Installation and Maintenance

EPT-516 Pumping Trap

This bulletin should be used by experienced personnel as a guide to the installation and maintenance of the EPT-516 Pumping Trap or Pumping Trap Package. Selection or installation of equipment should always be accompanied by competent technical assistance. We encourage you to contact Armstrong or your local Representative if further information is required.

The maximum operating pressure for the EPT-516 Pumping Trap is 10 bar g. The maximum design pressure for the EPT-516 Pumping Trap is 10 bar g at 250°C.
The EPT-516 pumping trap weighs up to 366 kg. App: Maximum back pressure is 5.5 bar

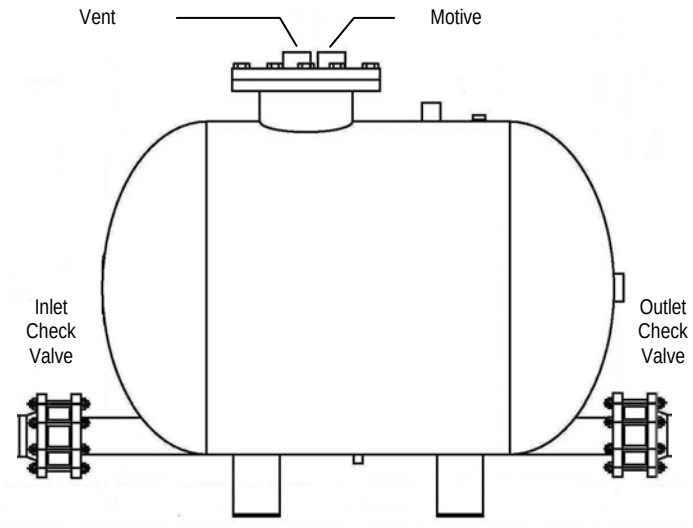

Fig. 1 : EPT-516 Pumping Trap – Vertical - Steel

Note : Although the maximum operating pressure is 10 bar g, it is highly recommended that the motive be set 2 bar g above the back pressure. This will provide optimum performance and reduce venting time between cycles.

Pumping Trap Operation

1. At start up, the float lies at its lowest position in the bottom of the tank. The motive inlet valve is closed and the vent valve is open.

2. Liquid enters the pump body by gravity through the inlet check valve. Back pressure (typically) holds the discharge check valve closed. The float becomes buoyant and begins rising.

3. Continued rising of the float, through linkage, increases spring compression until it reaches its upper tripping point. The linkage then snaps upward over center. This upward motion opens the inlet valve and closes the vent valves simultaneously.

4. Steam, air or gas enters the inlet valve and builds pressure inside the pumping trap. This pressure will close the inlet check valve and force liquid out through the discharge check valve as it opens.

5. The discharge cycle will lower the float level until it reaches its lower tripping point. The compression spring will cause the mechanism to snap over its center point downward. This action will close the motive inlet valve and simultaneously open the vent valve.

6. Venting or pressure from the body opens the inlet check valve and closes the discharge check valve. Liquid now flows by gravity through the inlet check valve into the pumping trap body as a new cycle begins.

Suggested Installation of accessories

Gauge Glass Assembly :
The Bronze Gauge Glass Assembly will have male NPT connections.
The EPT-516 requires additional parts to mount the gauge glass. (2) Two ½'' x 3'' nipples and (2) two ½'' couplings. Carbon Steel gauge glass requires two (2) 3'' nipples.

Cycle Counter :
There is a ¼'' connection on top of the cap where the cycle counter can be mounted. (1) One ¼'' pigtail siphon and ¼'' isolation valve are required. It is very important that a steel siphon or ''pig tail'' be used prior to the cycle counter to avoid any damage to the cycle counter.

