

# Close coupled condensate pump and receiver Q Series

## Instructions

- Installation
- Operation
- Maintenance

**Read this entire book** before attempting to install, operate or repair this pump. Properly installed, your Peerless pump will give you satisfactory, dependable service. We urge that you read carefully these step-by-step instructions, to simplify any problems of installation, operation or repair.

Failure to read and comply with installation and operating instructions will void the responsibility of the

manufacturer and may also result in bodily injury as well as property damage.

This book is intended to be a permanent part of your pump installation and should be preserved in a convenient location for ready reference. If these instructions should become soiled, obtain a new copy from Peerless Pump. Include pump model and/or serial number with your request.

**STERLING**



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**Sterling Fluid Systems (USA), Inc.**

## WARRANTY

New equipment manufactured by Seller is warranted to be free from defects in material and workmanship under normal use and service for a period of one year from date of shipment; Seller's obligation under this warranty being limited to repairing or replacing at its option any part found to its satisfaction to be so defective provided that such part is, upon request, returned to Seller's factory from which it was shipped, transportation prepaid. This warranty does not cover parts damaged by decomposition from chemical action or wear caused by abrasive materials, nor does it cover damage resulting from misuse, accident, neglect, or from improper operation, maintenance, installation, modification or adjustment. This warranty does not cover parts repaired outside Seller's factory without prior written approval. Seller makes no warranty as to starting equipment, electrical apparatus or other material not of its manufacture, since the same are usually covered by warranties of the respective manufacturers thereof.

In the event, notwithstanding the terms of this agreement, it is determined by a court of competent jurisdiction that an express warranty has been given by Seller to Purchaser with respect to the head, capacity or other like performance characteristics of said equipment, Seller's liability for breach of the same shall be limited to accepting return of such equipment F.O.B. plant of manufacture, refunding any amount paid thereon by Purchaser (less depreciation at the rate of 15% per year if Purchaser has used equipment for more than thirty (30) days) and cancelling any balance still owing on the equipment.

This warranty is expressly in lieu of any other warranties, expressed or implied, and Seller specifically disclaims any implied warranty of merchantability or fitness for a particular purpose.

## IMPORTANT SAFETY PRECAUTIONS

Pump parts and the tools and lifting equipment used in installation are heavy and may easily cause personal injury if dropped or carelessly handled. The normal precautions and safety rules associated with the installation or repair of machinery, in regard to manual lifting, use of power equipment, and handling of tools, must be observed in the installation of this pump.

Petroleum-base cleaning solvents are flammable. Smoking by personnel, open flame, or other activity which could ignite vapors in the vicinity of these solvents is extremely hazardous and must not be permitted.

Do not work under a suspended object unless there is a positive support under it to stop its fall in event of sling or hoist failure.

Before attempting examination, handling or repair, be certain that the electrical current to the motor is shut off. An electrical shock from contact with live wires or cords can be fatal.

Before attempting examination or repairs to pump, open the disconnect switch to electric motor. This prevents accidental running of pump motor. Starting motor during examination or repair activities could damage pump and may cause personal injury.

A replacement electric motor must be of the same voltage, RPM and frame number as original motor. If replacement motor is of higher RPM, pump will develop excessive pressure and horsepower, causing pump and equipment damage and personal injury.

### WARNING

The pumps described in this bulletin must not be installed in any manner except as specified herein, and must not be operated with different electrical power supplied than listed on the motor nameplate. Pumps are designed to operate in gravity feed condensate return steam heating systems or in medium to low pressure condensate return steam heating systems at 10 inches of mercury vacuum to 30 psig, and at temperature not more than 180°F (82°C).

The receiver must be properly vented to avoid exposing the receiver to any pressure other than standard atmospheric pressure.

Violation of this warning will void the warranty and may result in serious property damage or grave personal injury.

## INSTALLATION

### **WARNING**

Do not work under a suspended object unless there is a positive support under it to stop its fall in event of sling or hoist failure. Disregard of this warning could result in grave personal injury.

### **CAUTION**

Be sure the voltage and frequency indicated on motor nameplate are the same as service provided. If the motor has been wired at the factory, note the voltage caution card. If available service is other than that indicated, consult motor and switch manufacturer's instructions accompanying unit for proper wiring changes.

## OPERATION

### **WARNING**

Never operate pump unless discharge is flooded. Failure to do so will injure rotary seal and cause pump to leak.

