



Installation and Maintenance

ARMSTRONG "K" SERIES FLOAT AND THERMOSTATIC STEAM TRAPS,
CONDENSATE CONTROLLERS, AND LIQUID DRAINERS

This bulletin should be used by experienced personnel as a guide to the installation and maintenance of "K" Series float and thermostatic steam traps, condensate controllers, and liquid drainers. Selection or installation of equipment should always be accompanied by competent technical assistance. We encourage you to contact Armstrong or its local representative if further information is required.

Armstrong "K" Series steam traps, condensate controllers, and liquid drainers have capacities to 105,000 lbs. of hot condensate per hour. The inlet and outlet connections are 2 1/2" NPT. The maximum allowable pressure is 175 psig and the maximum operating pressure is 50 psig.

INSTALLATION

1. Series "K" steam traps, condensate controllers, and liquid drainers have individual requirements for installation.
 - A) Float and Thermostatic Steam Trap
Install the trap so that its inlet connection is below the liquid level in the equipment to be drained. Figure 1 shows the recommended piping method.
 - B) C o n d e n s a t e
The condensate controller's ability to handle flash steam enables it to operate efficiently with syphon drained equipment. Figure 2 shows the recommended piping method.
 - C) Liquid Drainer
Install the liquid drainer with its inlet connection **below** the liquid level in the equipment to be drained. Figure 3 shows the recommended piping for a liquid drainer.
 - 2) Before installing any trap, blow down the piping that leads to the trap's inlet. Use full line pressure. Be sure the maximum operating pressure (MOP) of the unit is adequate for the installation.
 - 3) Set the unit as shown in Figure 1, 2, or 3, with the flange resting on the floor or on a platform for support. Then install and tighten the inlet and discharge piping to secure the unit in its operating position. Use good piping practices to avoid excessive strain on the piping.
 - 4) To allow for maintenance and provide maximum service, install a valve on each side of the unit, and a 2 1/2" strainer ahead of the inlet. All valves should be of the fullported type to avoid restricting flow.
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NOTE: USE GOOD PIPING PRACTICES. MAKE INLET PIPING AS SHORT AS POSSIBLE WITH A MINIMUM OF ELBOWS AND OTHER RESTRICTIONS. INSTALL A DIRT POCKET IN THE LINE AHEAD OF THE UNIT AS SHOWN IN FIGURES 1, 2, AND 3.

- 5) LIQUID DRAINERS must be back vented to avoid air-binding. Do not reduce the pipe size to less than 1" for the back vent. Connect as shown in Figure 3. Use a full ported valve in the back-vent line. Remember that the pressure in the drainer is the same as in the unit drained. Only the difference in liquid levels produces flow. Minimize fittings and length of pipe between the vessel and the drainer.
- 6) If condensate is discharged to an overhead return, insure that adequate differential pressure exists across the trap to elevate the condensate. Install a check valve in the discharge piping near the unit to prevent backflow when the system is not in operation.
- 7) Under conditions where the load may approach the maximum capacity of the trap, it is recommended that the size of the DISCHARGE piping be increased at least one size as close to the trap as is practical.
- 8) Series "K" units do not require priming. They are ready for operation when installed.

MAINTENANCE

Check the internal mechanism of these units for damage at least once a year.

A. Dwening the Unit

- 1) Close the valves in both supply and discharge lines. If the unit is hot, allow it to cool. (Liquid Drainers: close the valve in the back-vent line.)
- 2) Remove the drain plug from the bottom of the body and allow the liquid to drain.

CAUTION: DO NOT ATTEMPT TO REMOVE THE BODY WITHOUT FIRST REMOVING THE THERMOSTATIC AIR VENT OR FIXED ORIFICE AND COUPLING

- 3) Before removing the body:
 - A) Steam Traw. Remove the air vent cap (1 1/2" plug) from the top of the body. When the cap is removed, the thermostatic air vent extends through the top of the body. Using a spanner wrench or pliers, remove the thermostatic air vent and gasket. Inspect the air vent for indications of damage. The valve should be away from the valve seat. If you have the facilities, place the air vent in a pan of water and heat it to boiling. The valve should close. If the bellows is collapsed or ruptured, or the valve and seat of the vent are eroded, discard it and install a new one.