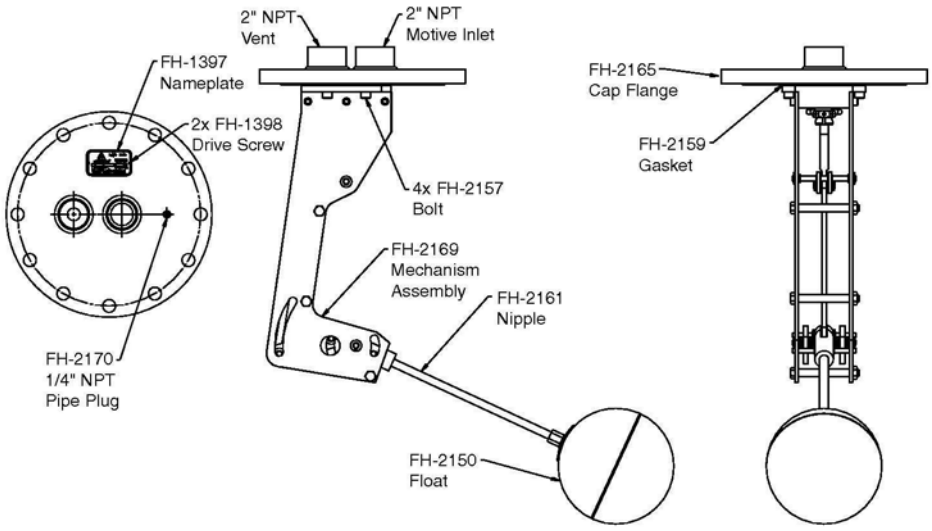

Fig.2 : EPT-516 Pumping Trap Cap Assembly

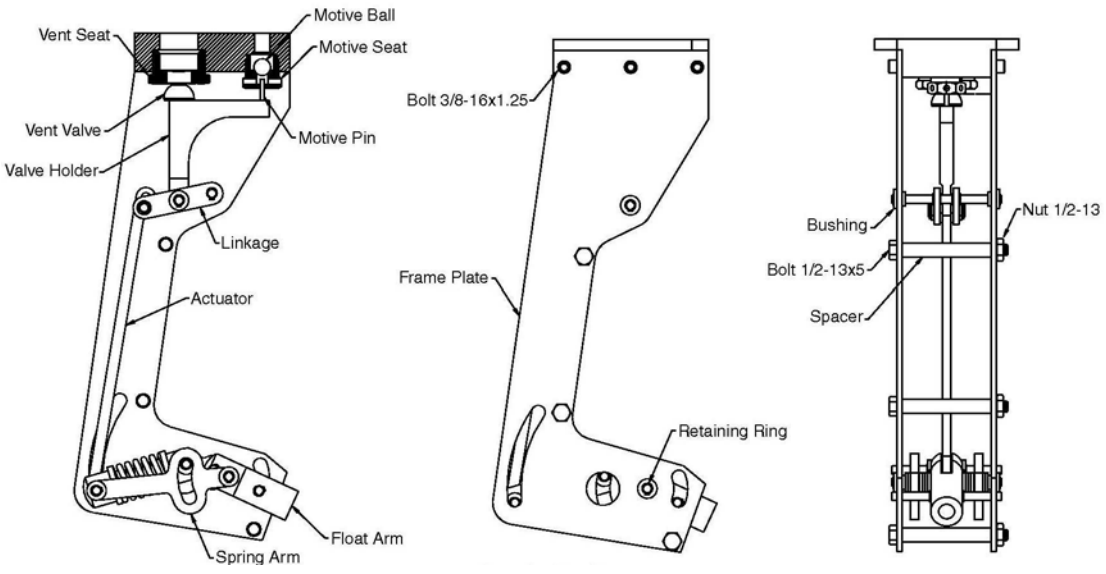

Fig.3 : EPT-516 Pumping Trap Mechanism

Installation

Note : It is important to check all fittings before start up to ensure that none loosened during shipment.

Filling Head :

Install the EPT-516 pumping trap below the equipment being drained. A minimum filling head of 600 mm is required for the EPT-516. Filling head is measured from the *bottom* of the receiver or reservoir pipe to the *top* of the EPT-516 pumping trap cap. All inlet fittings must be full ported and match the pump's liquid inlet connection size. Greater fill heads may increase the capacity of the pump trap. Refer to capacity chart for multiplying factors for other filling heads in Catalog. (Table CRE-219-3).

Liquid Reservoir :

Liquid flowing from the equipment being drained must be stored during the pump's discharge cycle. A liquid reservoir (pipe reservoir) or vented receiver should be installed in a horizontal plane to prevent flooding of the equipment. Please contact your local Armstrong representative for questions regarding reservoir pipe sizing or reference reservoir sizing data from page CRE-221 in Catalog. Also see typical hook-ups on page 6 in this installation bulletin.

Check Valves :

NOTE : The EPT-516 pumping trap will not function without inlet and discharge check valves.
Connect the Armstrong supplied check valves to the pump. The EPT-516 has (2) two 4'' flanged connections. The uses of Armstrong supplied check valves is necessary to ensure the pump will attain published capacities. Best performance is achieved when a minimum of horizontal pipe is used before the inlet check valve.

The following guidelines apply if the EPT-516 Pumping Trap is installed without Armstrong supplied check valves.

-- Inlet check valves should be 4'' in-line wafer style with a carbon steel body and stainless steel trim. Class 150 or PN40 (minimum). All stainless steel 4'' in-line wafer check valves may also be used.
-- Discharge check valves should be 4'' in-line wafer style with a carbon steel body and stainless steel trim. Class 150 or PN40 (minimum). All stainless steel 4'' in-line wafer check valves may also be used.

