warranty compliance.

Section VI - Servicing

Water Removal

Water vapor may condense in the reservoir and must be removed. The frequency with which water must be removed is determined by the ambient air conditions. During hot and humid conditions, water should be drained off the bottom of the reservoir daily. In cold and dry conditions, water may only need to be drained weekly. To drain water from the reservoir, turn the compressor off and let sit for at least 5 minutes. Then open the drain valve.

Water is heavier than the compressor fluid and will collect at the bottom of the reservoir. When the drain is first opened some compressor fluid may come out before the water starts to flow. Close the valve when the water flow changes to compressor fluid. Make certain that there is no pressure in the reservoir before opening the drain valve. Water content in the compressor fluid in excess of 200 PPM could cause bearing damage and air end failure.

Air/Fluid Separator Elements

The air fluid separator element should be replaced as indicated in the maintenance schedule or as follows:

- ◆ If excessive fluid carryover is observed.
- ◆ Every 4000 running hours.
- ◆ Once a year.

Continuity Testing of Separator Elements

NOTICE!

Electrical continuity between all separator element metal surfaces must be checked prior to replacing any separator element. Do not install if continuity is not present. Return the separator element to your Quincy Distributor for replacement.

Prior to installation, test the separator element as follows:

- 1) Locate a continuity test light or a volt-ohm-meter (v-o-m) capable of reading 20 ohms.
- 2) Assure that battery has proper charge. Touch the probe leads together to assure the light works or to zero calibrate the meter.
- 3) Contact the grounding spring clip on the separator element gasket with the ground probe of the test indicator.
- 4) Touch the top cap of the separator element with the other probe. The indicator light should illuminate on the test or the v-o-m test must read no more than 20 ohms.
- 5) Touch the bottom cap of the separator element. The indicator light should illuminate on the test or the v-o-m test must read no more than 20 ohms.
- 6) Touch the outside wire mesh. The indicator light should illuminate on the test or the v-o-m test must read no more than 20 ohms.
- 7) Touch the inside wire mesh (do not puncture the element media). The indicator light should illuminate on the test or the v-o-m test must read no more than 20 ohms.
- 8) If the separator element fails any of the above test , return it to your Quincy Distributor for replacement.
- 9) Make sure the compressor is bonded (wired) to an earth ground to dissipate static electricity.

Air Filter

The standard QGB™ air filter is a single stage, dry type element attached to the inlet valve. The filter media is pleated and will stop particles of 10 microns in size. This element is replaceable and should not be cleaned. Service intervals of the air filter element depends on ambient conditions and should be established by checking regular intervals until a pattern for servicing is found. Daily maintenance of the filter element is not uncommon in dirty conditions. If dirty conditions exist, it is advisable to relocate the intake air to an outside source. Each time the filter is serviced, inspect the filtered air side of the air cleaner canister and the suction manifold for dirt. If dirt is found, determine the cause and correct. Always make

sure all gaskets, threaded connections, flange connections, and hose connections between the air filter and air compressor are airtight. Dirty filters result in reduced airflow and can distort the element and allow dirt to bypass the filter element.

NOTICE!

Intake filtration equipment supplied from the factory may not be adequate for extremely dirty applications or some forms of dust or vapors. It is the customer's responsibility to provide adequate filtration for those conditions. Warranty will be voided if inadequate filtration causes a failure.

Section VI - Servicing

Shaft Seal

Compressor shaft seals are wear items that may eventually have to be replaced. Special tools and a complete understanding of the installation procedure are required for a successful seal replacement. Ask your Quincy distributor for complete illustrated instructions (available as a Service Alert) at the time you order the seal and special tools, if you decide to replace the seal yourself. If your distributor does not have a copy of these instructions, they can be ordered from Quincy Compressor® at no charge.

QGB™ compressors incorporate a fluid scavenge system to complement the use of a triple lip seal assembly. Any complaint of shaft seal leakage requires that the scavenge system be inspected for proper operation prior to the replacement of the shaft seal. Proper inspection consists of the following:

- Assure that the scavenge line itself is not plugged.
- Inspect the performance of the scavenge line check valve by removing the fitting located at the bottom of the motor adapter. Remove the check ball and inspect for wear. If the check valve is stuck open, fluid can backflush from the airend into the seal cavity and appear as a leak. If the check valve is stuck closed the seal cavity will not scavenge. Replace if necessary.
- Remove the four bolts securing the seal adapter to the suction housing.
- Insert two of the seal adapter retaining bolts into the seal adapter jack holes and turn clockwise (pushing the seal adapter away from the suction housing).

- After the seal adapter outer o-ring has cleared the seal adapter bore, remove the adapter for inspection.
- Disassemble the seal adapter as follows:
 - a. With the face of the seal adapter up, insert two small, flat screwdrivers under the outer lip of the fluid slinger and pop the slinger from the seal adapter bore.
 - b. Using a brass drift, tap the shaft seal assembly from the seal bore.
 - c. Inspect both seal lips for excessive wear, lip flaws or damage.
 - d. Inspect the outer o-ring on the fluid slinger for cuts or nicks.
 - e. Inspect the outer o-ring on the seal adapter for cuts and nicks.
 - f. Slide the wear sleeve removal tool over the end of the shaft and allow the jaws of the tool to snap on the backside of the wear sleeve. Tighten the outer shell of the tool down over the inner jaws.
 - g. Using a ratchet and socket, turn the puller jack screw clockwise in against the end of the compressor shaft to remove the seal wear sleeve.



CAUTION!

Do Not use an impact wrench with this tool.

Preparation for New Seal Installation

- Inspect the compressor shaft for burrs or deep scratches at the wear sleeve area. Using a 100 grit emery cloth, lightly sand horizontally any rust or Loctite™ on the shaft. Using a fine file or emery cloth, deburr the key area of the rotor shaft. Cover the keyway with masking tape to prevent damage to the new seal during installation.
- Clean the seal adapter with fast drying solvent. Assure that the scavenge drain in the seal adapter is clean and open. Place the outer face of the seal adapter on a flat, hard surface.
- Remove the new triple lip seal from the package and inspect for damage or imperfections on the seal lips.
- Apply a thin coat of Loctite™ 290 to the outer steel case of the seal and position the seal in the seal adapter bore.
- Insert the proper seal driver over the seal. Insert the proper wear sleeve driver in the seal driver and tap the new seal into the bore with a medium sized hammer.
- Preheat the wear sleeve (in a small oven) to 350°F. **Do not preheat in warm oil.**
- Apply a thin film of Loctite™ to the inner diameter of the wear sleeve and immediately install on the compressor shaft using the proper wear sleeve driver. Drive the wear sleeve on the shaft until the driver bottoms on the shaft shoulder.

Seal Installation

- Apply a thin coat of compressor fluid to the outer face of the wear sleeve and seal lip.
- Slide the proper seal installation sleeve against the wear sleeve with the taper toward the end of the rotor shaft.
- Install a new o-ring on the seal adapter and lubricate with compressor fluid.
- Install a new o-ring around the scavenge port (use petroleum jelly to hold the o-ring on the seal adapter face during installation).
- Carefully slide the seal adapter with the new seal installed over the end of the rotor shaft and up against the adapter bore.
- Using care not to damage the o-ring, evenly draw the adapter into the bore, install the four retaining bolts and tighten to the specified torque.
- Remove the installation sleeve.
- Apply a thin film of compressor fluid to the o-ring and seal lip of the outer fluid slinger.
- Install the outer slinger over the end of the rotor shaft and push into the scavenge bore using both thumbs.

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Differential Pilot Valve



WARNING!

Never adjust the pressure higher than the factory setting. Death or serious injury and compressor or property damage could result.

Open a manual vent valve to allow the compressor to exhaust air to the outside and start the unit. By manual regulation, slowly close the valve, allowing the unit to build air pressure to the desired modulation point and hold (100 PSIG standard). Adjust the screw on the bottom of the differential pilot valve so that a slight

stream of air can be felt coming from the orifice adjacent to the adjustment screw.

When the air is felt, air is beginning to pass through the pilot valve to the air cylinder on the inlet valve, causing the valve to modulate toward its closed position, thereby reducing the volume of air being compressed.

To raise the pressure, turn the adjusting screw in (clockwise). To lower the pressure, turn the screw out (counter clockwise). Maximum full load pressure is 100 PSIG for standard QGB™ units. Minimum full load pressure with modulation and standard controls is 75 PSIG.

Pressure Setting

The pressure setting determines what pressure the compressor will load and unload. Standard factory settings are listed in the QGB Specifications. If a lower setting is desired, adjust the differential pilot valve first and set the pressure cut-out point to 15 PSIG over the desired full load pressure. Refer to HMI Control Panel Operation in Section IV for instructions

on adjusting the pressure settings. The pressure settings should unload the compressor by the time it reaches the 20% load point. Raising the pressure without changing the compressor speed above factory settings will result in high amp draw and drive belt failures. Consult your parts book for proper sheave and belt part numbers.

V-belt Drive Maintenance

QGB series compressors are equipped with an automatic belt-tensioning device and require no adjustments between belt replacements.



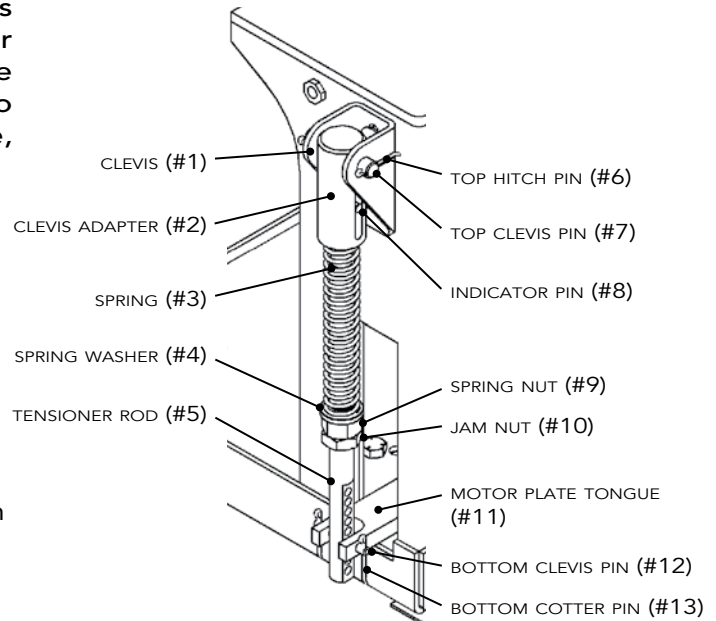
The automatic spring tensioner system should not need disassembly. If a component in the automatic spring tensioner system is damaged and needs replacement, be sure to relieve the tension in the spring before doing so. **DO NOT** attempt any adjustments to the automatic spring tensioner system without first relieving the tension in the spring. Failure to do so may result in component damage, system damage, or personal injury.

Belts must be replaced when automatic belt tensioning indicator pin (#8) has reached full length of travel in its adapter groove. The indicator pin is used as a visual aid to show the amount the belts have stretched and give a visual indication to when the belts need to be replaced. As the belts stretch, the spring (#3) along with motor weight, forces the tensioner rod (#5) down to keep adequate tension in the belts. As this occurs, the indicator

pin which is pressed into the tensioner rod will move down in the slot in the clevis adapter (#2) that is pinned to the clevis (#1).



Use caution when working with any spring assisted mechanism. When compressed, this spring can release a significant amount of energy without warning, causing serious injury.



Belt Maintenance Schedule

<p>EVERY 100 HOURS FOR THE FIRST 1000 HOURS</p>	<p>CHECK BELT CONDITION AND POSITION OF BELT TENSIONING INDICATOR SPRING PIN IN GROOVE. RECORD POSITION OF INDICATOR PIN BOTTOM FROM BOTTOM OF GROOVE (DIMENSION A).</p>	
<p>EVERY 1000 HOURS</p>	<p>CHECK BELT CONDITION AND POSITION OF BELT TENSIONING INDICATOR SPRING PIN IN GROOVE. RECORD POSITION OF INDICATOR PIN BOTTOM FROM BOTTOM OF GROOVE (DIMENSION A).</p>	

NOTICE!

If at any interval the belts appear to need servicing (show signs of thermal stress or excessive cracking), there are nicks in the sheave grooves or the indicator pin has bottomed out in the groove, please contact Quincy Compressor.

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Belt Drive Installation Procedure

- 1) Inspect sheave grooves for nicks.
- 2) Thoroughly inspect the tapered bore of the sheave and the tapered surface of the bushing. Any paint, dirt, metal chips, fluid or grease **MUST** be removed.



CAUTION!

DO NOT USE LUBRICANTS. Use of lubricants can cause product breakage during installation.

- 3) Position bushing and sheave assemblies and rough align with a metal straight edge. Mount sheaves as close to the compressor and/or motor housing as practical to avoid excessive bearing and shaft loads. With key on shaft, slide loosely assembled unit onto shaft so that cap screw heads are on the outside. Locate unit in the desired position on the shaft. When installing large or heavy parts in the conventional position it may be easier to mount the key and bushing on the shaft first, then place the product on the bushing aligning the holes and installing cap screws.



CAUTION!

When mounting on a vertical shaft, insure that the sheave and bushing do not drop during installation.

- 4) Tighten cap screws alternately and evenly to the wrench torques specified in the bushing data table on page 5. Note: When tightened there will be a 1/8" to 1/4" gap between the bushing flange and the hub.

Should this gap close, then either the shaft is undersized or the wrong bushing shaft size is indicated.



CAUTION!

EXCESSIVE SCREW TORQUE MAY CAUSE DAMAGE TO EITHER BUSHING AND/OR PRODUCT!

- 5) Tighten the set screw over the key and torque to the value listed in the bushing data table on page 5.
- 6) Some conditions may exist where step 5 will have to be completed before step 4 as the set screw will not be accessible once the sheave is in place.
- 7) After all screws have been torqued to their proper values, re-check the alignment. The laser alignment tool is highly recommended for aligning sheaves. If the alignment is out more than two marks on the laser alignment tool, redo alignment starting over at step 3.



NOTICE!

Misalignment of the sheaves will reduce belt and sheave life by increasing wear and increase the probability of belt turn over by decreasing stability. Misalignment comes in three varieties: Horizontal angular, vertical angular and parallel. Sheave alignment should be within .078. This is the total of all parallel and angular misalignment. Check sheave misalignment in at least three places after rotating one of the sheaves 120 degrees each time, to locate the position of maximum misalignment.

Belt Drive Removal Instructions

- 1) Remove all bushing cap screws.
- 2) Install cap screws into threaded jack holes.
- 3) Tighten all jack screws alternately and evenly, beginning with the screw farthest from the bushing saw slot, until bushing grip is released. Slide sheave and bushing assembly off the shaft.



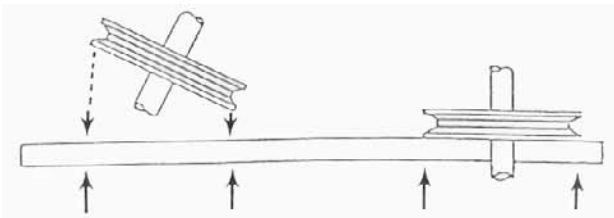
CAUTION!

Excessive screw torque may cause damage to either the bushing and/or product. Uneven pressure on jack screws may also damage the bushing flange making removal difficult without damage to the product.

Belt Drive Alignment Instructions

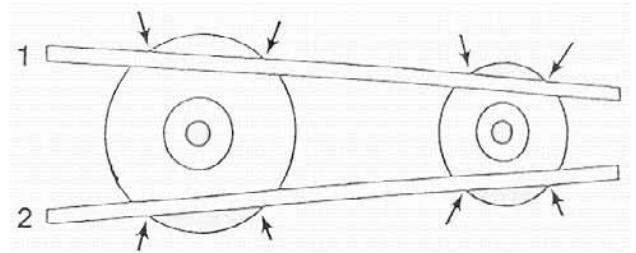
Straight Edge Alignment Procedure

Horizontal Angular (Shafts in same horizontal plane but not parallel)



- 1) To check, use straightedge or string near sheave centers.
- 2) To correct, loosen motor mounting bolts and rotate motor until all four points touch straightedge.

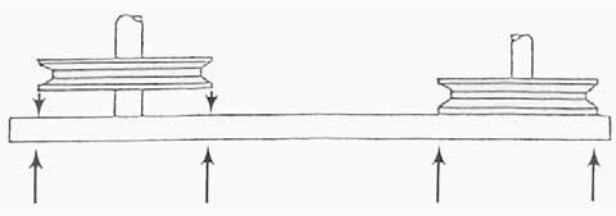
Vertical Angular (Shafts in same vertical plane but not parallel)



- 1) To check, place straightedge 1/4 radius from the outside diameter of both sheaves as shown:
 - a. Repeat on opposite side of shaft.
 - b. Straightedge should touch four points indicated in each position.
- 2) To correct, loosen sheave so it slides easily on shaft until all four points touch straightedge. Tighten sheave in position. **IMPORTANT:** Sheave should be mounted as close to bearing as possible to reduce overhung load on bearing. Relocate equipment, if necessary

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Parallel (Shafts are parallel; sheaves not in line)



- 1) To check, use a straight edge or string near sheave centers.
- 2) To correct, loosen sheave and relocate on shaft until all four points touch straightedge. Tighten sheave in position. **IMPORTANT:** Sheave should be mounted as close to bearing as possible to reduce overhung load on bearing. Relocate equipment, if necessary.

Laser Alignment Procedure (Recommended)

- 1) Attach a laser alignment block to each sheave.
- 2) Turn on the alignment lasers on each block.



