# The Proof is in the Piston

Armstrong

Many of Armstrong's manifolds utilize the piston valve because of its years of excellent performance in steam systems all over the world. The proof of Armstrong's long service life for manifolds…is in the piston.

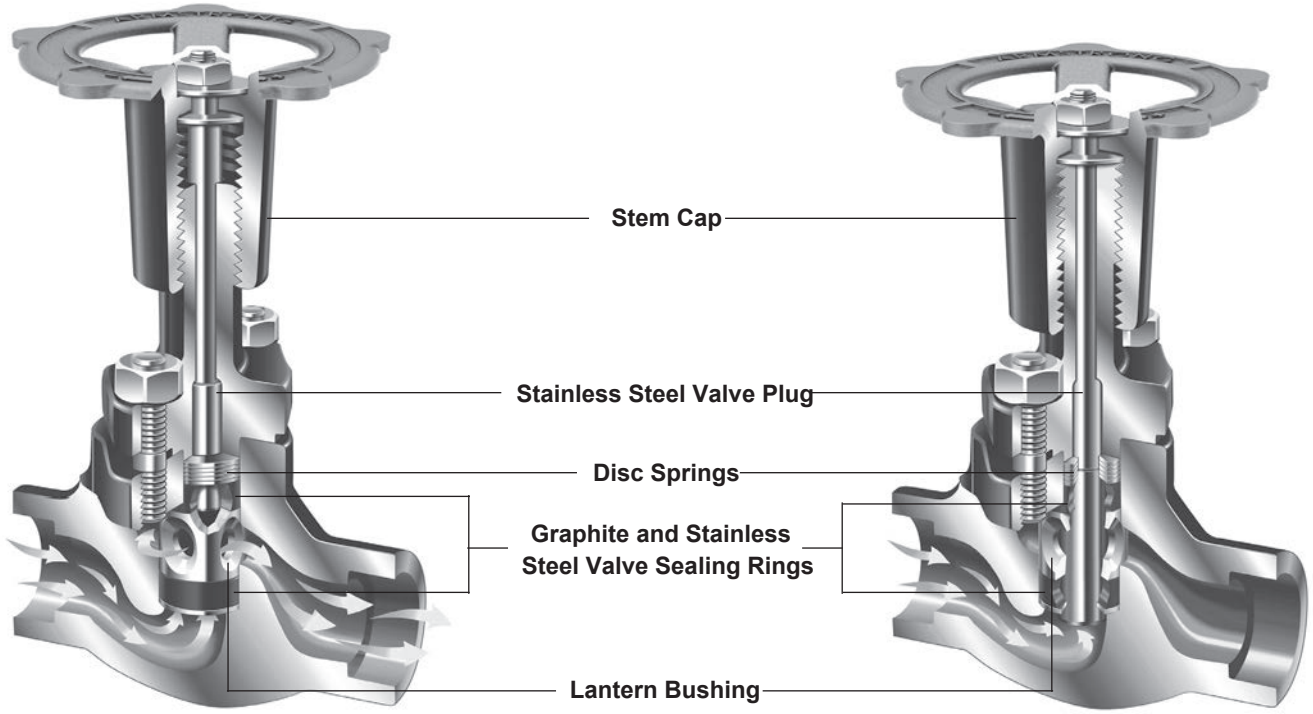
All types of valves—plug valves, gate valves, piston valves and even ball valves—have been summoned for duty in steam service. Due to its excellent sealing characteristics in steam service, and because it has no gland packing, the piston valve is frequently selected for steam systems.

People who have used it over the past 90 years can testify that leakage to atmosphere is extremely rare, even without any maintenance. The elastic contact between piston and valve sealing rings provides a perfect tightness, both in-line and to atmosphere.

Steam system valves, whatever their design, are used to isolate steam and condensate lines or when a faulty steam trap needs to be removed from the line. This means the valves stay in the open position for long periods and are nearly always in contact with the atmosphere. It is not surprising, therefore, that when the valves need to be closed, they can often prove difficult to operate. Our experience and the demands from end users for energy efficiency have led us to a sealing system designed especially for steam service.