Motive Inlet Piping :

Connect the motive force piping (steam, air or inert gas) to the inlet connection on the EPT-516 pump cap. Proper piping and trapping of the motive supply line must include a strainer, check valve, properly sized drip leg with mud pocket and drip trap. The motive supply line must be a minimum of 2''. The drip trap discharge line should be connected to the reservoir piping or vented receiver when practical. See figure 4 and 5 on page 6.

Note : The motive inlet connection is the one furthest away from the ¼'' NPT connection on top of the cap.

Pumping Trap

Maximum motive pressure for the pump trap is 10 bar g. A pressure reducing valve must be used when the motive pressure exceeds 10 bar g. It is also recommended that that motive pressure be set a minimum of 1.3 bar above the back but high enough to ensure capacity. Contact Armstrong or your local representative for capacity ratings. The PRV should be installed a minimum of 100mm from the pump. If less than 100mm is necessary, then the installation of an accumulator is warranted.

Installation of a safety relief valve and pressure gauge is recommended in the motive force supply line. The relief valve should be set for 10 bar g.

Vent Connection ("Open System" – vented to atmosphere):
Piping from the pump's cap connection labeled ''Vent'' should be installed vertically upward when possible and unrestricted. The minimum size of this vent piping should be 2''. If piping travels longer than three meters, the piping should be expanded to a minimum of 3''. If a horizontal run is required, this line should be pitched toward the pump trap in order to be self draining.

Note : The vent connection is the one closest to the ¼'' NPT connection on top of the cap.

Vent Connection (Closed loop system):
From the pump cap connection labeled ''Vent'', the equalizing line should be routed to the top of the equipment being drained or it's outlet piping immediately after the heat exchange equipment. An Armstrong thermostatic air vent is recommended (for steam) at the high point of the exhaust line (see figure 6 on page 8). Piping of the equalizing line should be a minimum of 2'' diameter and must be pitched in order to be self draining.

Note: The vent line may be tied back in to the heat exchange equipment if that equipment has less than 0.05 bar pressure drop. Otherwise, the vent line should be tied back in to the top of the receiver.

If pressure from the equipment being drained could ever exceed back pressure against the pump, a properly sized float and thermostatic trap must be installed between the pump and discharge check valve (see figure 8 on page 8).

Packaged Receiver Vent Connections: The receiver vent must be unrestricted and atmospherically vented unless a PED coded tank is specified.

Packaged Pump Trap Vent Connections: Piping from the pump's cap connection labeled "vent" should be installed upward to connect with the receiver vent line, and be a minimum of 2'' in diameter.

Packaged Connections:
NOTE: All receiver tanks should be operated at atmospheric pressure (vented) unless the package was ordered with a PED coded tank.

A pumping trap receiver package designates the number of pumps with a “S” for single (one pump), “D” for duplex (two pump), “T” for triple (three pump), and “Q” for quad (four pumps).

START-UP

1. Slowly open motive force (steam, air or inert gas) supply the EPT-516 Pumping Trap providing pressure to the inlet valve. Check for proper operation of drip trap on the motive line if using steam.
2. Open isolation valves leading to pump liquid inlet and discharge lines.
3. Open any additional valves upstream allowing liquid to enter the EPT-516 Pumping Trap from the equipment being drained. Pump will begin discharging when body is nearly full.
4. Proper operation includes an audible exhaust after each pump cycle. If operation doesn’t seem proper, recheck the installation and start-up procedure. Contact Armstrong or your local Armstrong Representative if necessary.
5. If overflow piping is used on a receiver, check that a water seal has formed to prevent venting of steam during operation. One suggestion would be the use of a “P”-Trap to form a sufficient water seal.

Armstrong strongly recommends the use of overflow piping on receiver tanks in open condensate return systems. Properly installed overflow piping increases the efficiency of the system, while addressing potential safety issues involved with the unintentional escape of hot condensate.

Maintenance

1. Close the valves in the motive supply, vent, condensate supply and discharge lines. Also close the shut-off valve(s) to the receiver for packaged units. Make sure that the EPT-516 pumping trap is completely relieved of pressure before breaking any connections.
2. Break motive inlet and vent (all cap) connections.
3. Remove cap assembly and inspect the mechanism for freedom of movement. Remove any dirt or scale inhibiting the motion of the mechanism (see figure 2 on page 3).
   IMPORTANT NOTE : the EPT-516 mechanism weighs approximately 55 kg. You will need a forklift or overhead lift to remove the mechanism from the pump body. The withdrawal distance is approximately 460 mm.
4. Check the condition of the springs. If defective, remove retaining pins and replace spring.
5. Check the float for pinhole leaks, dents or corrosion. Immerse in hot water and look for air bubbles to detect pinhole leaks.
6. Inspect motive and vent valves for wear. Reinstall or replace parts as necessary.
7. Replace gasket before reattaching the cap assembly to the pump body.
8. Inspect inlet and discharge check valves for freedom of movement. Ensure that both check seat properly. It is important that both check valves are able to fully seat. Foreign material or debris may damage seating surfaces.