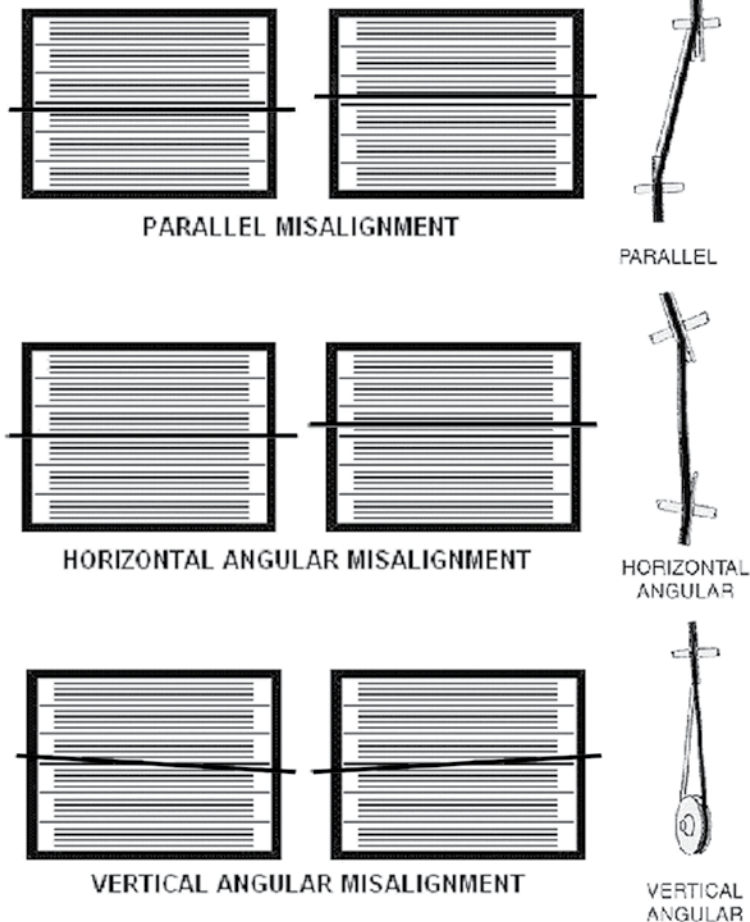
CAUTION!

Avoid laser contact with the eyes.

- 3) Check alignment. The figure below shows how to read the laser alignment tool. The sum of the drive and driven misalignment should be no greater than two marks.

NOTICE!

Never "pry" the belts into the sheave grooves. This can damage the belt cords and lead to belt turnover, short life or actual breakage. Without exception, the most important factor in the successful operation of a v-belt drive is proper belt tensioning. Too little tension results in slippage, causing rapid belt and sheave wear. Too much tension can result in excessive stress on belts, bearings and shafts.



Belt Replacement

These instructions must be followed in order to provide proper installation and tensioning. Once belt replacement is complete, perform drive system inspection as outlined above.

- 1) Lock out and tag out the electrical power supply.
- 2) Remove panels and guards to gain access to belt drive area.
- 3) Loosen Jam nut (#10).
- 4) Loosen spring nut (#9) until spring (#3) is at free length (uncompressed).
- 5) Remove top hitch pin (#6).
- 6) Remove top clevis pin (#7). (Make sure no spring force is exerted on the clevis pin before removing, as to prevent the adapter (#2) from springing up).
- 7) Raise the motor platen to a sufficient angle to allow the removal of the used belts and enable the installation of the new belts .

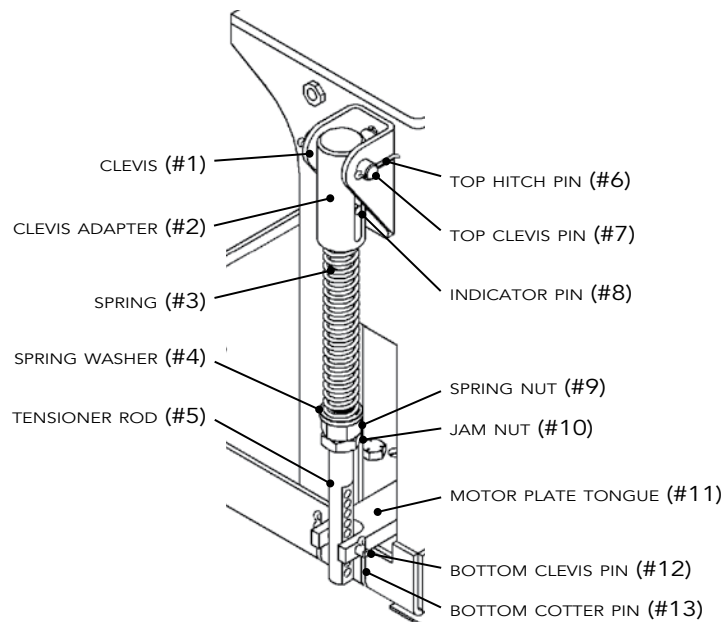
- 8) Lower the motor platen and allow the weight to be supported by the belts.



WARNING!

Keep body parts out from under the motor platen during belt replacement to avoid injury from falling motor platen.

- 9) Re-install top clevis pin (#7).
- 10) Re-install top hitch pin (#6).
- 11) Tighten spring nut (#9) and compress spring (#3) until the proper belt tension is achieved.
- 12) Check belt tension.
- 13) Tighten jam nut (#10) against spring nut (#9).
- 14) Operate compressor to check adjustment.



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Belt Tensioning Values

Unit Hp-Pressure-Hz	Belt Drive Powerbands	DEFLECTION GAUGE		SONIC TENSION METER				
		Deflection Force (lbf)	Deflection Distance (in)	Belt Mass Constant-M	Span Length-S (in)	Number of Ribs-W	Sonic Meter Tension (Hz)	
TEFC	60-100-60	2(3)-3VX600	12.4-13.3	0.28	70	17.73	3	70-73
	60-125-60	2(3)-3VX600	12.2-13.2	0.27	70	17.46	3	70-73
	60-150-60	2(3)-3VX600	12.1-13.0	0.29	70	18.28	3	67-69
	50-100-60	2(3)-3VX560	11.1-11.9	0.29	70	18.72	3	62-65
	50-125-60	2(3)-3VX560	11.0-11.9	0.28	70	18.18	3	64-66
	50-150-60	2(3)-3VX600	10.8-11.7	0.30	70	19.17	3	60-62
	40-100-60	5-3VX600	17.5-18.9	0.30	70	19.17	5	59-61
	40-125-60	5-3VX600	18.4-19.8	0.31	70	19.86	5	58-61
	40-150-60	2(3)-3VX560	10.5-11.3	0.30	70	18.94	3	60-62
	60-100-50	4-5VX600	31.7-34.1	0.29	185	18.43	4	56-58
	60-125-50	4-5VX600	31.6-33.9	0.28	185	17.99	4	57-59
	60-150-50	2(3)-3VX600	12.3-13.3	0.28	70	17.66	3	70-73
	50-100-50	2(3)-3VX560	11.7-12.6	0.29	70	18.79	3	64-66
	50-125-50	2(3)-3VX560	12.0-12.9	0.30	70	18.94	3	64-67
	50-150-50	3-5VX600	24.7-26.5	0.29	185	18.44	3	57-59
	40-100-50	2(3)-3VX560	10.4-11.2	0.30	70	19.35	3	58-61
	40-125-50	5-3VX600	18.6-20.1	0.30	70	19.48	5	60-63
	40-150-50	2(3)-3VX560	10.4-11.2	0.28	70	18.18	3	62-64

ODP	60-100-60	2(3)-3VX630	12.3-13.3	0.30	70	19.24	3	64-67
	60-125-60	2(3)-3VX630	12.2-13.2	0.30	70	18.97	3	65-67
	60-150-60	2(3)-3VX630	12.1-13.0	0.31	70	19.78	3	62-64
	50-100-60	2(3)-3VX560	11.1-11.9	0.29	70	18.72	3	62-65
	50-125-60	2(3)-3VX560	11.0-11.9	0.28	70	18.18	3	64-66
	50-150-60	2(3)-3VX600	10.8-11.7	0.30	70	19.17	3	60-62
	40-100-60	5-3VX600	17.5-18.9	0.30	70	19.17	5	59-61
	40-125-60	5-3VX600	18.4-19.8	0.31	70	19.86	5	58-61
	40-150-60	2(3)-3VX600	10.5-11.3	0.33	70	20.95	3	54-56
	60-100-50	4-5VX600	31.7-34.1	0.29	185	18.43	4	56-58
	60-125-50	4-5VX630	31.5-33.9	0.31	185	19.50	4	53-55
	60-150-50	2(3)-3VX630	12.3-13.2	0.30	70	19.16	3	64-67
	50-100-50	2(3)-3VX560	11.7-12.6	0.29	70	18.79	3	64-66
	50-125-50	2(3)-3VX560	12.0-12.9	0.30	70	18.94	3	64-67
	50-150-50	3-5VX600	24.7-26.5	0.29	185	18.44	3	57-59
	40-100-50	2(3)-3VX560	10.4-11.2	0.30	70	19.35	3	58-61
	40-125-50	5-3VX600	18.6-20.1	0.30	70	19.48	5	60-63
	40-150-50	2(3)-3VX600	10.4-11.2	0.32	70	20.18	3	56-58

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		DEFLECTION GAUGE		SONIC TENSION METER				
Unit Hp-Pressure-Hz	Belt Drive Powerbands	Deflection Force (lbf)	Deflection Distance (in)	Belt Mass Constant-M	Span Length-S (in)	Number of Ribs-W	Sonic Meter Tension (Hz)	
TEFC	30-100-60	5-3VX600	16.45-17.72	0.30	70	19.37	5	56-59
	30-125-60	5-3VX560	15.27-16.44	0.30	70	18.89	5	56-58
	30-150-60	5-3VX560	15.25-16.41	0.29	70	18.70	5	56-58
	30-175-60	5-3VX530	15.00-16.15	0.29	70	18.64	5	56-58
	25-100-60	4-3VX600	13.01-14.01	0.30	70	19.48	4	56-58
	25-125-60	4-3VX600	13.49-14.53	0.29	70	18.57	4	60-62
	25-150-60	3-3VX630	12.10-13.05	0.29	70	18.45	3	66-69
	25-175-60	3-3VX600	11.18-12.05	0.29	70	18.59	3	63-66
	20-100-60	3-3VX600	10.02-10.79	0.30	70	18.97	3	58-61
	20-125-60	3-3VX600	9.60-10.34	0.31	70	19.86	3	54-57
	20-150-60	3-3VX560	9.49-10.22	0.30	70	18.89	3	57-59
	20-175-60	3-3VX560	9.51-10.24	0.30	70	18.94	3	57-59
	30-100-50	5-3VX600	15.90-17.12	0.29	70	18.35	5	59-61
	30-125-50	5-3VX600	15.88-17.10	0.28	70	18.16	5	59-62
	30-150-50	5-3VX580	15.33-16.50	0.29	70	18.21	5	58-60
	25-100-50	4-3VX580	12.61-13.58	0.29	70	18.29	4	58-61
	25-125-50	4-3VX580	12.45-13.40	0.29	70	18.69	4	57-59
	25-150-50	4-3VX560	12.49-13.45	0.29	70	18.80	4	57-59
	20-100-50	3-3VX630	9.96-10.73	0.30	70	19.09	3	58-60
	20-125-50	3-3VX650	9.91-10.67	0.31	70	19.66	3	56-58
20-150-50	4-3VX530	11.48-12.36	0.30	70	19.07	4	53-55	
ODP	30-100-60	5-3VX600	16.45-17.72	0.30	70	19.37	5	56-59
	30-125-60	5-3VX560	15.27-16.44	0.30	70	18.89	5	56-58
	30-150-60	5-3VX560	15.25-16.41	0.29	70	18.70	5	56-58
	30-175-60	5-3VX530	15.00-16.15	0.29	70	18.64	5	56-58
	25-100-60	4-3VX600	13.01-14.01	0.30	70	19.48	4	56-58
	25-125-60	4-3VX630	13.46-14.50	0.31	70	20.09	4	55-57
	25-150-60	3-3VX650	12.09-13.03	0.30	70	19.46	3	63-65
	25-175-60	3-3VX630	11.16-12.03	0.31	70	20.10	3	58-61
	20-100-60	3-3VX600	10.02-10.79	0.30	70	18.97	3	58-61
	20-125-60	3-3VX600	9.60-10.34	0.31	70	19.86	3	54-57
	20-150-60	3-3VX560	19.49-10.22	0.31	70	18.89	3	57-59
	20-175-60	3-3VX560	9.51-10.24	0.30	70	18.94	3	57-59
	30-100-50	5-3VX600	15.90-17.12	0.29	70	18.35	5	59-61
	30-125-50	5-3VX600	15.88-17.10	0.28	70	18.16	5	59-62
	30-150-50	5-3VX580	15.33-16.50	0.29	70	18.21	5	58-60
	25-100-50	4-3VX600	12.58-13.54	0.30	70	19.32	4	55-58
	25-125-50	4-3VX600	12.42-13.37	0.31	70	19.71	4	54-56
	25-150-50	4-3VX580	12.47-13.42	0.31	70	19.82	4	54-56
	20-100-50	3-3VX630	9.96-10.73	0.30	70	19.09	3	58-60
	20-125-50	3-3VX650	9.91-10.67	0.31	70	19.66	3	56-58
20-150-50	4-3VX530	11.48-12.36	0.30	70	19.07	4	53-55	

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Bushing Data

	Unit Hp-Pressure-Hz	DriveR Cap Screw Size	DriveR Cap Screw Torque (in-lbf)	DriveR Set Screw Size	DriveR Set Screw Torque (in-lbf)	DriveN Cap Screw Size	DriveN Cap Screw Torque (in-lbf)	DriveN Set Screw Size	DriveN Set Screw Torque (in-lbf)
TEFC	60-100-60	5/16-18	180	1/4-20	87	5/16-18	180	1/4-20	87
	60-125-60	5/16-18	180	1/4-20	87	5/16-18	180	1/4-20	87
	60-150-60	5/16-18	180	1/4-20	87	5/16-18	180	1/4-20	87
	50-100-60	5/16-18	180	1/4-20	87	5/16-18	180	1/4-20	87
	50-125-60	5/16-18	180	1/4-20	87	5/16-18	180	1/4-20	87
	50-150-60	5/16-18	180	1/4-20	87	5/16-18	180	1/4-20	87
	40-100-60	5/16-18	180	1/4-20	87	5/16-18	180	1/4-20	87
	40-125-60	5/16-18	180	1/4-20	87	5/16-18	180	1/4-20	87
	40-150-60	N/A	N/A	5/16-18	430	5/16-18	180	1/4-20	87
	60-100-50	1/2-13	720	3/8-16	290	1/4-20	108	1/4-20	87
	60-125-50	1/2-13	720	3/8-16	290	1/4-20	108	1/4-20	87
	60-150-50	5/16-18	180	1/4-20	87	5/16-18	180	1/4-20	87
	50-100-50	5/16-18	180	1/4-20	87	N/A	N/A	5/16-18	430
	50-125-50	5/16-18	180	1/4-20	87	N/A	N/A	5/16-18	430
	50-150-50	3/8-16	360	3/8-16	290	5/16-18	180	1/4-20	87
	40-100-50	5/16-18	180	1/4-20	87	N/A	N/A	5/16-18	430
	40-125-50	5/16-18	180	1/4-20	87	5/16-18	180	1/4-20	87
	40-150-50	5/16-18	180	1/4-20	87	5/16-18	180	1/4-20	87
ODP	60-100-60	5/16-18	180	1/4-20	87	5/16-18	180	1/4-20	87
	60-125-60	5/16-18	180	1/4-20	87	5/16-18	180	1/4-20	87
	60-150-60	5/16-18	180	1/4-20	87	5/16-18	180	1/4-20	87
	50-100-60	5/16-18	180	1/4-20	87	5/16-18	180	1/4-20	87
	50-125-60	5/16-18	180	1/4-20	87	5/16-18	180	1/4-20	87
	50-150-60	5/16-18	180	1/4-20	87	5/16-18	180	1/4-20	87
	40-100-60	5/16-18	180	1/4-20	87	5/16-18	180	1/4-20	87
	40-125-60	5/16-18	180	1/4-20	87	5/16-18	180	1/4-20	87
	40-150-60	N/A	N/A	280	280	5/16-18	180	1/4-20	87
	60-100-50	1/2-13	720	3/8-16	290	1/4-20	108	1/4-20	87
	60-125-50	1/2-13	720	3/8-16	290	1/4-20	108	1/4-20	87
	60-150-50	5/16-18	180	1/4-20	87	5/16-18	180	1/4-20	87
	50-100-50	5/16-18	180	1/4-20	87	N/A	N/A	5/16-18	430
	50-125-50	5/16-18	180	1/4-20	87	N/A	N/A	5/16-18	430
	50-150-50	3/8-16	360	3/8-16	290	5/16-18	180	1/4-20	87
	40-100-50	5/16-18	180	1/4-20	87	N/A	N/A	5/16-18	430
	40-125-50	5/16-18	180	1/4-20	87	5/16-18	180	1/4-20	87
	40-150-50	5/16-18	180	1/4-20	87	5/16-18	180	1/4-20	87

