


# ICS Float and Thermostatic Steam Trap Installation and Operation Manual



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# General Safety Information

 **Warning:** This bulletin should be used by experienced personnel as a guide to the installation and maintenance of the Armstrong ICS Float and Thermostatic steam trap. Selection or installation of equipment should always be accompanied by competent technical assistance. You are encouraged to contact Armstrong International, Inc. or its local sales representative for additional information.

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Designs, materials, weights and performance ratings are approximate and subject to change without notice.

# Product Information

## 1. Product Information:

The ICS Float and Thermostatic steam trap is used for continuous drainage of condensate and high-capacity venting of air and  $\text{CO}_2$ , when steam pressure may vary from maximum steam supply pressure to vacuum.

### 1.1. Product Range

Armstrong ICS Float and Thermostatic steam trap is available with flanged connections of 150RF, 300RF, PN40RF, socket weld and screwed connections in 1/2" (15 mm), 3/4" (20 mm), 1" (25 mm), 1-1/2" (40 mm) and 2" (50 mm) sizes with a maximum operating pressure to 465 psig (32.0 barg). Refer table 4.1.

| Connection Size              | Orifice Size in (mm) | PMO psig (barg) |
|------------------------------|----------------------|-----------------|
| 1/2" (15 mm)<br>3/4" (20 mm) | 11/64 (4.3)          | 75 (5.1)        |
|                              | 1/8 (3.1)            | 150 (10.3)      |
|                              | 7/64 (2.8)           | 175 (12.0)      |
|                              | 3/32 (2.4)           | 225 (15.5)      |
|                              | 5/64 (2)             | 300 (20.6)      |
|                              | 1/16 (1.6)           | 465 (32.0)      |
| 1" (25 mm)                   | 5/16 (8)             | 40 (2.7)        |
|                              | 1/4 (6.3)            | 65 (4.4)        |
|                              | 7/32 (5.5)           | 100 (6.8)       |
|                              | 3/16 (4.8)           | 150 (10.3)      |
|                              | 5/32 (4)             | 200 (13.6)      |
|                              | 1/8 (3.2)            | 300 (20.6)      |
|                              | 3/32 (2.4)           | 465 (32.0)      |
| 1-1/2" (40 mm)<br>2" (50 mm) | 1-3/8 (35)           | 100 (6.8)       |
|                              | 1 (25)               | 200 (13.7)      |
|                              | 3/4 (20)             | 465 (32.0)      |

Table 4.1



Vertical



Horizontal

Figure 4.1

# Product Installation

## 2. Installation

### 2.1. Pre-Installation

Before installing the trap, blow down piping that leads to the trap inlet. Purpose of blowing down is to clean the line out of any debris that could damage the trap. Make sure that the Maximum Operating Pressure (PMO) of the trap is adequate for the installation. (The PMO is stamped on the nameplate).

### 2.2. Installation of ICS F&T Trap

- Install so the trap inlet is below the outlet of the equipment to be drained. Use good piping practices. Make inlet piping as short as possible. Use a minimum number of elbows and other restrictions in inlet and outlet piping. Install a dirt pocket in the line ahead of the trap.
- To allow maintenance and provide maximum service, install a valve on each side of the trap and a downstream testing tee. All valves should be of the full ported type to avoid restricting flow. Provide a strainer ahead of the inlet.
- Install a union upstream and downstream of the trap unless the discharge line is open and short.
- Avoid elevating the condensate if the equipment is under modulated control. If the discharge piping is to be elevated, ensure that adequate differential pressure exists always to provide proper drainage. When elevating condensate, install a check valve in the discharge piping near the trap to prevent backflow when the system is not in operation.