TYPICAL HOOK-UPS

NOTE: Hook-up sketches depict the Pumping Trap for clarity. However, the cap inlet and vent connections are actually located closer to each other than shown.

Vented Systems

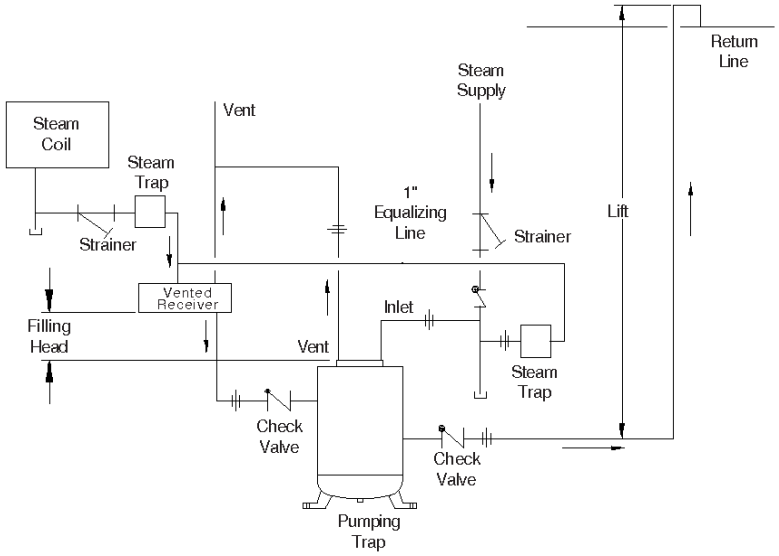

FIGURE 4 : Condensate drainage to vented receiver with overhead condensate return. Use of the Pumping Trap, combined with proper sizing of the steam trap and receiver assures successful coil drainage under low pressure conditions.

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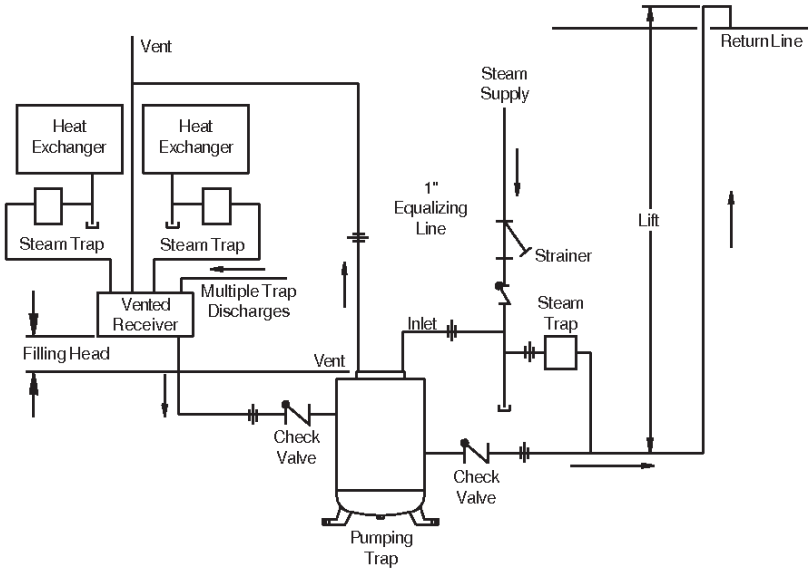


FIGURE 5 : Pumping of condensate from vented receiver handling multiple steam trap discharges. Motive force of steam is depicted.

Closed Loop Systems

A closed loop system must be installed with caution and if any questions arise, contact Armstrong Fluid Handling's Application Engineering Department.

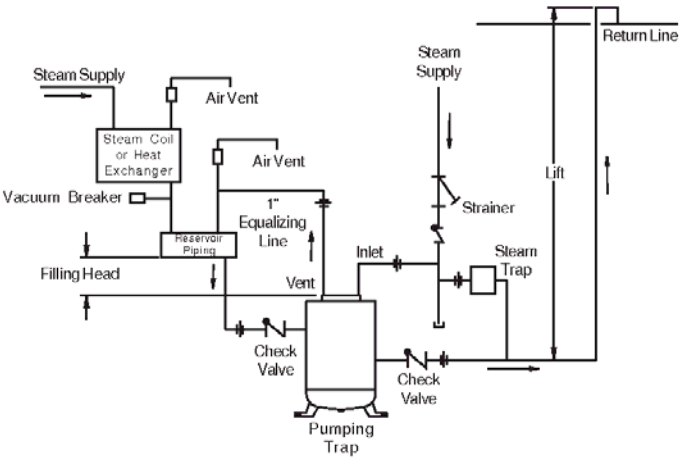


FIGURE 6 : Draining steam coil or heat exchanger when pressure in heat exchanger is lower than return line pressure combined with overhead lift. Please note the equipment is not trapped. In this application the pumping trap is used as both a steam trap and a pump.

