Instruction Manual for QR-25® Series Compressors

CAUTION

Vacuum pumps are complicated and can cause serious injury or death if operated improperly. Before installing or operating this vacuum pump, read and understand this manual, and follow all safety precautions!!

52201-104

February 1994

2 YEAR WARRANTY PROGRAM

Quincy Compressor Division
Industrial Reciprocating Products
QR-25, QT & PLT Series
2-Stage Compressors

A two year warranty is available for the basic compressor by purchasing warranty maintenance kits. The warranty maintenance kits contain lubricant, filter(s) and registration information for one year. Near the end of the first year, Quincy Compressor will remind you, by mail, that a second year of warranty may be obtained by purchasing a second warranty maintenance kit. (Kits may be purchased from the same place you bought your compressor.)

Your basic compressor will have the same coverage for the second year as it had for the first. You simply follow the recommended maintenance spelled out in the instruction manual. The two year warranty only applies when the maintenance kits are purchased for the first & second year of service and registered within thirty days of compressor purchase.

WARRANTY

Quincy Compressor Division
Industrial Reciprocating Products
QR-25 Series Compressors

GENERAL PROVISIONS

Coltec Industries / Quincy Compressor Division (The Seller) warrants to each retail purchaser (Purchaser) products of the Seller's own manufacture against defects in material and workmanship. With respect to products not manufactured by the Seller, the Seller will, if practical, pass along the warranty of the original manufacturer.

The Seller's sole obligation under this warranty shall be, at its option, to repair, replace, or refund the purchase price of any product or part thereof which is deemed to be defective, provided the Purchaser meets all of the applicable requirements of this warranty and none of the limitations apply.

WARRANTY PERIODS

Pressure Lubricated Basic Compressors

Seller warrants for sixty (60) months from date of factory shipment the following specific parts: head, cylinder, crankcase, oil pump, crankshaft, pistons, connecting rod assemblies and bearings. Labor, travel, and remaining parts will be warranted for twelve (12) months from start-up or twenty-four (24) months from factory shipment, whichever occurs first.

Splash Lubricated Basic Compressors

Seller warrants for twelve (12) months from date of start-up or twenty-four (24) months from factory shipment, whichever occurs first. This includes labor and approved travel. All warranty travel expense will be paid to the nearest authorized repair center.

Remanufactured Basics

Seller warrants for six (6) months from date of start-up or eighteen (18) months from date of factory shipment, whichever occurs first. This includes labor and approved travel. All warranty travel expense will be paid to the nearest authorized repair center.

Replacement Parts

Seller warrants 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.

Parts purchased outside the compressor's warranty period are warranted for ninety (90) days from the date of distributor sale, or one (1) year from the date of shipment from the factory, whichever occurs first.

Normal maintenance items and procedures are not warranted unless found to be defective in material or workmanship, i.e. but not limited to filters, gaskets, rings, valves and control lines.

Limitations

The following models are not eligible for travel expense when the Seller supplies as basics: X2, X3, X8, R-17, 108, 206, 210, 216, 240 and 310.

Notice of the alleged defect must be given to the Seller in writing with all identifying details, including serial number, model number, type of equipment and date of purchase within thirty (30) days of discovery of same during the warranty period. If requested by Seller, such product or product thereof must be promptly returned to Seller, freight collect for inspection.

The Seller must have the warranty registration card on file at Quincy, IL. within ten (10) days of start-up or the warranty may be declared null and void.

The above warranties 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, accident, neglect or misuse of equipment, improper storage or damages resulting during shipment.
(c) Deviation from operating instructions, specifications or other 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 or installation of product.
(f) High pressure models (above 250 psig) are warranted for 1 year

Disclaimer

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 Seller and any other warranties, express, implied in law or implied in fact, including any warranties of merchantability and fitness for particular use, are hereby specifically excluded.

Contents

SECTION 1 SAFETY

Safety First

At Quincy Compressor safety is not only a primary concern, but a faithfully performed practice. Beginning with the design stage, safety is built into "The World's Finest Compressor". It is the intention of this manual to pass along the "safety first" concept to you by providing safety precautions throughout its pages.

"DANGER !", **"WARNING !"**, and **"CAUTION !"** are displayed in large bold capital letters in the left hand column to call attention to areas of vital concern. They represent different degrees of hazard seriousness, as stated below. The safety precaution is spelled out in bold upper and lower case letters in the right hand column.

DANGER ! **Immediate hazards which will result in severe personal injury or death.**

WARNING ! **Hazards or unsafe practices that could result in personal injury or death.**

CAUTION ! **Hazards or unsafe practices which could result in minor personal injury, product or property damage.**

Each section of this instruction manual, as well as any instructions supplied by manufacturers of supporting equipment, should be read and understood prior to starting the compressor. If there are any questions regarding any part of the instructions, please call your local Quincy Compressor Distributor, or the Quincy Compressor factory before creating a potentially hazardous situation. Life, limb, or equipment could be saved with a simple phone call.

Compressors are precision high speed mechanical equipment requiring caution in operation to minimize hazard to property and personnel. There are many obvious safety rules that must be observed in the operation of this type of equipment. Listed below are some additional safety precautions that must be observed.

- Transfer of toxic, dangerous, flammable or explosive substances using Quincy Compressor products is at the user's risk.

- Turn off and lockout/tagout (per O.S.H.A regulation 1910.147) the main power disconnect switch before attempting to work or perform any maintenance.

- Do not attempt to service any part of the unit while it is operating.

- Per O.S.H.A regulation 1910.147, relieve the system of all pressure before attempting to service any part of the unit.

- Do not operate the unit with any of its safety guards, shields, or screens removed.

•Do not remove or paint over any DANGER!, WARNING!, CAUTION!, or instructional materials attached to the compressor. Lack of information regarding hazardous conditions can cause property damage or personal injury.

•Periodically check all pressure relief valves for proper operation.

•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.

•Do not install a shutoff valve in the compressor discharge line without first installing a pressure relief valve of proper size and design between the shutoff valve and the compressor.

•Do not use plastic pipe, rubber hose, or lead-tin soldered joints in any part of the compressed air system.

•Alterations must not be made to this compressor without Quincy Compressor's approval.

•Be sure that all tools, shipping and installation debris have been removed from the compressor and installation site prior to starting the compressor.

•Do not operate the compressor in excess of the A.S.M.E. pressure vessel rating for the receiver or the service rating of the compressor, whichever is lower.

•Make a general overall inspection of the unit daily and correct any unsafe situations.

•Reckless behaviour of any kind involving compressed air is dangerous and can cause very serious injury to the participants.

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

•Never use a flammable or toxic solvent for cleaning the air filter or any parts.

DANGER !

Air used for breathing or food processing must meet O.S.H.A. 29 C.F.R. 1910.134 or F.D.A. 21 C.F.R. 178.3570 regulations. Failure to do so may cause severe injury or death.

WARNING !

Do not operate a Quincy Compressor in excess of 250 p.s.i.g. unless it has been tested and certified for high pressure application by Quincy Compressor prior to shipment.

The owner, lessor or operator of any compressor unit manufactured by Quincy Compressor is hereby warned that failure to observe the above safety precautions may result in serious injury to personnel and/or damage to property.

Quincy Compressor neither states as fact, nor in any way implies that the above list of safety precautions is an all inclusive list, the observance of which will prevent all damage to property or injury to personnel.

Every effort has been taken to ensure that 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.

Summary of Changes to This Manual

(since previous printing dated August 1992):

- Model 240 was included in the "Limitations" section of the Warranty
- information pertaining to Principles of Dryers & Filters was added to Section 2
- maximum P.S.I.G. for Model 216 was limited to 100 P.S.I.G. in the Specifications table
- Torque Specifications table now includes information for obsolete models

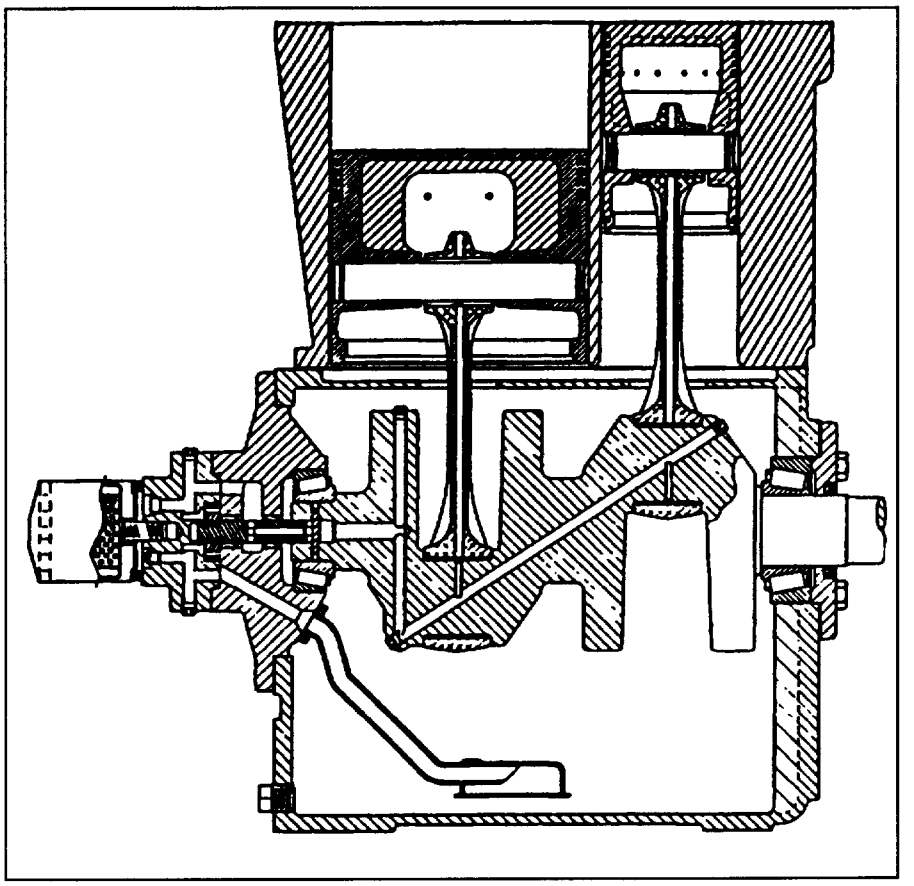

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Fig. 2-1 Cross Section of Typical QR-25
2 Stage Pressure Lubricated Cylinder & Crankcase

Description & Application

The Quincy Compressor QR-25 Series consists of heavy duty industrial, belt driven, single or two stage compressors. Single stage compressors are capable of delivering up to 100 P.S.I.G. continuously. Some single stage compressors are capable of delivering up to 150 P.S.I.G. intermittantly (with proper controls and modifications). Two stage compressors can deliver up to 200 P.S.I.G. continuously, and up to 250, 350 or 500 P.S.I.G. intermittently depending upon the model, controls and configuration.