If the unit includes a vacuum breaker, it is located in the air vent cap. Blow through the vacuum breaker from atmosphere **side** to be sure that it opens: suck air from the same side to be sure that it closes tightly. If the vacuum breaker does not operate properly, discard it and install a new one.

- B) Condensate Controller. Remove the air vent cap from the body. Remove the fixed orifice air vent and the coupling from the air relief tube.
 - C) Liquid Drainer. Disconnect the back-vent or secondary steam piping from the drainer body.
- 4) Put blocks under the body of the unit to support it (Wt. approx. 50 lbs.) and remove the 8 bolts that attach the body to the cap. To facilitate handling, screw a lifting lug into the 1 1/2" NPT hole in the top of the body. A hoist can be attached to the lifting lug.
 - 5) Carefully pull the body back from the cap, lifting slightly as you pull. Remove and discard the old gasket.
 - 6) Inspect all of the moving parts. Remove all worn or damaged parts and replace them with new parts. Figures 4, 5, 6, and 7 show all critical or moving parts. Check that each item is in good condition and operates normally.
 - 7) If the valve and seat are to be replaced, refer to Section B, "Replacing Valve and Seat."
 - 8) After inspection and repair, clean the gasket surfaces and place a new gasket between the body and the cap. Replace the body carefully to avoid bending the lever, float, or air relief tube (if used). Install and tighten the 8 bolts. (See Figure 8 for bolt tightening sequence)
 - 9) Screw the drain plug into the bottom of the body and tighten it securely.
 - 10) A) Steam Trap. Place the thermostatic air vent, with gasket installed, into the coupling at the top of the air relief tube. Tighten with a spanner wrench or pliers. Screw the air vent cap into the top of the body and tighten the cap with a wrench.
B) Condensate Controller. Screw the fixed orifice and coupling onto the upper end of the air relief tube. Screw the air vent cap into the top of the body and tighten it with a wrench.
C) Liquid Drainer. Reconnect the backvent piping.
 - 11) Open the valves in the supply and discharge lines. For liquid drainers, also open the valve in the backvent line. Check the equipment for normal operation.
- B. Disassembling the Valve and Seats (Refer to Figure 7)
- 1) Perform Steps 1 to 5 of Section A to open the unit. Inspect **all moving parts** and replace any that are damaged or worn.
 - 2) Use a wrench to loosen the lock nut. The float unscrews from the lever.
 - 3) Use a screwdriver to remove the retaining clips from both pivot pins. Then remove the pivot pins and the lever.



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- 4) Detach the cap extension from the cap by loosening the four bolts. If the integral seats of the cap extension are damaged, replace the cap extension. The cap extension must be detached from the cap in order to replace the valve assembly.
- 5) Use a wrench to remove the lock nut from the bottom of the lower valve. If necessary, hold the valve stem connector with another wrench.
- 6) Lift the valve stem connector to raise the valves off of the seats. Then turn the lower valve counterclockwise to remove it from the valve stem.
- 7) Lift the valve stem connector assembly, the upper valve, and the valve stem out of the cap extension assembly.
- 8) Remove the valve stem connector from the valve stem. Then remove the upper valve.

c. Installing Valves and Seats Refer to Figure 7

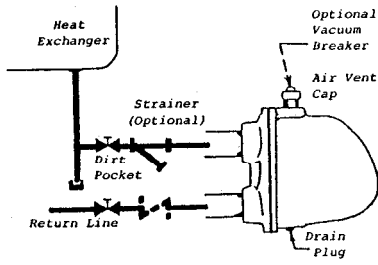
NOTE: Armstrong recommends purchasing the cap extension with valves installed by the factory for ease of replacement.

