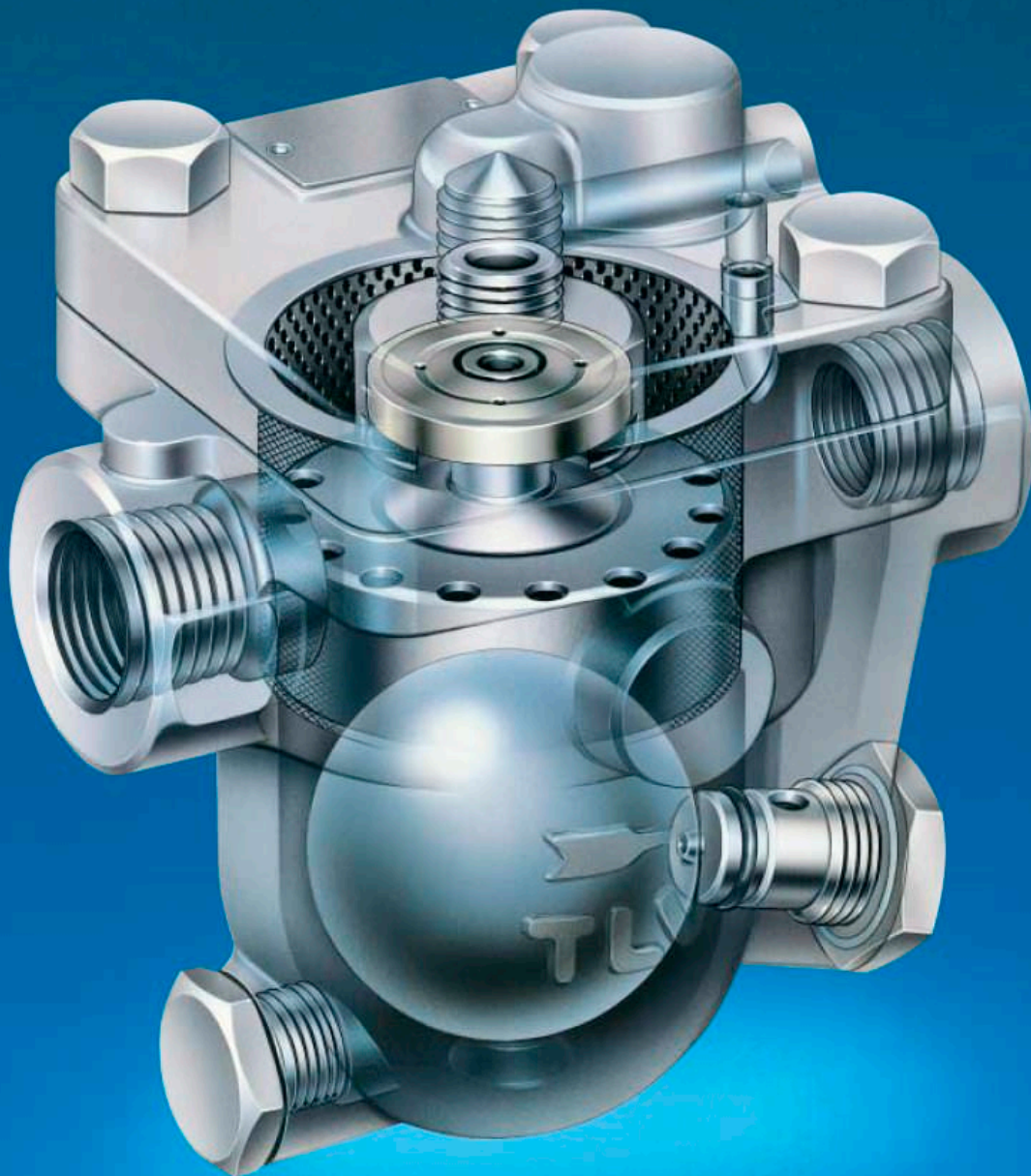


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# Free Float Steam Trap Series



# Free Float Steam Traps Revolutionizing Fluid Control Technology



## “Free Float”

**More than 40 years have passed since TLV introduced the free float concept to the steam industry. Since then, TLV’s Free Float traps and other innovative technologies have enabled users to achieve exceptional performance in facility after facility worldwide.**

### Free Float Principle

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The failure of mechanical steam traps is related to their number of moving parts.

**TLV** Free Float traps have only one moving part, the float. Compared to complex mechanical traps such as the inverted bucket with its levers and hinges, **TLV** Free Float traps mean fewer failures and long service life.

### Precision-ground Spherical Float

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For most **TLV** Free Float trap models, a unique grinding process virtually eliminates the welding seam, finishing the float to be almost perfectly spherical. These floats have unmatched sealing performance with the valve seat to prevent steam loss, and they are designed for severe service operation. Even at high pressures, they provide excellent durability and resistance to water hammer, ensuring long and reliable operation.

### Simple Is Best !

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Free Float technology manifests **TLV**’s product philosophy.

# The First Choice for Process Efficiency

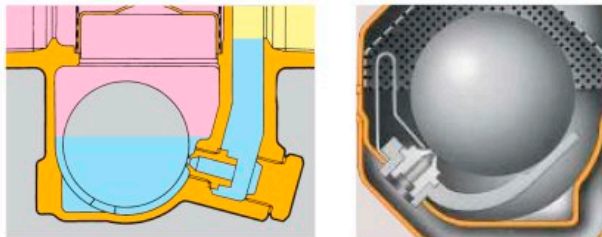
## The Reasons are Simple

### 1 Process Efficiency

The **TLV** Free Float adjusts quickly to changes in condensate flow, ensuring rapid discharge and maximum process efficiency. Unaffected by back pressure, the **TLV** Free Float is ideal wherever condensate is recovered.

### 2 Energy Conservation

A valve orifice below "water level" and 3-point seating in some models prevent steam leakage.



### 3 Integral Strainer

All internals are protected by an integral perforated stainless steel strainer screen.\*

\* except JL and J10 Series

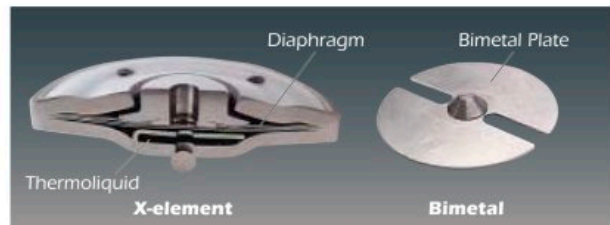
### 4 Long Life

The precision ground float provides an infinite number of contact surfaces with the valve seat, ensuring little wear and long reliable life.



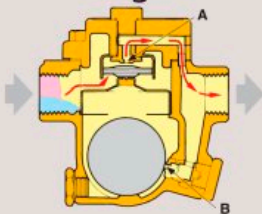
### 5 Automatic Air Venting

Automatic air venting discharges initial air so the equipment can be started up in the shortest possible time period. X-element also vents air at near steam temperature, suitable for batch operation equipment.



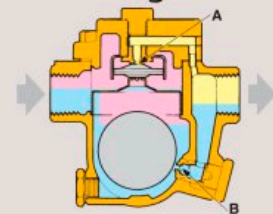
## FREE FLOAT OPERATION (X-element)

### 1 Start-up Discharge



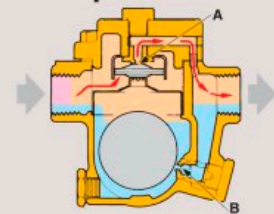
When trap is cool, the X-element contracts and valve port (A) opens wide, continuously discharging initial air. As cold condensate enters the trap, the float rises to allow discharge of condensate from valve port (B) and both air and condensate from valve port (A).

### 2 Hot Condensate Discharge



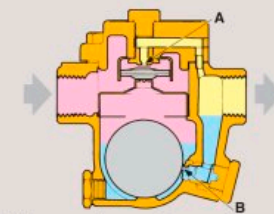
Once all initial air and cold condensate have been discharged, hot condensate heats the X-element and closes valve port (A) before steam can escape. Condensate which simultaneously enters the trap continues to be discharged through valve port (B).

### 3 Continuous Response



Air or retained condensate entering the trap drop the temperature and contract the X-element. Valve port (A) instantaneously opens to discharge both air and condensate. When higher temperature condensate follows, the X-element expands and closes valve port (A).

### 4 Complete Closure



When condensate flow to the trap ceases, the float closes valve port (B) which is always sealed below the water level. The upper section fills with steam, closing valve port (A). The trap is then completely sealed, preventing any steam leakage.

# THE CHOICE IS TLV'S JX/JH-X/JH-B SERIES TO MAXIMIZE ALL OF THE REQUIREMENTS OF A PROCESS STEAM TRAP'S FUNCTION

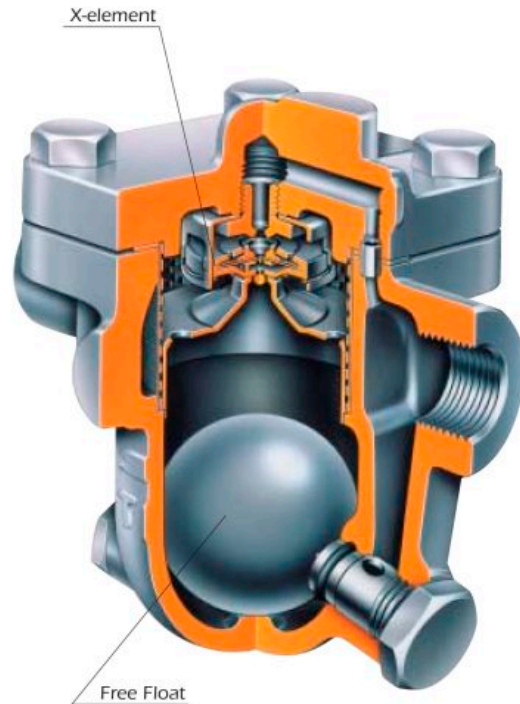
## Functions Required of Process Traps

### Improved Heating Efficiency and Production Quality

TLV's Free Float immediately adjusts the valve opening to perfectly match the amount of entering condensate. Condensate is continuously discharged, so no condensate backs up into equipment allowing process temperature to be maintained.