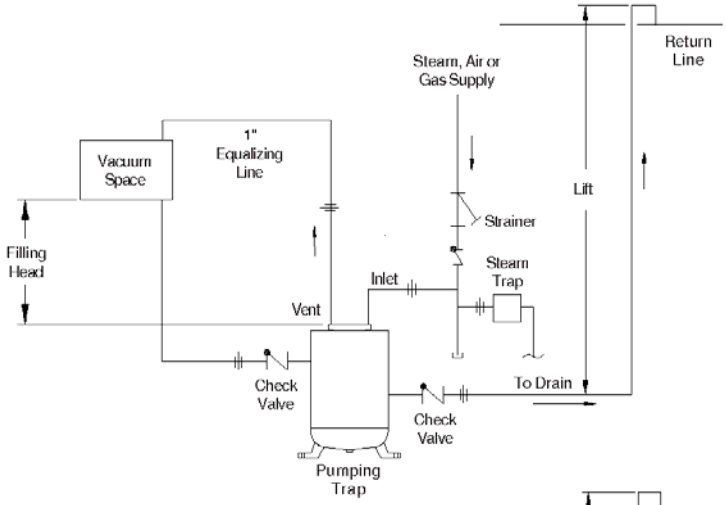


FIGURE 7 : Draining lquid from equipment under vacuum. The Pumping Trap provides drainage assistance whether liquid is to gravity or overhead.

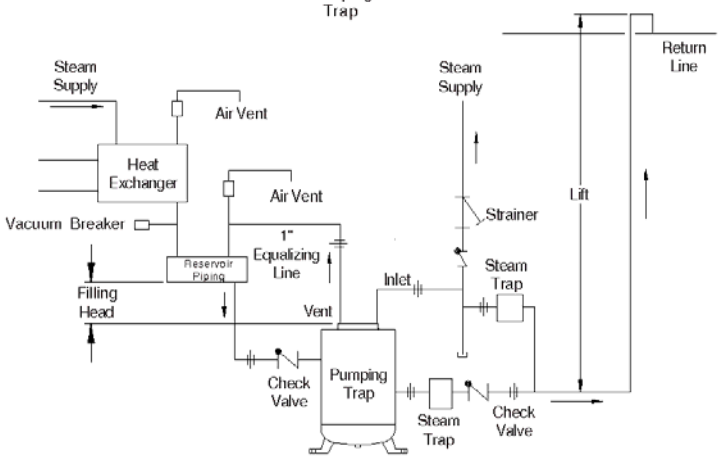
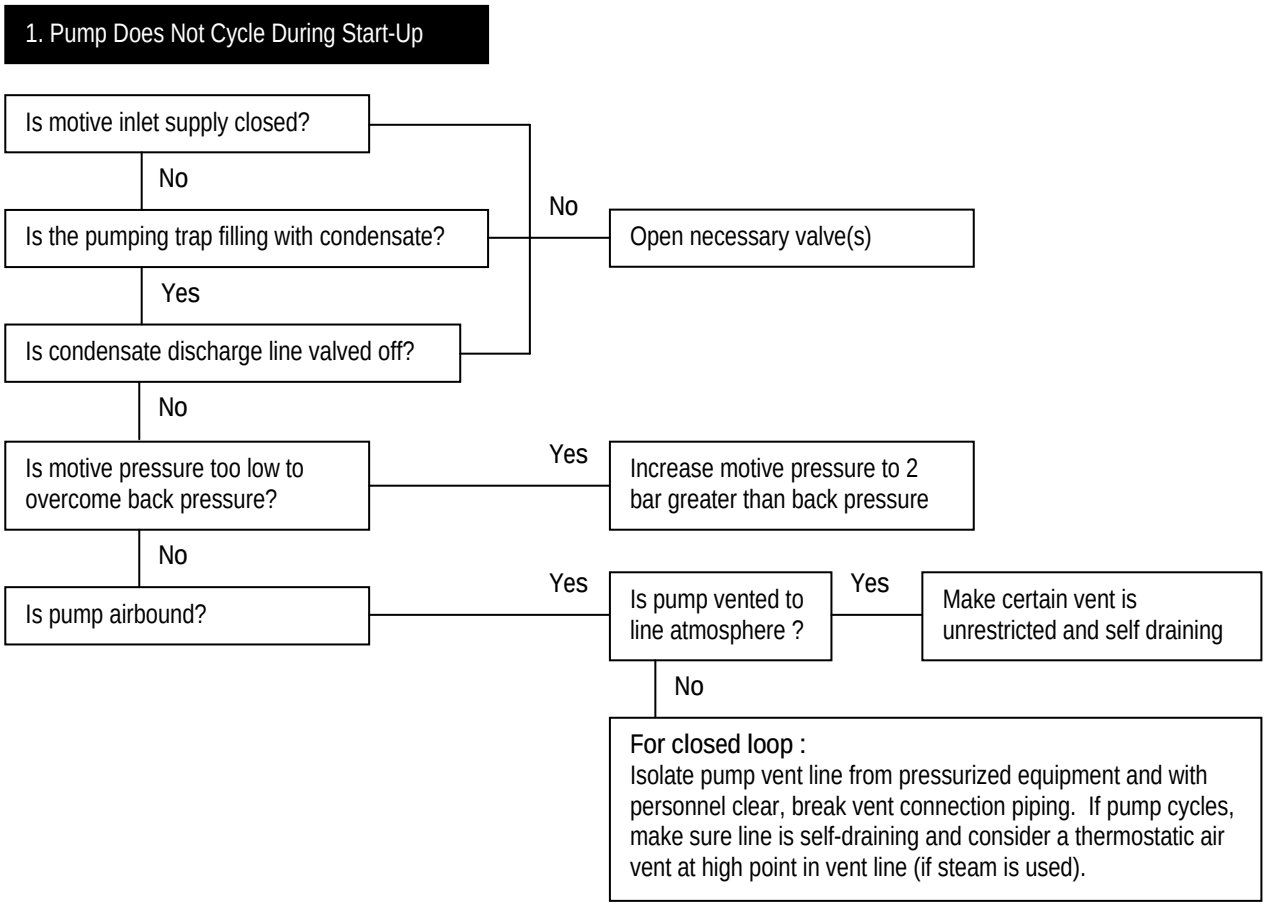