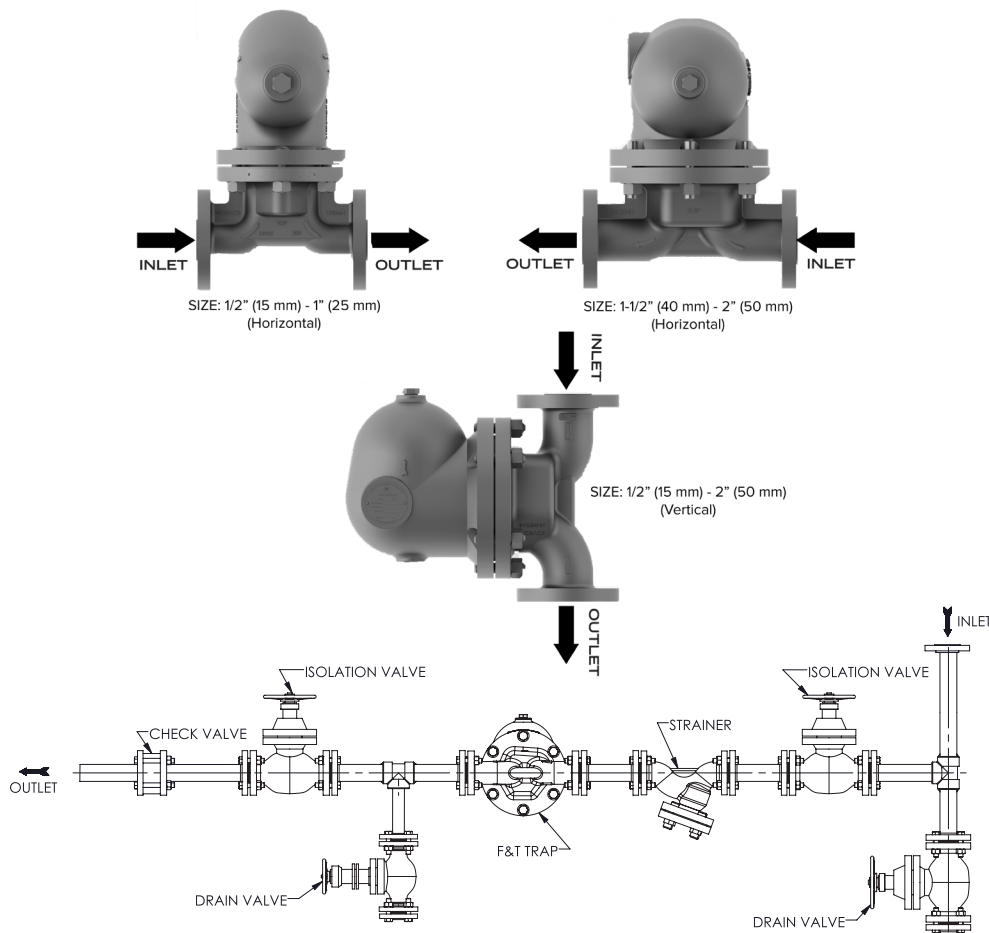


Figure 5.1

# Service and Maintenance

## 3. Service and Maintenance

### 3.1. Repairing the Trap

- Close the inlet and outlet valves. Make sure that the trap is cold and then drain the body.
- Unscrew the cap bolts and carefully remove the body.
- Remove the mechanism.
- Discard the old gasket and clean gasket surfaces.
- Clean any dirt or sediment from the trap body, cap, and mechanism.
- Check that the cap is free from erosion.
- Inspect the mechanism for signs of wear or damage. (See “Inspection” below). Replace the worn or damaged parts (see “Replacing the Mechanism” on page 7).
- Install a new gasket in the body and secure the body to the cap using a cross-tightening pattern. See table 8.1 and figure 9.1.
- Once all the bolts have been securely tightened and the drain plug re-installed, open the valves in the supply and discharge lines. Check the equipment for normal operation.

### 3.2. Inspection

- Linkages should be free to move without excessive wear. Valve lever and clip pin holes should be round, not elongated.
- A properly seating valve has a bright narrow ring all the way around its circumference.
- A properly wearing seat has a uniform edge with no nicks or wire drawing.
- Always replace valve and seats as a matched pair.
- Thermostatic air vent should be replaced at the same time you replace the valve and seat assembly.
- Floats should show no dents or creases. Shake the float; it should not contain any liquid. Look for pinhole leaks, especially along the seams. If you suspect a leak, immerse the float in hot water and look for bubbles rising to the surface of the water.

### 3.3. Remove the worn parts - Sizes 1/2” (15 mm), 3/4” (20 mm), 1” (25 mm)

- Remove the lever and float assembly by pulling out the pivot pin.
- Remove the valve lever clip by unscrewing the seat.
- Inspect the valve and seat for wear.
- If float or lever is damaged, unscrew the float screw to remove the float.
- Remove thermostatic air vent and replace with new element.

### 3.4. Installing new mechanism parts

- Secure the valve lever clip by threading the valve seat through it into the cap.
- Apply a drop of thread lock compound to the float screw and assemble the float to the lever assembly.
- Attach the valve lever assembly by inserting the pivot pin and check it for proper alignment. With the valve firmly seated, slide the lever pin back and forth to ensure it moves freely. If it does not, bend the ears on the valve lever clip in or out as needed until it does.