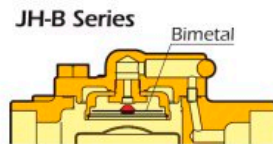
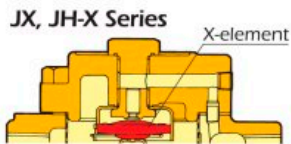
### The Optimal Air Vent for Any Application

The JX and JH series offer a variety of air vents and venting devices to offer an optimized solution for any application. From rapid air venting to extremely high-pressure applications, TLV offers an air vent to fit even the most demanding needs.



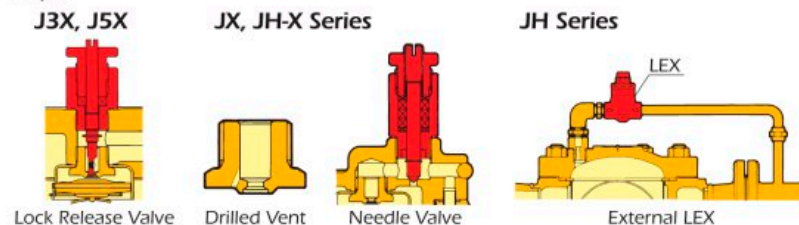
### Integral Automatic Air Vent

JX and JH-X series steam traps operate stress-free and their X-element type automatic air vents provide for rapid removal of air and non-condensable gases at start-up and during normal operation. JH-B series features a bimetal type automatic air vent for durable high temperature service and rapid start-up.



### Optional Venting Devices

Other JH series steam traps can be optionally equipped with automatic LEX air venting capability. For Rotating Can service, a lock release valve (needle valve) or drilled air vent is available on many JX and JH-X steam traps.\*



\*contact TLV for available models

### <Common Features>

#### Built-in Strainer

These steam traps also feature an integral screen with large surface area to extend trouble-free operation.

#### Inline Repairable

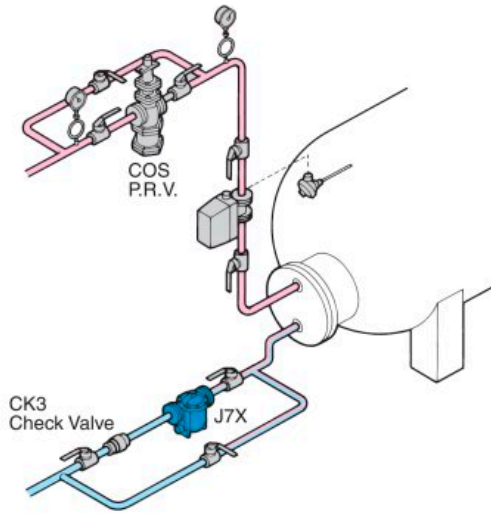
JX, JH-X and JH-B series steam traps are equipped with a removable cover to provide ease of inspection or maintenance without disturbing the piping.



# JX Series

Low-to-Med. Pressure	Small-to-Large Process
Medium Temperature	HVAC

Application: Heat Exchanger

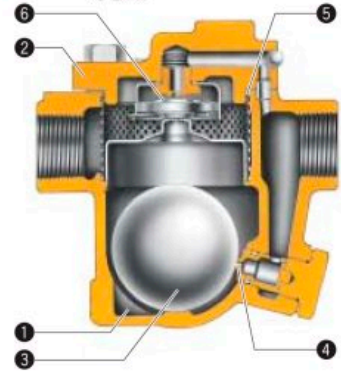


- Cast iron or ductile cast iron traps for low-to-medium pressure.
- J3S-X and J5S-X have stainless steel bodies.
- Automatic X-element air vent for fast start-up and venting air at close-to-steam temperature.
- Externally removable valve seat for inline inspection and repair.
- Internal float cover shields and protects float from water hammer.
- Reusable cover gaskets on J3X, J5X, J3S-X, J5S-X and J7X save maintenance costs.

No.	Description/Material
①	Body/Cast Iron, Ductile Cast Iron, or Stainless Steel
②	Cover/Cast Iron, Ductile Cast Iron, or Stainless Steel
③	Float/Stainless Steel
④	Orifice/-
⑤	Screen/Stainless Steel
⑥	X-element/Stainless Steel



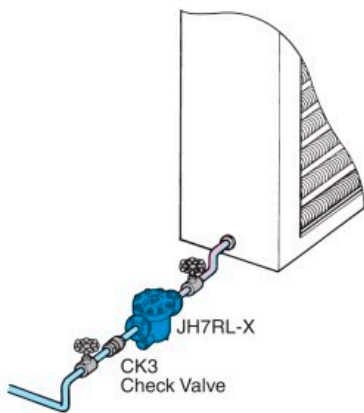
J3X



# JH-X Series

Low-to-High Pressure	Small-to-Large Process
Medium Temperature	Process Heater

Application: Heater Battery



- Cast steel or stainless steel traps for low-to-high pressure.
- Automatic X-element air vent for fast start-up and venting air at close-to-steam temperature.
- On most models, 3-point seating design ensures a steam-tight seal.
- Externally removable valve seat for inline inspection and repair.
- Internal float cover shields and protects float from water hammer.

No.	Description/Material
①	Body/Cast Steel or Stainless Steel
②	Cover/Forged Carbon Steel or Stainless Steel
③	Float/Stainless Steel
④	Orifice/-
⑤	Screen/Stainless Steel
⑥	X-element/Stainless Steel



JH3S-X



JH5RL-X

Model	J3X	J3S-X	J5X	J5S-X	J7X	J7.2X	J7.5X	J8X	JH3S-X**	JH5S-X**	JH5RL-X**	JH7RL-X**	JH7.2R-X**	JH7.5R-X	JH7.5RE-X**	JH8R-X
Connection*	S F	S,F	S F	S,F	S,F	F	F	F	S,W,F	S,W	S,W,F	S,W,F	F	F	F	F
Max. Allowable Pressure PMA (psig)	300 250	300	300 250	300	250	250	250	250	450	600	600	600	650	650	710	650
Max. Allowable Temperature TMA (°F)	428 428	428	428 428	428	428	428	428	428	662	800	800	800	800	800	800	800

\* S = screwed, W = socket weld, F = flanged \*\* 3-point seating type

## JH-B Series

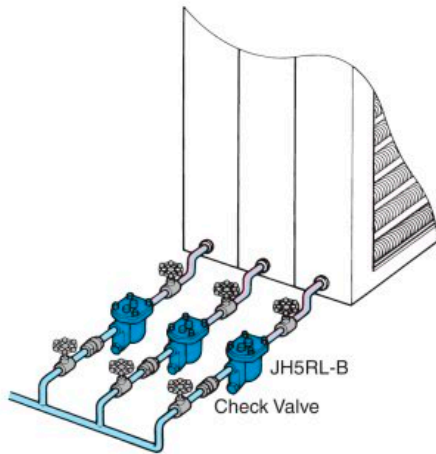
Low-to-High Pressure

Small-to-Large Process

Med.-to-High Temperature

Process Heater

Application: Heater Batteries

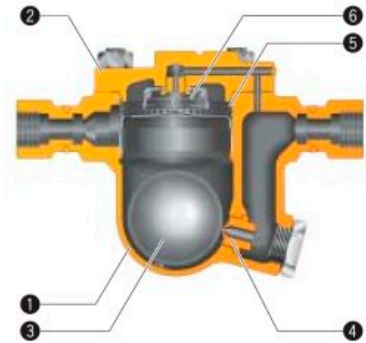


- Cast steel or stainless steel traps for low-to-high pressure.
- Automatic bimetal air vent for fast start-up.
- On most models, 3-point seating design ensures a steam-tight seal.
- Externally removable valve seat for inline inspection and repair.
- Internal float cover shields and protects float from water hammer.

No.	Description/Material
①	Body/Cast Steel or Stainless Steel
②	Cover/Forged Carbon Steel or Stainless Steel
③	Float/Stainless Steel
④	Orifice/-
⑤	Screen/Stainless Steel
⑥	Bimetal Plate/-



JH7RL-B



JH5RL-B

## JH Series

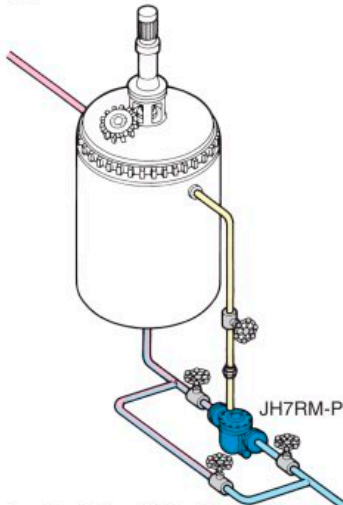
High Pressure

Small-to-Large Process

High Temperature

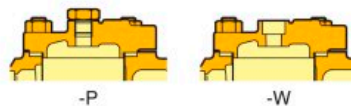
Dowtherm

Application: Reactor for Dowtherm



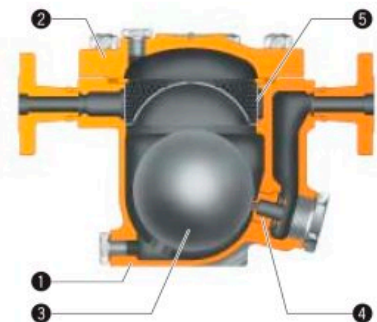
The JH7RHP is designed for high-pressure/high-temperature applications. The JH series can be specially fitted with a cover connection (such as for Dowtherm applications) or an external air vent. A screwed or socket weld connection is available. Equipped with the same features as the JH-B series other than air venting.