### **CAUTION**

New or repaired heating systems should be operated several days with the returns open to sewer until water appears clear in order to thoroughly flush and clean the lines and prevent clogging of the pump when it is put into operation. This may take from four days to two weeks.

## MAINTENANCE

### WARNING

Before attempting examination or repairs to pump, open the disconnect switch to electric motor, to prevent accidental running of pump motor. Starting motor during examination or repair activities could damage pump and may cause personal injury. An electrical shock from contact with live wires or cords can be fatal.

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Always take adequate precaution to prevent accidental running of pump motor before starting to remove pump from base. Starting motor during pump removal could damage pump and may cause personal injury.

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Before opening conduit box of electric motor, be certain that the current to the motor is shut off. An electrical shock from contact with live motor leads can be fatal.

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Let the unit cool to ambient temperature before servicing, as severe burns can result from contact.

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Petroleum-base cleaning solvents are flammable. Smoking or open flame in the vicinity of these solvents is extremely hazardous and must not be permitted. Disregard of this warning could result in grave personal injury.

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A replacement electric motor must be of the same voltage, RPM and frame number as original motor. If replacement motor is of higher RPM, pump will develop excessive pressure and horsepower, causing pump and equipment damage and personal injury.

### CAUTION

Never run pump when receiver is empty, or expose unit to freezing temperature when filled with water, or severe equipment damage can occur.

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Use care not to damage highly finished faces of mechanical seal. Any damage to one or both faces will require replacement of entire mechanical seal.

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Never use hydrocarbon liquids (oil or solvent) to clean mechanical seal parts. Use of oil or solvent will deteriorate material used for manufacture of the seal.

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Clean seal parts using a mild soap solution. Rub only with finger to remove dirt. Rinse with clear water and dry with mild air stream. Use care not to damage or scratch lapped surfaces.

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Use care not to mar or scratch the lapped surfaces of floating seat and sealing washer when installing mechanical seal. Damage to these surfaces will result in leakage and will require replacement of the entire seal.

Notice: Materials of construction, specifications, dimensions, design, features and application information, where shown in this bulletin, are subject to change and/or modification without notice by Peerless Pump at their option.

## **KEEP THESE INSTRUCTIONS NEAR THE PUMP FOR USE OF OPERATOR**

### **INSTALLATION INSTRUCTIONS**

**Locating Pump:** Install the pump in a clean, dry, well ventilated and drained location. The top of the pump receiver should be below the lowest return since it is best to keep the return lines dry. If receiver inlet is above the lowest return line, the returns will be wet and the system will not free itself of air.

**Piping:** Connect returns to inlet of receiver with a gate valve in each return and a union or flange joint next to receiver. Connect discharge of pump to boiler using a union, swing check valve and gate valve; with the swing check valve as close to pump as possible. If discharge line is longer than 50 feet, use pipe one size larger. Piping must be of proper length and size to prevent any strain upon the unit.

**Wiring:** The electrical connections between the motor, float switch and automatic starter (if furnished) are made at the factory. Connect the electric service to the float switch or automatic starter using conduit and wire sizes as required by state/local codes. Provide a fused main line switch in motor circuit. **CAUTION:** The motor is wired at the factory to operate at the voltage specified. If voltage is other than originally specified, consult motor manufacturer's instructions accompanying unit for proper wiring. Where a polyphase motor is furnished with only a float switch, **IT WILL BE NECESSARY TO INSTALL A SUITABLE PHASE PROTECTOR SWITCH IN THE MOTOR CIRCUIT TO PREVENT MOTOR BURNOUTS SHOULD A SINGLE PHASE CONDITION OCCUR.**

**Fuses:** Be sure fuses are installed which comply in size with National Electrical Code recommendations. When a fuse blows out, it indicates that something is wrong either in the motor, pump, switch, fuse rating or electric service. Do not replace fuse until the cause for its blowing out has been determined.

### **OPERATING INSTRUCTIONS**

**CAUTION:** New or repaired heating systems should be operated several days with the returns open to sewer until water appears clear, in order to thoroughly flush and clean the lines and prevent clogging of the pump when it is put in operation. This may take from a few days to two weeks. This pump is equipped with a mechanical seal instead of packing. **BE SURE that pump receiver is filled with condensate before starting because the mechanical seal will be damaged if run dry.**

**LUBRICATION:** None required for pump proper. However, the vertical motor is ball bearing type with pre-sealed and lubricated bearings, and no immediate lubrication is necessary. Required lubrication depends upon service pump is subjected to and cleanliness of location. When motor bearings become noisy, lubrication or replacement of ball bearings becomes necessary.

