



# Installation, Operation and Service Instructions

Protector Condensate Pumps  
June 2017

## 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, 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.



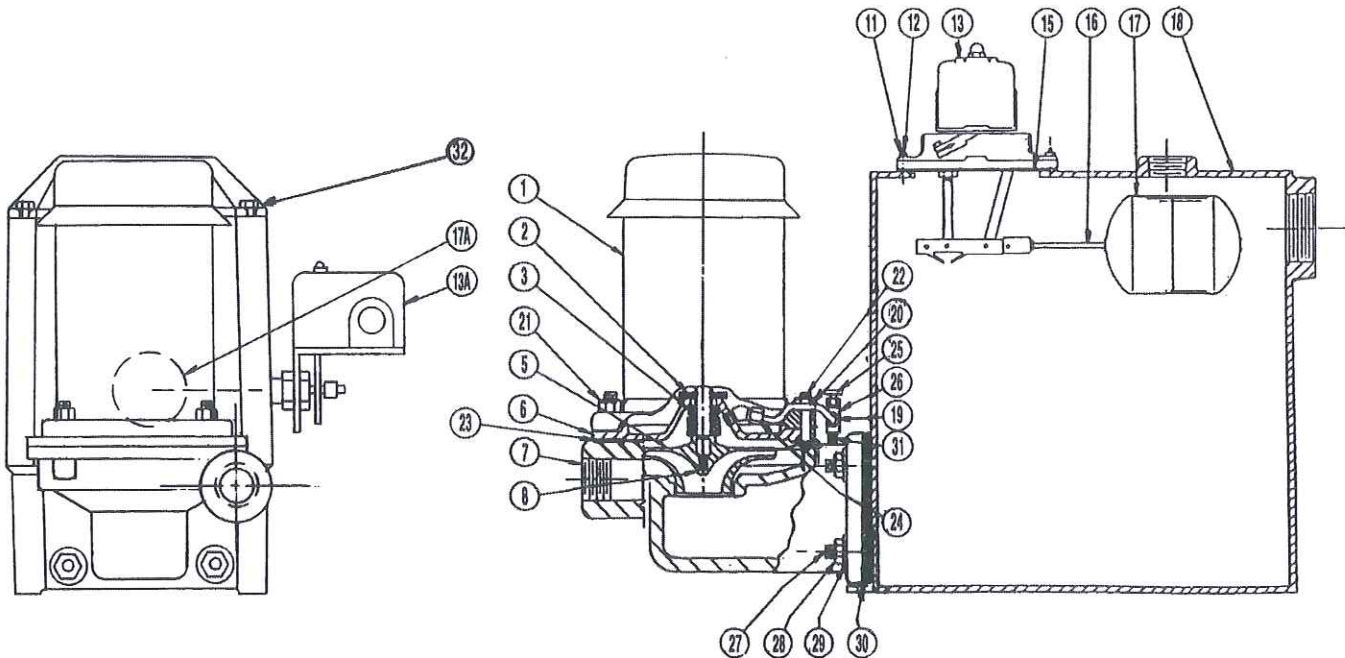
1875 Dewey Avenue  
Benton Harbor, MI 49022  
Phone 269-925-8812  
Fax 269-925-7888  
www.skidmorepump.com

## INSPECTION AFTER STARTING

1. With vent pip 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 manufacturer's service center of 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 RN 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

1	Vertical Electric Motor	19	Compression Fitting (priming vent line)
2	Water Slinger - Neoprene	20	Pump Vent Line
3	Mechanical Seal Assembly	21	Hex Nut (volute 4 required)
5	Centrifugal Impeller	22	Stud (volute 4 required)
6	Seal Plate - C.I.	23	Gasket - seal plate to pump housing
7	Volute - C.I.	24	Compression Fitting (seal plate)
8	Lockscrew (3 phase pump only)	25	Petcock (priming vent line)
11	Hex Nut (float switch) Steel only 4 required	26	Pipe Tee (priming vent line)
12	Hex Head Cap Crew (C.I. only) 4 required	27	Stud (cast iron receiver only)
13	Float Switch (flanged 4 bolt)	28	Hex Nut (receiver_
13A	Float Switch (screw-in style)	29	Volute Washer
16	Float Rod (flanged 4 bolt)	30	Volute Gasket
17	Float Ball (flanged 4 bolt)	31	Close Nipple (priming vent line)
17A	Float Ball (screw-in style)	32	Cover Fastening Kit (2 piece 6 gallon C.I. only)
18	Receiver		

## RECOMMENDED SPARE PART LIST - For 120 or 180 day period

PART NO.	DESCRIPTION	QUANTITY
3	Mechanical Seal Assembly	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 and 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 counterbore 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. 3mechanical 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.
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 lockscrew 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.

## TROUBLESHOOTING 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 OF 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 (reference 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 sound 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 shutoff 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 in impeller hub.