### Cover Connections



No.	Description/Material
①	Body/Cast Steel
②	Cover/Forged Carbon Steel
③	Float/Stainless Steel
④	Orifice/-
⑤	Screen/Stainless Steel

JH7RH-P



JH7RM-P (optional)

[Dowtherm is a trademark of Dow Chemical Co.]

Model	JH3S-B**	JH5SL-B**	JH5SH-B**	JH5RL-B**	JH5RH-B**	JH7RL-B**	JH7RM-B**	JH7RH-B**	JH7.2R-B	JH7.5R-B	JH7.5RE-B**	JH8R-B	JH7RH-P**
Connection*	S,W,F	S,W	W	S,W,F	W	W,F	S,W,F	W	F	W	W	F	W
Max. Allowable Pressure PMA (psig)	450	650	925	650	1150	650	925	1740	650	650	710	650	1740
Max. Allowable Temperature TMA (°F)	662	800	800	800	800	800	800	800	800	800	800	800	986

\* S = screwed, W = socket weld, F = flanged \*\* 3-point seating type

# FS-SS-SH Series

## <Common Features>

### 3-point Seating

These designs include “three-point” seating of the float for seal-tight shutoff with no steam loss even under low condensate flow condition.

### 3-point Seating



### Automatic Air Vent

Integral bimetal thermostatic air vent offers quick start-up and high resistance to water hammer.



### Inline Repairable

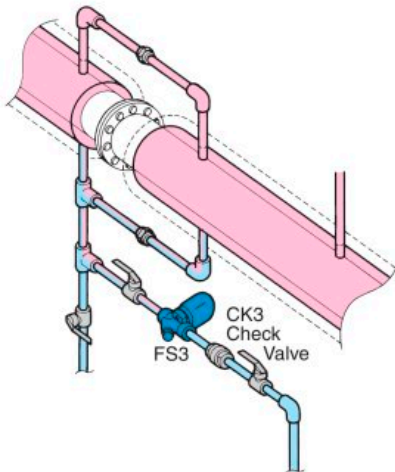
Removable cover (except FS3/5, and SS3/5) to provide ease of inspection or maintenance without disturbing the piping.



## FS Series

Medium Pressure	Small Process
Medium Temperature	Drip/Tracer

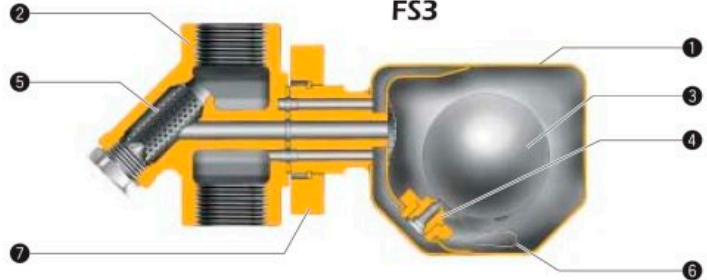
Application: Jacketed Tracer



- Stainless steel trap with 2-bolt universal connector facilitates installation and replacement.
- Universal flange permits correct installation in vertical and horizontal piping.



FS3



No.	Description/Material	No.	Description/Material
①	Trap Body/Stainless Steel	⑤	Screen/Stainless Steel
②	Connector Body/Cast Stainless Steel	⑥	Air Vent Strip/Bimetal
③	Float/Stainless Steel	⑦	Flange/Forged Carbon Steel
④	Orifice/-		

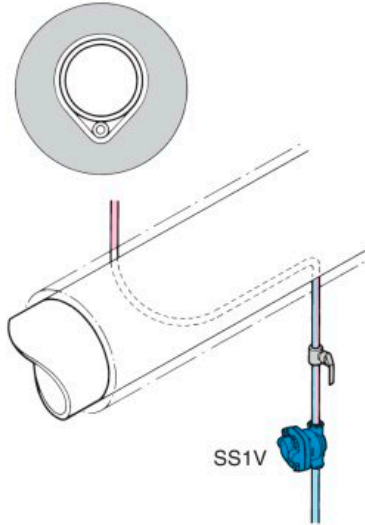
Model	FS3	FS5	FS5H
Connection*	S, W, F	S, W, F	S, W, F
Max. Allowable Pressure PMA (psig)	345	450	650
Max. Allowable Temperature TMA (°F)	752	752	800

\* S = screwed, W = socket weld, F = flanged

# SS Series

Medium Pressure	Small Process
Medium Temperature	Drip/Tracer

Application: Tracer



- All stainless steel traps for medium pressure.
- SS1N/V\* with removable cover for inspection and maintenance.
- SS3N/V\*, SS5N/V\*, SS5NH/VH\* with all-welded maintenance-free body.
- Recommended for superheat.

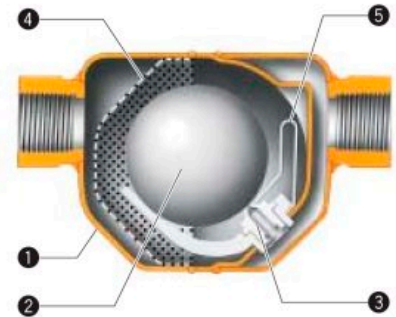
\* "N" for horizontal installation, "V" for vertical installation



SS3V

SS1N

No.	Description/Material
①	Body/Stainless Steel
②	Float/Stainless Steel
③	Valve Seat/-
④	Screen/Stainless Steel
⑤	Air Vent Strip/Bimetal
⑥	Insulation Cover (optional, not shown)

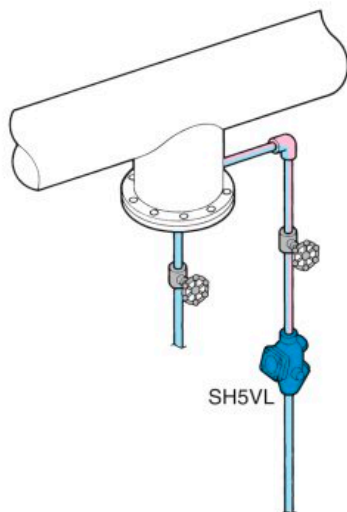


SS3N

# SH Series

High Pressure	Small to Medium Process
Superheat	Drip/Turbine

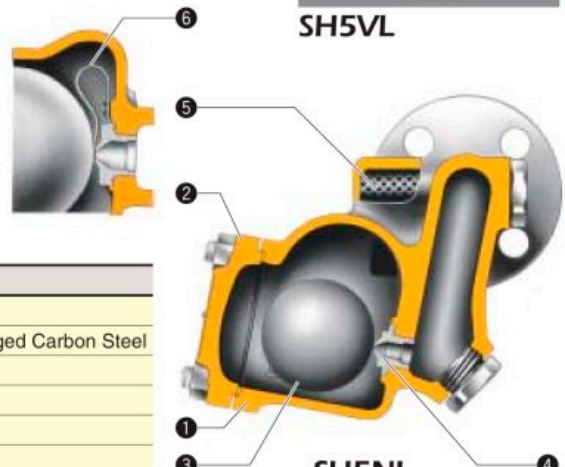
Application: Main (Drip)



- Cast steel traps for high pressure.
- Steam-tight, even under low condensate flow conditions.
- SH series traps offer horizontal installation, SH5VL offers vertical installation.
- Recommended for superheat.



SH5VL



SH5NL

No.	Description/Material
①	Body/Cast Steel
②	Float/Cast Steel or Forged Carbon Steel
③	Float/Stainless Steel
④	Orifice/-
⑤	Screen/Stainless Steel
⑥	Air Vent Strip/Bimetal

Model	SS1NL/VL	SS1NH/VH	SS3N/V	SS5N/V	SS5NH/VH	SH5VL	SH5NL	SH5NH	SH6NL	SH6NH
Connection*	S	S	S, F**	S	S, W	S, W	W, F	W, F	W, F	W
Max. Allowable Pressure PMA (psig)	300	300	345	650	650	925	925	1150	925	1500



Max. Allowable Temperature TMA (°F)	428	662	752	800	800	800	800	800	800	800
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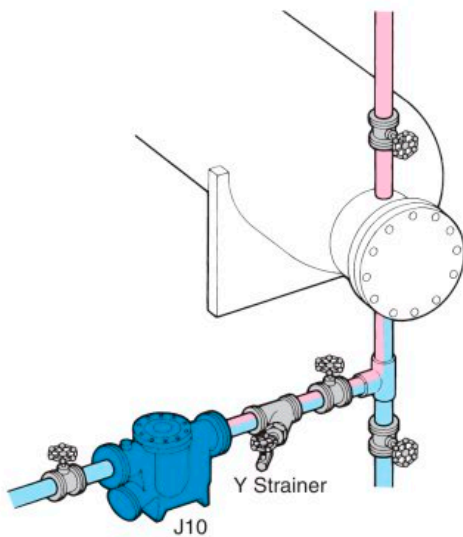
\* S = screwed, W = socket weld, F = flanged \*\* SS3V: S only

# Process Float Series

## J10, JH15

Medium-to-High Pressure	Extra Large Process
Medium-to-High Temperature	Extra Large Heater

Application: Large Re-Boiler



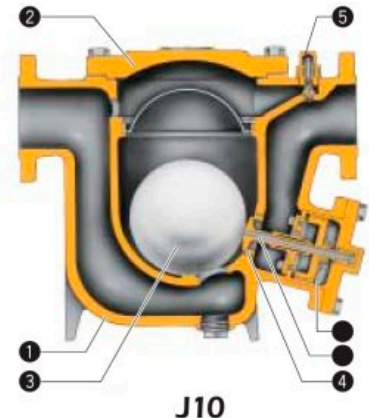
### Float Dynamic Principle:

When a large quantity of condensate flows into the trap, the float rises immediately, opening the orifice (E) wide. Condensate passes through the pilot orifice at a high velocity into the control chamber (F), where the pressure increases rapidly due to flashing condensate. The rapid expansion causes a force to be exerted on the piston, opening the large orifice instantly. As condensate discharges through the main orifice at high velocity, condensate in the equipment is induced into the trap for rapid discharge.