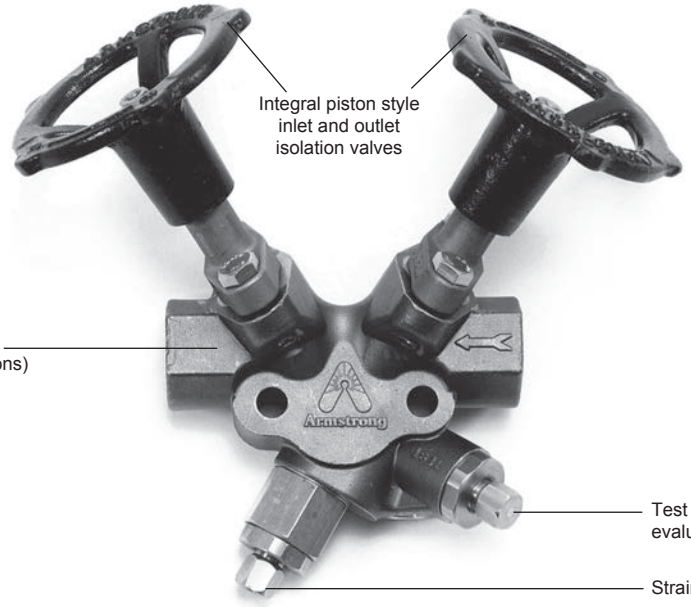
## The Piston Valve

Armstrong Steam Distribution Manifolds (MSD/SMSD) and Trap Valve Stations (TVS) incorporate advanced piston sealing technology for safer, longer lasting steam isolation service.




- **Dual sealing action.** The piston valve is a seatless valve that includes two graphite and stainless steel valve sealing rings that seal the stem and function as a seat. This combination provides long-term protection against leaks to the atmosphere and downstream piping.
- **Self-cleaning action.** Stainless steel piston slides without rotating between the two valve sealing rings, preventing dirt from damaging the surfaces.
- **Sealing integrity.** Flexible disc springs automatically provide leak tightness by exerting pressure, which keeps the upper and lower valve sealing rings compressed at all times. Sealing tightness is ensured by the compression of the sealing rings against the piston and valve body. This combination of disc springs and dual valve seal rings protects against expansion and contraction due to heating and cooling. This ensures dependable operation, even after years of service.
- **Protected valve stem.** The valve stem and sealing surfaces are completely protected from dirt and corrosion by the stem cap, whether in an open or closed position.
- **In-line repairability.** All sealing valve components may be easily replaced in-line.
- **Long-term operation.** Piston valve design ensures actuation even after many years without operation.

# TVS 4000 Trap Valve Station




## Description

Same principle. Different package with two piston-style isolation valves, test valve and integral stainless steel strainer with blowdown valve. What you'll find new are all the benefits of a piston valve integrated into the same space-saving package.

## Maximum Operating Conditions

Maximum allowable pressure:
650 psig @ 600°F (45 bar @ 315°C)

## Materials—TVS 4000 Connector

| | |
|---|---|
| Connector: | ASTM A351 Gr. CF8M |
| Strainer screen: | Stainless steel |
| Test valve: | Stainless steel |
| Blowdown valve: | Stainless steel |

## Isolation Valve Components

| | |
|---|---|
| All wetted parts: | Stainless steel |
| Valve sealing rings: | Graphite and stainless steel |
| Handwheel: | Ductile iron |

## Weight

6-1/2 lb (2.9 kg)

## Features

- Reduces installation and maintenance costs, and leak points.
- Incorporates integral test and strainer blowdown valves.
- Accommodates the AIM™ continuous monitoring technology
- Reduces engineering design time
- Three year warranty
- Easy, in-line, repairability with maximum safety. Positive isolation.
- Installation versatility. The 2-bolt feature accepts any manufacturer's steam trap
- Simplified steam trap testing and replacement.

## How to Order

| Model | Connection | Type of Connection Inlet/ Outlet | Flow Direction | Trap Type |
|---|---|---|---|---|
| TVS 4000 | 1/2"<br>3/4" | Screwed NPT (option BSPT)<br>Socket Weld (option)<br>Flanged (option) | R = Right to Left<br>L = Left to Right | Inverted Bucket<br>Disc<br>Thermostatic wafer<br>Bimetallic<br>Float and Thermostatic |

*Consult factory.