Section VI - Servicing

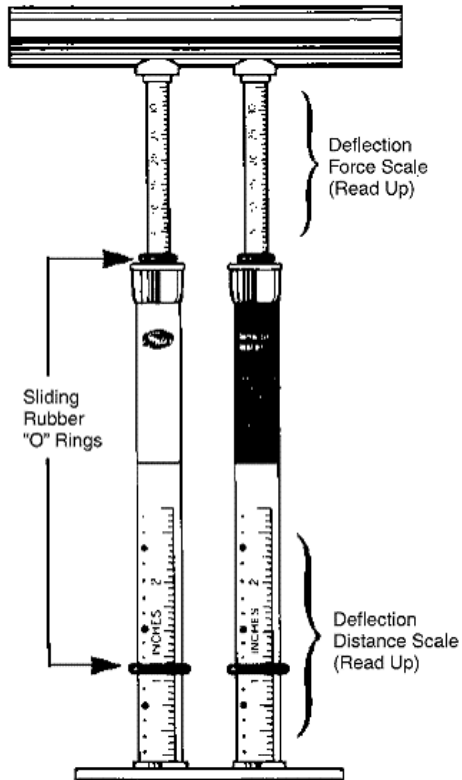
	Unit Hp-Pressure-Hz	DriveR Cap Screw Size	DriveR Cap Screw Torque (in-lbf)	DriveR Set Screw Size	DriveR Set Screw Torque (in-lbf)	DriveN Cap Screw Size	DriveN Cap Screw Torque (in-lbf)	DriveN Set Screw Size	DriveN Set Screw Torque (in-lbf)
TEFC	30-100-60	5/16-18	180	1/4-20	87	1/4-20	108	1/4-20	87
	30-125-60	5/16-18	180	1/4-20	87				
	30-150-60	5/16-18	180	1/4-20	87	1/4-20	108	1/4-20	87
	30-175-60	5/16-18	180	1/4-20	87	1/4-20	108	1/4-20	87
	25-100-60	5/16-18	180	1/4-20	87	1/4-20	108	1/4-20	87
	25-125-60	5/16-18	180	1/4-20	87	1/4-20	108	1/4-20	87
	25-150-60	5/16-18	180	1/4-20	87	1/4-20	108	1/4-20	87
	25-175-60	5/16-18	180	1/4-20	87	1/4-20	108	1/4-20	87
	20-100-60	5/16-18	180	1/4-20	87	1/4-20	108	1/4-20	87
	20-125-60	5/16-18	180	1/4-20	87	1/4-20	108	1/4-20	87
	20-150-60	1/4-20	108	1/4-20	87	1/4-20	108	1/4-20	87
	20-175-60	1/4-20	108	1/4-20	87	1/4-20	108	1/4-20	87
	30-100-50	5/16-18	180	1/4-20	87	1/4-20	108	1/4-20	87
	30-125-50	5/16-18	180	1/4-20	87	1/4-20	108	1/4-20	87
	30-150-50	5/16-18	180	1/4-20	87	1/4-20	108	1/4-20	87
	25-100-50	5/16-18	180	1/4-20	87	1/4-20	108	1/4-20	87
	25-125-50	5/16-18	180	1/4-20	87	1/4-20	108	1/4-20	87
	25-150-50	5/16-18	180	1/4-20	87	1/4-20	108	1/4-20	87
	20-100-50	5/16-18	180	1/4-20	87	1/4-20	108	1/4-20	87
	20-125-50	5/16-18	180	1/4-20	87	1/4-20	108	1/4-20	87
20-150-50	5/16-18	180	1/4-20	87	1/4-20	108	1/4-20	87	

ODP	30-100-60	5/16-18	180	1/4-20	87	1/4-20	108	1/4-20	87
	30-125-60	5/16-18	180	1/4-20	87				
	30-150-60	5/16-18	180	1/4-20	87	1/4-20	108	1/4-20	87
	30-175-60	5/16-18	180	1/4-20	87	1/4-20	108	1/4-20	87
	25-100-60	5/16-18	180	1/4-20	87	1/4-20	108	1/4-20	87
	25-125-60	5/16-18	180	1/4-20	87	1/4-20	108	1/4-20	87
	25-150-60	5/16-18	180	1/4-20	87	1/4-20	108	1/4-20	87
	25-175-60	5/16-18	180	1/4-20	87	1/4-20	108	1/4-20	87
	20-100-60	5/16-18	180	1/4-20	87	1/4-20	108	1/4-20	87
	20-125-60	5/16-18	180	1/4-20	87	1/4-20	108	1/4-20	87
	20-150-60	1/4-20	108	1/4-20	87	1/4-20	108	1/4-20	87
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	30-150-50	5/16-18	180	1/4-20	87	1/4-20	108	1/4-20	87
	25-100-50	5/16-18	180	1/4-20	87	1/4-20	108	1/4-20	87
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	20-100-50	5/16-18	180	1/4-20	87	1/4-20	108	1/4-20	87
	20-125-50	5/16-18	180	1/4-20	87	1/4-20	108	1/4-20	87
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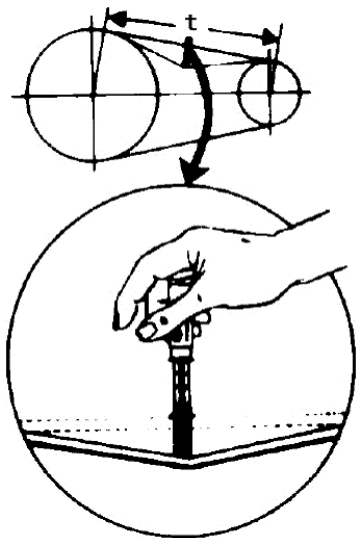
Section VI - Servicing

Deflection Gauge Instructions:

If an o-ring deflection gauge is used to measure static tension the double barrel o-ring gauge must be used. The required deflection distance and deflection force are provided in the charts above.



Read the scales at the bottom edge of the "O" Ring. Leave the upper "O" Ring in maximum "down" position



Sonic Meter Instructions:

Turn on the power. Press the "Power" key and the LCD screen display appears as follows: The LCD screen is back lit for use in low light conditions. The screen and back light remain on for up to five minutes of inactivity, and then the unit automatically turns off. The opening screen displays the contents of the data storage register that was last being used when the STM was turned off. Values for (1) "MASS" (Belt Mass Constant), (2) "WIDTH" (Belt Width), and (3) "SPAN" (Belt Span Length) are all displayed simultaneously.

Enter belt mass constant:

$$M = ______ \text{ g/m}$$

Belt mass constants are provided on the charts above. Press the "MASS" key and enter numbers on the keypad. Make sure the decimal is placed correctly in the display panel. If your entry is incorrect, press "MASS" again and the cursor returns to the original position.

Enter belt width or number of rib/strands:

$$W = ______ \text{ mm/#R}$$

When using the Sonic Tension Meter on the QGB drives with PowerBand® belts, be sure to use the appropriate mass constant and enter the correct number of belt strands being measured. There is no need to multiply the mass constant by the number of ribs/strands, as the Sonic Tension Meter will calculate the correct total belt mass.

Example: For a V-belt drive using four individual 3V belts enter "1" for the belt width ("Width" key). The Sonic Tension Meter will display the static belt tension per individual belt. When measuring the belt tension in the V-belt drive, make sure the V-belts do not interfere with each other while vibrating. If the same drive used a 4-strand 3V PowerBand® belt instead of single belts enter "4" for the belt width ("Width" key). The total belt tension for all four belts is measured as the entire belt vibrates. The Sonic Tension Meter will display the total static belt tension for the PowerBand® belt (for all strands within belt).

Enter the span length:

S = _____.__mm

The span length represents the distance between the contact points on adjacent sprockets/pulleys/sheaves. This distance is given in mm for each Beta unit.

Measurement

Press the "MEASURE" key and the green LED light will begin flashing. Tap the belt span to make the belt span vibrate. Hold the sensor approximately 1 cm (0.4 inch) from the belt or closer without touching the belt. The green LED light will continue to flash until a signal is received by the sensor, then the green LED light will turn off and a wave-form graphic will appear on the LCD screen. After the signal is processed, the measured belt tension is displayed, the meter beeps three times, and the green LED light turns on indicating a successful tension measurement. After a tension reading has been obtained, pressing the "Hz" key toggles the LCD display output between tension, frequency, or both. If the belt signal cannot be measured, or the measured frequency or the calculated belt tension is out of the range of the meter, the red LED light will turn on. When this occurs, either the tension or frequency fields may also display ERROR. To make another tension reading, simply tap the belt again. The auto-trigger feature will automatically re-activate the meter without pressing the "MEASURE" key.

Tension Display

T = _____ Kgf or lbf or N

The displayed output of measured force can be switched between units of Kilograms force, Pounds force, and Newtons. This can be accomplished as follows:

With the unit powered off, press the "0" and "9" and "Power" keys at the same time. The meter will then turn on with

the current unit of measure displayed. Units can then be changed by pressing the "SELECT" key until the desired unit appears. Press and hold down the "POWER" key again until the meter turns off. Now turn the meter on for normal operation. Data entered into the unit must still be in SI units of millimeters and grams.

Frequency Display

F = ____Hz

Pressing the "Hz" key toggles the LCD display output between tension, frequency, or both.

Measurement Errors

If either the calculated belt tension or measured frequency cannot be displayed the red LED light will turn on and the LCD screen may display "ERROR". If an error has been made in the measurement, "ERROR" will be displayed. Check the accuracy of the mass constants, width and span values and retry the measurement until a tension or frequency value is displayed. With the auto-trigger feature it is not necessary to press the "Measure" key again. When a tension or frequency reading is obtained, take at least two additional readings for comparison. Three readings in relative close proximity indicate reasonably accurate belt tension readings. Tension measurements made on belts at very low tensions may yield greater variability and a greater probability for errors. If a tension reading cannot be obtained, the belt may be too loose to generate a clear harmonic frequency signal. If this is the case, the belt may need to be tightened in order to obtain a tension reading. The optional Inductive Sensor is more effective at very low frequencies than the conventional microphone sensors, and may provide better results. NOTE: Frequency only readings must have data values in the storage registers or the meter's red LED light will stay on.

Section VI - Servicing

Electronic Control

Prior to attempting any repairs of the electronic control or related components, disconnect and lock out all power supplies to the compressor plus any remote controllers. Assure yourself that power is removed from the compressor by checking for any AC voltage at the line side of the motor starter.

Replacing the HAT or Transducer

To replace the temperature switch (HAT probe), remove the probe from the discharge end of the aircend. Install a new probe into discharge tube. Connect the wires of the new probe to the existing wires. Perform HAT tests to assure that the system functions correctly.

To replace the pressure transducer:
The pressure transducer is located at the minimum pressure check valve. Remove the connector at the back of the transducer, replace the transducer and reinstall the connector.

Replacing Electronic Control

Prior to replacing electronic control, gather and record information regarding total running hours, separator hours, air filter hours, fluid filter hours and fluid service/sample hours.

To replace the electronic control, remove the screws attaching control to the panel. Remove and discard wire tie-wraps.

NOTICE!

Prior to removing any wiring from the electronic control, identify individual wire location. Refer to the electrical wiring diagram.

Install new electronic control panel and install wiring in accordance with electrical wiring diagram. Attach to the panel using existing hardware. Install new wire tie-wraps to secure wiring to wire bundle.

Operational Test

Remove tag and lock out tools. Restore power to unit. If electronic control was replaced, refer to the Program Setup Menu to program the replacement electronic control. Once completed, perform an operational test to assure unit is operating correctly.

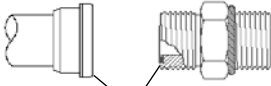
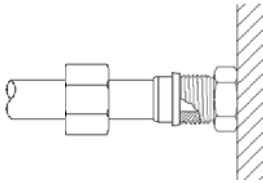
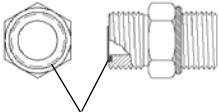
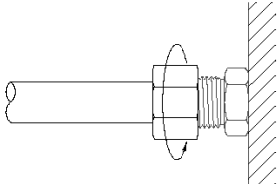
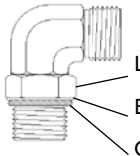
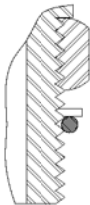
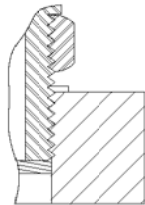
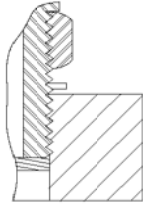
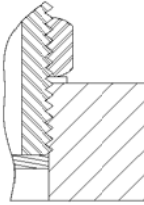
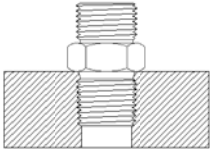
Air and Fluid Tubing

Flareless tubing is used in the air piping to eliminate pipe joints and provide a cleaner appearance. Replacement tubing and fittings are available; however, special installation procedures must be followed. Your authorized distributor has the necessary instructions and experience to perform these repairs.



WARNING!

Failure to install flareless tubing or fittings correctly may result in the tubing coming apart under pressure. Serious injury and property damage may result.

ASSEMBLING THE FACE SEAL END			
<p>1) CHECK SEALING SURFACES</p>  <p>CHECK SEALING SURFACE AND GROOVE FOR DAMAGE OR MATERIAL BUILDUP.</p>	<p>3) POSITION TO FITTING</p>  <p>ENSURE THAT O-RING IS PROPERLY SEATED IN THE GROOVE.</p> <p>POSITION AND HOLD FLAT SEALING FACE AGAINST O-RING.</p>		
<p>2) INSTALL O-RING</p>  <p>CORRECTLY SIZED O-RING IS 0.070" THICK AND ITS O. D. TOUCHES THE OUTSIDE EDGE OF THE GROOVE.</p>	<p>4) THREAD ON NUT BY HAND & 5) WRENCH TIGHTEN</p>  <p>IF PROPERLY ALIGNED, THE NUT SHOULD THREAD ON EASILY BY HAND.</p> <p>WRENCH TIGHTEN TO RECOMMENDED TORQUE FOR FACE SEAL END.</p>		
ASSEMBLING ADJUSTABLE END TO PORT			
<p>1) CHECK SEALING SURFACES & INSTALL O-RING</p>  <p>LOCKNUT BACKUP WASHER O-RING</p> <ul style="list-style-type: none"> • INSPECT FITTING FOR DAMAGE • USE O-RING INSTALLATION TOOL TO INSTALL O-RING • APPLY SMALL AMOUNT OF LUBRICANT TO O-RING 			
<p>2) BACK OFF NUT</p>  <p>BACK OFF LOCKNUT TO ITS UPPERMOST POSITION</p>	<p>3) THREAD INTO PORT</p>  <p>THREAD FITTING INTO THE PORT UNTIL THE BACKUP WASHER CONTACTS THE SURFACE</p>	<p>4) BACK OFF FOR ALIGNMENT</p>  <p>POSITION FITTING FOR ATTACHING LINE BY UN-THREADING UP TO 360°</p>	<p>5) WRENCH TIGHTEN</p>  <p>WRENCH TIGHTEN LOCKNUT</p>
ASSEMBLING NON-ADJUSTABLE PORT END			
 <ul style="list-style-type: none"> • INSPECT SEALING SURFACES FOR DAMAGE • INSTALL O-RING • THREAD FITTING INTO PORT AND WRENCH TIGHTEN 			

SEAL-LOK ASSEMBLY TORQUES (IN LBS)								
DASH SIZE	4	6	8	10	12	16	20	24
FACE SEAL	220	320	480	750	1080	1440	1680	1980
END	(+/-) 10	(+/-) 25	(+/-) 25	(+/-) 35	(+/-) 45	(+/-) 90	(+/-) 90	(+/-) 100

Section VII - Compressor Fluids

- Fluid Specifications
- Lubrication
- Fluid Level
- Fluid Filter
- Factors Affecting Fluid Life
- Fluid Analysis Program - General
- QuinSyn PG
- QuinSyn XP
- QuinSyn Plus
- QuinSyn Fluids
- QuinSyn Flush
- Cleaning and Flushing With QuinSyn Flush
- Converting to QuinSyn PG
- Converting to QuinSyn XP
- Converting to QuinSyn Plus
- Converting to QuinSyn
- Sampling Procedures
- Understanding the Analysis Report
- Fluid Parameters

The three functions of compressor fluid are:

- to lubricate the bearings and rotors
- to remove heat from the air as it is being compressed thus lowering the compressed air discharge temperature
- to seal the rotor clearances

Fluid Specifications

We recommend that all Quincy rotary screw compressors be filled with one of the following synthetic fluids:

- QuinSyn PG** - Standard fill.
- QuinSyn XP** - Standard fill for high pressure applications.
- QuinSyn Plus** - Extended life fluid.
- QuinSyn F** - Food grade applications.
- QuinSyn IV** - 4000 hour alternative fluid.

A fluid tag is attached to each Quincy rotary screw compressor indicating the type of fluid provided in the initial fill. All of the above fluids are available from any authorized Quincy distributor.



CAUTION!

Do not mix different grades or types of fluid. Do not use inferior grades of fluids.



NOTICE!

Failure to follow these fluid recommendations will adversely affect your warranty.

Lubrication

Most Quincy Compressors are equipped with a positive displacement fluid pump mounted to the compressor and directly driven by one of the rotors. Fluid is circulated through the cooler, fluid filter, and into the compressor.

In the compressor, fluid is diverted through internal passages to ensure positive lubrication of the bearings and shaft seal. The remainder of the fluid is injected at the beginning stage of the compression cycle to seal clearances and to cool and lubricate the rotors. Models not equipped

with a fluid pump use pressure differential to circulate the fluid. Positive pressure maintained in the reservoir forces the fluid throughout the machine.

Each Quincy compressor is filled at the factory with the correct amount of one of the synthetic fluid listed in the Fluid Specifications. Mineral oil can be requested and used in specific applications. The use of other brands or types of fluid may reduce the design life of the compressor or cause problems with filtration or carryover. Consult the Quincy Service Department before changing brands of fluid.

Fluid Level

Fluid level is monitored by a sightglass or a dial gauge while in operation. Fluid level should be in the "run" area on the dial gauge or completely fill the sight gauge. **DO NOT OVERFILL.**



Figure 1-1. Fluid Level Sight Gauges

Each unit comes equipped with a fluid level sight gauge, fluid fill opening, and a fluid drain in the reservoir. The fill plug is drilled to allow some pressure to escape before the plug is completely removed. Should

you hear pressurized air venting through the hole, immediately screw the plug back into the reservoir. Relieve the pressure in the machine before proceeding.



CAUTION!

Hot fluid under pressure could cause death or serious injury. Do not remove the fluid fill plug and attempt to add fluid to the reservoir while the compressor is in operation or when the system is under pressure. Be sure that the compressor's red mushroom stop button is pushed in and locked and that the main power disconnect switch is in the off position and locked out to assure that the compressor will not start automatically.

Section VII - Compressor Fluids

Fluid Filter

The fluid filter is a spin on, full flow unit. Replacement of the filter requires spinning off the cartridge and replacing it with a new one.

NOTICE!

Use genuine Quincy replacement filters only.

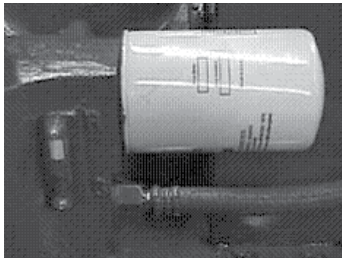


Figure 1-3. Spin-on Fluid Filter

The initial filter change should occur after the first 500 hours of operation. During normal service, the filter cartridge should be replaced under the following conditions, **whichever occurs first**:

- as indicated by the fluid filter maintenance indicator when the fluid is at normal operating temperature
- every 1,000 hours
- every fluid change

NOTICE!

The fluid filter maintenance indicator may read high upon start up on cool mornings due to sluggish fluid creating higher than normal differential pressures. Monitor indicator after the fluid warms up.