No.	Description/Material
①	Body/Stainless (J10) or Cast Steel (J10, JH15)
②	Cover/Cast Iron (J10) or Cast Steel (J10, JH15)
③	Float/Stainless Steel
④	Valve Seat/-
⑤	Air Vent/Stainless Steel



JH15

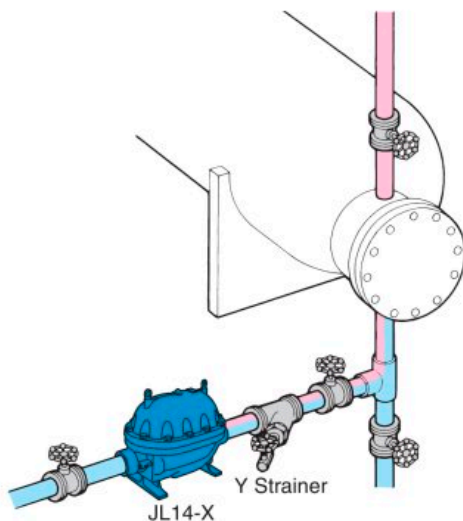


J10

## JL Series

Low-to-Medium Pressure	Extra Large Process
Medium Temperature	Extra Large Heater

Application: Large Re-Boiler

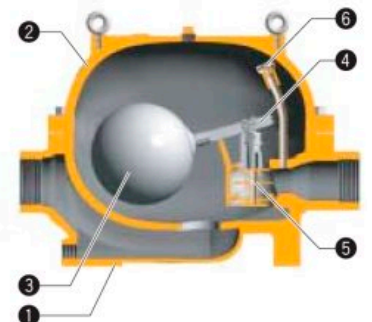


- Extremely durable, inline repairable cast iron or cast steel float trap for low-to-medium pressure.
- Automatic X-element air vent for fast start-up.
- Large double-seated valve with heat treat hardened working surfaces.
- Excellent resistance to water hammer.
- Inline inlet and outlet.

No.	Description/Material
①	Body/Cast Iron (JL9X, JL14-X) or Cast Steel (JLH9X, JLH14-X)
②	Cover/Cast Iron (JL9X, JL14-X) or Cast Steel (JLH9X, JLH14-X)
③	Float/Stainless Steel
④	Lever Unit/Stainless Steel
⑤	Trap Unit/Stainless Steel
⑥	X-element Air Vent/Stainless Steel




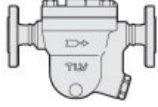

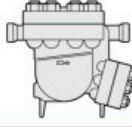
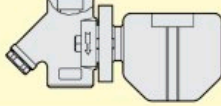
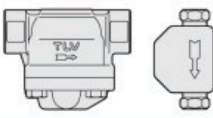
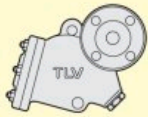
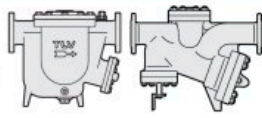
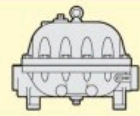
JL14-X



Model	J10	JH15	JL9X	JLH9X	JL14-X	JLH14-X
Connection*	F	F	S, F	S, W, F	S, F	S, W, F
Max. Allowable Pressure PMA (psig)	250	710	250	450	250	250
Max. Allowable Temperature TMA (°F)	428	800	428	464	428	750

\* S = screwed, W = socket weld, F = flanged

## Selection Guide

Model	Operating Pressure Range (psig)	Maximum Operating Temp (°F) TMO	Maximum Operating Capacity (lb/h)	Air Venting	Body Material	Application
<b>JX Series</b> 	Vacuum - 300	428	47,520	Automatic X-element	Cast Iron, Ductile Iron or Stainless Steel	Heat Exchangers Tank Heaters Coils, Dryers Unit Heaters Process Equipment
<b>JH-X Series</b> 	Vacuum - 450	464	40,000	Automatic X-element	Cast Steel or Stainless Steel	Heat Exchangers Tank Heaters Coils, Dryers Unit Heaters Process Equipment
<b>JH-B Series</b> 	1.5 - 1,500	800	14,950	Automatic Bimetal	Cast Steel or Stainless Steel	Steam Mains Turbines Tracer Lines Process Heaters Heat Exchangers
<b>JH Series</b> 	Vacuum - 1,740	986	970	Optional Automatic LEX	Cast Steel or Low Alloy Cast Steel	Steam Mains Small to Medium Process Equipment
<b>FS Series</b> 	1.5 - 650	752	1,510	Automatic Bimetal	Stainless Steel	Steam Mains Turbines Tracer Lines
<b>SS Series</b> 	1.5 - 650	800	1,510	Automatic Bimetal	Stainless Steel	Steam Mains Tracer Lines
<b>SH Series</b> 	1.5 - 1,500	800	2,110	Automatic Bimetal	Cast Steel	Superheated or High-Pressure Steam Mains Process Equipment
<b>J10 JH15</b> 	7 - 650	800	366,470	Manual Air Vent	Cast Iron or Cast Steel (J10) Cast Steel (JH15)	Large Capacity Process Equipment Heat Exchangers Heaters
<b>JL Series</b> 	Vacuum - 450	464	133,560	Automatic X-element	Cast Iron (JL9X/JL14-X) Cast Steel (JLH9X/JLH14-X)	Large Capacity Process Equipment Heat Exchangers Heaters

The highest figures listed may not apply to all traps within each series.

Full product details (sizes, pressures, capacities and materials) are included in the individual specification data sheets (SDS).

Local regulations may restrict the use of these products to below the conditions quoted.

Contact **TLV** directly or your local representative for further information.

Special **TLV** Free Float traps available for: ● Biotechnology Applications ● Dowtherm, ● Soot Blowing ● Gas and Air Applications



**DO NOT DISASSEMBLE OR REMOVE THIS PRODUCT WHILE IT IS UNDER PRESSURE.** Allow internal pressure of this product to equal atmospheric pressure and its surface to cool to room temperature before disassembling or removing. Failure to do so could cause burns or other injury. READ INSTRUCTION MANUAL CAREFULLY.

## TLV CORPORATION

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For Technical Service 1-800 "TLV TRAP"



Manufacturer

**TLV** CO., LTD.  
Kakogawa, Japan

is approved by LROA Ltd to ISO 9001/14001

ISO 9001/ISO 14001



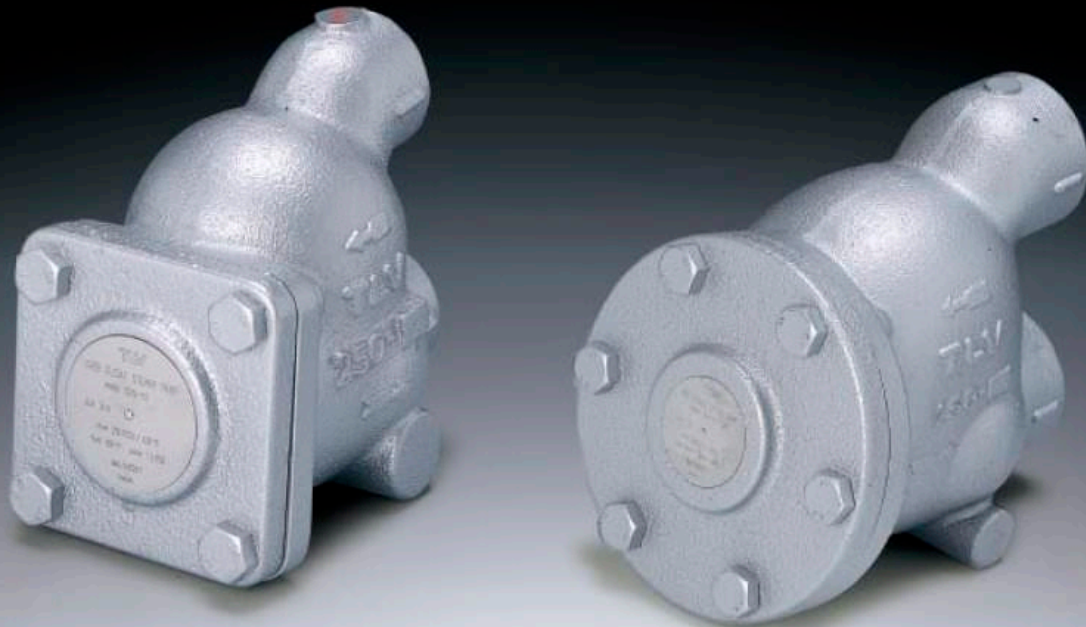
(O) **Internet World Wide Web URL <http://www.tlv.com>**

Pamphlet A2000 Rev. 8/2007  
Specifications subject to change without notice.

# TLV<sup>®</sup>

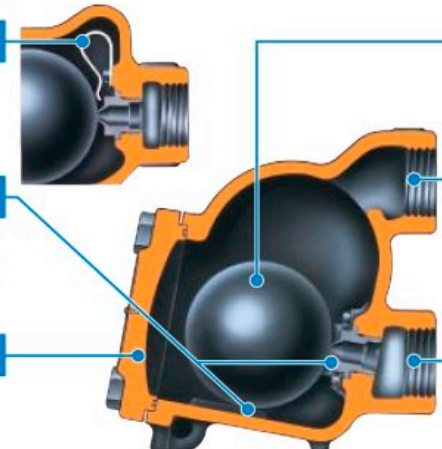
# FREE FLOAT STEAM TRAPS

## SJ Series



US. Pat. 5,186,203

# Compact and Light-Weight Steam Traps



**Rapid Initial Air Venting**  
Automatic bimetal air vent provides rapid air venting at start-up.

**Continuous Condensate Discharge**  
Self-modulating stainless steel free float provides continuous condensate discharge regardless of condensation rate. With virtually limitless sealing surfaces, the precision-ground float is durable with a long service life.