Principles of Compression Cycles

Single Stage Compressors

During the downstroke of a single stage compressor, air is drawn through an intake valve in the head of the compressor and into the cylinder. At the bottom of the stroke, the intake valve closes and air is trapped in the cylinder. The air is then compressed in the cylinder during the upstroke of the piston. Total compression, from atmospheric pressure to the final discharge pressure, is accomplished in one stroke of the piston.

Two Stage Compressors

During the downstroke of the piston of a two stage compressor, air is drawn through an intake valve in the head of the compressor into the low pressure cylinder and compressed during the upstroke of the piston.

The compressed air is then released through a discharge valve in the head of the compressor to an intercooler (usually finned tubing) where the heat resulting from compression is allowed to dissipate. The cooler compressed air is then drawn into a second compression cylinder, the high pressure cylinder, for compression to final pressure.

From there the compressed air is released through a discharge valve to an air receiver tank or directly to a network of compressed air supply lines. In one revolution of the crankshaft a compression cycle is completed.

Principles of Lubrication Systems

Splash Lubricated Models

With each stroke of the compressor, a dipper attached to the bottom of the connecting rod, dips into an oil bath at the bottom of the crankcase. This dipper splashes oil throughout the interior of the crankcase, lubricating all moving parts.

It is important with this system that the oil level be maintained between the high and low level marks on the dipstick. If the oil level is too high, excessive oil carryover could result. If the oil level is too low, or the compressor is not operated within the correct R.P.M. range, the moving parts will not be adequately lubricated.

Pressure Lubricated Models

Moving parts within the crankcase are supplied with lubrication by a positive displacement, gerotor type oil pump. Oil is drawn up from the bottom of the crankcase to the oil pump through an oil sump strainer screen. The oil is then forced under pressure through the oil filter (if so equipped). Oil travels under pressure through drilled journals in the crankshaft and connecting rods to lubricate crankshaft bearings, wrist pin bearings and the cylinder walls.

Principles of Cooling Systems

Aircooled Models

Fan blades of the compressor sheave force ambient air across fins of the cylinder head(s), and intercooler fins of two stage compressors, to cool the compressor. QR-25 series compressors are normally set up at the factory with a sheave that turns in a counterclockwise rotation. For special applications, clockwise rotation compressor sheaves are available as optional equipment on some models. Due to standard drive motor limitations, it is recommended that the compressor be operated in temperatures under 104°F.

Watercooled Models

In addition to cooling action provided by the fan blades of the compressor sheave, cool water is circulated throughout an internal water jacket surrounding the cylinders and heads of watercooled models.

Principles of Dryers & Filters

Moisture occurs naturally in air lines as a result of compression. Moisture vapor in ambient air is concentrated when pressurized and condenses when cooled in downstream air piping. Compressed air dryers reduce the moisture vapor concentration and prevent water formation in compressed air lines. Dryers are a recommended companion to filters, aftercoolers, and automatic drains for improving the productivity of compressed air systems.

Water and moisture vapor removal increases the efficiency of air operated equipment, reduces contamination and rusting, increases the service life of pneumatic equipment and tools, prevents air line freeze-ups, and reduces product rejects.

Control Components

Unloader Towers: Provided as part of the basic compressor when control version is specified.

Pilot Valve: Used in conjunction with unloader towers when the compressor is to run continuously and an operating pressure range is to be maintained. Refer to your parts manual for correct pilot valve, ranges and settings.

Hydraulic Unloader: Used on pressure lubricated compressors to protect the compressor in the event of a potentially damaging oil pressure drop. Also ensures that the compressor does not begin to produce compressed air until there is sufficient oil pressure.

Pressure Switch: Used for start/stop applications (usually accompanied by a hydraulic unloader). The pressure switch detects the demand for compressed air and allows the unit to start. When the demand is satisfied, the unit stops.

Control Versions

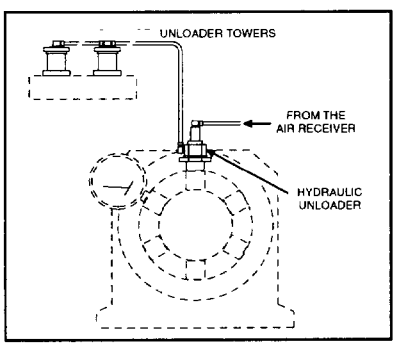

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Fig. 2-2 Control Version L

Various control versions are available for the model QR-25 series compressors. The control version required is determined by how frequent there is a demand for compressed air. The idea is to create compressed air on demand, but to limit the number of times a motor must start the compressor in a given time period. To prevent motor burnout, the motor should be limited to no more than six (6) starts per hour.

Control Version P : Describes a basic compressor with no added control features.

Control Version L : Consists of unloader tower(s)* located on the head of the compressor, a hydraulic unloader mounted on the bearing carrier, and a pressure switch. This version is recommended for those applications where the compressor will not be required to start more than six (6) times per hour. A compressor equipped with control Version L is sometimes referred to as a "start/stop machine"

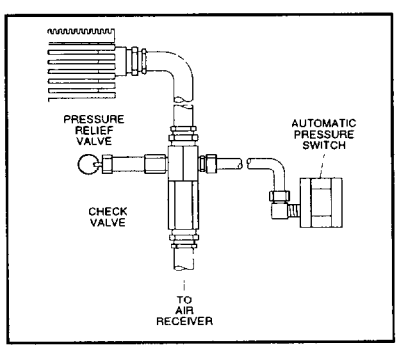

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Fig. 2-3 Control Version L Variation (Discharge Line Check Valve & Pressure Switch)

The pressure switch detects the demand for compressed air and allows the unit to start. When the demand is satisfied, the unit stops.

The hydraulic unloader allows the compressor to start in an "unloaded" state, that is, the compressor starts but does not begin to create compressed air until oil pressure is established. The hydraulic unloader also guards against excessive damage in the event of an oil pressure drop.

Control Version L Variations: Variations of Control Version L are illustrated in **Fig.s 2-3 & 2-4. Fig. 2-3** shows how a discharge line check valve, pressure switch, & pressure relief valve are combined to provide start/stop operation. **Fig. 2-4** is an example of how a Model 108 compressor is equipped with a flyweight controlled three-way valve and head unloader for start/stop operation.

**1, 2, or 4 unloader towers are employed depending upon the model of compressor.*

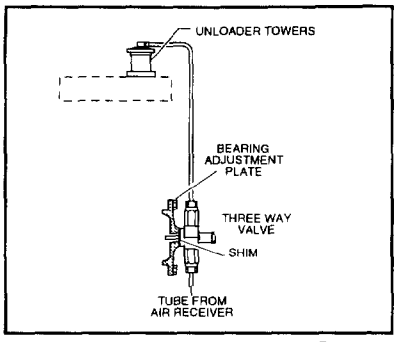

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Fig. 2-4 Control Version L Variation (Model 108 Start/Stop)

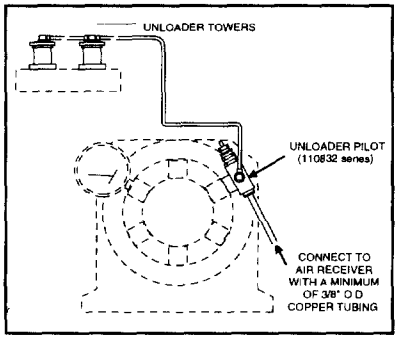

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Fig. 2-5 Control Version S

Control Version S : This version is best suited for "continuous run" applications (whenever the compressor must start more than six [6] times per hour). If the demand for compressed air is continuous and exceeds one half or more of the compressor's capacity, Control Version S should be used.

Once the compressor is started, it continues to run until it is manually turned off. Whenever there is a demand for compressed air, the pilot valve closes, allowing the unloader in the unloader tower to actuate. At this point, the compressor starts making compressed air. As soon as the demand for compressed air is met, the pilot valve opens, allowing air pressure to de-actuate in the unloader tower. The compressor continues to run but does not compress air.

Control Version LS: This version consists of a head assembly with unloader tower(s)* a pilot valve and a hydraulic unloader. It is usually applied to gas or diesel engine driven units. Virtually the same as Control Version S, but with a hydraulic unloader added to protect the compressor in the event of an oil pressure drop.

Control Version LVD: Unloader tower(s)*, a pilot valve with a manual shut-off, a hydraulic unloader, a check valve assembly, and a pressure switch make up the LVD Control Version. This version is recommended wherever the degree of demand and usage is variable.

The manual shutoff allows for the selection of either "start/stop" or "continuous run" control. In either situation, the hydraulic unloader protects the compressor from excessive damage caused by a drop in oil pressure.