Factors Affecting Fluid Life

To protect your investment, check for the following, which can affect the long life of QuinSyn:

- 1) High operating temperatures
- 2) Contaminants:
 - a. Other fluids
 - b. Strong Oxidizers such as:
 - acids
 - sulfur
 - chlorine
 - burnt fuel -
i.e. exhaust from: forklifts, boilers, jet aircraft
 - c. nitrogen oxides
 - d. ozone
 - e. welding fumes
 - f. plastic molding fumes
- c. Ammonia
- d. Solvent fumes:
 - chlorinated degreasers
 - ink solvents
- e. Airborne dust and particles
- f. Paper digester fumes

Locate your compressor in the coolest area possible. For every 18°F above 195°F, the operating life of any fluid is reduced to about half that at 195°F. Some mineral oils begin to form varnish at temperatures above 200°F. QuinSyn fluids are more forgiving than mineral oil at high temperatures. QuinSyn XP is designed to operate at sustained temperatures above 200°F. The life of other QuinSyn fluids will be shortened at high temperatures.

Air intake should provide contaminant-free, cool air. A Quincy heavy-duty intake filter will reduce the risk of abrasion and increased wear. An air filter does not eliminate reactive gases. Inspect your filter monthly and replace as required.

Fluid Analysis Program - General

Quincy's fluid analysis program is offered to all customers using QuinSyn fluids in Quincy Compressor® Rotary Screw Compressors. This service provides optimum drain intervals for compressors operating on QuinSyn fluids. Monitoring of the total acid number (TAN), barium level and/or viscosity throughout the life of the fluid provides maximum protection to your machine, while best utilizing the extended life features of QuinSyn.

The fluid analysis provides historical information, detailing items such as hours on the fluid, viscosity and total acid number (TAN). Should results appear unusual or suspicious, a detailed analysis can pinpoint specific contaminants. A detailed report is furnished to you, your Quincy Distributor and the Quincy Compressor® factory upon completion of the fluid analysis.

Although QuinSyn fluids are rated by hours of life expectancy under normal operating conditions, it is recommended that fluid samples be taken every 500 to 2000 hours

and sent to Quincy Compressor® Fluid Analysis until a history of performance in a specific compressor application is established. Once the appropriate drain interval is established, the frequency of the fluid analysis can be reduced unless operating conditions change.

NOTICE!

All Quincy Compressor® extended airend warranty programs require that fluid samples be sent to Quincy Compressor® Fluid Analysis a minimum of every 2,000 hours.

The depletion of antioxidants, change of viscosity, barium and acid levels all occur with time. It is extremely important to change QuinSyn before the antioxidants are completely depleted. If the fluid is left in the compressor beyond its useful life, removing all of the spent fluid is difficult. The oxidation products remaining can considerably shorten the life of the new fill of QuinSyn fluid.

Section VII - Compressor Fluids

QuinSyn PG

QuinSyn PG is a custom blended polyalklene glycol/ester (PAG). QuinSyn PG is an ISO 46 viscosity fluid with an 8,000 hour life under normal operating conditions (exact fluid life is determined by the fluid analysis program) and is the chosen fluid for Quincy's new five-year airend warranty effective June 1, 2000 (see Blue Alert #566). Under extended warranty conditions QuinSyn PG fluid life is rated at 8,000 hours or one year, whichever occurs first.

Typical Properties of QuinSyn PG ISO 46

Viscosity @ 100°F ASTM D445	52.4 cSt.
Viscosity @ 210°F ASTM D445	9.4 cSt.
Viscosity Index ASTM D2270	163
Specific Gravity 60/60	0.98
Flash Point ASTM D92	485°F
Fire Point ASTM D92	525°F

Applications

QuinSyn PG is the recommended fluid in high humidity applications due to its ability to hold water. QuinSyn PG is best suited for applications where high humidity exists and the machine cannot be shut down to drain water from the reservoir.

Disposal

QuinSyn PG is considered nonhazardous waste. Disposal of this fluid should be done in accordance with Local, State, and Federal regulations. Separation of

this fluid from condensate will require those separators designed to handle fluid emulsions. The QIOWA fluid/water separator is suitable for separation of fluid emulsions such as QuinSyn PG. Please contact Quincy's Service Department for more details.

Fluid Analysis Program

The fluid sampling for QuinSyn PG has been extended to 2,000 hours because of the superior quality and forgiving nature of this fluid. The new five-year extended warranty with QuinSyn PG requires 2,000 hour sampling as a condition of maintaining the warranty.

NOTICE!

To maintain warranty compliance, fluid samples of QuinSyn PG must be sent to Quincy Compressor® Fluid Analysis a minimum of every 2,000 hours.

Because this fluid differs from QuinSyn, different methods are employed to evaluate the fluid in the sampling program. Primary concerns with this fluid are the total acid number (TAN) and barium levels. QuinSyn PG will not be condemned on water percentage nor antioxidants but will be condemned on low barium and high TAN values. The barium in the fluid acts as a corrosion inhibitor, therefore we have set low limits for this additive (see page 60 for limits).

QuinSyn XP

QuinSyn XP is the factory fill for high pressure units (defined as units over 125 psig full flow). QuinSyn XP replaces QuinSyn HP 68 as our high pressure fluid and is totally compatible with QuinSyn HP 68 (the fluids can be mixed together with absolutely no problems). Aftermarket pail and drum orders for QuinSyn HP 68 will be filled with QuinSyn XP.

QuinSyn XP is a custom blended polyolester (POE) fluid ideally suited for rotary screw air compressors. QuinSyn XP is an ISO 68 viscosity fluid with a 12,000 hour life at 100 & 125 psig full flow under normal operating conditions and 8,000 hours as a high pressure fluid (exact fluid life is determined by the fluid sampling program). QuinSyn XP is the only fluid available with Quincy's ten-year airend warranty (see Blue Alert #566).

<u>Typical Properties of QuinSyn XP</u>	<u>ISO 68</u>
Viscosity @ 100°F ASTM D445	60.0 cSt.
Viscosity @ 210°F ASTM D445	9.8 cSt.
Viscosity Index ASTM D2270	131
Specific Gravity 60/60	0.95
Flash Point ASTM D92	570°F
Fire Point ASTM D92	645°F

Applications

QuinSyn XP is designed for applications where the fluid is exposed to elevated temperatures for extended periods of time. Fluid thermostat temperature settings can be elevated to assist in reducing water content in the fluid in high humidity applications. Consult Quincy's Service Department before making thermostat changes.

Disposal

QuinSyn XP is considered nonhazardous waste. Disposal of this fluid should be done in accordance with Local, State, and Federal regulations. Should condensate need to be treated, Quincy's QIOWA fluid/water separators are required.

Fluid Analysis Program

QuinSyn XP will be analyzed similar to QuinSyn although the primary concern is the total acid number (TAN). Supplemental "on site" TAN kits will be applicable to this fluid as well as QuinSyn PG.

 **NOTICE!**

To maintain extended warranty compliance, fluid samples of QuinSyn XP must be sent to Quincy Compressor® Fluid Analysis a minimum of every 2,000 hours.

Section VII - Compressor Fluids

QuinSyn Plus

QuinSyn Plus is an optional factory fill for Quincy rotary screw compressors. Machines ordered with QuinSyn Plus as the factory fill will be eligible for a five-year extended airend warranty.

QuinSyn Plus is an ISO 46 viscosity fluid with an 8,000 hour life under normal operating conditions (exact fluid life is determined by the fluid analysis program). It is a synthetic hydrocarbon/ester fluid.

QuinSyn Plus is totally compatible with QuinSyn. Machines currently running with QuinSyn fluid can be topped off with QuinSyn Plus with no adverse effects.

Some advantages of QuinSyn plus are:

- Superior demulsability (ability to separate from water)
- Less susceptible to varnish
- Extremely low volatility
- Excellent corrosion protection
- Outstanding low temperature properties
- Exceptional thermal stability
- Excellent oxidative stability
- Better gas-fluid separation

Typical Properties of QuinSyn Plus ISO 46

Viscosity @ 100°F ASTM D445	46.0 cSt.
Viscosity @ 210°F ASTM D445	7.5 cSt.
Viscosity Index ASTM D2270	127
Specific Gravity 60/60	0.89
Flash Point ASTM D92	475°F
Fire Point ASTM D92	540°F
Pour Point	-58°F

Applications

QuinSyn Plus is suited for use in rotary screw air compressors operating in harsh service conditions where the fluid is exposed to higher temperatures for extended periods of time. Fluid thermostat temperature settings can be elevated to assist in reducing water content in the fluid in high humidity applications. Please consult Quincy Service Department for any thermostat changes.

Disposal

QuinSyn Plus is considered nonhazardous waste. Disposal of this fluid should be done in accordance with Local, State, and Federal regulations. Should condensate need to be treated, Quincy's QIOWA fluid/water separators are required.

Fluid Analysis Program

QuinSyn Plus fluid is included in Quincy's fluid analysis program.

NOTICE!

To maintain extended warranty compliance, fluid samples of QuinSyn Plus must be sent to Quincy Compressor® Fluid Analysis a minimum of every 2,000 hours.

QuinSyn Fluids

QuinSyn F

QuinSyn F is Quincy’s food grade fluid, suitable in applications where there may be incidental food contact. Compliant with FDA 21 CFR 178.3570 (Lubricants With Incidental Food Contact), QuinSyn F is authorized by the USDA with an H-1 rating for use in federally inspected meat and poultry plants. Since the fluid is viewed as a possible indirect food additive, the limit for food contact is 10 ppm. Near white in color and low in volatility, QuinSyn F is ideal for clean service. A five-year extended warranty is available with the use of QuinSyn F.

QuinSyn IV

QuinSyn IV is a custom-blended Polyalphaolefin (PAO) partial synthetic hydrocarbon fluid giving improved lubrication at high and low temperatures, reduced volatility, good chemical inertness and hydrolytic stability, and compatibility with mineral oils and equipment designed for use with mineral oils. QuinSyn IV is a long life fluid formulated especially for flooded screw compressors. The fluid, clear with a green tint, is available on all flooded compressors as a factory fill option. Extended warranties are not available with the use of QuinSyn IV.

QuinSyn

QuinSyn is a Polyalphaolefin (PAO) type synthetic fluid. **Effective November 1, 2000, QuinSyn Compressor Fluid is no longer available as a factory fill option.** QuinSyn is still available in aftermarket pails, drums and kits. Extended warranties are not available with the use of QuinSyn, except on compressors shipped prior to June 1, 2000.

Fluid Life

QuinSyn F and QuinSyn IV provide an expected life of 4,000 hours at normal operating conditions. The expected life of QuinSyn is 8,000 hours or one year (whichever occurs first) at normal operating conditions.

Disposal

QuinSyn products are considered nonhazardous under the OSHA Hazard Communication Standard 21 CFR 1910.1200. They carry no hazardous labels or warnings under that standard.

Typical Properties of QuinSyn Fluids

Tests	QuinSyn F	QuinSyn IV	QuinSyn
Viscosity @ 100°F ASTM D445	43.0 cSt.	45.0 cSt.	43.0 cSt.
Viscosity @ 210°F ASTM D445	7.5 cSt.	7.3 cSt.	7.5 cSt.
Viscosity Index ASTM D2270	139	108	139
Flash Point ASTM D92	495°F	455°F	514°F
Fire Point ASTM D92	560°F	498°F	554°F
Pour Point	-76°F	<-35°F	-65°F
Specific Gravity 60/60	0.83	0.85	0.83
Color*	Water white/White	Clear/Green	Pale Blue

*Changes to color will occur during operation.

Section VII - Compressor Fluids

QuinSyn Flush

QuinSyn Flush is a specially formulated synthetic fluid capable of dissolving varnish and solubilizing sludge from lubricating systems while they are operating.

QuinSyn Flush contains oxidation and rust inhibitors, and can be used as a short-term fluid (for a maximum of 500 hours). It is fully compatible with mineral oils and QuinSyn synthetic fluids, and is highly recommended for use as a flushing fluid when converting to QuinSyn PG from QuinSyn or QuinSyn IV.

Applications

Cleaning fluid for removal of varnish, dirt and oxidized fluid from compressor fluid systems.

Flushing fluid when changing from other fluids to QuinSyn fluids.

Typical Properties of QuinSyn Flush

Viscosity @ 100°F ASTM D445	43.3 cSt.
Viscosity @ 210°F ASTM D445	5.6 cSt.
Viscosity Index	65
Flash Point ASTM D92	444°F
Fire Point ASTM D92	520°F
Pour Point	-45°F
Specific Gravity 60/60	0.965

Cleaning and Flushing With QuinSyn Flush

Normal Machines

Flushing **clean** machines presently using:

A. Mineral Oils -

Drain compressor thoroughly while hot including all the low areas. Shut down and lockout the machine. Detach lines and drain. Inspect machine; if clean, change filters and separator elements and proceed as follows:

Fill with QuinSyn Flush and run machine until it reaches normal operating temperature. Drain and refill with a fresh charge of the QuinSyn fluid selected for your machine. Send a fluid sample to Quincy Compressor® Fluid Analysis at 200 hours.

B. Polyalkylene glycols (PAG) or Silicone -

Drain compressor thoroughly as in (A). Fill machine with QuinSyn Flush and run for 500 hours. Send a fluid sample to Quincy Compressor® Fluid Analysis. Flush may need to be repeated several times. Analysis will determine if further flushes are needed.

Fill with the QuinSyn fluid selected for your machine. Send a fluid sample to Quincy Compressor® Fluid Analysis at 200 hours.

Varnished Machines

Always clean **slightly varnished** machines using mineral oils or PAO fluids with QuinSyn Flush using the following procedure:

Drain thoroughly as in (A) and fill with QuinSyn Flush. Run the machine for 300 hours and take a fluid sample. Send fluid sample to Quincy Compressor® Fluid Analysis to determine if further flushes are needed. Continue compressor operation until results of fluid analysis are reported. Drain or continue operation as advised by fluid analysis.

Always clean **medium to heavily varnished** machines using mineral oils or PAO fluids with QuinSyn Flush using the following procedure:

Drain thoroughly as in (A) and fill with QuinSyn Flush. Run the machine for 300

hours and take a fluid sample. Send fluid sample to Quincy Compressor® Fluid Analysis to determine if further flushes are needed. Run the flush for an additional 300 hours. Drain thoroughly as in (A) and inspect the compressor. If clean, flush with another half charge of QuinSyn Flush and run for 30 minutes. Drain completely. Change filters and separator elements and fill with a fresh charge of the QuinSyn fluid selected for your machine. Send fluid sample to Quincy Compressor® Fluid Analysis at 200 hours.

Extremely varnished machines should not be put back into service until mechanically or chemically cleaned. After proper cleaning, fill with a fresh charge of the QuinSyn fluid selected for your machine. Send fluid sample to Quincy Compressor® Fluid Analysis at 200 hours.

Section VII - Compressor Fluids

Converting to QuinSyn PG

Normal Machines

Flush **clean** machines presently using QuinSyn or QuinSyn IV before converting them to QuinSyn PG.

Drain compressor thoroughly while hot, including all the low areas, fluid lines and fluid cooler. Fill with QuinSyn Flush and run compressor until it reaches normal operating temperatures. Shut down and lockout the machine. Drain all the QuinSyn Flush and discard in accordance with all local, state and federal disposal regulations. Change the separator and all the filters on the compressor. Refill the reservoir and system with a full charge of QuinSyn PG.

NOTICE!

If all the previous fluid is not removed from the compressor, excessive foam may be visible in the fluid level sightglass. If this occurs, repeat the flushing procedure.

Varnished Machines

Flush **varnished** machines presently using QuinSyn or QuinSyn IV (following the procedures outlined on pages 52-53) before converting them to QuinSyn PG.

Drain compressor thoroughly while hot, including all the low areas, fluid lines and the fluid cooler. Fill with QuinSyn Flush and run for 300 hours. Take a fluid sample and send to Quincy Compressor® Fluid

Analysis to determine if further flushing is needed. Continue operating compressor until the results of fluid analysis are known. Drain or continue to run compressor as advised by the fluid analysis report.

NOTICE!

More than one flush may be required to remove varnish buildup and reduce the TAN to an acceptable level. It may be necessary to change the fluid filter more frequently while the machine is being cleaned.

If advised to refill with another charge of QuinSyn Flush, run compressor until it reaches normal operating temperature. Shut down and lockout the machine. Drain all of the original charge of the QuinSyn Flush and discard in accordance with all local, state and federal disposal regulations. Refill with a fresh charge of QuinSyn Flush and change the fluid filters. Run compressor for 300 hours. Take a fluid sample and send to Quincy Compressor® Fluid Analysis to determine if further flushing is needed. Proceed as instructed by the fluid analysis report.

If advised to drain the QuinSyn Flush, run compressor until it reaches normal operating temperature. Shut down and lockout the machine. Drain the QuinSyn Flush and discard in accordance with all local, state and federal disposal regulations. Change the separator and fluid filters on the compressor and refill with a full charge of the QuinSyn PG.

Converting to QuinSyn XP

Normal Machines

- A. Any QuinSyn fluid - No flush required. Drain Compressor thoroughly while hot, including all the low areas, fluid lines and the fluid cooler. Shut down and lockout the machine. Change the separator and all the filters on the compressor. Refill the reservoir and system with a full charge of QuinSyn XP.
- B. Mineral Oils - Drain compressor thoroughly while hot including all the low areas. Shut down and lockout the machine. Detach lines and drain. Inspect machine; if clean, change filters and separator elements. Fill with QuinSyn Flush and run machine until it reaches normal operating temperature. Drain and refill with a fresh charge of new QuinSyn XP. Send a fluid sample to Quincy Compressor® Fluid Analysis at 200 hours.

Varnished Machines

For **slightly to extremely varnished** machines using mineral oils or PAO fluids, flush the compressor with QuinSyn Flush following the procedures outlined on pages 52-53.