### **INSPECTION BEFORE STARTING UNIT FOR FIRST TIME**

1. Check motor shaft and be sure it rotates freely. If shaft is tight, inspect pump end and motor for foreign matter clogging pump or lodging in motor.
2. Check voltage supply and be sure it is same as motor on pump, or same as wiring connections made at factory.
3. Be sure piping connections to pump have been made as per instructions and that air vent pipe from receiver is open to atmosphere.
4. Be sure to properly prime the volute casing per the instruction tag supplied with unit. Failure to do so could lead to premature mechanical seal failure.
5. Be sure that the float in the receiver is free to operate float switch.

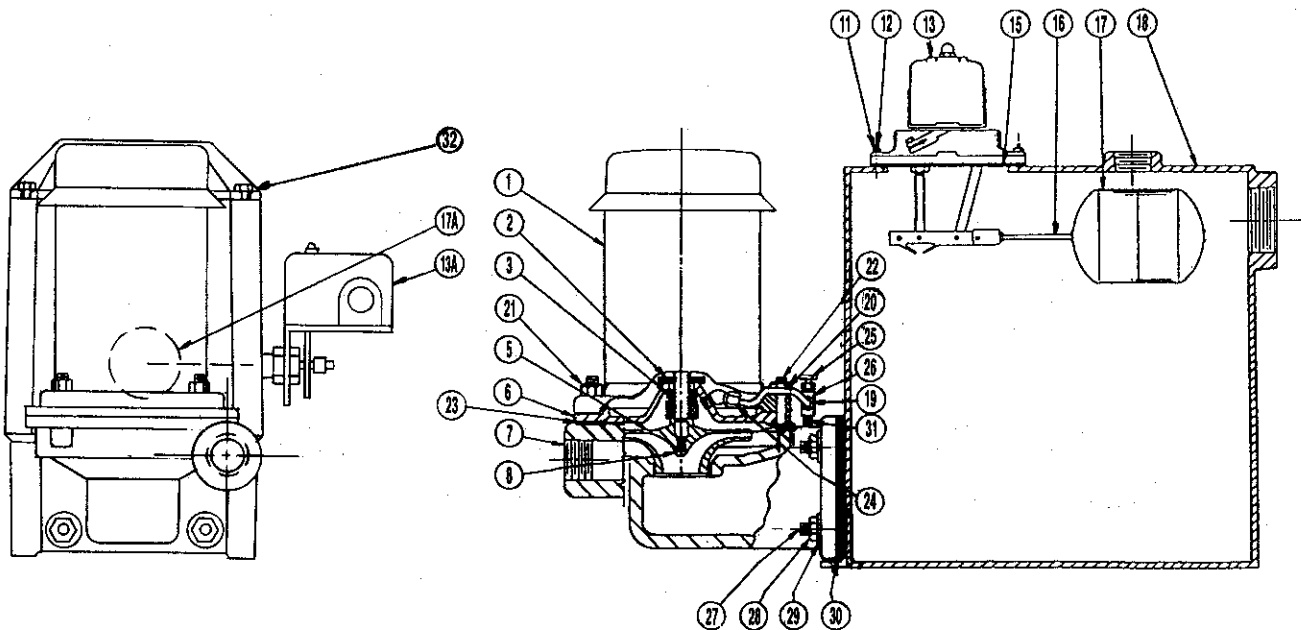
**Starting:** Open valves in discharge and return lines, close valves in drain lines and close fused knife switch. If an automatic starter with selector switch is installed, be sure selector switch button is in "Auto" position.

## INSPECTION AFTER STARTING

1. With vent pipe open to atmosphere, air and vapor can escape as fast as condensation flows into receiver. If vent is not open, or restricted, receiver will not fill.
2. Be sure pump and motor rotate in proper direction. Correct direction of rotation is **CLOCKWISE** when looking at top of motor. (If rotation is reversed, refer to motor instruction card and change proper leads.)
3. Check float switch to see that it starts and stops motor as receiver fills and empties.
4. Check all piping connections for leaks.
5. Observe operation of unit closely for several hours after first starting and at regular intervals for several days. A new unit is frequently stiff and bearings are tight and therefore should be watched to check performance.