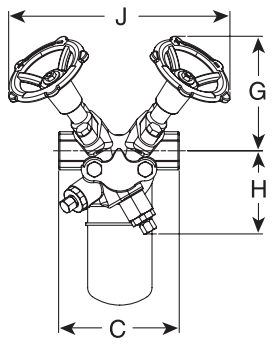
**U.S. Patent 6,467,503**

# TVS 4000 Series Stainless Steel Trap Valve Station

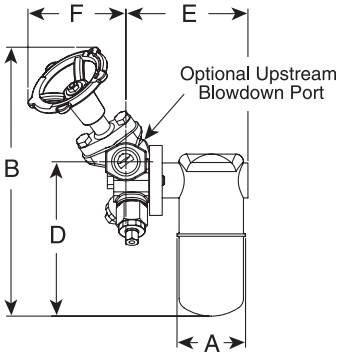
Armstrong

## For Pressures to 650 psig (45 bar)...Capacities to 1,300 lb/hr (590 kg/hr)

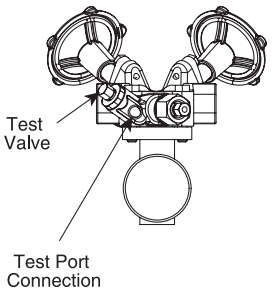
(Using 2000 Series Inverted Bucket Steam Traps)



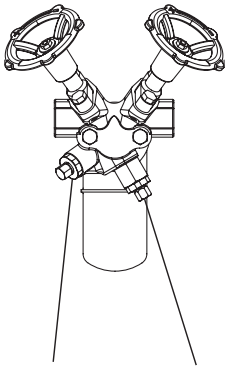

**Model TVS 4000 With 2000 Series SS Trap**
Front View




**Model TVS 4000 With 2000 Series SS Trap**
Side View




**Model TVS 4000 With 2000 Series SS Trap**
Bottom View



**Test Valve**
Used to test and evaluate trap operation

**Strainer Blowdown Valve**

Same principle. Different package with two piston-style isolation valves, test valve and integral stainless steel strainer with blowdown valve. Now the energy-saving performance and reliability of the inverted bucket steam trap are available in a versatile new package. You'll still enjoy all the familiar benefits. And the same efficient condensate drainage from virtually every kind of steam-using equipment. What you'll find new are all the benefits of a piston valve integrated into the same space-saving package.

### Materials—TVS 4000 Connector

| | | |
|---|---|---|
| Connector | : | ASTM A351 Gr. CF8M |
| Strainer screen | : | Stainless steel |
| Screen retainer | : | Stainless steel |
| Gasket | : | Stainless steel |
| Retainer unit | : | Stainless steel |
| Test valve | : | Stainless steel |
| Blowdown valve | : | Stainless steel |

### Isolation Valve Components

| | | |
|---|---|---|
| Handwheel | : | Ductile iron |
| Nut | : | Stainless steel |
| Stem, washers | : | Stainless steel |
| Bonnet | : | ASTM A351 Gr. CF8M |
| Bonnet, bolts | : | DIN 933, Gr. 8.8 per DIN 267 |
| Valve plug | : | Stainless steel |
| Disc springs | : | Stainless steel |
| Valve sealing rings | : | Graphite and stainless steel |
| Lantern bushing | : | Stainless steel |
| Valve washers | : | Stainless steel |

### Materials—Series 2000 Traps

| | | |
|---|---|---|
| Body | : | ASTM A240 Gr. 304L |
| Internals | : | All stainless steel—304 |
| Valve and seat | : | Hardened chrome steel—17-4PH |