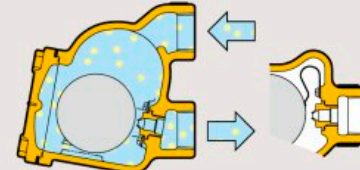
**Steam-Tight Seal**  
Three-point seating and constant water seal ensure steam-tight seal even under low-load conditions.

**Easy Maintenance**  
All internal parts can be accessed by removing the trap cover.

**Easy Installation**  
Same side inlet and outlet port connection allows for easy installation.

## Operation

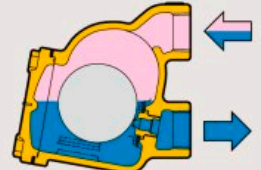
**1 Rapid Discharge of Initial Air**



During startup, the bimetal strip lifts up the float, opening the valve allowing air and cold condensate to be discharged as it flows into the trap.


■ Cold Water    ■ Air  
■ Steam        ■ Condensate

**2 Continuous Discharge**



As temperatures increase, the bimetal retracts, allowing the float to move freely. The float modulates with the condensate load, automatically adjusting the size of the orifice and the rate of condensate discharge.

**3 Tight Sealing**



When the flow of condensate stops, the float seats on the orifice supported by the orifice and two machined guides. The water level remains above the orifice to provide a steam-tight seal. The temperature keeps the bimetal retracted so that it does not affect the float's seating.

Model	SJ3	SJ5	SJ6	SJ7
Size (in.)	¾, 1	¾, 1, 1¼	1½, 2	1½, 2
Connection	Screwed (NPT)	Screwed (NPT)	Screwed (NPT)	Screwed (NPT)
Orifice No.	1, 2, 5, 10, 14	1, 2, 5, 10, 14	1, 2, 5, 10, 14	1, 2, 5, 10, 14
Maximum Operating Pressure (psig) PMO	15, 30, 75, 150, 200	15, 30, 75, 150, 200	15, 30, 75, 150, 200	15, 30, 75, 150, 200
Maximum Differential Pressure (psi) ΔPMX	15, 30, 75, 150, 200	15, 30, 75, 150, 200	15, 30, 75, 150, 200	15, 30, 75, 150, 200
Minimum Operating Pressure (psig)	1	1	1	1
Maximum Operating Temperature (°F) TMO	428	428	428	428
Maximum Allowable Pressure (psig) PMA	250	250	250	250
Maximum Allowable Temperature (°F) TMA	428	428	428	428
Maximum Discharge Capacity (lb/h)	1,360	2,540	7,320	14,180

Full product details (sizes, pressures, capacities and materials) are included in the individual specification data sheets (SDS).

**CAUTION** To avoid abnormal operation, accidents or serious injury, DO NOT use this product outside of the specification range. Local regulations may restrict the use of this product to below the conditions quoted.

**CAUTION** DO NOT DISASSEMBLE OR REMOVE THIS PRODUCT WHILE IT IS UNDER PRESSURE. Allow internal pressure of this product to equal atmospheric pressure and its surface to cool to room temperature before disassembling or removing. Failure to do so could cause burns or other injury. READ INSTRUCTION MANUAL CAREFULLY.

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# TLV<sup>®</sup>

## QuickTrap<sup>®</sup> Series

**FS3**  
**FP32**  
**FL32**

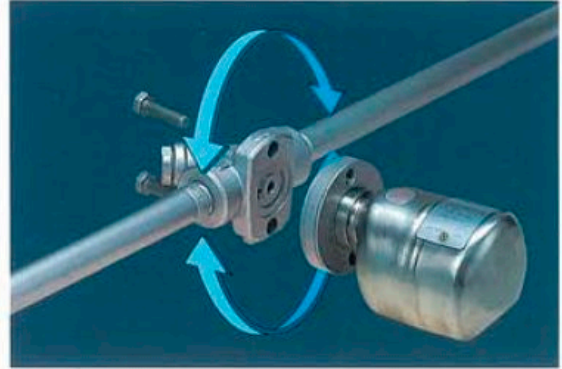
**Lower Your  
Replacement Costs**



**Unique Traps  
Cover Wide Range  
Of Applications**

# Quick Replacement

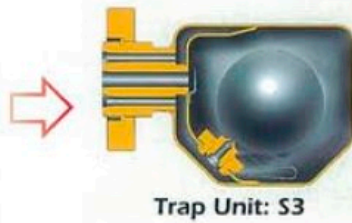
**TLV** QuickTrap two-bolt system will enable apprentice or entry level personnel to replace a steam trap in minutes. Also the design of the universal flange permits the installation of a steam trap in the correct position regardless of piping configuration.



# Application Choice

**TLV** QuickTrap series offers you a choice of trap principle to match the requirements of the application. Choose from Free Float, Thermodynamic and Thermostatic, to ensure maximum operating efficiency.

## Free Float: FS3\*



- Free Float ensures rapid removal of condensate.
- Unique "three point" seating provides tight shutoff.
- Bimetal vent for discharge of air at start-up.
- Stainless steel model available.

Choose the FS3 when it is essential that no condensate is held back in the steam space; e.g. Steam Main Drainage and High Temperature Tracing.

Max. Operating Press./Temp. (psig/°F): 300/752.  
 Min. Operating Pressure (psig): 1.5.  
 Max. Operating Capacity (lb/h): 475.



## Thermodynamic: FP32



- Rugged thermodynamic principle for arduous conditions.
- Air-jacketed cap as standard prevents rapid cycling.
- Bimetal vent as standard for discharge of air.

Choose the FP32 when low ambient temperature can cause "Freeze-ups"; e.g. Jacketed Pipe Tracing and Steam Main Drainage

Max. Operating Press./Temp. (psig/°F): 450/750.  
 Min. Operating Pressure (psig): 3.5.  
 Max. Operating Capacity (lb/h): 1200.

## Thermostatic: FL32\*\*



- Unique Fail Open feature of balanced pressure element (X-element).
- Outstanding air venting capability.
- X-element will continue to operate against high back pressure.

Choose the FL32 to prevent loss of heating on trap failure; e.g. Steam Tracing.

Max. Operating Press./Temp. (psig/°F): 450/464.  
 Min. Operating Pressure (psig): 1.5.  
 Max. Operating Capacity (lb/h): 930.

\* Higher pressure models, FS5 & FS5H are available  
 \*\* Lower pressure models, FL5 & FL21 are available

Please ask for SDS (Specification Data Sheet) for further information.

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# TLV<sup>®</sup>

## Clean Steam Traps

**LV6CE • LV6SF • LV6P  
SS5P  
P10**





Designed for Bio and  
Clean Steam Applications

# Clean Steam Trap

LV6 Series

SS5P

P10

CL

## All Stainless Steel Construction

- Low-quality stainless steel may corrode when exposed to water with even low ionic content. To solve this problem, the LV6 series and P10 use SUS316L, and the SS5P body/cover is made of A351 Gr. CF3M with an SUS316L float.

## Prevents Condensate Accumulation

- Smooth, virtually crevice-free interior allows for complete condensate drainage.
- The SS5P has a small drain hole to prevent condensate pooling.

LV6 Series

SS5P

Drain Hole

## Easy Disassembly and Cleaning

- Consists of only 5 simple components held together by easily removable clamps.
- Clamp pipe connections enable the trap to be easily removed from the pipeline.

## Prevents Bacterial Contamination

- Simply constructed clamp joining body and cover has few projections.
- Sanitary rubber gasket with a PTFE coat provides high durability and resistance to chemicals, heat and impurities.

- Ferrule clamp joint for clean steam (in accordance with Tri-Clamp\* standard) is used for connection to piping. Tube end connections are also available.
- \*Tri-Clamp is a registered trademark of Tri-Clover Inc.

- The LV6P\* has a uniquely designed free-draining electro-polished X-element case that allows complete fluid drainage and easy cleaning.
- \*LV6E and LV6SF use the standard X-element for Clean Steam Traps and a 2-piece clamp.

- The free float SS5P\* has a  $0.8\mu\text{m}$  Ra buff polish.
- \*The optional SS5EP has a  $0.4\mu\text{m}$  Ra buff and electro-polish



# LEAN STEAM TRAP

## Thermostatic Clean Steam Trap Compact LV6 Series

### What is the X-element?

- A multi-diaphragm valve mechanism filled with a thermoliquid which opens and closes the valve at approximately 11°F less than saturated steam temperature.



### Fail-open Safety Mechanism

- In the event of a damaged diaphragm, the LV6 is not blocked, but remains open, ensuring the operation of the steam using equipment.

### Automatic Air Venting

- The LV6 rapidly vents low temperature air and condensate at system start up, therefore reducing overall start-up time and improving productivity.
- In addition to rapid air venting at start up, air at near-to-steam temperature can be almost completely vented during operation, making the LV6 suitable for batch processes.

## Thermodyne Clean Steam Trap Cost Performance P10

### Air-jacketed Construction

- An insulating air pocket held above the pressure chamber slows radiant heat loss to reduce no-load cycling, minimizing steam loss and wear.



### Tight Sealing

- Precision-ground seating surfaces provide good sealing, lengthening the operation cycle, extending service life.

### Excellent Cost Performance

- The P10 achieves high reliability and performance for essential functions while maintaining the simplest, most cost-effective design

## Free Float Clean Steam Trap Continuous Discharge SS5P

### Continuous Discharge of Condensate

- The self-modulating free float automatically adjusts to the level of condensate allowing continuous discharge. There is no condensate backup or accumulation in the equipment.



### High Durability and Long Life

- The free float with simple construction and only one moving part, without levers or hinges, has less failure. Valve wear is distributed across the entire float surface, greatly improving valve service life.

### Suitable for Condensate Recovery

- Even with a back pressure of 99% of operating steam pressure, the free float operates without fail. The SS5P is therefore suitable for condensate recovery in closed systems.