Specifications

Model	Stroke	Bore(s) L.P. - H.P.	R.P.M. Range	Maximum P.S.I.G.**
X2	1 3/4	2	400-900	100/150
X3	1 3/4	2 3/8	400-900	100
X8	2	2 3/8	400-900	100
108	2 1/2	2 1/2	400-900	100/150
206	2	2	400-1000	100/150
210	2	2 1/2	400-1000	100/150
216	2 1/2	3	400-900	100
240	3	4	400-900	100
270	4	4 1/2	400-900	100
4125	4	4 1/2	400-900	100
310	2 1/2	3 1/2 - 2	400-900	200/500
325	3	4 1/2 - 2 1/2	400-900	200/500
340	3 1/2	5 1/4 - 3	400-900	200/500
350	3 1/2	6 - 3 1/4	400-900	200/350
370	4	6 - 3 1/4	400-1070	200/250
390	4	7 1/2 - 4	400-950	200/250
5120	4	6 - 3 1/4	400-1050	200/250
W5120	4	6 - 3 1/4	400-1050	200/250

**1, 2, or 4 unloader towers are employed depending upon the model of compressor.*
***Maximum continuous pressure is indicated on left side, maximum intermittent high pressure on right side.*

SECTION 3 INSTALLATION

Receiving Delivery

Immediately upon receipt of compressor equipment and prior to completely uncrating, the following steps should be taken:

Step 1) Inspect compressor equipment for damage that may have occurred during shipment. If any damage is found, demand an inspection from the carrier. Ask the carrier how to file a claim for shipping damages. (Refer to **SECTION 3, *Freight Damage*** for complete details.) **Shipping damage is not covered by Quincy Compressor warranty.**

Step 2) Insure that adequate lifting equipment is available for moving the compressor equipment.

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

Step 3) Read the compressor nameplate to verify the model and size ordered.

Step 4) Read the motor nameplate to be sure the motor is compatible with your electrical conditions (volts, phase, hertz).

Step 5) Read the pressure relief valve nameplate to be sure it does not exceed the working pressure shown on the compressor or any other component in the system.

Step 6) **Read and understand the safety precautions contained within this manual.** The successful and efficient operation of compressor equipment depends largely upon the amount of care taken to install and maintain the equipment. Quincy Compressor strongly recommends that any or all person(s) in charge of installing, maintaining, or servicing one of our compressors read and understand the entire contents of this manual in order to perform such duties safely and efficiently.

Freight Damage

It is extremely important that you examine every carton and crate as soon as you receive it. If there is any obvious damage to the shipping container, have the delivering carrier sign the freight bill, noting the apparent damage, and request a damage report.

If concealed damage is discovered at a later date, the carrier must be notified within 15 days of initial receipt of freight. Concealed shipping damage is not covered by Quincy Compressor Warranty. Contact the carrier as soon as possible, giving them an opportunity to inspect the shipment at the premises where the delivery was made. Do not move the damaged freight from the premises where the original delivery was made.

Retain all containers and packing for inspection by the carrier.

A claim form can be requested from the carrier: Standard Form for Presentation of Loss and Damage Claims (form # 3208). Your claim will need to be substantiated with the following documents:

a.) form #3208

b.) original bill of lading

c.) original paid freight bill

d.) original invoice or certified copy

e.) other particulars obtainable in proof of loss or damage (photos, damage inspection, etc.)

The proper description and classification of our product in the National Motor Freight Classification 100-H, contained in item 118100, reads as follows: Compressors, air, or air ends: with or without air tanks, hose or nozzles, mounted or not mounted."

We suggest that these instructions be circulated to your shipping and receiving personnel.

Location

Quincy air compressors should be installed in an area that is clean, well lighted, and adequately ventilated. Inspection and maintenance checks are required daily. Therefore, sufficient space needs to be provided around the compressor for safe and proper inspection, cleaning, and maintenance.

The compressor must not be installed closer than 24 inches to a wall or another compressor. This allows ample circulation of air across the compressor cylinders, heads and cooler (if so equipped). If at all possible, the pulley drive system (i.e. motor pulley, compressor sheave, belts and guard) should be located next to a wall to minimize any danger created by the drive system while the compressor is operating.

Due to standard drive motor limitations, it is recommended that the compressor be operated in temperatures under 104°F. In cold climates, the compressor should be installed in a heated building.

CAUTION ! **Do not operate this compressor in ambient temperatures lower than -15° F. A crankcase heater is recommended for a compressor that is to operate in temperatures under 32° F.**

WARNING ! **Under no circumstances should a compressor be used in an area that may be exposed to toxic, volatile, or corrosive atmosphere. Do not store toxic, volatile, or corrosive agents near the compressor.**

Noise

Noise is a potential health hazard that must be considered. There are federal and local laws governing acceptable noise levels. Check with local officials for specifications.

Excessive noise can be effectively reduced through various methods. Total enclosures, intake silencers, baffle walls, relocating or isolating the compressor can reduce noise levels. Care must be taken when constructing total enclosures or baffle walls. If not properly constructed or positioned, they could contribute to unacceptable noise levels or overheating. Consult your local Quincy Compressor Distributor if assistance is required.

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

Electrical Supply Requirements

The electrical installation of this unit should be performed by a qualified electrician with knowledge of the National Electrical Code (N.E.C.), O.S.H.A. code and/or any local or state codes having precedence.

Before installation, the electrical supply should be checked for adequate wire size and transformer capacity. A suitable circuit breaker or fused disconnect switch should be provided. When a 3 phase motor is used to drive a compressor, any unreasonable voltage imbalance between the legs must be eliminated and any low voltage corrected to prevent excessive current draw. **Note: This unit must be grounded.**

The installation, electric motor, wiring, and all electrical controls must be in accordance with NFPA 70-1993 National Electric Code, National Electric Safety Code, state and local codes. Failure to abide by the national, state and local codes may result in physical harm and/or property damage.

DANGER ! **High voltage may cause personal injury or death. Disconnect and lockout/tagout per O.S.H.A. regulation 1910.147 all electrical power supplies before opening the electrical enclosure or servicing.**

WARNING ! **Never assume a compressor is safe to work on just because it is not operating. It could restart at any time. Follow all safety precautions outlined in SECTION 5, *Stopping For Maintenance.***

CAUTION ! **NEMA electrical enclosures and components must be appropriate to the area installed.**

Mounting

Proper mounting of Quincy compressors is crucial to the safe operation and longevity of the equipment. The installation requires a flat and level concrete floor or pad. Satisfactory results can usually be obtained by mounting the compressor on vibration isolating pads available from your local Quincy Distributor.

State or local codes may mandate that the compressor be bolted to the floor. In this case the unit must be leveled and bolted making absolutely certain the feet are not stressed in any manner. Uneven feet drawn tightly to the concrete pad will cause severe vibrations resulting in cracked welds or fatigue failure.

The customer is responsible for providing a suitable foundation & isolator mounting where necessary.

Mounting Mobile Units

Gas engine driven compressors mounted to truck beds should be fastened in such a way so as not to create any stress to the air receiver tank. Truck beds, characteristically, have a tendency to flex and could cause damage to the receiver tank if the tank is fastened directly to the truck bed. It is the User's responsibility to provide an adequate means of fastening the unit in these applications.

System components

Efficiency and safety are the primary concerns when selecting components for compressed air systems. Products of inferior quality can not only hinder performance of the unit, but could cause system failures that result in bodily harm or even death. Select only top quality components for your system. Call your local Quincy Distributor for quality parts and professional advice.

Drive Pulleys / Sheaves

Various pulley and sheave combinations are available to obtain the desired air pressure and delivery rate of your compressor. Consideration must be given to these combinations to ensure that the motor is not overloaded by operating above or below the designed speed range.

Whatever combination is employed, the drive pulleys & compressor sheaves must be properly aligned and drive belt tension set to specifications (refer to **SECTION 5, *Pulley / Sheave Alignment & Belt Tension***). Improper pulley/ sheave alignment and belt tension can cause motor overloading, excessive vibration, and premature belt and/or bearing failure.

WARNING !

Excessive compressor RPM's (speed) could cause a pulley or sheave to shatter. In an instant, the pulley or sheave could separate into fragments capable of penetrating the belt guard and causing bodily harm or death. Do not operate the compressor above the recommended RPM (refer to SECTION 2, *Specifications*).

Guards

All mechanical action or motion is hazardous in varying degrees and needs to be guarded. Guards should be designed to achieve the required degree of protection and still allow full air flow from the compressor sheave across the unit. Guards shall be in compliance with OSHA safety and health standards 29 CFR 1910.219 in OSHA manual 2206 and any state or local codes.

WARNING !

Guards must be fastened in place before starting the compressor and never removed before cutting off and locking out the main power supply.

Check Valves

Check valves are designed to prevent back-flow of air pressure in the compressed air system (air flows freely in one direction only). The check valve must

be properly sized for air flow and temperature. **Do not rely upon a check valve to isolate a compressor from a pressurized tank or compressed air delivery system during maintenance procedures!**

Manual Shutoff Valves

Manual shutoff valves block the flow of air pressure in either direction. This type of valve can be used to isolate a compressor from a pressurized system, provided the system is equipped with a pressure relief valve capable of being manually released. The pressure relief valve should be installed between the manual shutoff valve and the compressor (refer to **Fig. 3-1, Typical Drop Leg & Component Location**).

Pressure Relief Valves

Pressure relief valves aid in preventing system failures by relieving system pressure when compressed air reaches a determined level. They are available in various pressure settings to accommodate a range of applications. Pressure relief valves are preset by the manufacturer and under no circumstances should the setting be changed by anyone other than the manufacturer.

DANGER !

Pressure relief valves are designed to protect compressed air systems in accordance with ASME B19 safety standards. Failure to provide properly sized pressure relief valves may cause property damage, severe personal injury or even death.

Induction System

Air Intake

A clean, cool and dry air supply is essential to the satisfactory operation of your Quincy air compressor. The standard air filter that the compressor is equipped with when leaving the factory is of sufficient size and design to meet normal conditions, when properly serviced, in accordance with the maintenance section of this manual.

If, however, the compressor is to be installed in a location where considerable dust, dirt and other contaminants are prevalent, consult your local Quincy Distributor for advice and optional filters. It is the user's responsibility to provide adequate filtration for those conditions. Oil bath filters are not to be used. Warranty will be void if a failure is determined to be caused by inadequate filtration.

Remote Inlet Filters

Depending on the size of the compressor and the size and construction of the room in which the unit operates, the air inlet may have to be located outside of the room. If it is necessary to remotely install the air filter, make the inlet piping as short and direct as possible. Remotely installed air filters can lead to vibrations in the inlet piping. These vibrations can be minimized by adding a pulsation dampener in the inlet piping between the remote inlet filter(s) and the compressor.

If the intake is piped to outside atmosphere, a hooded filter should be installed to prevent water or snow from being ingested into the compressor.