## SERVICE AND CARE OF UNIT

1. **Inspection:** To insure best operation of unit, make a systematic inspection at least once a week.
2. **Cleanliness:** Keep the interior and exterior of motor and automatic switches free from moisture, oil and dirt. Occasionally drain and flush pump receiver to remove sediment and pipe scale.
3. **Motor Bearings:** Lubrication or replacement may be required depending on the service requirements. When service is required, consult the motor manufacturers service center or our factory for further details.
4. **Automatic Switches:** Occasionally examine contacts of automatic switches and see that they make a full firm contact and break the circuit quickly. Be sure all terminal connections are tight and not corroded.
5. **Mechanical Shaft Seal:** Occasionally examine unit for mechanical seal leakage on No. 6 seal plate. Leakage indicates that the seal surfaces are worn and Part No. 3 will need replacing. (For proper procedure in replacing these parts, refer to instructions under Disassembly of Pump.) **CAUTION: NEVER OPERATE PUMP WHEN RECEIVER IS EMPTY, BECAUSE THE SEAL WILL BE DAMAGED IF RUN DRY.**
6. **Shutting Down:** At end of heating season, open main line switch, close valves in return line and discharge piping, and drain receiver and pump. If necessary, cover electric motor and automatic switches to protect them against dirt, oil and moisture.
7. **Caution:** Never operate pump when receiver is empty or expose it to freezing temperature when filled with water.



## PARTS LIST

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| <ul style="list-style-type: none"> <li>1 - Vertical Electric Motor</li> <li>2 - Water Slinger - Neoprene</li> <li>3 - Mechanical Seal Assy.</li> <li>5 - Centrifugal impeller</li> <li>6 - Seal plate - C.I.</li> <li>7 - Volute - C.I.</li> <li>8 - Lockscrew (3 Phase Pump Only)</li> <li>11 - Hex nut (Float Switch) steel only 4 req.</li> <li>12 - Hex head cap screw (C.I. Only) 4 req.</li> <li>13 - Float switch (Flanged 4 Bolt)</li> <li>13A - Float switch (Screw-In style)</li> <li>16 - Float Rod (Flanged 4 bolt)</li> <li>17 - Float Ball (Flanged 4 bolt)</li> <li>17A - Float Ball (Screw-In style)</li> </ul> | <ul style="list-style-type: none"> <li>18 - Receiver</li> <li>19 - Compression fitting (Priming Vent Line)</li> <li>20 - Pump vent line</li> <li>21 - Hex nut (Volute 4 req'd.)</li> <li>22 - Stud (Volute 4 req'd.)</li> <li>23 - Gasket - seal plate to pump housing</li> <li>24 - Compression fitting (seal plate)</li> <li>25 - Petcock (Priming Vent Line)</li> <li>26 - Pipe Tee (Priming Vent Line)</li> <li>27 - Stud (Cast Iron Receiver Only)</li> <li>28 - Hex nut (receiver)</li> <li>29 - Volute washer</li> <li>30 - Volute gasket</li> <li>31 - Close Nipple (Priming Vent Line)</li> <li>32 - Cover Fastening Kit<br/>(2 piece 6 gallon C.I. only)</li> </ul> |
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RECOMMENDED SPARE PART LIST — For 120 or 180 day period		
PART NO.	DESCRIPTION	QUANTITY
3	Mechanical Seal Assy.	1
23	Gasket -Volute to Seal Plate	2
30	Gasket Volute to Receiver	2
13 OR 13A	Float Switch	1
17 OR 17A	Float Ball	1

NOTE: When ordering parts, give Part Number and description, also Pump Type number and Serial number appearing on pump nameplate.

### DISASSEMBLY OF PUMP

#### TO REMOVE PUMP AND MOTOR ASSEMBLY:

- 1 - Remove top fitting on pump vent line Item 20.
- 2 - Disconnect wires and flexible conduit at motor terminal box or at float switch, whichever is more convenient.
- 3 - Remove motor flange nuts No. 21.
- 4 - Lift motor & pump unit from No. 7 Volute.