# Service and Maintenance Continued

## 3.5. Replacing the mechanism - Sizes 1-1/2" (40 mm) and 2" (50 mm)

- Clean and inspect the cap to body and cap extension gasket surfaces.
- Check to see if the erosion shield fits tightly into the cap extension and is flush with the gasket surface.
- Place the cap extension gasket over the erosion shield and place the cap extension with erosion shield into the cap. **MAKE SURE THE EROSION SHIELD OUTLET IS POINTING TOWARDS THE OUTLET CONNECTION.**
- Screw one cap extension bolt (on the outlet side) into the cap and loosely tighten it.
- Place the other cap extension bolt through the baffle, cap extension and loosely tighten it into the cap.
- Place another cap extension bolt through the baffle, spacer and tighten it into the cap.
- Tighten all three bolts, evenly, to 140-170 lbs (190-230 N-m)
- Screw thermostatic air vent into the cap, using new gasket, to 20-30 ft-lbs (27-40 N/m)

# Troubleshooting

## 4. Troubleshooting

| <b>Problem</b>   | <b>Causes</b>                             | <b>Solution</b>                              |
|--|---|--|
| Steam loss   | Thermostatic element damaged              | Replace it                                   |
|  | Thermostatic element's gasket damaged     |  |
|  | Worn valve parts                          |  |
| No condensate discharge  | Float punctured or deformed               | Replace it                                   |
|  | Piece of scale lodged in orifice          | Clean the orifice                            |
| If trap operates satisfactorily when discharging to atmosphere, but trouble is encountered when connected with the return line | Back pressure may reduce capacity of trap | Check whether, return line is too small      |
|  |   | Check whether, other traps are blowing steam |

**Table 8.1**



# Torque Value

## 5. Torque Value

| Connection Size                                 | Bolt Size    | Torque Value       |
|---|--------------|--------------------|
| 1/2" (15 mm)                                    | 7/16"-14 UNC | 48 Lbf-ft (65 N-m) |
| 3/4" (20 mm)                                    |              |                    |
| 1" (25 mm)                                      | 1/2"-13 UNC  | 66 Lbf-ft (90 N-m) |
| 1-1/2" (40 mm)                                  | M16x2        | 66 Lbf-ft (90 N-m) |
| 2" (50 mm)                                      |              |                    |
| Thermostatic Capsule                            |              | 63 Lbf-ft (85 N-m) |
| Seat (Size: 1/2" (15mm) – 1" (25mm))            |              | 49 Lbf-ft (67 N-m) |
| Cap extension (size: 1-1/2" (40mm) – 2" (50mm)) |              | 22 Lbf-ft (30 N-m) |