FIGURE 8 : Drainage from a heat exchanger in a closed-loop system where the supply pressure may be higher or lower than the back pressure. If the heat exchanger pressure exceeds the back pressure the pumping trap will be idle and the steam trap will prevent the steam from ''blowing through'' into the return line. Motive force of steam is depicted.
NOTE: It is suggested that Armstrong 's Application Engineering Department be contacted prior to installation.

TROUBLE SHOOTING FLOW CHART

For Safety of Personnel – Vent line piping should be isolated from equipment and pump pressure should be relieved prior to breaking connections. WARNING : WATER MAY RUN OUT OF THE VENT CONNECTION WHEN PIPING IS BROKEN. CARE SHOULD BE TAKEN TO AVOID DANGER TO PERSONNEL OR DAMAGE TO NEARBY EQUIPMENT.



TROUBLE SHOOTING FLOW CHART—Continued…

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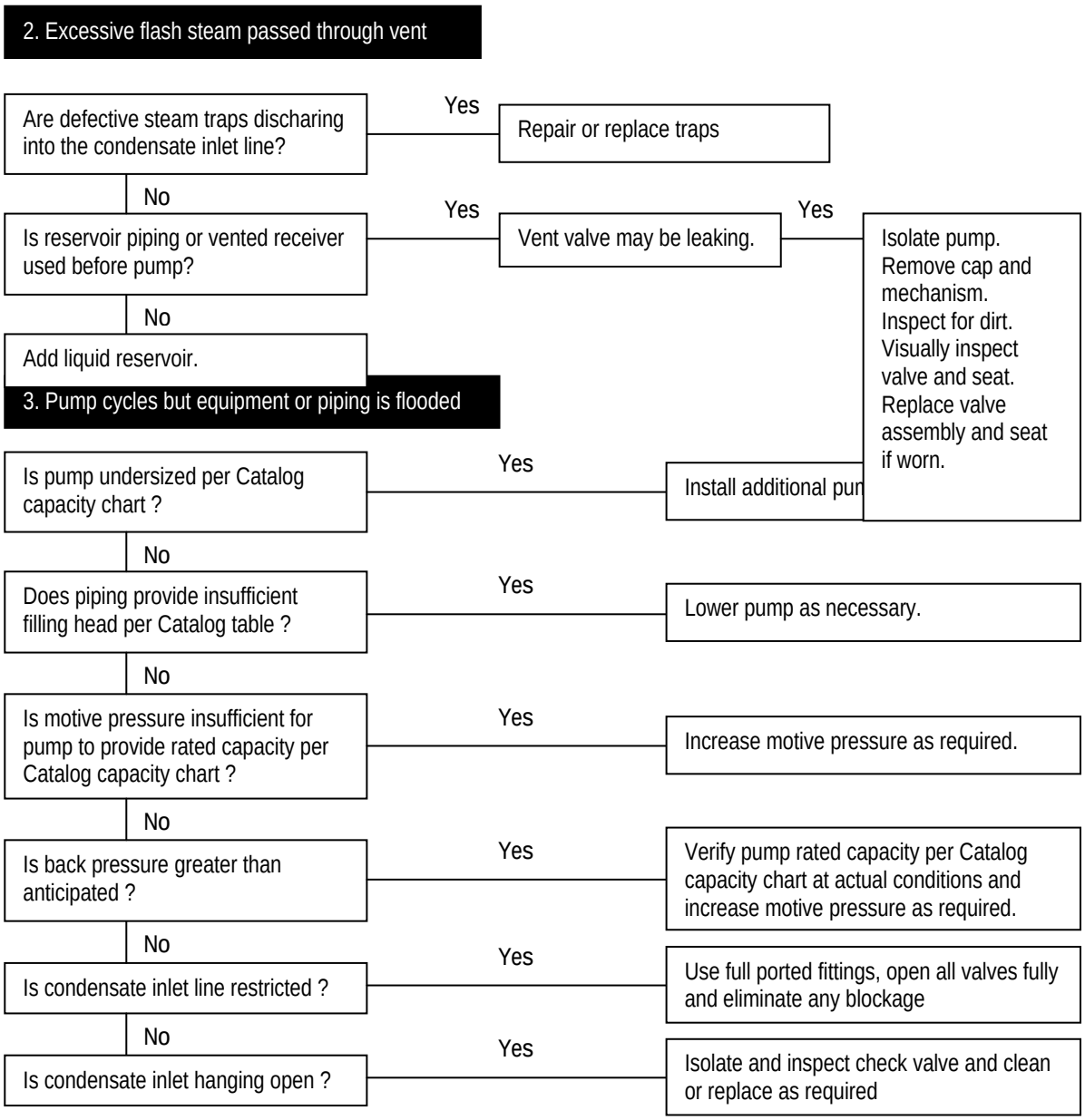
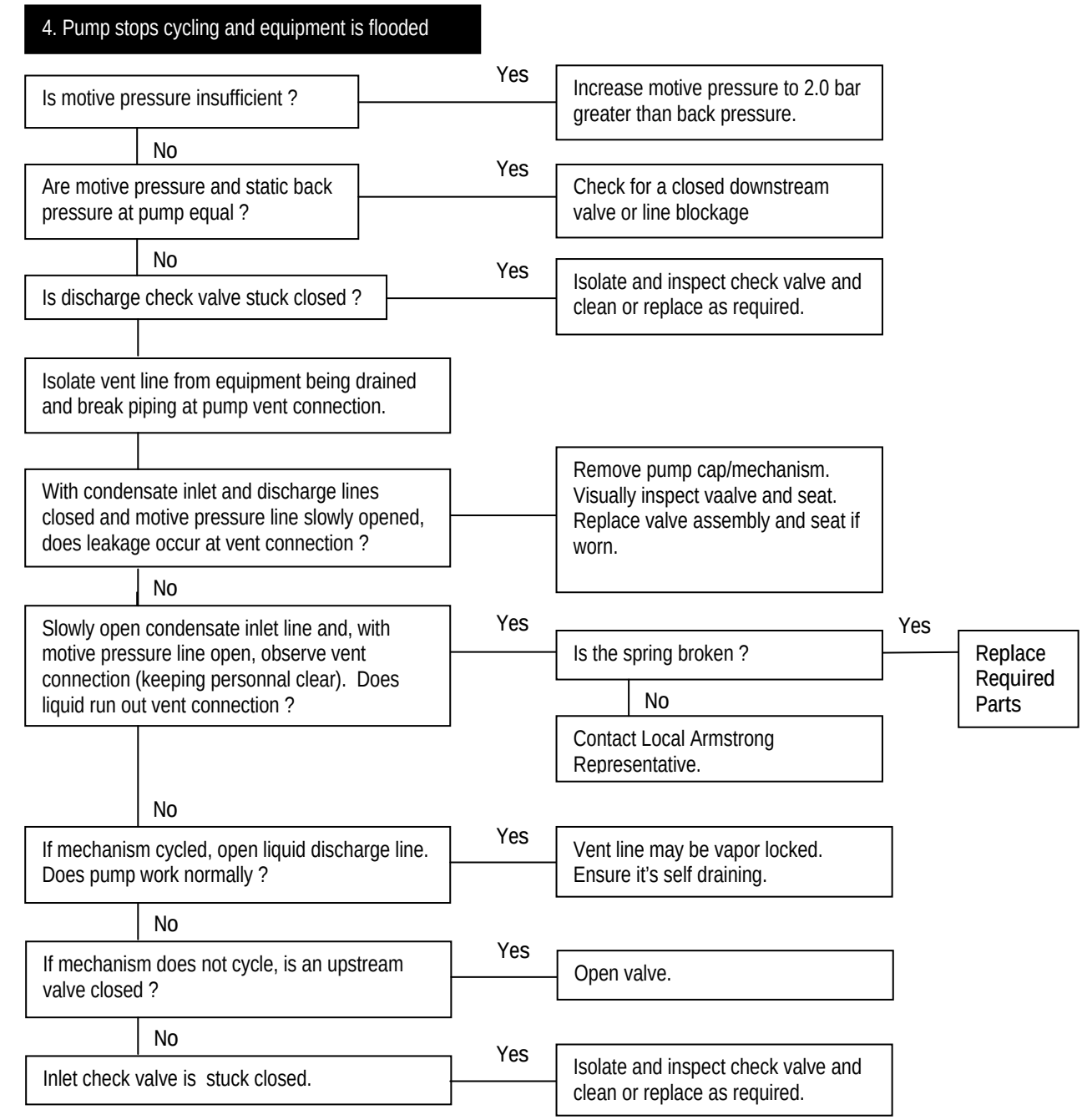