Converting to QuinSyn Plus

Normal Machines

- A. Any QuinSyn fluid (**except QuinSyn PG**) - No flush required. Drain Compressor thoroughly while hot, including all the low areas, fluid lines and the fluid cooler. Shut down and lockout the machine. Change the separator and all the filters on the compressor. Refill the reservoir and system with a full charge of QuinSyn Plus.
- B. Mineral Oils and QuinSyn PG - Drain compressor thoroughly while hot including all the low areas. Shut down and lockout the machine. Detach lines and drain. Inspect machine; if clean, change filters and separator elements. Fill with QuinSyn Flush and run machine until it reaches normal operating temperature. Drain and refill with a fresh charge of new QuinSyn Plus. Send a fluid sample to Quincy Compressor® Fluid Analysis at 200 hours.

Varnished Machines

For **slightly to extremely varnished** machines using mineral oils or PAO fluids, flush the compressor with QuinSyn Flush following the procedures outlined on pages 52-53.

Section VII - Compressor Fluids

Converting to QuinSyn

QuinSyn fluids are compatible with the materials and elastomers used in mineral oil systems. Converting your compressor from mineral oil to QuinSyn or QuinSyn IV may be as easy as a simple flush to remove any sludge and varnish present. Emphasis must be placed on draining after each step. Contaminants left in the compressor after flushing have a direct effect on the fluid's life. Once the oxidized material (varnish) is dissolved in the QuinSyn Flush, the cleaner and varnish must be removed from the compressor and system parts (particularly in areas like filters, coolers and piping, etc.). See your Quincy Compressor® Distributor to assist in the evaluation of your compressor.

NOTICE!

If converting to QuinSyn F from any QuinSyn fluid contact the Quincy Service Department.



Sampling Procedures

Preferred sample location is the fluid filter. If unable to take sample from fluid filter, proceed as follows:

1. Shutdown and lockout compressor.
2. Relieve pressure in reservoir.
3. Remove plug from reservoir drain line.
4. Drain water from reservoir and discard in approved manner.
5. Fill sample bottle with fluid.
6. Close valve and replace plug in drain line.
7. Return compressor to service and check fluid level during operation. Service with fluid as required.

Using fluid filter sample valve, proceed as follows:

1. Open valve, drain 2-4 ounces of fluid from filter and discard in an approved manner.
2. Fill sample bottle.
3. Close valve.

After collecting sample from either of the above methods:

1. Fill out information label completely.*

Be certain to provide all information as to possible hazards related to a given sample. If this situation exists, all information shall be clearly marked on the sample bottle label.

2. Attach Sample Bottle Label to the bottle and put bottle in mailer.
3. Place Shipping Label on the outside of the mailer and send it by UPS.

FROM: _____ Customer Fax # _____
Model No. _____ Serial No. _____
Fluid _____ Sample Date _____
Hours on Fluid _____ Hours on Machine _____
Distributor _____
Sample From <input type="checkbox"/> Reservoir <input type="checkbox"/> Filter

Sample Bottle Label

FROM:
TO:
 Quincy Compressor Fluid Analysis 2300 James Savage Road Midland, MI 48642-6535

Shipping Label

Note: A fluid sample valve kit is available from Quincy Compressor. Contact the Service Department and ask for part number 143286.

Section VII - Compressor Fluids



PRODUCT ANALYSIS REPORT

(a)

(b)

Customer	(d)
Comp. Mfr.	(e)
Fluid Type	(f)
Serial Number	(g)
Model Number	(h)
Hrs. on Fluid	(i)
Hrs. on Machine	(j)
Sample Date	(k)
I.D. #	

(c)

Evaluation: (1)

Physical Properties* Results (m)

Water by Karl Fischer (ppm)	Viscosity 40° C (cSt)	TAN Total Acid #	Particle Count								ISO Code	Antioxidant Level
			5 um	10 um	15 um	20 um	25 um	30 um	35 um	40 um		

* Property values, not to be construed as specifications

Spectrochemical Analysis (n)

Sample Date (Fluid Hours)	Values below are in parts per million (ppm)																	
	Silver (Ag)	Alum. (Al)	Chrom (Cr)	Copp. (Cu)	Iron (Fe)	Nickel (Ni)	Lead (Pb)	Tin (Sn)	Titan (Ti)	Vanad (V)	Bari (Ba)	Calc. (Ca)	Mag. (Mg)	Mol. (Mo)	Sod. (Na)	Phos. (P)	Sili. (Si)	Zinc (Zn)

Quincy Compressor Fluid Analysis
 2300 James Savage Road
 Midland, MI 48642-6535

Thank you for this opportunity to provide technical assistance to your company. If you have any questions about this report please contact us at 1-800-637-8628 or fax 1-517-496-2313.

*means this parameter not tested

Accuracy of recommendations is dependant on representative fluid samples and complete correct data on both unit and fluid.

CC List

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Understanding the Analysis Report

Reference the page 58 for a copy of a blank analysis report.

- a) REPORT DATE - The date that the fluid was analyzed.
- b) REPORT NUMBER - The assigned number to this report.
- c) CUSTOMER ADDRESS - The name and address of person that this report is being mailed to. This information is being taken from the sample bottle as it is received.
- d) CUSTOMER - The owner of the unit that sample came from.
- e) COMPRESSOR MANUFACTURER - Brand of compressor sample taken from.
- f) FLUID TYPE - This should always be one of the fluids listed in the previous section.
- g) SERIAL NUMBER - The unit serial number of the Quincy compressor the fluid sample was taken from.
- h) MODEL NUMBER - The model number of the Quincy compressor that the fluid sample was taken from.
- i) HOURS ON FLUID - These are the actual hours that the QuinSyn fluid has been in the unit since the last fluid change.

- j) HOURS ON MACHINE - This is the total hours on the compressor hourmeter.
- k) SAMPLE DATE - The date that the sample was taken from the compressor.

NOTICE!

Items c) through k) are information provided by the service person supplying the fluid for analysis. Incomplete or incorrect information will affect the report's accuracy.

- l) EVALUATION - This is a brief statement made by the technician performing the actual fluid analysis. This statement addresses the condition of the fluid and filter. This statement will also note any problems that need attention.
- m) PHYSICAL PROPERTIES RESULTS - Particle size is measured in microns. See Fluid Parameters on pages 60-61.
- n) SPECTROCHEMICAL ANALYSIS - See Fluid Parameters on pages 60-61.

Section VII - Compressor Fluids

FLUID PARAMETERS QuinSyn PG, QuinSyn XP & QuinSyn Plus

PROPERTY	UNITS	TEST METHOD	FLUID TYPE	NEW FLUID	MARGINAL	UNACCEPTABLE
VISCOSITY 40°C	cSt	ASTM D-445	QUINSYN PG	45-55	41,61	<41, >61 (1)
			QUINSYN XP	58-75	50, 85	<50, >85 (1)
			QUINSYN PLUS	42-51	38, 56	<38, >56 (1)
ACID No. TAN	MG KOH/GM	ASTM D-947	QUINSYN PG	<0.2	0.7-0.9	>1 (1)
			QUINSYN XP	<0.2	3-4	>4 (1)
			QUINSYN PLUS	<0.2	1.7-1.9	>2.0 (1)
ADDITIVE METALS						
BARIUM	PPM	PLASMA EMISSION	QUINSYN PG	375-550	150	<10 (1)
			QUINSYN XP	0	5-20	>20
			QUINSYN PLUS	0	5-20	>20
CALCIUM	PPM	PLASMA EMISSION	ALL	0	5-20	>20
MAGNESIUM	PPM	PLASMA EMISSION	ALL	0	5-20	>20
MOLYBDENUM	PPM	PLASMA EMISSION	ALL	0	5-20	>20
SODIUM	PPM	PLASMA EMISSION	QUINSYN PG	0	40-50	>100
			QUINSYN XP	0	40-50	>100
			QUINSYN PLUS	0	5-20	>20
PHOSPHORUS	PPM	PLASMA EMISSION	QUINSYN PG	0	5-20	>20
			QUINSYNXP	<50	5-20	0
			QUINSYN PLUS	0	5-20	>20
ZINC	PPM	PLASMA EMISSION	ALL	0	100-200	>200
WEAR METALS						
SILVER	PPM	PLASMA EMISSION	ALL	0	5-10	>10
ALUMINUM	PPM	PLASMA EMISSION	ALL	0	5-10	>10
CHROMIUM	PPM	PLASMA EMISSION	ALL	0	5-10	>10
COPPER	PPM	PLASMA EMISSION	ALL	0	5-10	>10
IRON	PPM	PLASMA EMISSION	ALL	0	5-10	>10
NICKEL	PPM	PLASMA EMISSION	ALL	0	5-10	>10
LEAD	PPM	PLASMA EMISSION	ALL	0	5-10	>10
TIN	PPM	PLASMA EMISSION	ALL	0	5-10	>10
TITANIUM	PPM	PLASMA EMISSION	ALL	0	5-10	>10
VANADIUM	PPM	PLASMA EMISSION	ALL	0	5-10	>10
OTHER						
SILICON	PPM	PLASMA EMISSION	ALL	0	10-15	>15
WATER	PPM	KARL FISHER	QUINSYN PG	<2000	NOT REPORTED	
			QUINSYNXP	<800	NOT REPORTED	
			QUINSYN PLUS	<800	NOT REPORTED	
ANTIOXIDANT	%	HPCL	ALL	95% MIN.	NOT REPORTED	

(1) THE FLUID WILL BE CONDEMNED BASED ON THESE PARAMETERS.

FLUID PARAMETERS
QuinSyn, QuinSyn IV & QuinSyn F

PROPERTY	UNITS	TEST METHOD	FLUID TYPE	NEW FLUID	MARGINAL	UNACCEPTABLE
VISCOSITY 40°C	cSt	ASTM D-445	QUINSYN	40-48	38, 52	<38, >52 (1)
			QUINSYN IV	40-48	38, 52	<38, >52 (1)
			QUINSYN F	41-51	39, 56	<39, >56 (1)
ACID NO. TAN	MG KOH/GM	ASTM D-947	ALL	0.2	0.8-0.9	>1 (1)
ADDITIVE METALS						
BARIUM	PPM	PLASMA EMISSION	ALL	0	5-20	>20
CALCIUM	PPM	PLASMA EMISSION	ALL	0	5-20	>20
MAGNESIUM	PPM	PLASMA EMISSION	ALL	0	5-20	>20
MOLYBDENUM	PPM	PLASMA EMISSION	ALL	0	5-20	>20
SODIUM	PPM	PLASMA EMISSION	ALL	0	5-20	>20
PHOSPHORUS	PPM	PLASMA EMISSION	ALL	0	5-20	>20
ZINC	PPM	PLASMA EMISSION	ALL	0	100-200	>200
WEAR METALS						
SILVER	PPM	PLASMA EMISSION	ALL	0	5-10	>10
ALUMINUM	PPM	PLASMA EMISSION	ALL	0	5-10	>10
CHROMIUM	PPM	PLASMA EMISSION	ALL	0	5-10	>10
COPPER	PPM	PLASMA EMISSION	ALL	0	5-10	>10
IRON	PPM	PLASMA EMISSION	ALL	0	5-10	>10
NICKEL	PPM	PLASMA EMISSION	ALL	0	5-10	>10
LEAD	PPM	PLASMA EMISSION	ALL	0	5-10	>10
TIN	PPM	PLASMA EMISSION	ALL	0	5-10	>10
TITANIUM	PPM	PLASMA EMISSION	ALL	0	5-10	>10
VANADIUM	PPM	PLASMA EMISSION	ALL	0	5-10	>10
OTHER						
SILICON	PPM	PLASMA EMISSION	ALL	0	10-15	>15
WATER	PPM	KARL FISHER	ALL	<100	200	>200
PARTICLE COUNT	MICRONS	HIAC ROYCO	ALL	ISO CODE X/20		
ANTIOXIDANT	%	LIQUID CHROMATOGRAPHY	ALL	95	NOT REPORTED	

(1) THE FLUID WILL BE CONDEMNED BASED ON THESE PARAMETERS.

Section VIII - Troubleshooting

Failure to Start:

POWER NOT TURNED "ON"	TURN THE POWER "ON" BY CLOSING THE MAIN DISCONNECT SWITCH OR CIRCUIT BREAKER.
BLOWN CONTROL CIRCUIT FUSE	REPLACE FUSE. FIND AND CORRECT CAUSE.
SAFETY CIRCUIT SHUTDOWN RESULTING FROM HIGH DISCHARGE AIR TEMPERATURE	CORRECT THE SITUATION IN ACCORDANCE WITH THE INSTRUCTION IN THE "HIGH DISCHARGE AIR TEMPERATURE" SECTION OF THIS TROUBLESHOOTING GUIDE. RESTART THE COMPRESSOR.
THERMAL OVERLOAD RELAYS TRIPPING	CORRECT THE CAUSE OF THE OVERLOADED CONDITION, RESET OVERLOAD RELAY AND PRESS THE START BUTTON.
LOW VOLTAGE	ASK THE POWER COMPANY TO MAKE A VOLTAGE CHECK AT YOUR ENTRANCE METER, THEN COMPARE THAT READING TO A READING TAKEN AT THE MOTOR TERMINALS. USE THESE TWO READINGS AS A BASIS FOR LOCATING THE SOURCE OF LOW VOLTAGE.
FAULTY START SWITCH	CHECK THE SWITCH FOR MALFUNCTION OR LOOSE CONNECTIONS.
POWER FAILURE	CHECK POWER SUPPLY TO THE UNIT.
LOOSE WIRE CONNECTIONS	CHECK ALL WIRING TERMINALS FOR CONTACT AND TIGHTNESS.
FAULTY CONTROL RELAY	REPLACE THE RELAY.
FAULTY HIGH AIR TEMPERATURE (HAT) SWITCH	CHECK HAT SWITCH. CONTACT A QUALIFIED SERVICE TECHNICIAN FOR REPAIRS.
FAULTY TRANSFORMER	CHECK SECONDARY VOLTAGE ON TRANSFORMER.

Unscheduled Shutdown:

HIGH DISCHARGE AIR TEMPERATURE	CORRECT THE SITUATION IN ACCORDANCE WITH THE INSTRUCTION IN THE "HIGH DISCHARGE AIR TEMPERATURE" SECTION OF THIS TROUBLESHOOTING GUIDE. RESTART THE COMPRESSOR.
THERMAL MOTOR OVERLOAD RELAYS TRIPPING	CORRECT THE CAUSE OF THE MOTOR OVERLOADED CONDITION, RESET THE OVERLOAD RELAY AND PRESS THE RESET BUTTON.
POWER FAILURE	CHECK POWER SUPPLY AND TRANSFORMER FUSES.
LOOSE WIRE CONNECTIONS	CHECK ALL WIRING TERMINALS FOR CONTACT AND TIGHTNESS.

Unscheduled Shutdown (continued):

FAULTY HAT SENSORS	CONTACT A QUALIFIED SERVICE TECHNICIAN FOR REPAIRS.
FAULTY CONTROL RELAY	REPLACE RELAY.

Thermal Overload Relays Tripping:

EXCESSIVE DISCHARGE PRESSURE	LOWER FULL LOAD PRESSURE SETTING AT CONTROL PANEL.
LOW VOLTAGE	CHECK VOLTAGE AND AMPERAGES WHILE OPERATING AT FULL LOAD PRESSURE.
LOOSE OVERLOAD CONNECTION	TIGHTEN MOUNTING SCREWS ON THERMAL OVERLOAD.
INCORRECT THERMAL OVERLOAD RELAY SETTING	CHECK MOTOR NAMEPLATE AND COMPARE TO OVERLOAD RELAY SETTING.
LOOSE MOTOR OR STARTER WIRING	CHECK ALL CONNECTIONS FOR TIGHTNESS.
FAULTY MOTOR	CHECK MOTOR STARTER WIRING BEFORE REMOVING MOTOR. REMOVE MOTOR AND HAVE TESTED AT MOTOR MANUFACTURER REPAIR CENTER.

Low Air Delivery:

PLUGGED AIR INTAKE FILTER ELEMENT	CLEAN AIR FILTER ELEMENT OR REPLACE WITH NEW ELEMENT.
EXCESSIVE LEAKS IN THE SERVICE LINES	CHECK SERVICE LINES FOR LEAKS WITH SOAP SUDS. REPAIR AS NECESSARY.
INLET VALVE NOT FULLY OPEN	CHECK FOR BUILD UP OR GUMMING OF SHAFT.
RESTRICTED FLUID FLOW	CHECK FLUID FILTER FOR PLUGGING.

Low Receiver Pressure:

EXCESSIVE AIR DEMAND	REEVALUATE AIR DEMAND. INSTALL ADDITIONAL COMPRESSORS AS NEEDED.
EXCESSIVE LEAKS IN THE SERVICE LINES	CHECK SERVICE LINES FOR LEAKS WITH SOAP SUDS. REPAIR AS NECESSARY.
INLET VALVE NOT FULLY OPEN	CORRECT IN ACCORDANCE WITH THE INSTRUCTIONS IN "INLET VALVE NOT OPENING OR CLOSING IN RELATION TO AIR DEMAND" SECTION OF TROUBLESHOOTING GUIDE.
PLUGGED AIR INTAKE FILTER	REPLACE AIR FILTER ELEMENT.

Section VIII - Troubleshooting

Low Receiver Pressure (continued):

DIFFERENTIAL PILOT VALVE NOT SET CORRECTLY	ADJUST DIFFERENTIAL PILOT VALVE TO ACHIEVE DESIRED MODULATION RANGE.
AIR PRESSURE SETTING NOT SET CORRECTLY	ADJUST AIR PRESSURE SWITCH TO ACHIEVE DESIRED CUT-IN AND CUT-OUT PRESSURE.
FAULTY RECEIVER PRESSURE GAUGE OR SENSOR	CHECK AND REPLACE AS NECESSARY.

High Receiver Pressure:

AIR PRESSURE SETTING NOT SET CORRECTLY	ADJUST AIR PRESSURE SETTING TO ACHIEVE DESIRED CUT-IN AND CUT-OUT PRESSURE. ENSURE UNLOAD PRESSURE DOES NOT EXCEED MAXIMUM OPERATING PRESSURE.
INLET VALVE NOT CLOSING AT LOWER AIR DEMAND	CORRECT IN ACCORDANCE WITH INSTRUCTION ON "INLET VALVE NOT OPENING OR CLOSING IN RELATION TO AIR DEMAND" SECTION OF THIS TROUBLESHOOTING GUIDE.
BLOWDOWN VALVE NOT RELIEVING RECEIVER PRESSURE	CHECK CONTROL SOLENOID AND BLOWDOWN VALVE.