All inlet piping should be at least the same size (or larger) in diameter as the inlet connection to the compressor. For every 10 feet of inlet piping or every 90° bend, increase the inlet piping diameter by one pipe size. The inlet piping must be thoroughly clean inside. Remove all weld slag, rust or dirt. Galvanized pipe with threaded or flanged fittings is preferred.

CAUTION !

Never locate the compressor air inlet system where toxic, volatile or corrosive vapors, air temperatures exceeding 100°F, water, or extremely dirty air could be ingested. These types of atmospheres could adversely affect the performance of the compressor system.

Compressed Air Discharge System

The discharge piping should be of the same diameter as the compressor discharge connection, or sized so that the pressure drop at any point in the system does not exceed 10% of the air receiver pressure. Install auxiliary air receivers near heavy loads or at the far end of a long system. This will insure sufficient pressure if the use is intermittent, or sudden large demands are placed on the system.

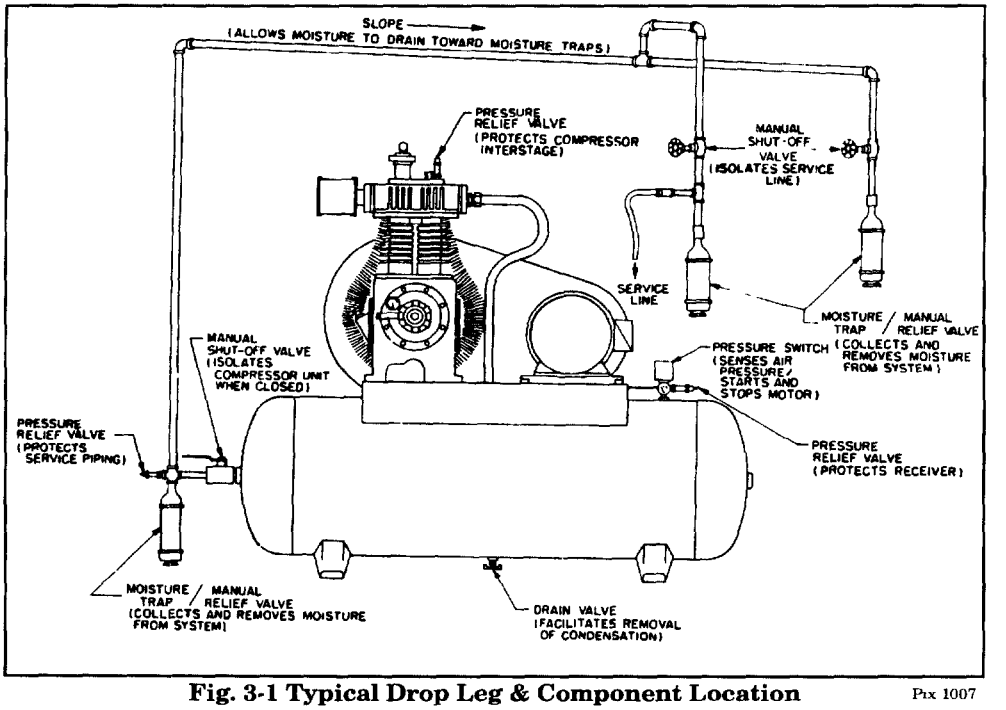

Fig. 3-1 Typical Drop Leg & Component Location Pix 1007

Discharge piping should slope to a drop leg (refer to **Fig. 3-1, Typical Drop Leg & Component Location**) or moisture trap to provide a collection point where moisture can be easily removed. All service line outlets should be installed above the moisture traps to prevent moisture from entering the tool or device using the air. Manual shutoff valves, protected by pressure relief valves, should be installed at all service line outlets to eliminate leakage while the tools are not in use.

As with any piping, all parts of the discharge piping should fit so as not to create any stress between the piping and components.

Pnuematic Circuit Breakers or Velocity Fuses

The Occupational Safety and Health Act (O.S.H.A.), Section 1926.303, Paragraph 7, published in the Code of Federal Regulations 29 CFR 1920.1, revised July 1, 1982 states that 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"

These pnuematic safety devices are designed to prevent hoses from whipping and/or the loss of hazardous or toxic gasses, all of which could result in a serious or fatal accident.

WARNING !

Never join pipes or fittings with lead-tin soldering. Welded or threaded steel pipes and cast iron fittings, designed for the pressures and temperatures, are recommended.

Pressure Vessels

Air receiver tanks and other pressure containing vessels such as *(but not limited to)* pulsation bottles, heat exchangers, moisture separators and traps, shall be in accordance with ASME Boiler and Pressure Vessel Code Section VIII and ANSI B19.3 safety standards. They should be equipped with a pressure relief valve, pressure gauge, tank drain, & manual shutoff valve (refer to **Fig. 3-1, Typical Drop Leg & Component Location**).

WARNING !

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 property damage, severe injury or even death.

A drain valve should be located in the bottom of the air receiver to allow for moisture drainage. Extend piping away from the unit to provide safe and convenient removal of excess moisture. An automatic drain valve is recommended.

If the air receiver is going to be subject to temperatures of 32°F or below, provisions must be made to guard against freezing of the pressure relief valves, pressure gauge, and moisture drain.

SECTION 4 START-UP & OPERATION

Pre-starting Checklist

WARNING ! **Never assume a compressor is safe to work on just because it is not operating. It could restart at any time. Follow all safety precautions outlined in SECTION 5, *Stopping For Maintenance.***

WARNING ! **Failure to perform the pre-starting checklist may result in mechanical failure, property damage , serious injury or even death.**

Steps 1 through 12 should be performed prior to connecting the unit to a power source. If any condition of the checklist is not satisfied, make the necessary adjustments or corrections before starting the compressor.

Step 1) Remove all installation tools from the compressor and check for installation debris.

Step 2) **Unless otherwise specified, Quincy compressors are normally shipped without lubricant in the crankcase.** Add correct amount of specified oil to the crankcase. (Refer to **SECTION 5, *Lubrication*** for quantity and types of lubricant to be used.)

Step 3) Check motor pulley and compressor sheaves for alignment and tightness on shaft. (Refer to **SECTION 5, *Pulley / Sheave Alignment & Belt Tension.***)

Step 4) Manually rotate the compressor sheave several rotations to be sure there are no mechanical interferences.

Step 5) Check inlet piping installation (Refer to **SECTION 3, *Induction System.***)

Step 6) Check belt tension. (Refer to **SECTION 5, *Pulley / Sheave Alignment & Belt Tension.***)

Step 7) Check all pressure connections for tightness.

Step 8) Make sure all pressure relief valves are correctly installed. (Refer to **SECTION 3, *System Components.***)

Step 9) Be sure all guards are in place and securely mounted. (Refer to **SECTION 3, *System Components.***)

Step 10) Check fuses, circuit breakers, and thermal overloads for proper size. (Refer to **SECTION 3, *Electrical Supply Requirements.***)

Step 11) Open all manual shutoff valves at and beyond the compressor discharge.

Step 12) On watercooled units, open the water valve to fill the cooling system. Check for leaks.

If a manual water valve is used, adjust the valve to maintain an adequate flow of water.

If a water temperature regulator valve is used, install a small bypass orifice in front of the regulator valve to allow heated water to circulate around the temperature sensing bulb at all times.

Step 13) After all the above conditions have been satisfied, the unit can be connected to the proper power source.

Step 14) Jog the starter switch to check the rotational direction of the compressor. It should agree with the rotation arrow embossed on the compressor sheave.

Step 15) Check for proper rotation of the cylinder cooling fan (fins inside sheave). The fan should blow cooling air across the cylinder.

Initial Starting & Operating

This instruction manual, as well as any instructions supplied by manufacturers of supporting equipment, should be read and understood prior to starting the compressor. If there are any questions regarding any part of the instructions, please call your local Quincy Distributor, or the Quincy Compressor factory.

With the pre-starting checklist completed and satisfied, start the compressor. Watch and listen for excessive vibration and strange noises. If either exist, stop the compressor. Refer to **SECTION 6, *Troubleshooting*** for help in determining the cause of such problems.

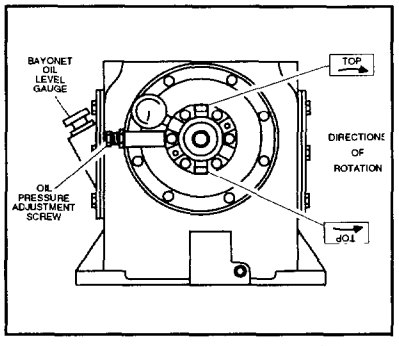

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Fig. 4-1
Oil Pressure Adjustment

If you are starting a pressure lubricated model, check the oil pressure. Compressors producing up to 250 p.s.i.g. of discharge air pressure should maintain 18 to 20 p.s.i.g. of oil pressure. High pressure rated compressors producing more than 250 p.s.i.g. of discharge air pressure should maintain 22 to 25 p.s.i.g. of oil pressure.

Normally the oil pressure does not need to be adjusted. But if it does, loosen the locknut on the adjustment screw located on the left side of the oil pump housing (see **Fig. 4-1, Oil Pressure Adjustment**). Increase the oil pressure by turning the adjustment screw clockwise; decrease the oil pressure by turning the adjusting screw counterclockwise. After adjustment tighten the locknut.

Check the air receiver pressure gauge or system pressure gauges for proper readings. If inadequate or excessive air pressure conditions exist, refer to **Section 6 Troubleshooting**.

Observe compressor operation closely for the first hour of operation and then frequently for the next seven hours. After the first eight hours, monitor the compressor at least once every eight hours. If any abnormal conditions are witnessed, stop the compressor and correct the problem. After two days of

operation check belt tension, oil level, and inspect the system for leaks.

Daily Starting Checklist

Do not proceed until the ***Pre-starting Checklist*** and ***Initial Starting & Operating*** sub-sections have been read and are thoroughly understood.

Step 1) Check oil level in crankcase.

Step 2) Drain liquid from the air receiver and moisture trap (if so equipped).