- 1) Hold cap-extension upright as shown in Fig. 7. Rotate 90° to the right and place in vise. As you look down into the 2 chambers of the assembly, the lever support should extend to the right.
- 2) Place either valve into the left (lower) chamber. Be sure the tapered edge of the valve rests on the seat.
- 3) Insert the short threaded end of the valve stem through (in the following order) the right (upper) chamber., the valve stem guide, and into the left (lower) chamber. Screw the lower valve onto the threads, running it all the way and then backing off a 1/4 turn.
- 4) Tighten the lock nut holding on the bottom valve. (If the valve will not remain stationary during tightening, jam a chisel or file of dimensions 1/4" x 3/4" x 3" between a flat side of the valve and the inner wall of the cap extension.)
- 5) Hold the lower valve and seat in place and screw the upper valve onto the long threaded end of the valve stem. If the top valve is turned down too far, the bottom valve will raise off the seat. Find the adjustment where both valves are seated by turning the top valve up and down. When this adjustment has been found, back the top valve upward 1/8 of a turn.
- 6) Install and tighten the valve stem connector. Recheck the valve and seat adjustment after tightening the connector. When holding the bottom valve with 2 fingers, neither top nor bottom valve should be able to wiggle.
- 7) Bolt the cap extension to the cap using the four bolts provided.
- 8) Place the lever into position and secure it with the pivot pins and retaining clips.
- 9) Turn the float onto the end of the lever and tighten lock nut. Install the trap body and make necessary connections described in Section A, Steps 8 to 11.

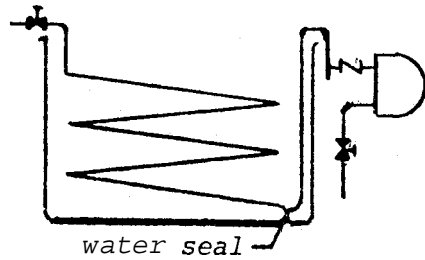


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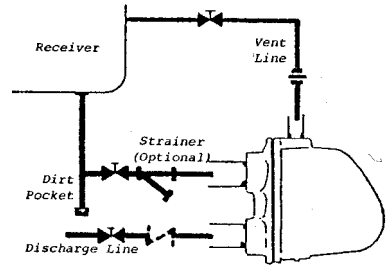
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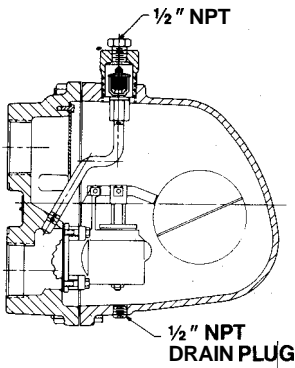
Steam Trap
Figure 1



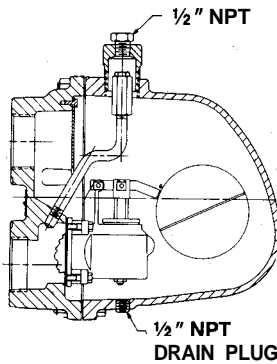
Condensate Controller
Figure 2



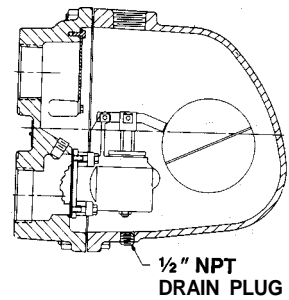
Liquid Drainer
Figure 3



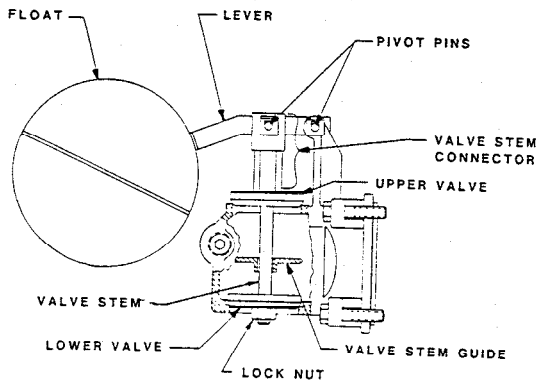
Steam Trap
Figure 4



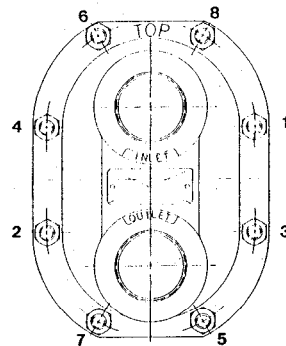
Condensate Controller
Figure 5



Liquid Drainer
Figure 6



Cap Extension and Assembly
Figure 7



Bolt Tightening Sequence
Figure 8