

MAINTENANCE INSTRUCTIONS



Clean Steam Trap Valves CT Series 8 and 9, 1/2" - 2" Manually Operated

Follow instructions to ensure optimum performance:

Adjusting for Normal Wear

1. PBM Ball Valves are designed with the Adjust-O-Seal® feature. If the valve shows signs of leakage due to normal seat wear, tighten the end fitting fasteners evenly, in a staggered sequence, until leakage stops and the valve operates smoothly:
 - a. Initially, there should be a space between end fittings and the body. This space is key to the Adjust-O-Seal feature and allows in-line adjustment of the seats and gaskets.
 - b. End fitting fasteners should be tightened only until the valve stem breakaway torque is reached (Table 1).
2. If valve shows signs of leakage in stem area due to normal stem packing wear, loosen the upper jam nut on the stem, then tighten the lower jam nut to completely compress the spring washers, then loosen nut 3/4 turn.

Leakage should stop, and the valve should continue to operate smoothly.

3. After adjustments have been made to seats, or if packing leakage cannot be stopped, a repair kit will be required.

Installing Replacement Parts

1. Isolate and depressurize the associated piping system. Cycle the valve to depressurize and drain any trapped fluid from the body cavity. Remove insulation, if any, and disconnect the piping at the purge port.
2. For valves with Tri-Clamp end connections:
 - a. Loosen and remove the clamps connecting the valve to the piping. Then, remove the valve and Tri-Clamp gaskets.
 - b. Loosen and remove the hex nuts and spring washers from the body/end fitting fasteners.
 - c. Pull the end fittings free from the body.
3. For valves with welded end connections, the valve can be disassembled with the body subassembly swung out from the end fittings, or it can be disassembled with the body subassembly completely removed from the end fittings.
 - a. To swing out the body subassembly from the end fittings:
 - i. Open the valve.
 - ii. Loosen the hex nuts on the end fitting fasteners.
 - iii. Remove the fasteners, nuts, and spring washers between the body swing out ring and the stem.
 - iv. Spring the connecting piping 1/8" to remove the compression on the body from the end fittings.
 - v. Swing the body out from the end fittings until the body completely clears the end fittings. The body's swing out ring will rotate about its fastener.
 - vi. The sprung piping can now be returned to its original compression, if desired.
 - b. To remove the entire body subassembly from the piping:

- i. Open the valve.
 - ii. Remove the fasteners, nuts, and spring washers between the body swing out ring and the stem. Remove the fastener, including the nut that passes through body swing out ring, spring washers, tag, and external ground spring, if any.
 - iii. Spring the connecting piping 1/8" to remove the compression on the body from the end fittings.
 - iv. Slide the body subassembly out from between the end fittings.
 - v. The sprung piping can now be returned to its original compression, if desired.
4. Remove the seats, metal encapsulated rings, gaskets, and O-rings from the body.
 5. Turn the stem to close the ball. Slide the ball out of the body, taking care not to nick or scratch the ball.
 6. Remove the internal ground spring, if any, from under the stem.
 7. Loosen and remove the jam nut from the stem. Remove the handle, spring washers, and follower.
 8. Push the stem into the body and out an open end of the body. The bottom packing may come off with the stem. If not, reach into the body counter-bore and remove.
 9. Remove the top packings from the body.
 10. Before reassembling the valve, examine the parts and repair or replace damaged or worn parts. Clean metal parts, as necessary, using a solvent compatible with the process fluid and a non-abrasive cloth. PBM recommends using new seats and seals at each assembly.
 11. Insert a new TFM (white in color) packing on the stem such that the packing seats on top of the ledge on the stem.
 12. Insert the stem into the body bore and through the stem bore in the body.
 13. Install a new TFM (white in color) packing over the stem. Push the packing into the body counter-bore. Then install a new SS/TFE (charcoal in color) packing over the stem. Push the packing into the body counter-bore.
 14. Install the follower over the stem until it rests on the top packing.
 15. Install a large spring washer on the stem, concave side facing upward. Install the external ground wire terminal on top of this spring washer, if applicable.
 16. Install remaining large spring washers, alternating convex with concave curves and with the concave side of top spring washer facing upward. Spring washers should not be "nested" (curving in the same direction).
 17. Lubricate the stem threads with an anti-galling lubricant. Install the handle such the handle points to open when the handle is in the open position. Install and tighten the remaining jam nut to secure the handle to the stem. Thread a jam nut onto the stem. Tighten to completely compress the spring washers, then back off 3/4 turn.
 18. Position the stem to close the valve. Install the internal ground spring, if any, on the bottom of the stem.

19. Insert the ball into the body. Slide the stem tang into the ball slot, being careful not to nick or scratch the ball. The purge holes in the ball should be on the left side of the body when the pointed end of the handle is pointing away from the assembler.
20. Rotate the stem until the ball is in the open position.
21. Lubricate the O-rings and the first ½ inch of each end of the body bore with a lubricant compatible with the process fluid.
22. Install the large O-rings onto the groove on the outer diameter of the seats, then carefully force the seats into the body bore until they contact the ball.
23. Insert metal encapsulating rings into the bores of the seats.
24. Install the gaskets onto the body bore and install the small O-rings between the metal encapsulating rings and the gaskets.
25. Lubricate the external threads of the body bolting with an anti-galling lubricant.
26. For valves with Tri-Clamp end fittings, install end fittings against body.
27. For valves with end fittings welded into the piping, with the valve open, spring the end fittings outward and slide the body between them. Release spring force from end

- fittings to allow end fittings to enter body, taking care not to cut the O-rings.
28. Install fasteners, external ground spring (if any), external ground wire (if any), and tag. If the valve is electrically grounded, install the external ground spring around the bolt that passes through the swing out ring. This spring should ground the ring to the end fitting.
 29. Install spring washers on the body bolts with the concave surfaces of the two washers facing one another. Install and hand-tighten hex nuts. Then, close the valve.
 30. Wrench-tighten the bolting in a staggered sequence, keeping an even gap between the body and end fittings, and until the stem torque, as shown in Table 1, is reached. The torque is the measured stem torque as the valve leaves the closed position. Cycle the valve to verify freedom of operation and torque.
 31. If the valve has Tri-Clamp end fittings, reinstall the valve into the piping using appropriate Tri-Clamp gaskets and clamps.
 32. For valves with gear operators, install the gear operator, bracket, and coupling.
 33. If practical, check the valve seats and seals for leaks.
 34. Insulate the valve, if applicable.

| TABLE 1: STEM TORQUE (IN.-LB.) | | |
|--------------------------------|-----------|---|
| Valve Size | Size Code | Valve Stem Breakaway Torque (in-lbs.) TFM Seats |
| ½" | C8 or C9 | 25 |
| ¾" | D8 or D9 | 30 |
| 1" | E8 or E9 | 58 |
| 1½" | G8 or G9 | 132 |
| 2" | H8 or H9 | 182 |

Notes for Table 1:

1. Stem torque values shown represent ideal conditions (100 psig or less, ambient temperature, with fluid free of suspended solids and comparable in viscosity to water).
2. Torque values are measured at the stem, NOT at the fasteners.



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To ensure safe product selection and operation, it is the responsibility of the process system designer and end user to determine the appropriate compatible materials of construction and adequate product ratings for the process system. Process system designer, installer, and or end user are responsible for proper installation, operation, and maintenance.