## LV6 Series



LV6CE / LV6SF



LV6P

### ● Specifications

Model	LV6CE	LV6SF	LV6P
Material	Stainless Steel SUS316L		
Connection	Clamp End / Tube End		
Size (in)	1/2, 3/4, 1		
Maximum Operating Pressure (psig) PMO	85		
Minimum Operating Pressure (psig)	Vacuum		
Maximum Back Pressure	90% of Inlet Pressure		
Maximum Operating Temperature (°F) TMO	329		
Maximum Allowable Pressure (psig) PMA	150		
Maximum Allowable Temperature (°F) TMA	365		
Maximum Discharge Capacity (lb/h)	1700		
Subcooling of Capsule Fill (°F)	Up to 11		
X-element Type (for <b>Clean Steam Traps</b> )	Standard		Polished Free-draining
Clamp Type	2-Piece Clamp		3-Piece Clamp
Finishing (Internal/External)*	Natural Machining	0.8 μm Ra / 1.2 μm Ra Fine Machining	0.8 μm Ra / 1.2 μm Ra Polish

\* LV6EP with 0.4 μm Ra electro-polishing is available on request

## SS5P



### ● Specifications

Model	SS5P
Material	Body: Cast Stainless Steel A351 Gr. CF3M Float: Stainless Steel SUS316L
Connection*	Clamp End
Size (in)	1, 1 1/2
Maximum Operating Pressure (psig) PMO	85
Maximum Differential Pressure (psi) ΔPMX	85
Maximum Operating Temperature (°F) TMO	329
Maximum Allowable Pressure (psig) PMA	150
Maximum Allowable Temperature (°F) TMA	365
Maximum Discharge Capacity (lb/h)	1150
Clamp Type	3-Piece Clamp
Finishing (Internal/External)**	0.8 μm Ra Buff-polished / Bead-blasted and Electro-polished

\* Tube end connections available on request \*\* SS5EP with 0.4 μm Ra electro-polishing is available on request

## P10











### ● Specifications

Model	P10
Material	Stainless Steel SUS316L
Connection	Screwed   Clamp End
Size (in)	1/2
Maximum Operating Pressure (psig) PMO	150
Minimum Operating Pressure (psig)	Horizontally installed : 3.5 Vertically installed : 6
Maximum Back Pressure	80% of Inlet Pressure
Maximum Operating Temperature (°F) TMO	850
Maximum Allowable Pressure (psig) PMA	300
Maximum Allowable Temperature (°F) TMA	850
Maximum Discharge Capacity (lb/h)	530
Finishing (Internal/External)	Natural Machining / Natural Forged Surface

**CAUTION** To avoid abnormal operation, accidents or serious injury, DO NOT use this product outside of the specification range. Local regulations may restrict the use of this product to below the conditions quoted.

## TLV Stainless Steel Product Series

Steam Traps	Air & Gas Traps	Pressure Reducing Valves	Air Vents	Check Valves	Filters		
 SS1NL	 SS3N	 SS1VG	 COS	 DR20	 VS1C	 CKF3M	 SF1

Contact **TLV** for more information on these and other stainless steel products.

### CAUTION

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# TLV<sup>®</sup>

# THERMODYNE

## Steam Traps



## Thermodyne Steam Traps Have Winning Features to Save Steam and Money

Unique features make the Thermodyne the world's most efficient thermodynamic disc steam trap. The bimetal ring provides quick air venting at start-up and prevents air binding without the use of bypass valves; the mirror-polished disc seals tight; the air- or steam-jacketed pressure chamber prevents no-load

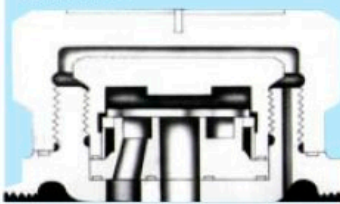
actuation and chattering by insulating the trap from ambient temperatures. Designed for top performance and durability, the Thermodyne effectively drains steam mains, branches, and tracer lines to keep your plant operating at peak efficiency.

### Bimetal Air Vent Ring



To reach full operating efficiency, air and condensate must be purged from steam lines. Conventional traps must be blown down manually with bypass valves, but the bimetal ring quickly and efficiently vents traps for rapid start-up without air binding.

### Jacketed Pressure Chamber

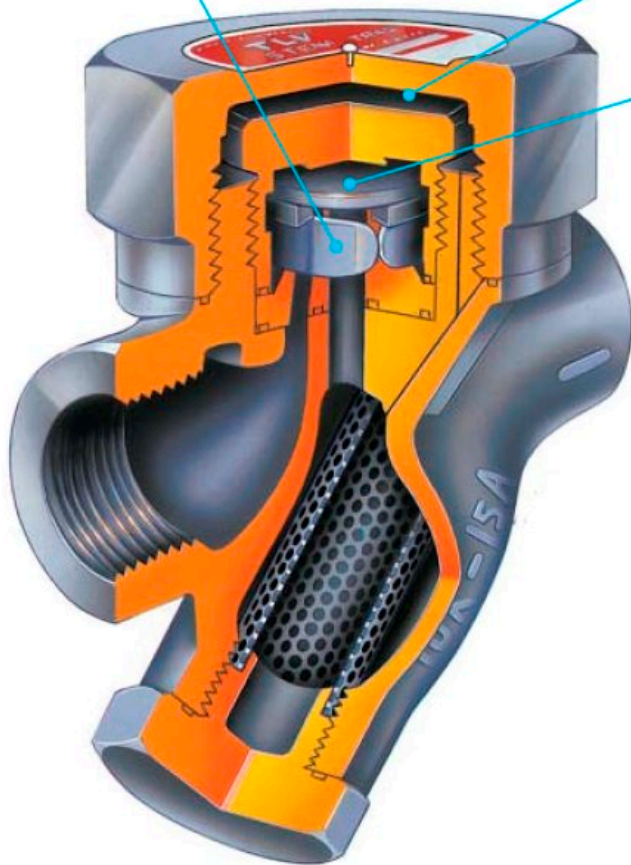


Radiant heat loss causes no-load actuation, which wastes steam and accelerates wear of both the disc and seat. Air or steam jackets insulate the pressure chamber to save steam and reduce wear.

### Lapped Disc

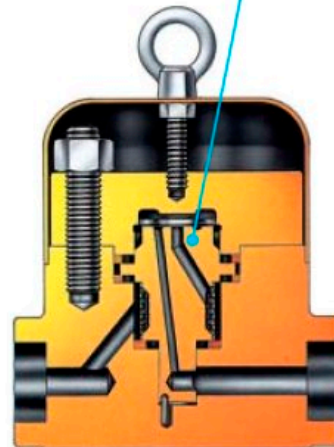


Conventional valve discs are rough ground or even slit to prevent air binding; they waste steam by leaking and no-load actuation. With the bimetal ring, the valve disc can be lapped, not ground, and mirror polished to a high tolerance. The resulting tight seal saves steam and lengthens the operation cycle for greatly extended service-life.



### Replaceable valve module

Many TLV traps have a replaceable valve module to facilitate inline replacement.

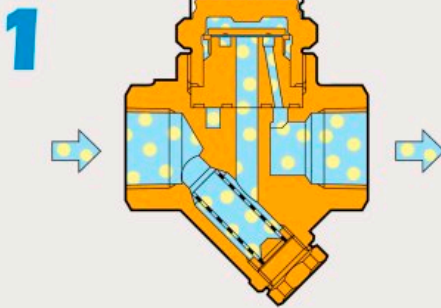


# Thermodyne Principles: A Look Inside the Standard-Setters

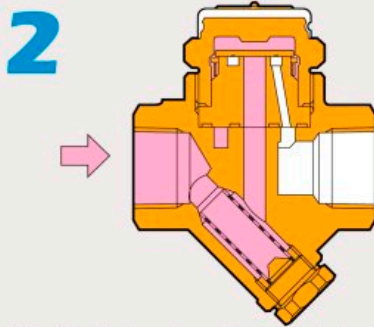
## Thermodyne traps with bimetal air vent ring

### How they operate

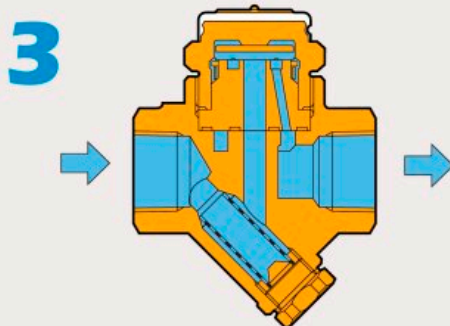
- Cold condensate
- Air
- Hot condensate
- Steam



At start-up, the bimetal ring holds the disc up until air and cold condensate have been discharged.



Entering hot condensate expands the bimetal and frees the disc. Steam flow creates a low-pressure region under the disc, which suctions it onto the seat. Also, pressure in the pressure chamber forces the disc down, closing the valve tightly. An air or steam jacket insulates the pressure chamber from the radiant heat loss that could cause no-load actuation from the drop in pressure.

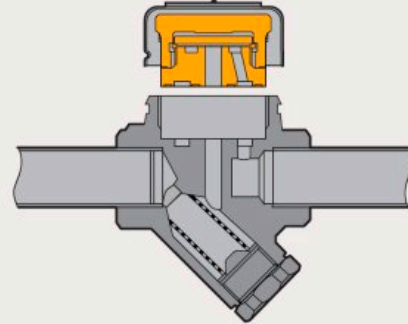


Condensate enters and lowers the steam pressure in the pressure chamber, allowing the inlet pressure to push the disc up and discharge the condensate. Entering flash steam then closes the trap, as in (2).