**For a fully detailed certified drawing, refer to CD #1232.**

**TVS 4000 Series With 2000 Series Inverted Bucket Steam Trap**

| Model No. | 2010 | | 2011 | | 2022 | |
|---|---|---|---|---|---|---|
| Pipe Connections | in | mm | in | mm | in | mm |
| | 1/2, 3/4 | 15, 20 | 1/2, 3/4 | 15, 20 | 1/2, 3/4 | 15, 20 |
| "A" Trap Diameter | 2-11/16 | 68 | 2-11/16 | 68 | 3-7/8 | 98 |
| "B" Height (Valve Open) | 8 | 203 | 10-1/2 | 268 | 12-1/2 | 318 |
| "C" Face to Face | 4-3/4 | 120 | 4-3/4 | 120 | 4-3/4 | 120 |
| "D" Connection ℄ to Bottom | 4-3/4 | 120 | 6 | 154 | 8 | 203 |
| "E" Connection ℄ to Outside of Trap | 4-1/2 | 114 | 4-13/16 | 122 | 5-7/8 | 149 |
| "F" Connection ℄ to Front of Handwheel (Valve Open) | 3-1/2 | 89 | 3-7/8 | 98 | 3-7/8 | 98 |
| "G" Connection ℄ to Top of Handwheel (Valve Open) | 3-1/4 | 83 | 4-1/2 | 114 | 4-1/2 | 114 |
| "H" Connection ℄ to Bottom of Connector | 1-7/8 | 47 | 3-1/4 | 83 | 3-1/4 | 83 |
| "J" Width Across Handwheels (Valve Open) | 9-1/4 | 235 | 8-3/4 | 222 | 8-3/4 | 222 |
| Test Port Connection | 1/4 NPT | 6 | 1/4 NPT | 6 | 1/4 NPT | 6 |
| Weight lb (kg) | 9 | 4 | 9-1/2 | 4.3 | 12 | 5.4 |
| Maximum Operating Pressure (Trap) | 200 psi (14 bar) | | 400 psi (28 bar) | | 650 psig (45 bar) | |
| Maximum Allowable Pressure (Trap) | 400 psi (28 bar) @ 750°F (399°C) | | | | 650 psig @ 600°F (45 bar @ 315°C) | |

**U.S. Patent 6,467,503**

# TVS 4000 Series Stainless Steel Trap Valve Station

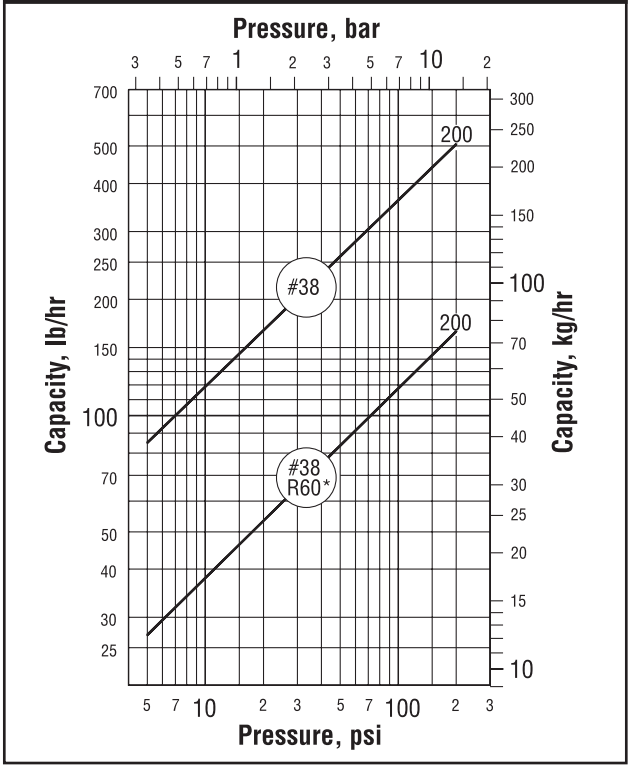
**For Pressures to 650 psig (45 bar)...Capacities to 1,300 lb/hr (590 kg/hr)**