TROUBLE SHOOTING FLOW CHART—Continued…

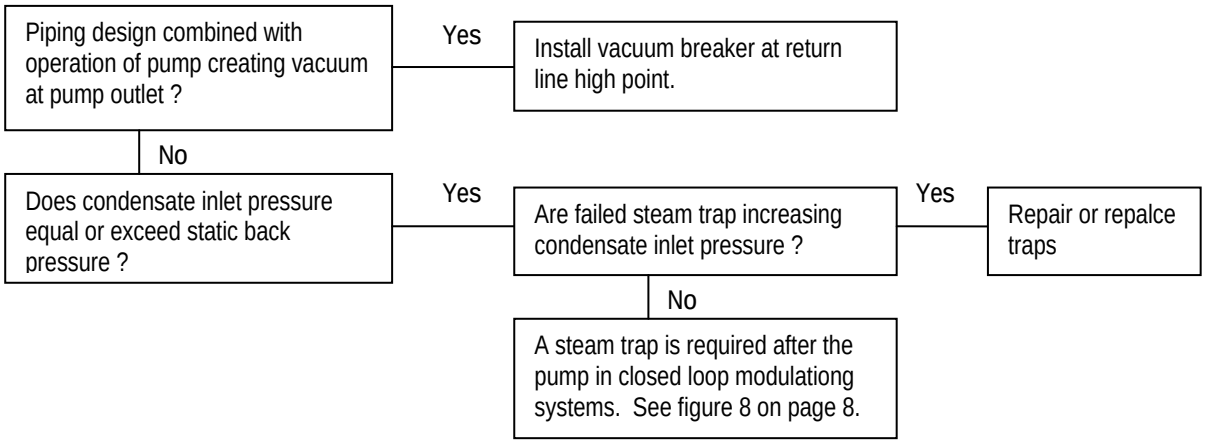
For Safety of Personnel – Vent line piping should be isolated from equipment and pump pressure should be relieved prior to breaking connections. WARNING : WATER MAY RUN OUT OF THE VENT CONNECTION WHEN PIPING IS BROKEN. CARE SHOULD BE TAKEN TO AVOID DANGER TO PERSONNEL OR DAMAGE TO NEARBY EQUIPMENT.



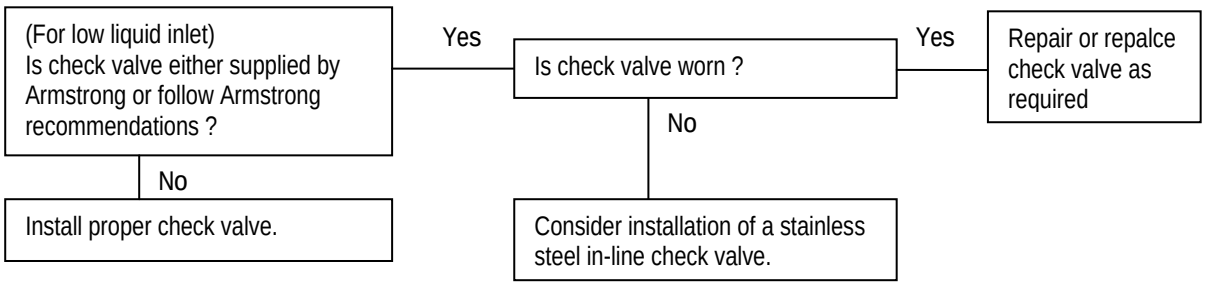
TROUBLE SHOOTING FLOW CHART—Continued...

For Safety of Personnel – Vent line piping should be isolated from equipment and pump pressure should be relieved prior to breaking connections. WARNING : WATER MAY RUN OUT OF THE VENT CONNECTION WHEN PIPING IS BROKEN. CARE SHOULD BE TAKEN TO AVOID DANGER TO PERSONNEL OR DAMAGE TO NEARBY EQUIPMENT.

5. Chattering or knocking in return line after discharge



5. Excessive chatter from inlet check valve



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