High Discharge Air Temperature and/or High Fluid Injection Temperature:

INADEQUATE CIRCULATION OF COOLING AIR AT THE COOLER	CHECK LOCATION OF COOLER AND ASSURE NO RESTRICTION TO FREE CIRCULATION OF COOLING AIR. CHECK COOLER FIN AND CLEAN AS NECESSARY.
LOW FLUID LEVEL IN RESERVOIR	ADD FLUID TO RECOMMENDED LEVEL. CHECK FLUID SYSTEM FOR LEAKS.
CABINET PANELS REMOVED	REPLACE ALL PANELS, ENSURE ALL SEALING SURFACES AND MATERIALS ARE SATISFACTORY.
COOLER PLUGGED	CLEAN COOLER, FIND AND CORRECT CAUSE OF CONTAMINATION.
FLUID FILTER PLUGGED	REPLACE FLUID FILTER ELEMENT(S).
EXCESSIVE AMBIENT TEMPERATURES	MAXIMUM AMBIENT FOR PROPER OPERATION IS LISTED IN DATA SHEET. VENTILATE ROOM OR RELOCATE COMPRESSOR.
INCORRECT FAN ROTATION	CORRECT ROTATION IS WITH THE FAN PUSHING THE AIR THROUGH THE COOLER. REVERSE MOTOR STARTER LEADS L ₁ AND L ₂ .
IMPROPER FLUID	USE RECOMMENDED FLUIDS ONLY. REFER TO "COMPRESSOR FLUIDS" SECTION OF THIS MANUAL.

High Discharge Air Temperature and/or High Fluid Injection Temperature (continued):

CLOGGED AIR FILTER	CLEAN OR REPLACE AS NECESSARY.
FAULTY THERMAL VALVE	REPAIR OR REPLACE AS NECESSARY.
FAULTY SENSORS	CHECK AND REPLACE AS NECESSARY.
AIREND FAILURE	CONTACT AN AUTHORIZED QUINCY DISTRIBUTOR.

Frequent Air/Fluid Separator Clogging:

FAULTY AIR FILTER OR INADEQUATE FILTER FOR THE ENVIRONMENT	IF FAULTY AIR FILTER ELEMENTS, REPLACE THEM. IF AIR FILTER IS INADEQUATE FOR THE ENVIRONMENT, RELOCATE THE INTAKE AIR TO A CLEAN SOURCE.
FAULTY FLUID FILTER	REPLACE FLUID FILTER ELEMENT.
FLUID BREAKDOWN	CORRECT IN ACCORDANCE WITH THE INSTRUCTION IN "FLUID BREAKDOWN" SECTION OF THE TROUBLESHOOTING GUIDE.
INCORRECT FLUID SEPARATOR ELEMENT	USE GENUINE QUINCY REPLACEMENT ELEMENTS ONLY.
EXTREME OPERATING CONDITIONS SUCH AS HIGH COMPRESSOR DISCHARGE TEMPERATURES, HIGH AMBIENT TEMPERATURE WITH HIGH HUMIDITY AND HIGH RESERVOIR PRESSURE	OPERATE COMPRESSOR AT RECOMMENDED RESERVOIR PRESSURE AND DISCHARGE AIR TEMPERATURE.
MIXING DIFFERENT GRADES OR TYPES OF FLUIDS	DO NOT MIX DIFFERENT GRADES OR TYPES OF FLUID. DO NOT MIX FLUIDS FROM DIFFERENT MANUFACTURERS.
INCORRECT FLUID	FOLLOW FLUID SPECIFICATIONS AS DESCRIBED IN "COMPRESSOR FLUIDS" SECTION OF THIS MANUAL.
CONTAMINATED FLUID	CHANGE FLUID. SERVICE AIR FILTER AND FLUID FILTER IN ACCORDANCE WITH THE RECOMMENDED MAINTENANCE SCHEDULE.

Fluid Discharge Out Blowdown Valve:

TOO HIGH FLUID LEVEL IN RESERVOIR	ADJUST FLUID LEVEL TO RECOMMENDED FLUID LEVEL BY DRAINING THE RESERVOIR. USE FLUID LEVEL GAUGE AS A GUIDE.
AIR/FLUID RESERVOIR BLOWS DOWN TOO FAST	CHECK FOR PROPER BLOWDOWN VALVE SIZE.

Section VIII - Troubleshooting

Fluid Discharge Out Blowdown Valve (continued):

INLET VALVE NOT CLOSING COMPLETELY

CORRECT IN ACCORDANCE WITH INSTRUCTIONS IN "INLET VALVE NOT OPENING OR CLOSING IN RELATION TO AIR DEMAND" SECTION OF THIS TROUBLESHOOTING GUIDE

Frequent Fluid Filter Clogging:

FAULTY INDICATOR

REPLACE INDICATOR ASSEMBLY.

INCORRECT FLUID FILTER

USE GENUINE QUINCY REPLACEMENT FILTERS ONLY.

FAULTY, INCORRECT OR INADEQUATE AIR FILTER

REPLACE AIR FILTER ELEMENT.

FLUID BREAKDOWN

SEE FLUID BREAKDOWN SECTION OF THIS TROUBLESHOOTING GUIDE.

SYSTEM CONTAMINATION

CHECK AND CLEAN SYSTEM OF ALL DIRT, CORROSION AND VARNISH.

Excessive Fluid Consumption:

TOO HIGH FLUID LEVEL IN THE RECEIVER

ADJUST FLUID LEVEL TO RECOMMENDED FLUID LEVEL BY DRAINING THE RESERVOIR. USE FLUID LEVEL GAUGE AS A GUIDE.

PLUGGED SCAVENGE LINE

CLEAN SCAVENGER LINE ORIFICE AND TUBE.

HIGH DISCHARGE TEMPERATURE

CORRECT IN ACCORDANCE WITH THE INSTRUCTIONS IN "HIGH DISCHARGE AIR TEMPERATURE" SECTION OF THIS TROUBLESHOOTING GUIDE.

LOW RESERVOIR PRESSURE WITH FULLY OPEN INLET VALVE

RESERVOIR PRESSURE SHOULD NOT FALL BELOW 50 PSIG WHEN RUNNING LOADED. CHECK SYSTEM CFM REQUIREMENT AND MINIMUM PRESSURE CHECK VALVE.

FAULTY OR DAMAGED SEPARATOR

CHANGE AIR/FLUID SEPARATOR.

LEAK IN FLUID LINES

CHECK FOR LEAKS AND CORRECT.

SEAL FAILURE, LEAKS

REPLACE SEAL ASSEMBLY AND O-RINGS.

INCORRECT FLUID

USE RECOMMENDED FLUIDS ONLY. SEE COMPRESSOR FLUID SECTION.

Frequent Air Cleaner Clogging:

COMPRESSOR OPERATING IN HIGHLY CONTAMINATED ATMOSPHERE	USE REMOTE AIR INTAKE MOUNTING.
AIR CLEANER NOT ADEQUATE FOR CONDITIONS	USE SPECIALIZED AIR FILTER. CONTACT AN AUTHORIZED QUINCY DISTRIBUTOR.

Inlet Valve Not Opening Or Closing In Relation To Air Demand:

IMPROPER PRESSURE SETTING OR FAULTY SENSOR	ADJUST AIR PRESSURE SETTING OR REPLACE SENSOR, IF FAULTY.
EXCESSIVE MOISTURE IN CONTROL AIR LINE AT AIR CYLINDER	SERVICE CONTROL AIR LINE FILTER DAILY.
IMPROPER FUNCTIONING OF INLET VALVE PISTON	CHECK PISTON AND CYLINDER BORE. REPAIR OR REPLACE AS NEEDED.
JAMMED AIR INLET VALVE ASSEMBLY	CHECK AIR INLET VALVE BUSHING AND SHAFT. CHECK PISTON AND CYLINDER BORE. REPAIR OR REPLACE AS NEEDED.
FAULTY SOLENOID VALVE	REPAIR OR REPLACE AS NECESSARY.
FAULTY SHUTTLE VALVE	REPAIR OR REPLACE AS NECESSARY.
LOOSE WIRING CONNECTIONS AT SOLENOID VALVE/ PRESSURE SWITCH	CHECK AND TIGHTEN WIRING TERMINALS.
BROKEN SPRING IN AIR INLET VALVE	REPLACE SPRING.

Compressor Does Not Unload When There Is No Air Demand:

INCORRECT AIR PRESSURE SETTING	ADJUST TO PROPER SETTING.
FAULTY AIR PRESSURE SENSOR	REPLACE SENSOR.
FAULTY BLOWDOWN VALVE	REPAIR OR REPLACE AS NECESSARY.
FAULTY SOLENOID VALVE	REPAIR OR REPLACE AS NECESSARY.
FAULTY DIFFERENTIAL PILOT VALVE	REPAIR OR REPLACE AS NECESSARY.
LEAKS IN CONTROL LINES	CHECK ALL CONTROL LINE FITTINGS AND TUBING.
LEAKS IN SERVICE LINES	CHECK LINES BEFORE MPC VALVE.

Section VIII - Troubleshooting

Compressor Does Not Revert To Load When Service Line Pressure Drops To Reset Pressure:

FAULTY AIR PRESSURE SENSOR	REPAIR OR REPLACE AS NECESSARY.
LOOSE WIRING CONNECTION	CHECK AND TIGHTEN WIRING TERMINALS.
JAMMED AIR INLET VALVE ASSEMBLY	CHECK AND REPAIR AIR INLET VALVE.
FAULTY SOLENOID	REPAIR OR REPLACE AS NECESSARY.
FAULTY DIFFERENTIAL PILOT VALVE	ORIFICE PLUGGED. CLEAN OR REPLACE AS NECESSARY.

Compressor Will Not Time-out Or Shut Down When Unloaded (Auto/Dual Only):

LEAKS IN CONTROL LINES	CHECK AND REPAIR ANY LEAKS.
LEAKS IN SERVICE LINES	CHECK PLANT AIR DISTRIBUTION SYSTEM FOR LEAKS.
FAULTY AIR PRESSURE SENSORS	REPLACE AS NECESSARY.

Excessive Water in Plant Air Distribution System:

CLOGGED MOISTURE SEPARATOR/TRAP	CLEAN OR REPLACE AS REQUIRED.
INSTALLATION/APPLICATION	CHECK OTHER COMPRESSORS ON SAME SYSTEM.
FAULTY COOLER/LEAKS	REPLACE COOLER.

Pressure Relief Valve Exhausting:

DIFFERENTIAL PRESSURE REGULATOR NOT SET CORRECTLY	ADJUST DIFFERENTIAL PRESSURE REGULATOR TO OBTAIN DESIRED MODULATION RANGE.
AIR PRESSURE NOT SET CORRECTLY	READJUST AIR PRESSURE SWITCH SO THAT THE COMPRESSOR UNLOADS AT THE DESIRED PRESSURE.
AIR INLET VALVE NOT CLOSING PROPERLY IN RELATION TO AIR DEMAND	CORRECT IN ACCORDANCE WITH THE INSTRUCTION IN "INLET VALVE NOT OPENING OR CLOSING IN RELATION TO AIR DEMAND" SECTION OF THIS TROUBLESHOOTING GUIDE.
PLUGGED SEPARATOR	REPLACE WITH NEW AIR/FLUID SEPARATOR.
FAULTY RECEIVER PRESSURE GAUGE	CHECK GAUGE FOR ACCURACY AND REPLACE IF NECESSARY. ADJUST CONTROL SETTINGS.

Pressure Relief Valve Exhausting (continued):

FAULTY PRESSURE RELIEF VALVE

CHECK PRESSURE RELIEF VALVE FOR CORRECT PRESSURE SETTING. IF VALVE IS STILL LEAKING, REPLACE IT.

Excessive Water Content In Fluid:

WATER DRAIN INTERVALS

DRAIN WATER AS NEEDED TO REDUCE WATER CONTENT IN FLUID BELOW 200 PPM.

DISCHARGE TEMPERATURE TOO LOW

CHECK OPERATION OF THERMOSTATIC VALVE OR WATER REGULATING VALVE. IF CONDITION CONTINUES, CONSULT QUINCY SERVICE DEPARTMENT.

Premature Belt Failure:

BROKEN BELTS:

OBJECT FALLING INTO DRIVE

PROVIDE ADEQUATE GUARDS OR DRIVE PROTECTION.

BELTS FAIL TO CARRY LOAD FOR NO VISIBLE REASON:

DAMAGED TENSILE MEMBER

FOLLOW CORRECT INSTALLATION PROCEDURE.

WORN SHEAVE GROOVES

CHECK GROOVES FOR WEAR. REPLACE SHEAVES AS NECESSARY.

CENTER DISTANCE MOVEMENT

CHECK DRIVE FOR CENTER DISTANCE MOVEMENT DURING OPERATION.

EDGE CORD FAILURE:

MISALIGNMENT

REALIGN AND RETENSION DRIVE.

DAMAGED TENSILE MEMBER

FOLLOW CORRECT INSTALLATION PROCEDURE.

V-Belts Turn over or Come Off Drive:

FOREIGN MATERIAL IN GROOVES

PROVIDE ADEQUATE GUARDS OR DRIVE PROTECTION.

MISALIGNMENT

REALIGN AND RETENSION DRIVE.

WORN SHEAVE GROOVES

REPLACE SHEAVES.

DAMAGED TENSILE MEMBERS (BELTS PRIED ON)

FOLLOW CORRECT INSTALLATION PROCEDURE.

MISMATCHED BELT SET

INSTALL NEW MATCHED BELT SET. (DO NOT MIX OLD AND NEW BELTS.)

Section VIII - Troubleshooting

Belt Stretches Beyond Available Take-up:

MISALIGNMENT	REALIGN AND RETENSION DRIVE.
DEBRIS IN SHEAVES	CLEAN SHEAVES.
BROKEN TENSILE MEMBER OR CORD DAMAGE	REPLACE ALL BELTS.
MISMATCHED BELTS	INSTALL NEW MATCHED BELT SET. (Do NOT MIX OLD AND NEW BELTS.)

Belt Noise:

BELTS SQUEAL OR CHIRP:

BELT SLIP	RETENSION BELTS.
CONTAMINATION	CLEAN BELTS AND SHEAVES.
SLAPPING SOUND:	
LOOSE BELTS	CHECK AUTOMATIC TENSIONING DEVICE.
MISMATCHED BELTS	INSTALL NEW MATCHED BELT SET. (Do NOT MIX OLD AND NEW BELTS.)
MISALIGNMENT	REALIGN AND RETENSION DRIVE.

RUBBING SOUND:

GUARD INTERFERENCE	REPAIR OR REPLACE GUARD.
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UNUSUALLY LOUD DRIVE:

INCORRECT BELTS	USE CORRECT BELT SIZE.
WORN SHEAVES	REPLACE SHEAVES.
DEBRIS IN SHEAVES	CLEAN SHEAVES AND IMPROVE SHIELDING.

Unusual Vibration:

BELTS FLOPPING:

LOOSE BELTS (UNDER-TENSIONED)	RETENSION BELTS.
MISMATCHED BELTS	INSTALL NEW MATCHED BELT SET. (Do NOT MIX OLD AND NEW BELTS.)
MISALIGNMENT	REALIGN AND RETENSION DRIVE.

UNUSUAL OR EXCESSIVE VIBRATION:

INCORRECT BELTS	USE CORRECT BELT SIZE.
SHEAVE OUT OF ROUND	REPLACE SHEAVES AS NECESSARY.

Unusual Vibration (continued):

LOOSE DRIVE COMPONENTS

CHECK MACHINE COMPONENTS AND GUARDS, MOTOR MOUNTS, MOTOR PADS, BUSHINGS, BRACKETS AND FRAMEWORK FOR STABILITY, PROPER MAINTENANCE AND PROPER INSTALLATION.

Severe or Abnormal Belt Wear:

WEAR ON TOP OF BELT:

RUBBING AGAINST GUARD

REPLACE OR REPAIR GUARD.

WEAR ON TOP CORNERS OF BELT:

INCORRECT BELT TO SHEAVE FIT (BELT TOO SMALL FOR GROOVE)

USE CORRECT BELT TO SHEAVE COMBINATION.

WEAR ON SIDEWALLS OF BELT:

BELT SLIP

RETENSION BELTS.

MISALIGNMENT

REALIGN AND RETENSION DRIVE.

WORN SHEAVES

REPLACE SHEAVES.

INCORRECT BELTS

REPLACE WITH CORRECT BELT SET.

WEAR ON BOTTOM CORNER OF BELT:

INCORRECT BELT TO SHEAVE FIT (BELT TOO SMALL FOR GROOVE)

USE CORRECT BELT TO SHEAVE COMBINATION.

WORN SHEAVES

REPLACE SHEAVES.

WEAR ON BOTTOM SURFACE OF BELT:

BELT BOTTOMING ON SHEAVE GROOVE

USE CORRECT BELT TO SHEAVE COMBINATION.

WORN SHEAVES

REPLACE SHEAVES.

DEBRIS IN SHEAVES

CLEAN SHEAVES AND IMPROVE SHIELDING.

UNDERCORD CRACKING:

SHEAVE DIAMETER TOO SMALL

USE CORRECT BELT TO SHEAVE COMBINATION.

BELT SLIP

RETENSION BELTS.

IMPROPER BELT STORAGE

DO NOT COIL, KINK OR BEND BELTS. AVOID HEAT AND DIRECT SUNLIGHT.

UNDERCORD OR SIDEWALL HARDENING:

BELT SLIP

RETENSION BELTS.

WORN SHEAVES

REPLACE SHEAVES.

Section VIII - Troubleshooting

Severe or Abnormal Belt Wear:

SHAFT MOVEMENT	CHECK FOR CENTER DISTANCE CHANGES.
BELT SURFACE HARD OR STIFF: HOT DRIVE ENVIRONMENT	IMPROVE VENTILATION TO DRIVE.
BELT SURFACE FLAKY, STICKING OR SWOLLEN: CHEMICAL CONTAMINATION	DO NOT USE BELT DRESSING. ELIMINATE SOURCE OF CONTAMINATION.