### DISMANTLING PUMP AND MOTOR UNIT

- 1 - Remove drip cover from top end of motor. Note slot or two (2) flat spots on motor shaft. Use a 7/16" open end wrench to hold motor shaft securely.
- 2 - Remove No. 8 Impeller lockscrew (on 3 phase model only), turning lockscrew CLOCKWISE. Omit this operation on single phase model.
- 3 - Remove No. 5 impeller by turning COUNTER-CLOCKWISE. Impeller hub is threaded and screws on to motor shaft.
- 4 - Remove No. 3 mechanical seal assembly by sliding along motor shaft.

### REPLACING MECHANICAL SHAFT SEAL AND REASSEMBLING PUMP

- 1 - Pump and motor unit must be completely dismantled as indicated on page 3 in steps 1 to 4 inclusive.
- 2 - Remove Ceramic stationary seat and sealing cup from No. 6 seal plate.
- 3 - Be sure counter-bore in plate No. 6 is perfectly clean before inserting new ceramic seal and sealing cup.  
NOTE: A water based lubricant can be used here to ease the assembly process.
- 4 - Assemble No. 6 seal plate to motor.
- 5 - Apply a water based lubricant to the carbon rotating member of the No. 3 mechanical seal assembly and slide the carbon ring portion squarely up to the ceramic stationary seat surface. Use caution so as not to scratch or mar lapped surfaces of the carbon ring or ceramic stationary seat.

## REPLACING MECHANICAL SHAFT SEAL AND REASSEMBLING PUMP (Continued)

- 6 - Hold top end of motor shaft with an open end wrench and screw Impeller No. 5 CLOCKWISE onto motor shaft until tight.
- 7 - Replace lock screw No. 8 (on 3 phase model only) and turn COUNTER-CLOCKWISE until tight.
- 8 - Replace gasket No. 23 and set pump and motor assembly over studs and onto pump housing No. 7. Tighten stud nuts No. 21 and No. 19 compression fitting (Priming Vent Line).
- 9 - Reconnect wiring and flexible conduit from motor to switch.
- 10 - NEVER RUN PUMP WITH RECEIVER EMPTY, BECAUSE BOTH ELEMENTS OF MECHANICAL SHAFT SEAL WILL BE DAMAGED.

### TROUBLE CHART

Should trouble develop with the unit, the information given below may enable the operator to locate it and correct it without the aid of a factory service man.

#### INSUFFICIENT OR NO CONDENSATE DISCHARGE

- 1 - Not enough condensate in tank to prime pump.
- 2 - Pump not properly primed.
- 3 - Discharge head too high.
- 4 - Impeller loose on shaft, plugged or worn.
- 5 - Incorrect pump rotation  
(Ref. Rotational arrow)
- 6 - Plugged vent line.

#### PUMP DOES NOT START

- 1 - Motor lead connections may be wired wrong.
- 2 - Blown fuses in disconnect switch.
- 3 - Bad coil in starter.
- 4 - Loose connection in disconnect switch, starter, float switch or motor leads.
- 5 - Overload protection in starter not Re-set.
- 6 - Rotating assembly is bound. Try turning motor shaft from top side of motor with an open end wrench.
- 7 - Motor Damaged

#### EXCESSIVE POWER CONSUMPTION

- 1 - Pump operating beyond design point.
- 2 - Loose wiring connections.
- 3 - Mechanical defects:
  - (a) Motor shaft bent.
  - (b) Rotating element binds.
  - (c) Foreign elements between impeller and volute.

#### PUMP IS NOISY

- 1 - Bearings are bad (these are sealed ball bearings in motor).
- 2 - Pump may be operating at a low enough head to be in cavitation range. Cavitation sounds like pebbles rattling in a pail. Throttle discharge valve to correct pressure and lock. (If cavitation noise disappears it may be wise to install a smaller diameter impeller, or install a restriction orifice in the discharge line.)
- 3 - Pump is operating too near shut-off head. Check discharge piping downstream to determine whether or not improvements can be implemented. If this cannot be accomplished, consult factory.
- 4 - Internal parts rubbing.
- 5 - Motor has magnetic hum or high windage noises. Check with motor manufacturer.

#### LOSS OF SUCTION FOLLOWING PERIOD OF SATISFACTORY OPERATION

- 1 - Air leak at mechanical shaft seal or pump gasket.
- 2 - Pump vent line plugged.
- 3 - Air or gasses in condensate or condensate too hot.
- 4 - Excessive wear on impeller hub.