Step 3) Turn on cooling water (watercooled units)

Step 4) Jog the starter button and check compressor rotation. *Note: Continuous Run Units - Prior to starting a continuous run unit, pull the ring attached to the pilot valve out and turn the finger nut in (clockwise) until it seats against the pilot housing. Now the compressor can be started unloaded. Once the compressor is running at full speed, the finger nut on the pilot valve can be turned out (counterclockwise) until it seats against the pull ring.*

Step 5) Start compressor per factory instructions. (Refer to **SECTION 4, *Pre-Starting Checklist and Initial Starting & Operating.***)

Step 6) Check system pressure.

Step 7) Check cooling fan.

Step 8) Check all pressure relief valves for proper operation.

Step 9) Check control system for proper operation.

Stopping for Maintenance

The following procedures should be followed when stopping the compressor for maintenance or service:

Step 1) Per O.S.H.A. regulation 1910.147: The Control of Hazardous Energy Source (Lockout/Tagout), disconnect and lockout the main power source. Display a sign in clear view at the main power switch stating that the compressor is being serviced.

WARNING ! **Never assume a compressor is safe to work on just because it is not operating. It could restart at any time.**

Step 2) Isolate the compressor from the compressed air supply by closing a manual shutoff valve upstream and downstream from the compressor. Display a sign in clear view at the shutoff valve stating that the compressor is being serviced.

Step 3) Lock open a pressure relief valve within the pressurized system to allow the system to be completely de-pressurized. **NEVER** remove a plug to relieve the pressure!

Step 4) Shut off the water cooling supply (watercooled versions).

Step 5) Open all manual drain valves within the area to be serviced.

Step 6) Wait for the unit to cool before starting to service. (Temperatures of 125°F can burn skin. Some surface temperatures exceed 350°F when the compressor is operating.)

Maintenance Schedule

To assure maximum performance and service life of your compressor, a routine maintenance schedule should be developed. A sample schedule has been included here to help you to develop a maintenance schedule designed for your particular application. Time frames may need to be shortened in harsher environments.

The envelope shipped with the compressor contains a **Maintenance Schedule Checklist**. Make copies of this checklist and retain the master to make more copies as needed. On a copy of the checklist, enter dates and initials in the appropriate spaces. Keep the checklist and this Instruction Manual readily available near the compressor.

Maintenance Schedule Checklist Sample

Every 8 Hours (or Daily)

- Maintain oil level between high and low level marks on bayonet gauge. (Discoloration or a higher oil level reading may indicate the presence of condensed liquids.) If oil is contaminated, drain and replace.
- Drain receiver tank, drop legs and traps in air distribution system.

- Give compressor an overall visual inspection and be sure safety guards are in place.
- Check for any unusual noise or vibration.
- Check oil pressure *(hot)*. Maintain 18 to 20 p.s.i.g.*
- Check for oil leaks.

Every 40 Hours (or Weekly)

- Manually operate the pressure relief valves to be certain they are working.
- Clean the cooling surfaces of the intercooler and compressor.
- Check the compressor for air leaks.
- Check the compressed air distribution system for leaks.
- Inspect oil for contamination & change if necessary.
- Clean or replace the air intake filter. Check more often under humid or dirty conditions.

Every 160 Hours (or Monthly)

- Check belt tension

Every 500 Hours (or Every 3 Months)

- Change oil & filter (more frequently in harsher environments).
- Torque pulley clamp screws or jamnut.

Every 1000 Hours (or Every 6 Months)

- When Quin-Cip oil is used, oil change intervals may be extended to every 1000 hours or every 6 months, whichever occurs first (change more frequently in harsher conditions).
- Inspect compressor valves for leakage and/or carbon build-up. The oil sump strainer screen inside the crankcase of pressure lubricated models should be thoroughly cleaned with a safety solvent during every oil change. If excessive sludge build-up exists inside the crankcase, clean the inside of the crankcase as well as the screen. **Never use a flammable or toxic solvent for cleaning. Always use a safety solvent and follow the directions provided.**

Every 2000 Hours (or Every 12 Months)

- Inspect the pressure switch diaphragm and contacts. Inspect the contact points in the motor / starter.

Lubrication

Quincy compressors are normally shipped without lubricant in the crankcase. Before starting this compressor, add enough lubricant to the crankcase to register between the high and low marks on the dipstick. **Use a Quin-Cip oil or consult the Quincy Compressor factory for recommendations!**

Quin-Cip lubricant has proven under extensive testing to minimize friction and wear, limit oil carryover, and reduce carbon and varnish deposits. It will support the performance characteristics and life designed into all Quincy compressors and is highly recommended. Refer to the charts below to determine the correct amount of lubricant and viscosity to use for your model and application.

**High pressure rated compressors should maintain 22 to 25 p.s.i.g. of oil pressure.*

Approximate Crankcase Oil Capacities

Splash Lubricated Model	Oil Capacity
X2 & X3	4 oz. (118 ml.)
X8	10 oz. (296 ml.)
108 & R-17*	24 oz. (710 ml.)
210SLS	20 oz. (591 ml.)

Pressure Lubricated Model**	Oil Capacity
206 &210	20 oz. (591 ml.)
216, 240*, 310 & 325	1qt. - 16 oz. (1.42 lit.)
270*, 340, 350 & 370	4 qts. - 24 oz. (4.5 lit.)
390	9 qts. - 16 oz. (9 lit.)
4125*, 5120 & W5120	9 qts. - 24 oz. (9.22 lit.)

**Includes vacuum pump versions.*

***These models may be equipped with oil filters. Add 10 oz. of oil if so equipped.*

Lubricant Specifications

(Use Quin-Cip oil or consult factory.)

Ambient Temperature	SAE Viscosity	ISO Viscosity
Below 0°F	SAE 5W	ISO 22
0-32° F	SAE 10W	ISO 32
32-80°F	SAE 20W	ISO 68
60-104°F	SAE 30	ISO 100

CAUTION ! **The lubricant selected must have a pour point at least 15° F lower than the minimum expected ambient temperature .**

CAUTION ! **Do not operate this compressor in ambient temperatures lower than -15° F. A crankcase heater is recommended for compressors operating in temperatures under 32° F.**

A new or rebuilt reciprocating compressor should be run for a total of 100 hours at full discharge operating pressure to break-in the new piston rings. Until the rings are seated, the compressor will discharge higher than normal amounts of oil. In light of this fact, the oil level should be checked more frequently during the 100 hour break-in period.

Pulley / Sheave Alignment & Belt Tension

Improper pulley/sheave alignment and belt tension are causes for motor overloading, excessive vibration, and premature belt and/or bearing failure. To prevent this from happening, check the pulley/sheave alignment and belt tension on a regular basis (refer to **SECTION 5, *Maintenance Schedule***).

Periodically inspect the motor pulley(s) and compressor sheave(s) for oil, grease, nicks or burrs. Clean or replace if necessary. Make sure they are

securely fastened. Align the compressor sheave with the motor or engine pulley. Drive belt grooves of the pulley(s) and sheave(s) should be in line with each other. The compressor crankshaft must be parallel to the motor or engine drive shaft.

Belt tension should be measured and adjusted to provide smooth operation. Step-by-step procedures are provided here to correctly measure and set the drive belt tension:

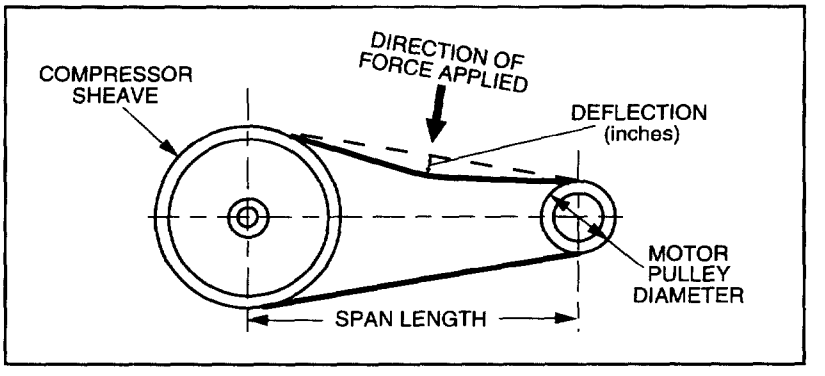

Fig. 5-1
Setting Belt Tension

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Step 1) Measure the span length of the drive. (Refer to **Fig. 5-1, Setting Belt Tension**.)

Belt Cross Section	Motor Pulley Dia. Range (inches)	Recommended Deflection Force (lbs.) Minimum	Maximum
	3.0 - 3.2	2.3	3.2
A	3.4 - 3.6	2.5	3.6
	3.8 - 4.2	2.9	4.2
	4.6 - 7.0	3.5	5.1
	4.6	4.0	5.9
B	5.0 - 5.4	4.5	6.7
	5.6 - 6.4	5.0	7.4
	6.8 - 9.4	5.8	8.6

Step 2) Determine the amount of deflection (in inches) required to measure deflection force (in pounds) by multiplying the span length x $^1/_{64}$ (.016) (i.e. 32" span length x $^1/_{64}$ [.016] = $^1/_2$"[.50] of deflection required to measure deflection force).

Step 3) Lay a straightedge across the top outer surface of a drive belt from pulley to sheave.