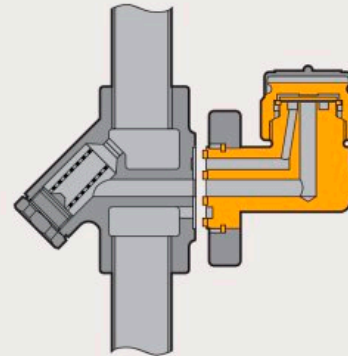
## Thermodyne traps with inline-replaceable module

### Different types available

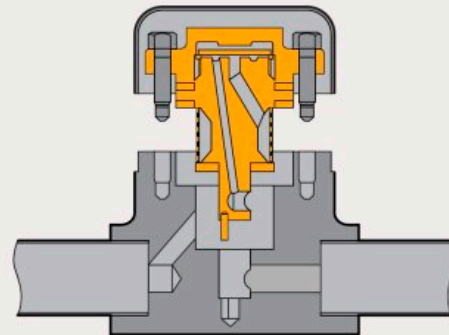
A Series Traps and P46SRN have a "drop in" module design for standard use on pressures up to 925 psig.



FP Series Traps use a "2 bolt" universal module design for standard use on pressures up to 450 psig.












HR Series Traps use a "draw bolt" module design for tightest sealing on pressures up to 3700 psig.



Whichever design is needed, TLV's inline-repairable traps will improve profits through energy and installation savings.

## The world's most advanced and complete thermodynamic disc trap range.

TLV manufactures a wide variety of Thermodyne Traps in all pressure and temperature ranges, and with multiple configurations to effectively drain condensate from steam mains, tracer lines and steam turbines. Select the model that fits your needs from low to supercritical pressure applications.

Thermodyne Models	Operating Press. Range psig	Max. Operating Temp. °F	Protection from Ambient Temperatures	Air Venting	Body Material
A3N (S)* 	5 - 230	428	Steam Jacket	Bimetal	Malleable Cast Iron (A47 Gr.32510)
P21S (S)* 	3.5 - 300	800	Air Jacket		Stainless Steel (AISI420)
P46SS (S)* 	3.5 - 650	800	Air Jacket	Bimetal	Stainless Steel (AISI420)
P46SRN (S, W)* 	5 - 650	800	Air Jacket	Bimetal	Carbon Steel (A105)
FP32 (S, W, F)* 	3.5 - 450	750	Air Jacket	Bimetal	Trap: Stainless Steel (AISI420) Connector Body: Cast Stainless Steel (A351 Gr.CF8)
A46S (S, W)* A46SR (S, W, F)* A46SW (S, W)* A50S (S, W)* A65S (S, W)* 	5 - 650 5 - 710 5 - 925	800	Air Jacket	Bimetal	Carbon Steel (A105) A46SW: Cast Steel (A216 Gr.WCB)
HR80A (S, W)* 	115 - 1150	887	Air Jacket	Bimetal	Alloy Steel (A182 F22 Cl.3)
HR150A (W)* 	230 - 2100	1022	Air Jacket		Alloy Steel (A182 F22 Cl.3)
HR260A (W)* 	230 - 3700	1022	Air Jacket		Alloy Steel (A182 F22 Cl.3)

\* Letters in brackets show pipe connections available: S = screwed, W = socket weld, F = flanged.

\*\* Model with replaceable module

Full details can be found on individual SDS.

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# TLV<sup>®</sup>

## BALANCED PRESSURE THERMOSTATIC STEAM TRAPS



U.S. Pat. 5,197,669



# X-ELEMENT

Patented "fail open"

## Design matches needs

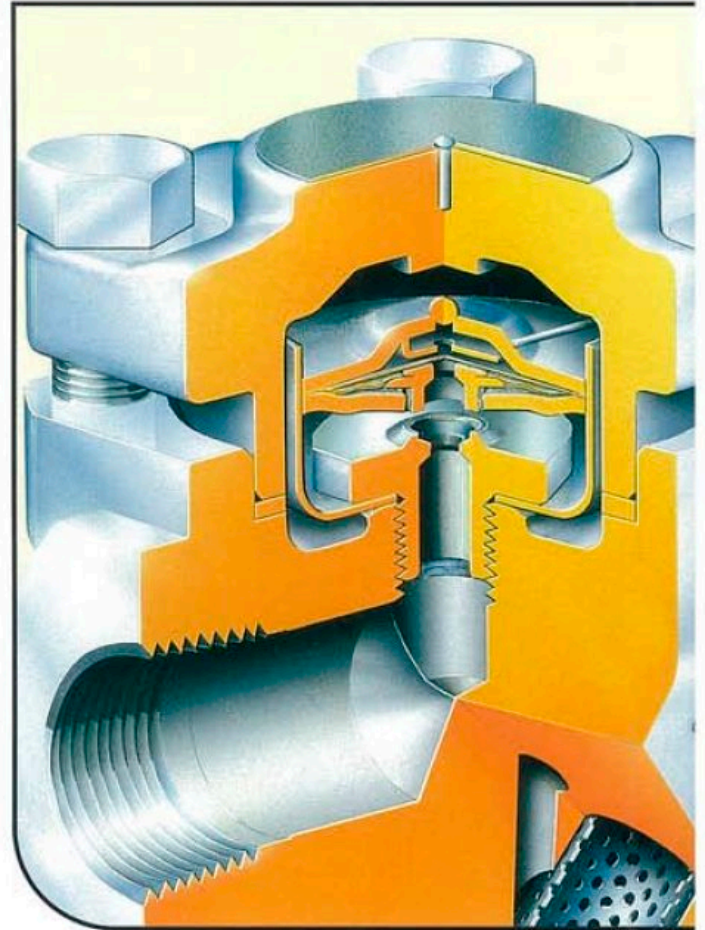
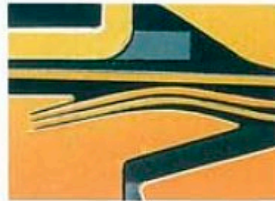
TLV "L-Series" Traps are manufactured with high quality to ensure excellent performance and life. Even so, failure of any mechanical device is inevitable and the consequences can be severe. A steam trap can either:

- \*"Fail open", causing much energy loss.
- \*"Fail closed", thereby accumulating condensate.

Failing closed can allow condensate back-up into the steam main where it is carried downstream with severe consequences such as water hammer. Also, a similarly dangerous situation exists when a trap fails closed on steam tracing, because the failure can cause the product to gel or even become permanently solidified in the line. TLV's "L-Series" thermostatic traps, with a patented nickel based alloy steel diaphragm "X-element" are designed to "fail open" and protect against unwanted condensate accumulation.

## Valve shape supports diaphragm

The valve has been designed to match the diaphragm contour. This provides the diaphragms with excellent support when internal pressure pushes them against the valve, and subsequently the danger of deformation or element rupturing is virtually eliminated.



## FAIL OPEN VS. FAIL CLOSED

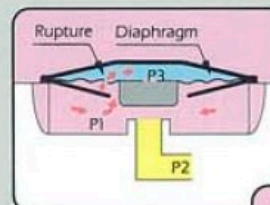
### "Which type is better?"

The thin diaphragm is the most delicate part of a thermostatic capsule. "Fail open" means that, except for plugging, the valve will fail open even if the diaphragm(s) break. "Fail closed" means that, while the trap may leak when failed, it also has a significant tendency to close tightly once failed. When a trap has "failed closed", condensate accumulates and can cause:

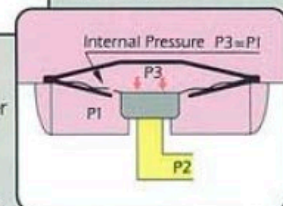
1. Water hammer
2. Low process temperatures
3. Solidification of the product in the traced line

... the "fail open" feature reduces the danger of production or operation losses and provides for a safer working environment.

### "Fail closed" elements have only two diaphragms, or can be bellows type:



1. When the diaphragm attached to the valve head breaks, its liquid fill escapes. This allows the primary pressure, P1 to build up in the chamber above the diaphragm.



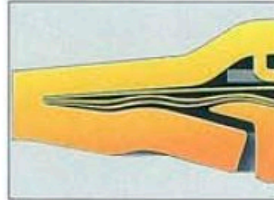
2. The internal chamber pressure, P3, equalizes with the incoming P1 and closes the valve. System drainage ceases.

# en" capsule resists water hammer and superheat.



## Case supports diaphragms

The protective case design is perfectly contoured to match the shape of the two lower diaphragms. Therefore, even if subjected to water hammer or excessive internal superheat pressure, the diaphragms are well protected from damage.



## Safety - "fail open" feature

The unique configuration of multiple diaphragms and a valve head with a center hole guarantees a "fail open" position should any valve part fail. Condensate will be discharged even in the event of damage to the X-element itself. Consequently, the process will not be disturbed or interrupted, nor will there be any danger of water hammer due to condensate back-up.

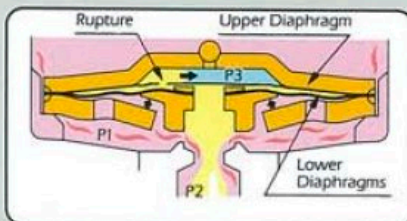


## Inline repairable

Inline maintenance of valve and strainer is easy with L-Series steam traps. Simply remove the cover and clip for valve access, or the strainer for cleaning.



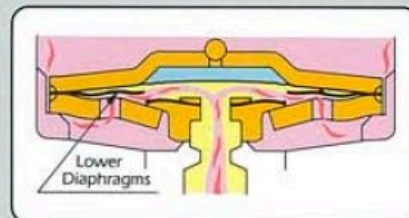
## TLV's "fail open" "X-element" When the Upper Diaphragm is Ruptured



The internal chamber pressure "P3", equalizes with the downstream pressure, "P2". This causes the lower diaphragms and attached valve head to be lifted by the primary pressure, "P1", which opens the valve.

The valve remains raised and the trap is "FAIL OPEN" as long as the primary pressure is maintained.