Integrated Dryer Troubleshooting:

Unit does not run:

MOTOR LINE OPEN.	CLOSE DISCONNECT SWITCH, TO START.
FUSE BLOWN.	REPLACE FUSE.
TRIPPED OVERLOAD.	TURN SWITCH OFF, WAIT 15 MINUTES, CHECK FOR OVERLOAD CONDITION.
SAFETY CONTROLS OPEN.	REPAIR OR REPLACE.
FROZEN (LOCKED) COMPRESSOR.	REPAIR OR REPLACE.
WIRING IMPROPER OR LOOSE.	CHECK WIRING AGAINST DIAGRAM.

Unit short cycles:

MOTOR COMPRESSOR OVERLOAD CUTTING OUT.	CHECK FOR HIGH HEAD PRESSURE, CLOGGED CONDENSER, HIGH AMBIENT, OR AIR OVERLOAD. CHECK HIGH PRESSURE CUTOUT, REPAIR OR REPLACE.
SHORTAGE OF REFRIGERANT.	REPAIR LEAK AND RECHARGE.
SUCTION PRESSURE LOW.	CHECK HOT GAS BYPASS ADJUST, REPAIR OR REPLACE.
STICKING EXPANSION VALVE.	REPAIR OR REPLACE.

Compressor will not start – hums:

IMPROPERLY WIRED.	CHECK WIRING AGAINST DIAGRAM.
LOW LINE VOLTAGE.	CHECK VOLTAGE – CORRECT.
RELAY OR CONTACTOR NOT CLOSING.	CHECK FOR REASON – REPAIR OR REPLACE.
SINGLE-PHASING.	CHECK FUSES.

Integrated Dryer Troubleshooting (continued):

Compressor starts and runs – short cycles on overload:

LOW VOLTAGE, OR PHASE UNBALANCE.	CHECK VOLTAGE TO BE WITHIN $\pm 10\%$ OF VOLTAGE LISTED ON NAME PLATE.
ADDITIONAL CURRENT GOING THRU OVERLOAD.	CHECK WIRING DIAGRAM, CHECK FOR ADDED ELECTRICAL DEVICES CONNECTED THRU PROTECTOR.
OVERLOAD PROTECTORS DEFECTIVE.	CHECK CURRENT, REPLACE.
HIGH DISCHARGE PRESSURE. SHORT IN WINDING.	CHECK RESISTANCE, REPLACE COMPRESSOR.

Head pressure too high:

REFRIGERANT OVERCHARGE.	PURGE OR VACUUM AND RECHARGE.
AIR IN SYSTEM.	CHECK FOR REASON, REPAIR.
DIRTY CONDENSER.	BLOW CLEAN WITH COMPRESSED AIR.
LOCATION TOO HOT.	COOL AMBIENT, RELOCATE UNIT, ADD VENTILATION.
DEFECTIVE CONDENSER PRESSURE SWITCH.	REPAIR OR REPLACE.
DEFECTIVE FAN MOTOR.	REPLACE.
FAN OPERATING IN WRONG DIRECTION.	SWITCH TWO WIRES AT DISCONNECT.

Head pressure too low:

REFRIGERANT SHORTAGE.	REPAIR LEAK AND RECHARGE.
COMPRESSOR SUCTION OR DISCHARGE VALVES INEFFICIENT.	REPAIR OR REPLACE.
DEFECTIVE CONDENSER FAN CYCLING PRESSURE SWITCH.	REPAIR OR REPLACE.
DEFECTIVE WATER REGULATING VALVE.	ADJUST, REPAIR OR REPLACE.

Section VIII - Troubleshooting

Integrated Dryer Troubleshooting (continued):

Noisy unit:

MOUNTINGS LOOSE.	TIGHTEN MOUNTING, ETC.
BENT FAN BLADE.	STRAIGHTEN OR REPLACE BLADE.
FAN MOTOR BEARING WORN.	REPLACE.
REFRIGERANT FLOODING BACK.	CHECK EXPANSION VALVE, ADJUST, REPAIR OR REPLACE. CHECK CRANKCASE HEATER.
COMPRESSOR OIL CHARGE LOW.	CHECK OIL LEVEL.

Frosted suction line:

EXPANSION VALVE AND/OR HOT GAS BYPASS OUT OF ADJUSTMENT.	ADJUST THE HOT GAS BYPASS VALVE TO BRING THE SUCTION PRESSURE INTO THE PROPER RANGE.
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Unit runs but air temperature is high:

NOTE: OUTLET AIR TEMPERATURE GAUGE MAY READ HIGHER THAN ACTUAL TEMPERATURES AT LOW AIR FLOW CONDITIONS.

REFRIGERANT LEAK.	LOCATE WITH LEAK DETECTOR. REPAIR OR REPLACE DEFECTIVE PART.
EVAPORATOR CONTROLS SET TOO HIGH.	CORRECT SETTING.
FILTER/DRYER CLOGGED.	REPLACE.
REFRIGERANT SHORTAGE.	REPAIR LEAK AND RECHARGE.
DIRTY CONDENSER.	CLEAN CONDENSER.
AIR IN SYSTEM.	CHECK REASON, REPAIR, VACUUM, RECHARGE.
COMPRESSOR INEFFICIENT.	REPAIR OR REPLACE.
EVAPORATOR CONTROL(S) STUCK.	REPAIR AS REQUIRED, ADJUST.
DEFECTIVE INSULATION.	REPAIR.
AIR OVERLOAD.	REDUCE LOAD.
UNIT TOO SMALL.	ADD UNIT OR REPLACE.
HIGH AMBIENT.	REDUCE OR CHANGE LOCATION.
ENTERING AIR TEMPERATURE TOO HIGH.	LOWER ENTERING AIR TEMPERATURE.

Integrated Dryer Troubleshooting (continued):

Unit runs but low air pressure:

SYSTEM PRESSURE LOW.	INCREASE PRESSURE.
PRECOOLER AND/OR EVAPORATOR CLOGGED.	BACK-FLUSH AS DESCRIBED IN SECTION V.
INCORRECT PIPING.	INCREASE LINE SIZE AND/OR CORRECT PIPING AS REQUIRED.
AIR OVERLOAD.	REDUCE OVERLOAD.
UNIT TOO SMALL.	ADD ANOTHER UNIT OR REPLACE WITH LARGER UNIT.
EXCESS WATER IN UNIT.	CHECK DRAIN, REPAIR OR REPLACE IF NEEDED.

Integrated Dryer Troubleshooting (continued):

Unit runs but low air pressure:

EVAPORATOR FREEZE-UP.	ADJUST HOT GAS BYPASS VALVE.
CLOGGED AIR COMPRESSOR INTAKE FILTER.	CLEAN OR REPLACE AIR INTAKE FILTER.
DIRTY AIR SYSTEM.	BACK-FLUSH AS DESCRIBED IN SECTION V.

Unit runs, but air flow erratic or zero:

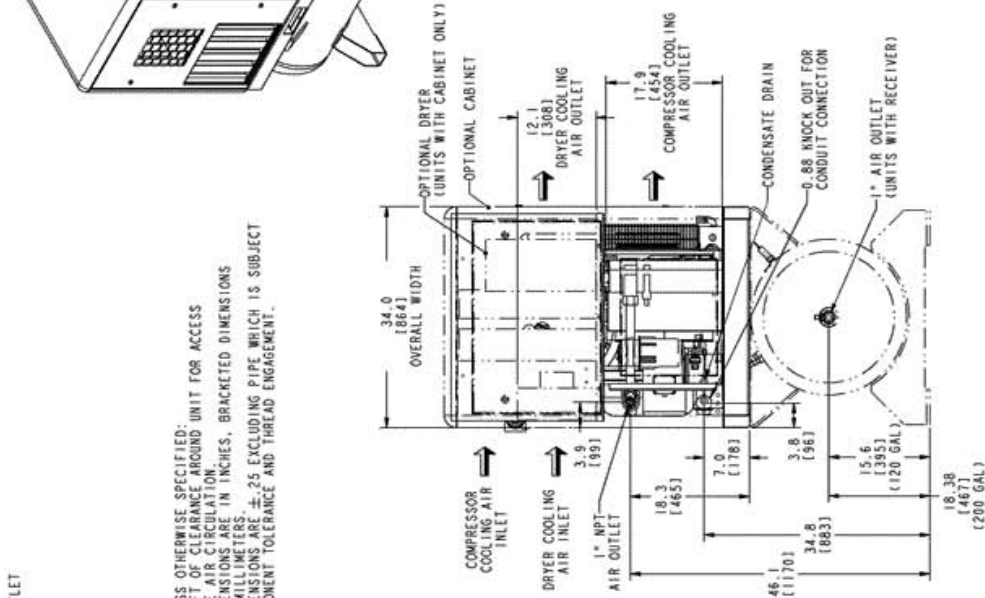
FREEZE-UP.	CHECK SUCTION TEMPERATURE AT EVAPORATOR OUTLET OR TURN OFF UNIT AND ALLOW IT TO THAW TO DETERMINE IF THIS IS PROBLEM. ADJUST CONTROLS AT NO-LOAD IF FREEZING IS OCCURRING.
PRECOOLER AND/OR EVAPORATOR CLOGGED.	BACK-FLUSH AS DESCRIBED IN SECTION V.
RESTRICTION IN PIPING UPSTREAM FROM UNIT.	CORRECT AS REQUIRED.

Evaporator freeze-up:

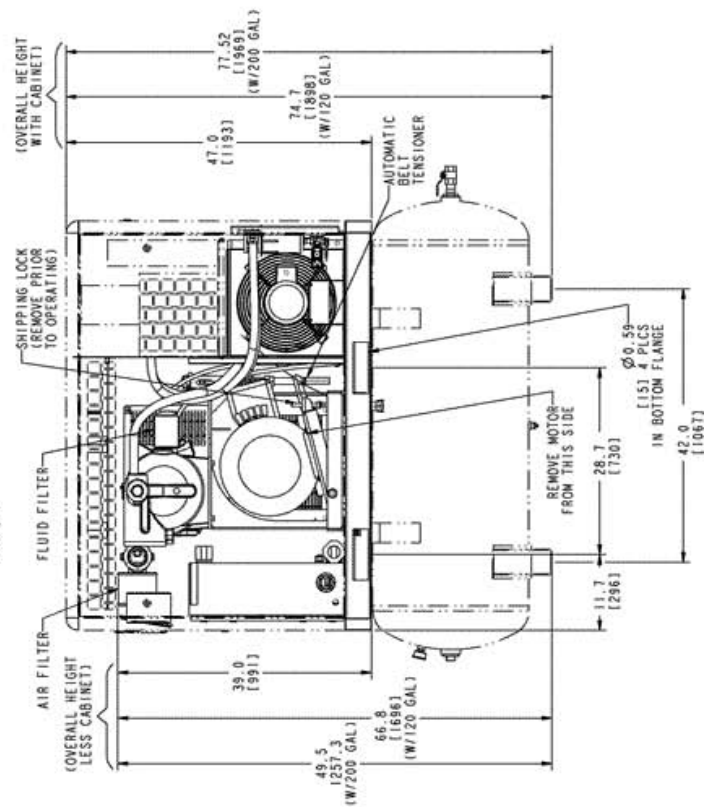
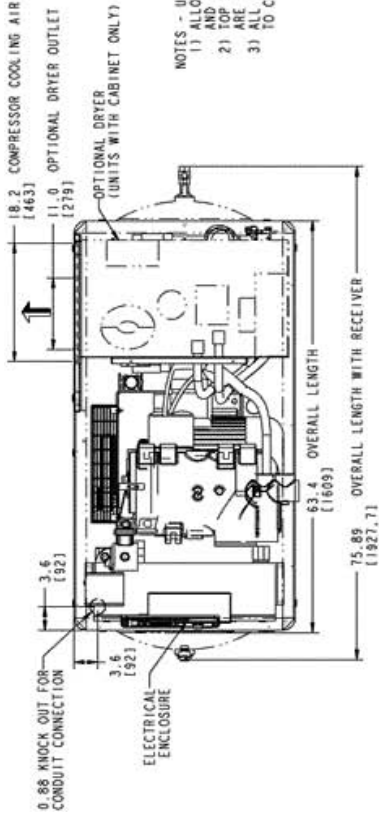
HOT GAS BYPASS VALVE OUT OF ADJUSTMENT.	ADJUST SUCTION PRESSURE. ADJUST HOT GAS BYPASS VALVE.
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Appendix A - Dimensional Drawings

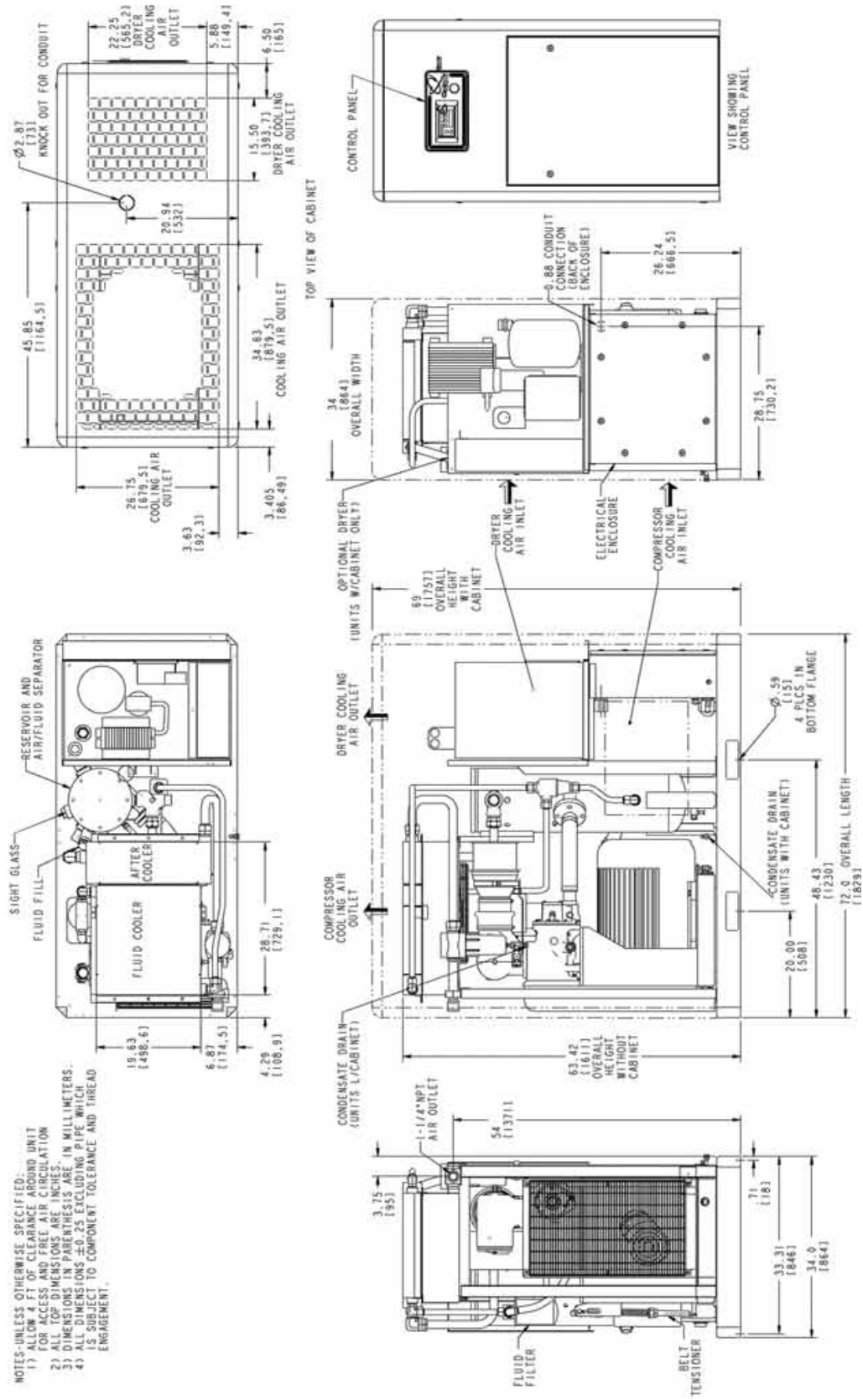
QGB 20/25/30



NOTES - UNLESS OTHERWISE SPECIFIED:
 1) ALLOW 4FT OF CLEARANCE AROUND UNIT FOR ACCESS AND FREE AIR CIRCULATION.
 2) TOP DIMENSIONS ARE IN INCHES, BRACKETED DIMENSIONS ARE IN MILLIMETERS.
 3) ALL DIMENSIONS ARE $\pm .25$ EXCLUDING PIPE WHICH IS SUBJECT TO COMPONENT TOLERANCE AND THREAD ENGAGEMENT.