Step 4) At the center of the span, perpendicular to the belt, apply pressure to the outer surface of the belt with a belt tension gauge (refer to **Fig. 5-2, Belt Tension Gauge**). Force the belt to the predeter-

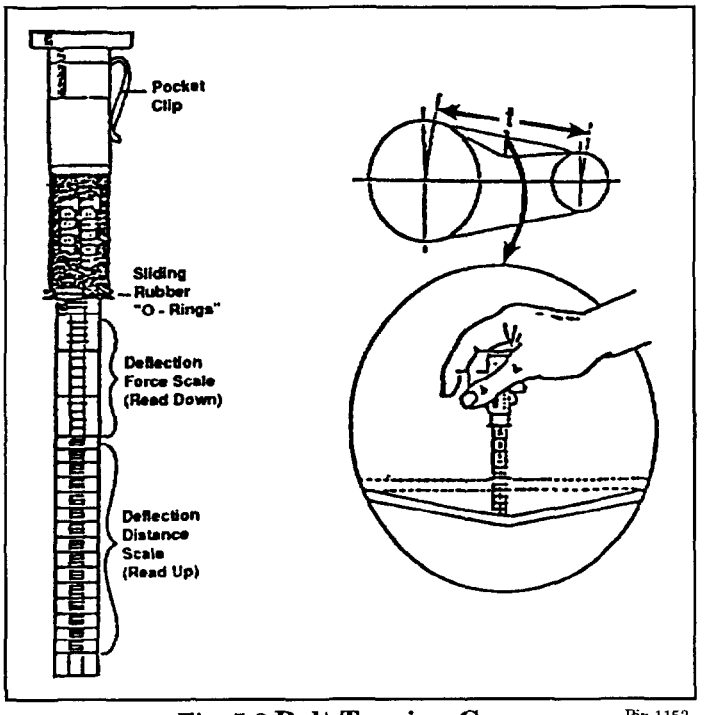

Fig. 5-2 Belt Tension Gauge Pix 1153

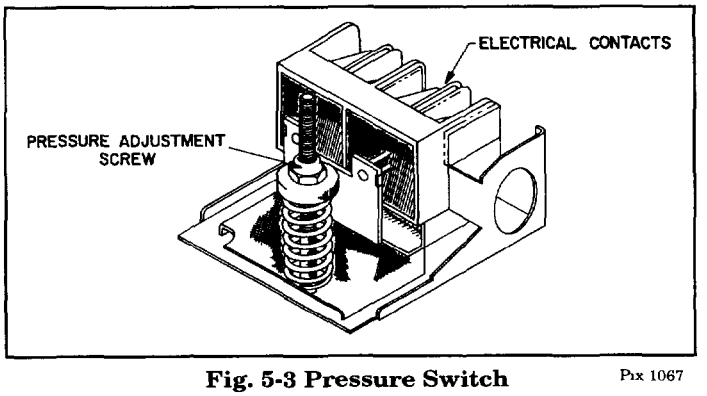

Fig. 5-3 Pressure Switch Pix 1067

mined deflection (refer to **Step 2** above). Record the reading on the belt tension gauge and compare to the chart following **Fig 5-1**. The deflection force reading should be within the minimum and maximum values shown. Adjust belt(s) accordingly. New belts should be initially tensioned to the maximum value plus 33% (multiply by 1.33).

Step 5) Recheck the tension of the new belts several times in the first 50 hours of operation and adjust if necessary. Thereafter, check belt tension on a regular basis (refer to **SECTION 5, *Maintenance Schedule***).

Pressure Switch Adjustment

Pressure switches provided by Quincy Compressor are pre-set at the factory and usually do not require adjustment. However, the following procedures can be performed by a qualified electrician to adjust the pressure switch.

Step 1) Remove the pressure switch cover.

Step 2) While the compressor is running, screw the spring loaded adjustment screw in (clockwise) to increase the amount of air pressure required to open the switch and stop the unit. Screw the spring loaded adjustment screw out (counterclockwise) to decrease the amount of air pressure required to open the switch and stop the unit.

Standard pressure switches supplied by Quincy Compressor are equipped with a fixed 20 p.s.i.g. (approx.) differential. Optional switches include both pressure and differential adjustment capabilities.

WARNING ! **Electric power always exists inside the pressure switch whenever the compressor package is connected to a power supply. Be careful not to touch any electrical leads when setting the pressure switch.**

WARNING ! **Never exceed the designed pressure for the system or overload the motor beyond its Maximum Amp Draw.**

* Full Load Amps x Service Factor = Maximum Amp Draw

WARNING ! **Never assume a compressor is safe to work on just because it is not operating. It may be in the automatic stand-by mode and may restart any time. Follow all safety precautions outlined in SECTION 5, *Stopping For Maintenance.***

**Full load amps (FLA) & Service Factor can usually be found on the motor nameplate.*

Reversal of Compressor Rotation

Pressure lubricated QR-25 series compressors can be modified to operate in reverse rotation with exception to the Models 206 & 210. These two models operate in the counterclockwise direction only.

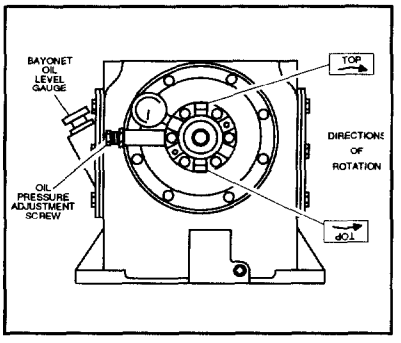

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Fig. 5-4 Compressor Directional Arrows

To reverse the operating direction of a pressure lubricated compressor, perform the following steps:

Step 1) Remove:

- the control tubing from the hydraulic unloader and pilot valve (if so equipped).
- the oil pressure gauge and hydraulic unloader.
- the pilot mounting stud set screw and pilot valve assembly.
- the oil filter* (turn counterclockwise).
- six (6) oil pump housing bolts.

Step 2) Rotate the oil pump housing $^1/_2$ turn (180°). (Note: The rotational arrow at the top of the pump housing should now reference the direction you wish the compressor to rotate. (See **Fig. 5-4, *Compressor Directional Arrows***)

Step 3) Re-install the six (6) housing bolts and torque them in a star or cross pattern to six (6) ft.-lbs.

Step 4) Remove the countersunk pipe plug* from the oil pump housing and relocate it in the opposite (bottom) hole. (See**Fig. 5-5,*Relocating Countersunk Pipe Plug***)

Failure to relocate this pipe plug will result in complete loss of oil flow throughout the compressor. Compressor seizure will result and warranty will be void. The countersunk pipe plug must always be relocated in the bottom port position.

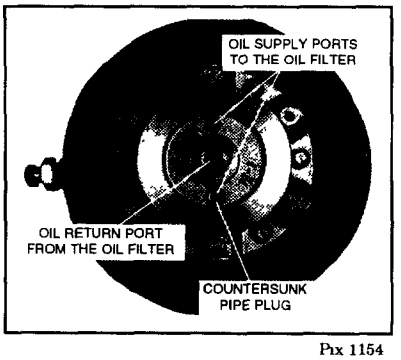

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Fig. 5-5 Relocating Countersunk Pipe Plug

Step 5) Install a new oil filter*. Tighten the filter $^1/_2$ turn after initial gasket contact.

Step 6) Re-assemble the control components in reverse order.

Step 7) Double check the directional arrows.

Step 8) For aircooled models only, remove the standard compressor sheave and replace with a reverse rotation sheave available from your local Quincy Compressor Distributor.

Step 9) Start the compressor and adjust the oil pressure.

**Not applicable to models without oil pumps.*

Torque Specifications

(in ft./lbs., dry threads)

Model	Rod Bolt	Brng. Carr.	Adj. Plate	Hand Hole Plate	C'case to Cyl.	Cyl. to Head	Comp. Pulley Bolts	Valve Cover Plate	Valve Clamp Screw	Valve Clamp L'nut	Unldr. Diaph. Bolt	Inter-cooler Bolts
X2/X3	6	6	6	7	N/A	13	30	N/A	70	N/A	N/A	N/A
X8	6	6	6	7	N/A	17	30	N/A	70	N/A	N/A	N/A
***A4**	28	30	30	15	30	40	40	N/A	70	N/A	N/A	N/A
***R15/17**	28	30	30	15	30	30	40	N/A	N/A	N/A	N/A	N/A
***106**	28	30	30	15	30	20	75	N/A	70	85	6	N/A
108	28	30	30	15	30	20	75	N/A	70	85	6	N/A
206/210	17	17	N/A	10	17	17	30	N/A	70	85	3	N/A
***212**	28	30	30	5	30	30	30	N/A	60	75	3	N/A
***214**	17	17	N/A	10	17	17	30	N/A	70	85	3	N/A
216	19	30	30	5	30	30	30	N/A	60	75	6	N/A
***230**	35	30	30	12	50	50	90	50	60	50	6	N/A
***230VAC**	35	30	30	12	50	50	90	50	60	50	N/A	N/A
240	35	30	30	12	50	50	90	50	60	50	6	N/A
240 VAC	35	30	30	12	50	50	90	50	60	50	N/A	N/A
***244**	40	30	30	12	75	50	90	50	60	50	6	N/A
***244 VAC**	40	30	30	12	75	50	75	50	60	75	N/A	N/A
***255**	40	30	30	12	75	50	90	50	60	75	6	N/A
***255VAC**	40	30	30	12	75	50	90	50	60	75	N/A	N/A
270	40	30	30	12	75	50	90	50	60	75	6	N/A
***270VAC**	40	30	30	12	75	50	90	50	60	75	N/A	N/A
***306**	17	15	N/A	10	17	20	30	N/A	70	85	3	N/A
***308**	28	30	30	5	30	30	30	N/A	60	75	6	17
310	19	30	30	5	30	30	30	N/A	60	75	6	17
325	35	30	30	12	50	50	75	50	60	50	6	17
340	40	30	30	12	75	65	90	50	60	50	6	17
350	40	30	30	12	75	65	90	50	60	75	6	65
370	40	30	30	12	75	65	90	50	60	75	6	65
390	40	75	75	12	110	80	150	75	75	100	6	65
***4088**	40	75	75	12	75	50	150	50	60	75	6	N/A
***4110**	40	75	75	12	75	50	150	50	60	75	6	N/A
4125	40	75	75	12	75	50	150	50	60	75	6	N/A
***4125VAC**	40	75	75	12	75	50	150	50	60	75	N/A	N/A
***5080**	40	75	75	12	75	65	150	50	60	50	6	65
***5105**	40	75	75	12	75	65	150	50	60	75	6	65
5120	40	75	75	12	75	65	150	50	60	75	6	65
W5120	40	75	75	12	75	40	150	50	60	75	6	25

**Obsolete models*

Torquing Cylinder to Head Capscrews

Torque cylinder to head capscrews to specifications during assembly. Then, run the compressor for at least 30 minutes. Shut the unit off and follow precautions outlined in **SECTION 5, *Stopping for Maintenance.*** Retorque the head capscrews to same specifications while the unit is still hot.