**(Using 2000 Series Inverted Bucket Steam Traps)**

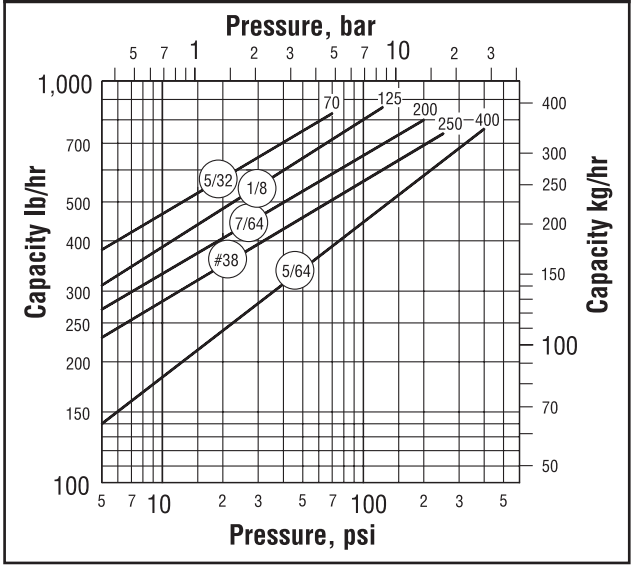
Armstrong

ALPHA GROUP

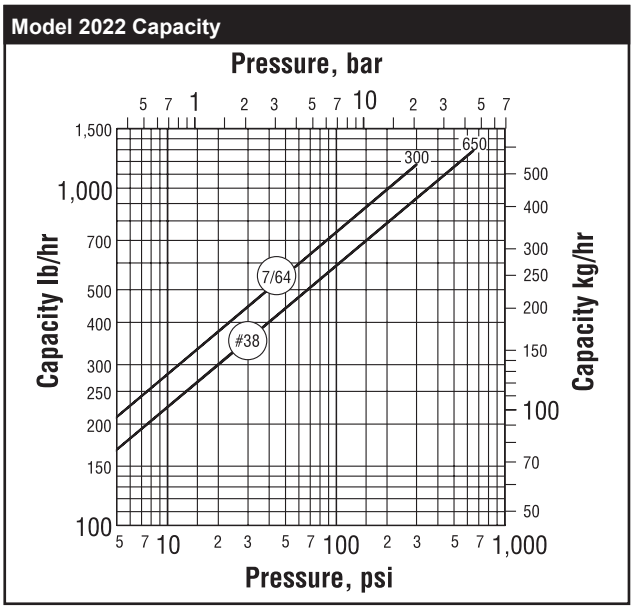
## Model 2010 Capacity




## Model 2011 Capacity




## Model 2022 Capacity



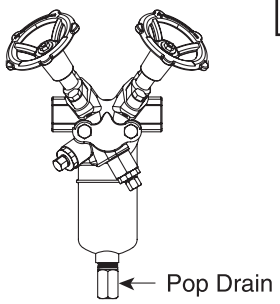

*NOTE: Because the orifice is located at the top, inverted bucket steam traps handle dirt and scale better than other types of traps. However, in applications where extremely dirty conditions exist, care should be exercised in the use of all types of restricted-orifice, reduced-capacity traps.

## Options

### Insu-Pak™

Now you can insulate the in-line traps in your plant without complicating regular trap maintenance. Insu-Pak, a simple reusable insulation package, cuts the time and cost of in-field installation because it goes on in a snap. And it comes off just as easily. The Insu-Pak can prevent trap freeze-up when used with a properly designed condensate manifold. Designed for use with Model 2010 and Model 2011 traps.

### Pop Drain




Simple but effective against freeze-up. Properly installed and maintained at low points in your system, the simple, pressure-actuated pop drain opens for condensate drainage at 5 psig (0.35 bar) for Models 2011 and 2022.

Probe Connections are available for trap monitoring on Models 2011 and 2022.

### How to Order

| Model | Connection | Type of Connection Inlet/ Outlet | Flow Direction | Trap Type |
|---|---|---|---|---|
| TVS 4000 | 1/2”<br>3/4” | NPT<br>SW<br>BSPT<br>Flanged* | R = Right to Left<br>L = Left to Right | Inverted Bucket<br>Disc<br>Thermostatic wafer<br>Bimetallic<br>Float and Thermostatic |

*Consult factory.

**U.S. Patent 6,467,503**