QGB 40/50/60



Appendix B - Technical Data

QGB 20

Full Load Operating Pressure	psig	100	125	150	175
Max. Operating Pressure	psig	115	140	165	190
Min. Operating Pressure	psig	75			
Max. Ambient Operating Temp.	°F	130			
Min. Ambient Operating Temp.	°F	40			
Compressor Drive Motor	Nameplate HP	20			
Inlet Capacity	acfm	89	80	70	59
Service Line Connection Size	In. (FLG)	1			
Rotor Diameter	mm	85			
Male Rotor Speed	rpm	6589	5962	5287	4602
Male Tip Speed	m/sec	29.3	26.5	23.5	20.5
Aftercooling Data					
Heat Rejection - Fluid Cooler	btu/min	728			
Aftercooler	btu/min	107			
Aftercooler Approach to Cooling Air (@ std. conditions)	°F	15			
Max Static Backpressure	in./H ₂ O	0.125			
Fan Motor	Nameplate HP	1			
Fan Motor	rpm	3524			
Fan Flow	cfm	1530			
Compressor Fluid Data					
Fluid Flow	gpm	5.2	5.8	6.4	6.8
Total Fluid Capacity	gal	2.7			
Reservoir Fluid Capacity	gal	1.3			
Normal Airend Discharge Temp.	°F	190			
Typical Fluid Carryover	ppm	<3			
Sound Data (at 1 meter)					
Unenclosed	dB(A)	77			
Standard Enclosure	dB(A)	70			
Energy Consumption (air-cooled)					
Full Load Drive Motor HP	Bhp	21.3			
Unloaded Drive Motor HP	Bhp	5.2			
Fan Motor HP	Bhp	0.8			
FL Drive Motor Consumption	kW	17.6	17.08	17.08	17.08
FL Fan Motor Consumption	kW	0.8	0.75	0.75	0.75
Total Package Consumption	kW	18.03	17.93	17.93	17.93
Total Package Specific Power	kW/100 cfm	20.3	22.4	25.6	30.4
	bhp/100 cfm	24.8	27.6	31.6	37.5
Dimensions					
Length	in (mm)	63 (1600)			
Width	in (mm)	34 (834)			
Height	in (mm)	47 (1190)			

Appendix B - Technical Data

QGB 25

Full Load Operating Pressure		psig	100	125	150	175
Max. Operating Pressure	psig		115	140	165	190
Min. Operating Pressure	psig		75			
Max. Ambient Operating Temp.	°F		125			
Min. Ambient Operating Temp.	°F		40			
Compressor Drive Motor	Nameplate HP		25			
Inlet Capacity	acfm		108	100	90	79
Service Line Connection Size	In. (FLG)		1			
Rotor Diameter	mm		85			
Male Rotor Speed	rpm		8010	7080	6700	6011
Male Tip Speed	m/sec		35.6	31.5	29.8	26.7
Aftercooling Data						
Heat Rejection - Fluid Cooler	btu/min		916			
Aftercooler	btu/min		126			
Aftercooler Approach to Cooling Air (@ std. conditions)	°F		15			
Max Static Backpressure	in. H2O		0.125			
Fan Motor	Nameplate HP		1			
Fan Motor	rpm		3469			
Fan Flow	cfm		1870			
Compressor Fluid Data						
Fluid Flow	gpm		5.2	5.8	6.4	6.8
Total Fluid Capacity	gal		2.7			
Reservoir Fluid Capacity	gal		1.3			
Normal Airend Discharge Temp.	°F		190			
Typical Fluid Carryover	ppm		<3			
Sound Data (at 1 meter)						
Unenclosed	dB(A)		78			
Standard Enclosure	dB(A)		71			
Energy Consumption (air-cooled)						
Full Load Drive Motor HP	Bhp		25.9			
Unloaded Drive Motor HP	Bhp		6.4			
Fan Motor HP	Bhp		1			
FL Drive Motor Consumption	kW		21.24	20.77	20.77	20.77
FL Fan Motor Consumption	kW		0.96	0.93	0.93	0.93
Total Package Consumption	kW		22.2	21.7	21.7	21.7
Total Package Specific Power	kW/100 cfm		20.6	21.7	24.1	27.5
	bhp/100 cfm		24.9	26.9	29.9	34.1
Dimensions						
Length	in (mm)		63 (1600)			
Width	in (mm)		34 (834)			
Height	in (mm)		47 (1190)			

Appendix B - Technical Data

QGB 30

Full Load Operating Pressure	psig	100	125	150	175
Max. Operating Pressure	psig	115	140	165	190
Min. Operating Pressure	psig	75			
Max. Ambient Operating Temp.	°F	115			
Min. Ambient Operating Temp.	°F	40			
Compressor Drive Motor	Nameplate HP	30			
Inlet Capacity	acfm	132	121	110	93
Service Line Connection Size	In. (FLG)	1			
Rotor Diameter	mm	85			
Male Rotor Speed	rpm	9758	8795	8091	6868
Male Tip Speed	m/sec	43.4	39.1	36.0	30.6
Aftercooling Data					
Heat Rejection - Fluid Cooler	btu/min	1096			
Aftercooler	btu/min	149			
Aftercooler Approach to Cooling Air (@ std. conditions)	°F	15			
Max Static Backpressure	in. H2O	0.125			
Fan Motor	Nameplate HP	1.5			
Fan Motor	rpm	3462			
Fan Flow	cfm	2280			
Compressor Fluid Data					
Fluid Flow	gpm	5.2	5.8	6.4	6.8
Total Fluid Capacity	gal	2.7			
Reservoir Fluid Capacity	gal	1.3			
Normal Airend Discharge Temp.	°F	190			
Typical Fluid Carryover	ppm	<3			
Sound Data (at 1 meter)					
Unenclosed	dB(A)	78			
Standard Enclosure	dB(A)	71			
Energy Consumption (air-cooled)					
Full Load Drive Motor HP	Bhp	32.2			
Unloaded Drive Motor HP	Bhp	7.9			
Fan Motor HP	Bhp	1.6			
FL Drive Motor Consumption	kW	26.37	25.82	25.82	25.82
FL Fan Motor Consumption	kW	1.5	1.49	1.49	1.49
Total Package Consumption	kW	27.87	27.31	27.31	27.31
Total Package Specific Power	kW/100 cfm	21.1	22.6	24.8	29.4
	bhp/100 cfm	25.6	27.9	30.7	36.3
Dimensions					
Length	in (mm)	63 (1600)			
Width	in (mm)	34 (834)			
Height	in (mm)	47 (1190)			

QGB 40

Full Load Operating Pressure		psig	100	125	150
Max. Operating Pressure	psig		115	140	165
Min. Operating Pressure	psig		75		
Max. Ambient Operating Temp.	°F		122		
Min. Ambient Operating Temp.	°F		40		
Compressor Drive Motor	Nameplate hp		40		
Inlet Capacity	acfm		190	161	137
Service Line Connection Size	In. (FLG)		1.25		
Rotor Diameter	mm		127.5		
Male Rotor Speed	rpm		3514	3078	2723
Male Tip Speed	m/sec		23.4	20.5	18.2
Aftercooling Data					
Heat Rejection - Fluid Cooler	btu/min		1425		
Aftercooler	btu/min		236		
Aftercooler Approach to Cooling Air (@ std. conditions)	°F		14.2		
Max Static Backpressure	in. H2O		0.125		
Fan Motor	Nameplate hp		1		
Fan Motor	rpm		1769		
Fan Flow	cfm		2170		
Compressor Fluid Data					
Fluid Flow	gpm		15	16.7	18.4
Total Fluid Capacity	gal		8.5		
Reservoir Fluid Capacity	gal		5.4		
Normal Airend Discharge Temp.	°F		190		
Typical Fluid Carryover	ppm		<3		
Sound Data (at 1 meter)					
Unenclosed	dB(A)		82		
Standard Enclosure	dB(A)		72		
Energy Consumption (air-cooled)					
Full Load Drive Motor HP	Bhp		43.1	42.6	40.6
Unloaded Drive Motor HP	Bhp		6.8		
Fan Motor HP	Bhp		0.7		
FL Drive Motor Consumption	kW		35	34.16	32.55
FL Fan Motor Consumption	kW		0.7	0.65	0.65
Total Package Consumption	kW		35.7	34.81	33.2
Total Package Specific Power	kW/100 cfm		18.8	21.6	24.2
	bhp/100 cfm		23.1	26.9	30.1
Dimensions					
Length	in (mm)		72 (1830)		
Width	in (mm)		34 (834)		
Height	in (mm)		69.5 (1765)		

Appendix B - Technical Data

QGB 50

Full Load Operating Pressure	psig	100	125	150
Max. Operating Pressure	psig	115	140	165
Min. Operating Pressure	psig	75	75	75
Max. Ambient Operating Temp.	°F	122	122	122
Min. Ambient Operating Temp.	°F	40	40	40
Compressor Drive Motor	Nameplate hp	50		
Inlet Capacity	acfm	238	206	186
Service Line Connection Size	In. (FLG)	1.25	1.25	1.25
Rotor Diameter	mm	127.5	127.5	127.5
Male Rotor Speed	rpm	4276	3835	3540
Male Tip Speed	m/sec	28.5	25.6	23.6
Aftercooling Data				
Heat Rejection - Fluid Cooler	btu/min	1789		
Aftercooler	btu/min	281		
Aftercooler Approach to Cooling Air (@ std. conditions)	°F	13.3		
Max Static Backpressure	in. H2O	0.125		
Fan Motor	Nameplate hp	1		
Fan Motor	rpm	3525		
Fan Flow	cfm	2430		
Compressor Fluid Data				
Fluid Flow	gpm	15	16.7	18.4
Total Fluid Capacity	gal	8.5		
Reservoir Fluid Capacity	gal	5.4		
Normal Airend Discharge Temp.	°F	190		
Typical Fluid Carryover	ppm	<3		
Sound Data (at 1 meter)				
Unenclosed	dB(A)	82		
Standard Enclosure	dB(A)	75		
Energy Consumption (air-cooled)				
Full Load Drive Motor HP	Bhp	54.4	54.4	54.5
Unloaded Drive Motor HP	Bhp	9.5	9.5	9.5
Fan Motor HP	Bhp	0.82	0.82	0.82
FL Drive Motor Consumption	kW	43.83	43.62	43.7
FL Fan Motor Consumption	kW	0.77	0.76	0.76
Total Package Consumption	kW	44.6	44.38	44.46
Total Package Specific Power	kW/100 cfm	18.7	21.5	23.9
	bhp/100 cfm	23.2	26.8	29.7
Dimensions				
Length	in (mm)	72 (1830)		
Width	in (mm)	34 (834)		
Height	in (mm)	69.5 (1765)		

QGB 60

Full Load Operating Pressure		psig	100	125	150
Max. Operating Pressure	psig		115	140	165
Min. Operating Pressure	psig		75	75	75
Max. Ambient Operating Temp.	°F		115	115	115
Min. Ambient Operating Temp.	°F		40	40	40
Compressor Drive Motor	Nameplate hp		60		
Inlet Capacity	acfm		284	251	220
Service Line Connection Size	In. (FLG)		1.25	1.25	1.25
Rotor Diameter	mm		127.5	127.5	127.5
Male Rotor Speed	rpm		5126	4608	4109
Male Tip Speed	m/sec		34.2	30.7	27.4
Aftercooling Data					
Heat Rejection - Fluid Cooler	btu/min		2148		
Aftercooler	btu/min		327		
Aftercooler Approach to Cooling Air (@ std. conditions)	°F		17.9		
Max Static Backpressure	in. H2O		0.125		
Fan Motor	Nameplate hp		2		
Fan Motor	rpm		3481		
Fan Flow	cfm		3370		
Compressor Fluid Data					
Fluid Flow	gpm		15	16.7	18.4
Total Fluid Capacity	gal		8.5		
Reservoir Fluid Capacity	gal		5.4		
Normal Airend Discharge Temp.	°F		190		
Typical Fluid Carryover	ppm		<3		
Sound Data (at 1 meter)					
Unenclosed	dB(A)		89		
Standard Enclosure	dB(A)		79		
Energy Consumption (air-cooled)					
Full Load Drive Motor HP	Bhp		67.8	66.5	64.2
Unloaded Drive Motor HP	Bhp		12.2	12.2	12.2
Fan Motor HP	Bhp		1.3	1.3	1.3
FL Drive Motor Consumption	kW		54.3	53.32	51.48
FL Fan Motor Consumption	kW		1.2	1.21	1.21
Total Package Consumption	kW		55.5	54.53	52.69
Total Package Specific Power	kW/100 cfm		19.5	21.7	24.0
	bhp/100 cfm		24.3	27.0	29.8
Dimensions					
Length	in (mm)		72 (1830)		
Width	in (mm)		34 (834)		
Height	in (mm)		69.5 (1765)		

STANDARD TERMS AND CONDITIONS

QUINCY COMPRESSOR AND ORTMAN FLUID POWER DIVISIONS

LEGAL EFFECT: Except as expressly otherwise agreed to in writing by an authorized representative of Seller, the following terms and conditions shall apply to and form a part of this order and any additional and/or different terms of Buyer's purchase order or other form of acceptance are rejected in advance and shall not become a part of this order.

The rights of Buyer hereunder shall be neither assignable nor transferable except with the written consent of Seller.

This order may not be canceled or altered except with the written consent of Seller and upon terms which will indemnify Seller against all loss occasioned thereby. All additional costs incurred by Seller due to changes in design or specifications, modification of this order or revision of product must be paid for by Buyer.

In addition to the rights and remedies conferred upon Seller by this order, Seller shall have all rights and remedies conferred at law and in equity and shall not be required to proceed with the performance of this order if Buyer is in default in the performance of such order or of any other contract or order with seller.

TERMS OF PAYMENT: Unless otherwise specified in the order acknowledgment, the terms of payment shall be net cash within thirty (30) days after shipment. These terms shall apply to partial as well as complete shipments. If any proceeding be initiated by or against Buyer under any bankruptcy or insolvency law, or in the judgment of Seller the financial condition of Buyer, at the time the equipment is ready for shipment, does not justify the terms of payment specified, Seller reserves the right to require full payment in cash prior to making shipment. If such payment is not received within fifteen (15) days after notification of readiness for shipment, Seller may cancel the order as to any unshipped item and require payment of its reasonable cancellation charges.

If Buyer delays shipment, payments based on date of shipment shall become due as of the date when ready for shipment. If Buyer delays completion of manufacture, Seller may elect to require payment according to percentage of completion. Equipment held for Buyer shall be at Buyer's risk and storage charges may be applied at the discretion of Seller.

Accounts past due shall bear interest at the highest rate lawful to contract for but if there is no limit set by law, such interest shall be eighteen percent (18%). Buyer shall pay all cost and expenses, including reasonable attorney's fees, incurred in collecting the same, and no claim, except claims within Seller's warranty of material or workmanship, as stated below, will be recognized unless delivered in writing to Seller within thirty (30) days after date of shipment.

TAXES: All prices exclude present and future sales, use, occupation, license, excise, and other taxes in respect of manufacture, sales or delivery, all of which shall be paid by Buyer unless included in the purchase price at the proper rate or a proper exemption certificate is furnished.

ACCEPTANCE: All offers to purchase, quotations and contracts of sales are subject to final acceptance by an authorized representative at Seller's plant.

DELIVERY: Except as otherwise specified in this quotation, delivery will be F. O. B. point of shipment. In the absence of exact shipping instruction, Seller will use its discretion regarding best means of insured shipment. No liability will be accepted by Seller for so doing. All transportation charges are at Buyer's expense. Time of delivery is an estimate only and is based upon the receipt of all information and necessary approvals. The shipping schedule shall not be construed to limit seller in making commitments for materials or in fabricating articles under this order in accordance with Seller's normal and reasonable production schedules.

Seller shall in no event be liable for delays caused by fires, acts of God, strikes, labor difficulties, acts of governmental or military authorities, delays in transportation or procuring materials, or causes of any kind beyond Seller's control. No provision for liquidated damages for any cause shall apply under this order. Buyer shall accept delivery within thirty (30) days after receipt of notification of readiness for shipment. Claims for shortages will be deemed to have been waived if not made in writing within ten (10) days after the receipt of the material in respect of which any such shortage is claimed. Seller is not responsible for loss or damage in transit after having received "In Good Order" receipt from the carrier. All claims for loss or damage in transit should be made to the carrier.

STANDARD TERMS AND CONDITIONS

QUINCY COMPRESSOR AND ORTMAN FLUID POWER DIVISIONS

TITLE & LIEN RIGHTS: The equipment shall remain personal property, regardless of how affixed to any realty or structure. Until the price (including any notes given therefore) of the equipment has been fully paid in cash, Seller shall, in the event of Buyer's default, have the right to repossess such equipment.

PATENT INFRINGEMENT: If properly notified and given an opportunity to do so with friendly assistance, Seller will defend Buyer and the ultimate user of the equipment from any actual or alleged infringement of any published United States patent by the equipment or any part thereof furnished pursuant hereto (other than parts of special design, construction, or manufacture specified by and originating with Buyer), and will pay all damages and costs awarded by competent court in any suit thus defended or of which it may have had notice and opportunity to defend as aforesaid.

STANDARD WARRANTY: Seller warrants that products of its own manufacture will be free from defects in workmanship and materials under normal use and service for the period specified in the product instruction manual. Warranty for service parts will be ninety (90) days from date of factory shipment. Electric Motors, gasoline and diesel engines, electrical apparatus and all other accessories, components and parts not manufactured by Seller are warranted only to the extent of the original manufacturer's warranty.

Notice of the alleged defect must be given to the Seller, in writing with all identifying details including serial number, type of equipment and date of purchase within thirty (30) days of the discovery of the same during the warranty period.

Seller's sole obligation on this warranty shall be, at its option, to repair or replace or refund the purchase price of any product or part thereof which proves to be defective. If requested by Seller, such product or part thereof must be promptly returned to seller, freight prepaid, for inspection.

Seller warrants repaired or replaced parts of its own manufacture against defects in materials and workmanship under normal use and service for ninety (90) days or for the remainder of the warranty on the product being repaired.

This warranty shall not apply and Seller shall not be responsible or liable for:

- (a) Consequential, collateral or special losses or damages;
- (b) Equipment conditions caused by fair wear and tear, abnormal conditions of use, accident, neglect or misuse of equipment, improper storage or damage resulting during shipping;
- (c) Deviation from operating instructions, specifications or other special terms of sale;
- (d) Labor charges, loss or damage resulting from improper operation, maintenance or repairs made by person(s) other than Seller or Seller's authorized service station.

In no event shall Seller be liable for any claims whether arising from breach of contract or warranty or claims of negligence or negligent manufacture in excess of the purchase price.

THIS WARRANTY IS THE SOLE WARRANTY OF SELLERS AND ANY OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED IN LAW OR IMPLIED IN FACT, INCLUDING ANY WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR USE ARE HEREBY SPECIFICALLY EXCLUDED.

LIABILITY LIMITATIONS: Under no circumstances shall the Seller have any liability for liquidated damages or for collateral, consequential or special damages or for loss of profits, or for actual losses or for loss of production or progress of construction, whether resulting from delays in delivery or performance, breach of warranty, negligent manufacture or otherwise.

ENVIRONMENTAL AND OSHA REQUIREMENTS: At the time of shipment of the equipment from the factory, Quincy Compressor / Ortman Fluid Power will comply with the various Federal, State and local laws and regulations concerning occupational health and safety and pollution. However, in the installation and operation of the equipment and other matters over which the seller has no control, the Seller assumes no responsibility for compliance with those laws and regulations, whether by the way of indemnity, warranty or otherwise.



an EnPro Industries company

Quincy Compressor Products: 217.222.7700
E-mail: info@quincycompressor.com
Website: www.quincycompressor.com



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