Trouble	Probable Cause
Low discharge pressure	•Restricted inlet •Defective compressor valves or valve unloading mechanism •Leaks in the compressed air distribution system at fittings, connections, etc. •Unloader pilot defective or set wrong •Pressure switch defective or set wrong •Drive belt slipping •3-way valve defective (Model 108) •Flyweight assembly on crankshaft not functioning properly •Incorrect speed •Worn piston rings or loose piston •Faulty hydraulic unloader •Leaking head gasket •Low oil pressure •Drain valve open •Defective pressure gauge •Excessive running clearances *(refer to* **SECTION 2, *Specifications*)** •Pressure relief valve leaking •Clogged intercooler •Loose compressor valves or leaking at valve gaskets •Compressor incorrectly sized for the altitude it is operating at •Piston rings not seated; allow 100 hours at full pressure
Water in the crankcase (lubricant appears milky)	•Compressor does not run long enough to get hot and vaporize the liquids squeezed out of the air during compression •Leaking water jacket or cylinder head •Incorrect or inferior grade of lubricant •Cooling water circulating in compressor too cold •System pressure leaking back through discharge valve
Rusty valves and/or cylinders	•Compressor operated too infrequently •Compressor does not run long enough to get hot and vaporize the liquids squeezed out of the air during compression *(compressor may be too large for application)* •Leaking water jacket or cylinder head •Cooling water circulating in compressor too cold •Compressor not properly prepared for storage •Discharge line from compressor head is pointed upward allowing con densation to drain back at shutdown
Excessive vibration	•Incorrect speed •Compressor valves not functioning properly •Loose pulley/sheave •Motor or engine out of balance •Compressor, motor or engine not secured tightly, or tightened into a bind •Foundation or frame inadequate

Trouble	Probable Cause
Excessive Vibration (cont.)	•Piping inadequately supported or tightened into a bind •Excessive discharge pressure •Compressor feet may need to be leveled with shims
Excessive drive belt wear	•Pulley/sheave out of alignment •Belt too loose or too tight •Belt slipping •Pulley/sheave wobbling •Pulley/sheave groove damaged or rough •Incorrect belts
Low oil pressure	•Oil pump direction reversed •Oil sump strainer plugged •Excessive leakage at crankshaft seals •Low oil level •Oil pump incorrectly assembled to the bearing carrier ("o"ring not properly located between oil pump body & bearing carrier) •Oil pressure adjusting screw not set properly •Defective oil pressure gauge •Plugged oil filter
Compressor loads and unloads excessively	•Air receiver too small •Compressor valves or unloaders defective •Excessive system leakage •Compressor operating at incorrect speed •Unloader pilot differential set too close •Pressure switch defective
Defective pressure switch	•Moisture &/or oil buildup on the pressure switch diaphragm •Ruptured diaphragm •Burned contact points •Plugged air passage from the receiver to the pressure switch •Loose electrical connection
Excessive air pressure in air receiver	•Air pressure gauge inaccurate •Leaks in unloader piping system •Defective compressor valve unloader •Pilot valve or pressure switch set incorrectly or defective •Pressure switch wired incorrectly •Hydraulic valve or three way valve not functioning properly •Tube to compressor unloader valve plugged
Excessive intercooler pressure ***(Two stage models only)***	•Intercooler restricted or plugged •Compressor valves in second stage broken or not functioning properly •Pilot valve or pressure switch set incorrectly or defective •Pressure gauge defective

Trouble	Probable Cause
Intercooler pressure abnormally low ***(Two stage models only)***	•Compressor valves or valve unloaders in first stage not functioning properly or defective •Restricted air inlet filter or suction line •Pilot valve or pressure switch set incorrectly or defective •Pressurized air at valve unloader not venting properly when demand for air is required; vent passage at hydraulic unloader or three-way valve could be plugged •Compressor valve or head gasket leaking •Worn piston rings •Defective pressure gauge •Leaking air at intercooler or intercooler connections
Compressor overheats	•Clogged intake system •Defective compressor valves •Pressure setting too high •Clogged intercooler, internally or externally •Clogged water passages in cylinder head &/or cylinders •Defective water temperature regulator valve •Inadequate cooling water flow, ventilation, or recirculation of hot air •Pulley/sheave rotation wrong •Incorrect speed •Running clearances insufficient *(piston to cylinder wall or running gear)* •Lubrication inadequate •Compressor incorrectly sized
High discharge temperature	•Defective water temperature regulating valve •Inadequate cooling water flow •Compressor valve assemblies defective •Discharge pressure too high •Inadequate ventilation or hot air recirculating •Cooling surfaces of compressor or intercooler excessively dirty •Internal surface of heat exchanger fouled •Ambient temperature too high •Scored or excessively worn cylinder walls •Cooling water temperature too hot
Compressor knocks	•Head clearance insufficient •Piston loose in cylinder bore, cylinder bore worn, piston or piston rings worn •Worn rods or main bearing •Wrong pressure setting, discharge pressure excessive •Crankcase lubrication inadequate •Loose pulley/sheave •Compressor valve assemblies loose

Trouble	Probable Cause
Excessive oil consumption	•Compressor runs unloaded too long •Worn piston rings •Restricted intake system •Compressor running too hot •Breather valve not functioning properly •Oil level in crankcase too high •Oil viscosity wrong for the application •Connecting rod out of alignment, bent or twisted •Leaking oil seal •Piston rings not seated *(allow 100 hours for seating)* •Wrong oil *(may be a detergent oil with a tendency to foam)* •Inferior grade of oil
Excessive current draw *(To determine maximum amperage allowed, multiply the FLA on the motor nameplate by the service factor.)* **CAUTION !** **Motor surface temperature normally exceeds 170° F.**	•Low voltage *(must be within 10% of nameplate voltage)* •Loose electrical connection •Wire size too small •Incorrect oil •Discharge pressure too high •Intercooler plugging •Bearings tight or seizing •No crankshaft endplay •Motor sized incorrectly •Motor defective •Drive belts too tight
Failure to start	•Power not on •Blown circuit fuse •Thermal overload fuses tripped •Low voltage •Faulty start switch •Power failure •Pressure switch incorrectly adjusted or faulty •Loose or broken wire •Motor defective •Compressor seized
Motor stalls	•Motor overloaded *(refer to* **Excessive current draw***)*

Approximate Capacity Correction for Altitude

Altitude (ft.)	Correction Factors						
	25 psig	40 psig	60 psig	80 psig	90 psig	100 psig	125psig
Sea Level	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1000	0.996	0.993	0.992	0.992	0.998	0.987	0.982
2000	0.992	0.987	0.984	0.977	0.972	0.969	0.962
3000	0.987	0.981	0.974	0.967	0.959	0.954	0.942
4000	0.982	0.974	0.963	0.953	0.944	0.940	0.923
5000	0.977	0.967	0.953	0.940	0.931	0.925	
6000	0.972	0.961	0.945	0.928	0.917	0.908	
7000	0.967	0.953	0.936	0.915	0.902	0.890	
8000	0.962	0.945	0.925	0.900	0.886	0.873	
9000	0.957	0.938	0.915	0.887	0.868	0.857	
10000	0.951	0.931	0.902	0.872	0.853	0.840	
11000	0.945	0.923	0.891	0.858	0.837		
12000	0.938	0.914	0.878	0.839	0.818		
14000	0.927	0.897	0.852	0.805			
15000	0.918	0.887	0.836	0.784			

Notes:

1.) Correction factors are approximate and shown for **single stage compressors**.

2.) For two stage compressors use the interstage pressure to find the correction factor.

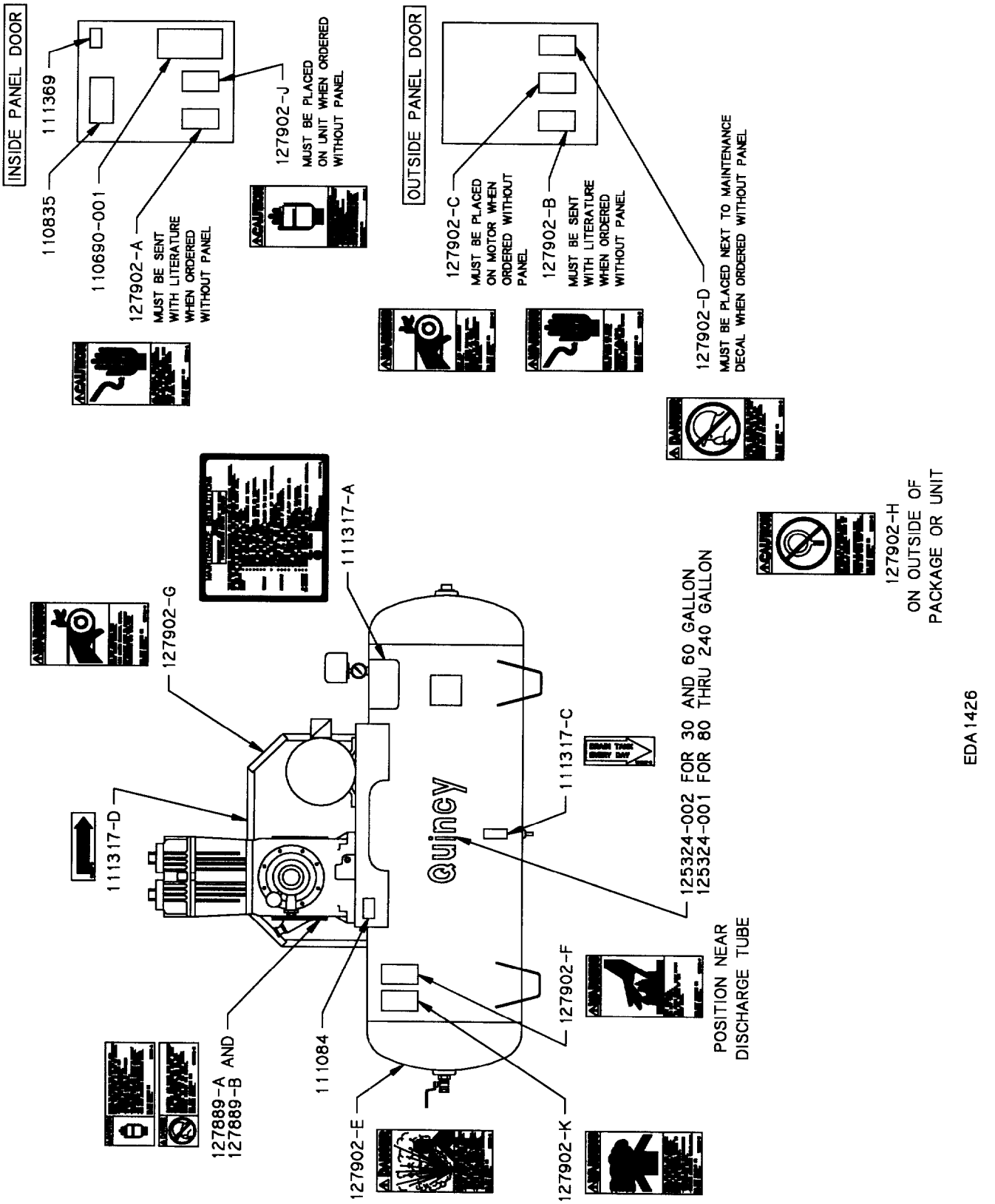
3.) This chart does not allow for air tools which require more free air at altitiudes above sea level.