Table 9.1

## Cross Tightening Patterns

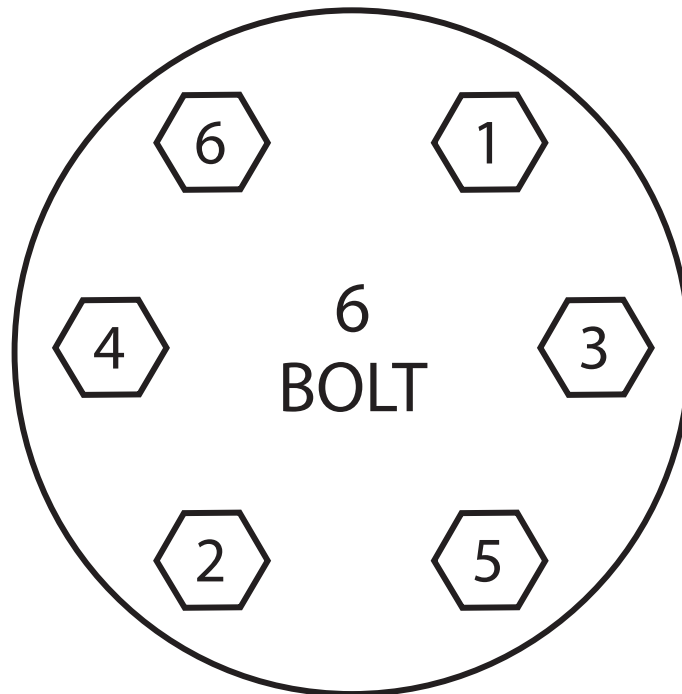


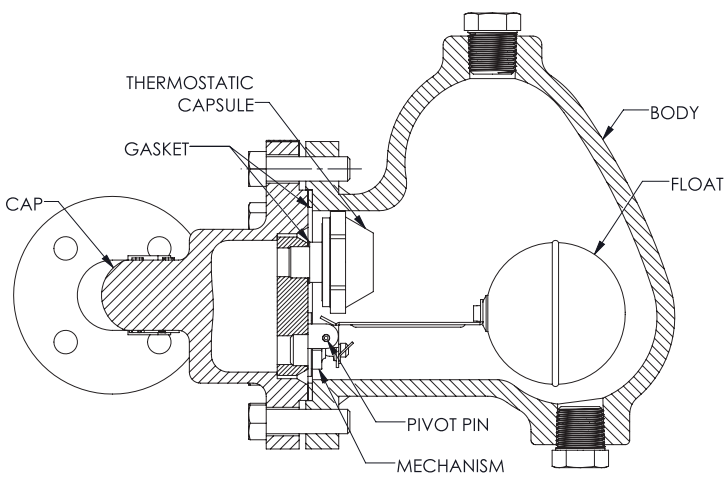
Figure 9.1

# Repair Parts

## 6. Repair Parts

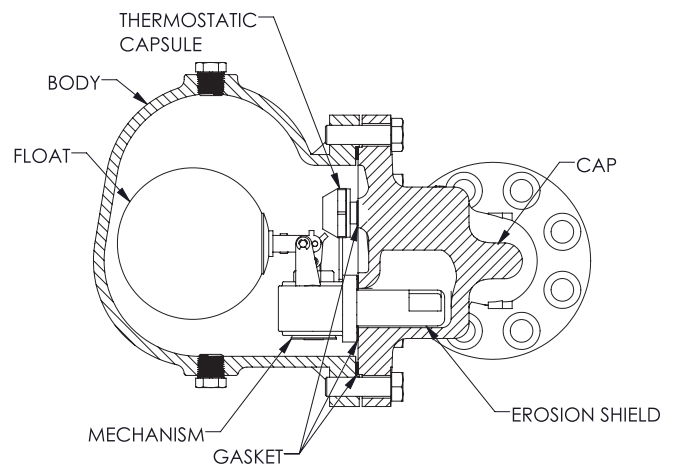
| Size                         | Orifice | Mechanism (less float) | Gasket | Mechanism's Gasket | Float  | Capsule | Capsule's Gasket |
|------------------------------|---------|------------------------|--------|--------------------|--------|---------|------------------|
| 1/2" (15 mm)<br>3/4" (20 mm) | 11/64"  | C5149-1                | D14236 | NA                 | A21803 | B2465-3 | B2465-3          |
|                              | 1/8"    | C5149-3                |        |                    |        |         |                  |
|                              | 7/64"   | C5149-4                |        |                    |        |         |                  |
|                              | 3/32"   | C5149-5                |        |                    |        |         |                  |
|                              | 5/64"   | C5149-6                |        |                    |        |         |                  |
|                              | 1/16"   | C5149-7                |        |                    |        |         |                  |
| 1" (25 mm)                   | 5/16"   | C5150-1                | D11994 |                    |        |         |                  |
|                              | 1/4"    | C5150-2                |        |                    |        |         |                  |
|                              | 7/32"   | C5150-3                |        |                    |        |         |                  |
|                              | 3/16"   | C5150-4                |        |                    |        |         |                  |
|                              | 5/32"   | C5150-5                |        |                    |        |         |                  |
|                              | 1/8"    | C5150-6                |        |                    |        |         |                  |
|                              | 3/32"   | C5150-7                |        |                    |        |         |                  |
| 1-1/2" (40 mm)<br>2" (50 mm) | 20 mm   | C6213                  | C6260  | B7549              | B6991  |         |                  |
|                              | 25 mm   | C6209                  |        |                    |        |         |                  |
|                              | 35 mm   | C6200                  |        |                    |        |         |                  |

Table 10.1



1/2", 3/4", and 1" Traps

Figure 10.1



1-1/2" and 2" Traps

Figure 10.2

# Limited Warranty and Remedy

## 7. Warranty Terms

Armstrong International, Inc. or the Armstrong division that sold the product (“Armstrong”) warrants to the original user of those products supplied by it and used in the service and in the manner for which they are intended, that such products shall be free from defects in material and workmanship for a period of one (1) year from the date of installation, but not longer than 15 months from the date of shipment from the factory, [unless a Special Warranty Period applies, as listed below]. This warranty does not extend to any product that has been subject to misuse, neglect or alteration after shipment from the Armstrong factory. Except as may be expressly provided in a written agreement between Armstrong and the user, which is signed by both parties, Armstrong **DOES NOT MAKE ANY OTHER REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.**

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