4.) To find the capacity of a compressor at a given altitude, multiply the rated capacity of the compressor by the factor corresponding to the altitude and discharge pressure. The result will be the actual capacity (cfm) of the compressor at the given altitude.

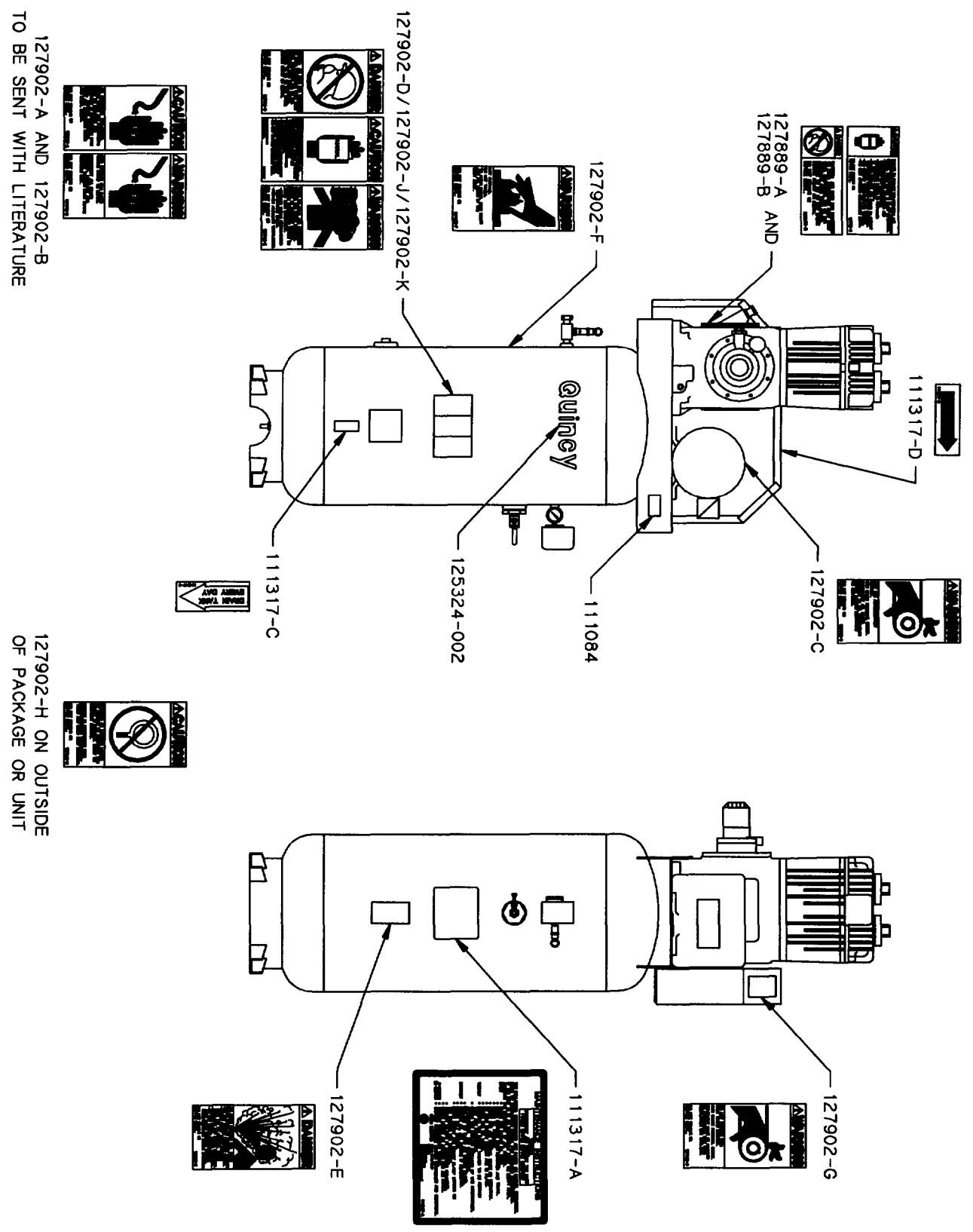
Average Intercooler Pressures

Final Discharge Pressure (psig)	QR-25 Series Models							
	310	**325**	**340**	**350**	**370**	**390**	**5120**	**W5120**
100	35.0	35.5	32.0	34.0	41.0	41.0	41.0	40.0
125	36.5	37.0	33.0	35.0	43.5	43.5	43.5	42.5
150	38.0	38.5	34.0	36.5	46.0	45.5	46.0	45.0
175	39.5	40.0	35.0	38.0	48.5	47.5	48.5	47.5
200	41.0	41.5	36.0	39.0	51.5	49.0	51.5	50.5
225	42.0	43.0	37.0	40.5	53.5	51.0	53.5	52.5
250	43.5	44.5	38.0	42.0	56.0	53.0	56.0	55.0
275	45.0	46.0	39.0	43.0				
300	47.0	47.5	40.0	44.5				
325	48.5.	49.0	41.0	46.0				
350	50.0	50.5	42.0	47.0				
375	51.5.	52.0	43.0					
400	53.0	53.5	44.0					
425	54.0	55.0	45.0					
450	55.5	57.0	46.0					
475	57.0	58.5	47.0					
500	58.5	60.0	48.0					

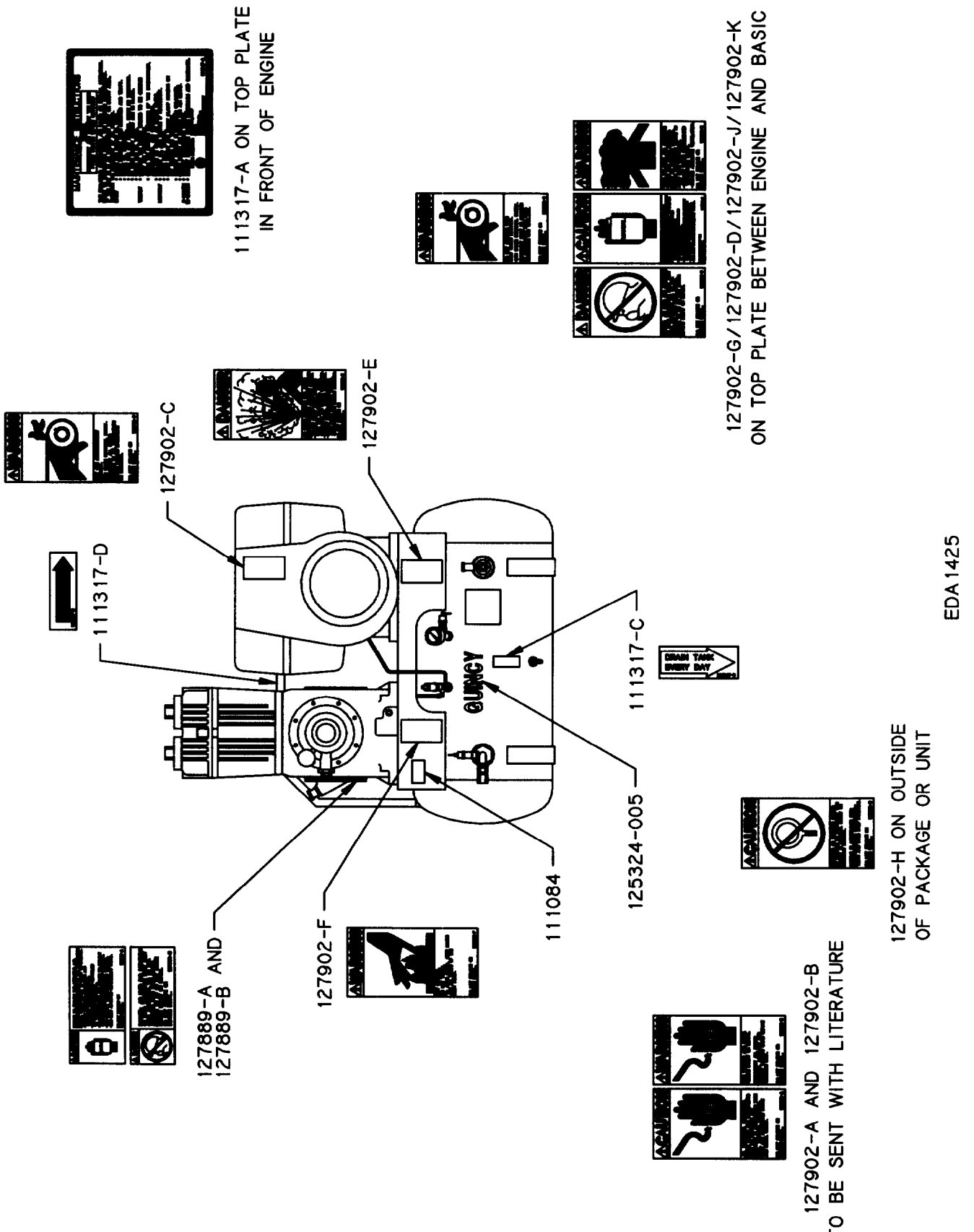
Decal Locations



Typical QR-25 Unit with Horizontal Receiver



Typical QR-25 Unit with Vertical Receiver



Typical Engine Driven QR-25 Unit with Horizontal Receiver

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