## When the Lower Diaphragms are Ruptured

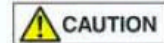
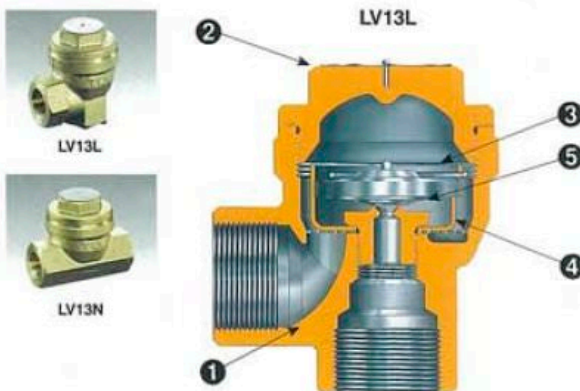
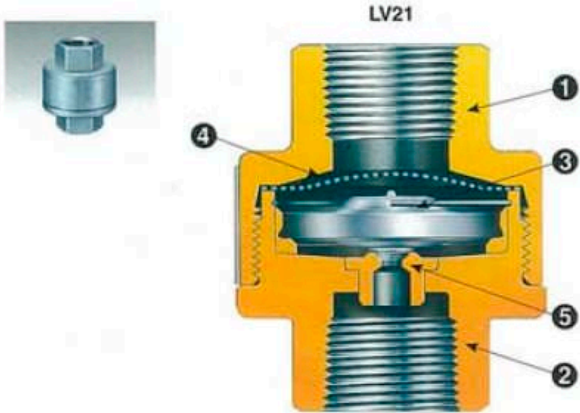
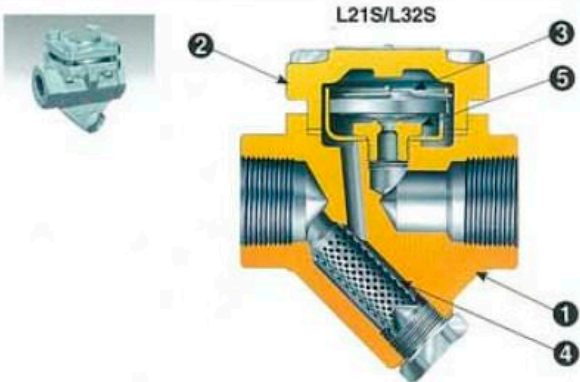


When the lower diaphragms suffer only a slight tear and the valve head is intact, the trap may leak, but it can still discharge condensate at the maximum discharge rate.

If the valve head (completely severed from the lower diaphragms) was fully seated, the condensate rate would drain through its center hole at approximately 60% of the trap's discharge rate.

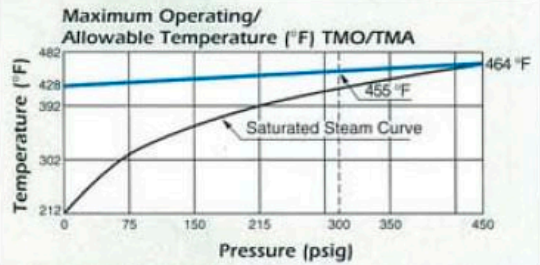


## Specifications



To avoid abnormal operation, accidents or serious injury, DO NOT use this product outside of the specification range. Local regulations may restrict the use of this product to below the conditions quoted.

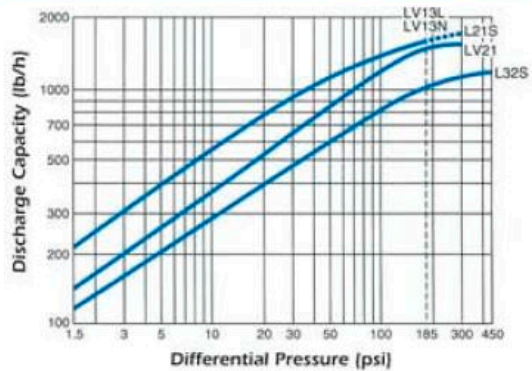
Model	Size (inch)	Max. Oper. Press. (psig) PMO	Max. Oper. Temp. (°F) TMO	Max. Allow. Press. (psig) PMA	Conn.
L21S	1/2, 3/4, 1	300	see graph below	450 at 572 °F	NPT SW Figd
L32S*		450			
LV21	1/4, 3/8 1/2, 3/4	300		300 at 572 °F	NPT
LV13L LV13N	1/2, 3/4	185	392	230 at 428 °F	



\* In-line replaceable universal flange model FL32 QuickTrap available

No.	Description	Material		
		L21S-L32S	LV21	LV13L LV13N
1	Body	Forged Steel Stainless Steel	Stainless Steel	Brass
2	Cover	Forged Steel Stainless Steel	Stainless Steel	Brass
3	X-element		Stainless Steel	
4	Screen		Stainless Steel	
5	Valve Seat		Stainless Steel	

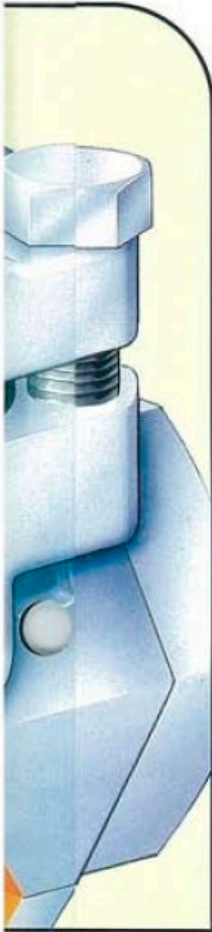
## Discharge Capacity



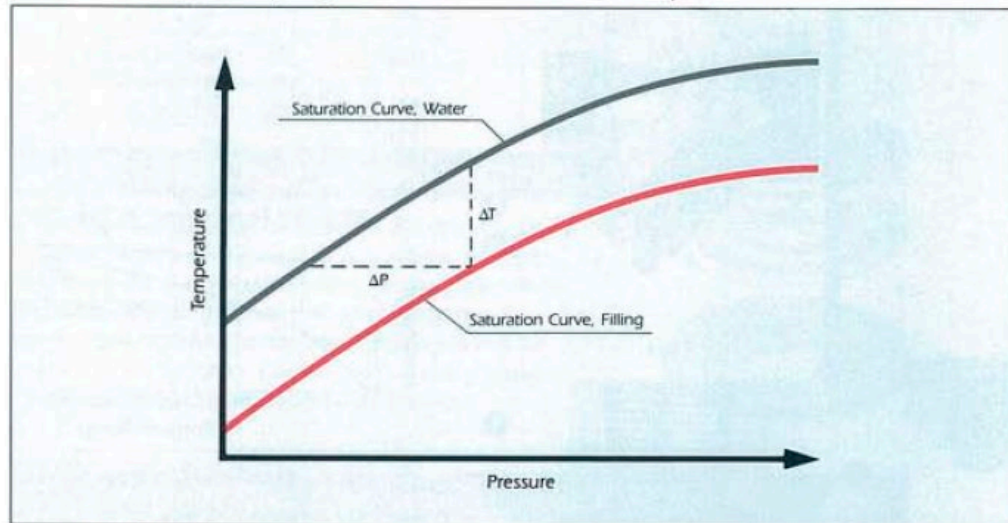
1. Differential pressure is the difference between the inlet and outlet pressure of the trap.
2. Recommended safety factor: 2.

Specifications subject to change without notice.

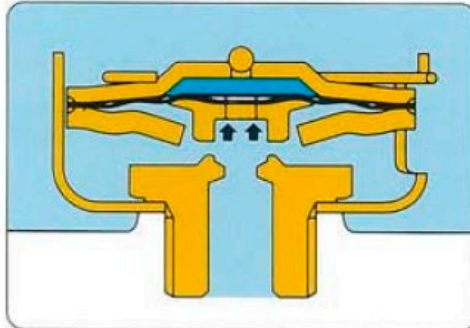
# en' capsule resists water hammer and superheat.



The "X-element" internal chamber contains a liquid fill whose saturation temperature is slightly lower than the saturation temperature of water. With rising condensate temperature reaching the trap, the fill evaporates and its resulting internal pressure expands the diaphragms to close the valve. When the condensate temperature cools, the fill condenses and its resulting pressure reduces allowing the diaphragms to contract for the valve to open.

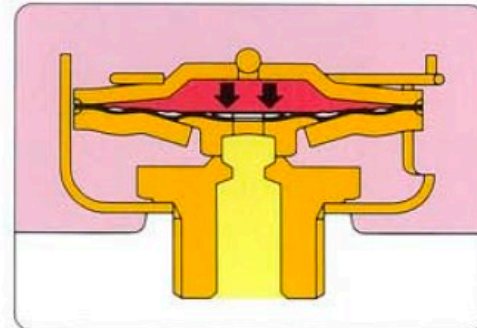


## VALVE OPEN



During start-up of steam using equipment, steam mains, or tracers, the fill is in the liquid state while the capsule is still cold. While the fill is liquid, the internal chamber pressure is lower than the external primary pressure. This difference allows the diaphragms to be raised by the external pressure and open the valve so that air, other incondensibles and condensate can be discharged.

## VALVE CLOSED



High condensate temperature evaporates the "X-element" fill and increases the internal chamber pressure to expand the diaphragms.

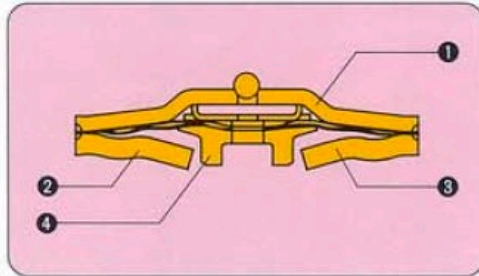
- The valve closes.

As the condensate temperature surrounding the element drops due to radiation heat loss, the vaporized fill cools and condenses lowering the internal chamber pressure. The diaphragms can then be lifted by the higher external pressure.

- The valve opens and discharges again.
- This operation repeats cyclically.

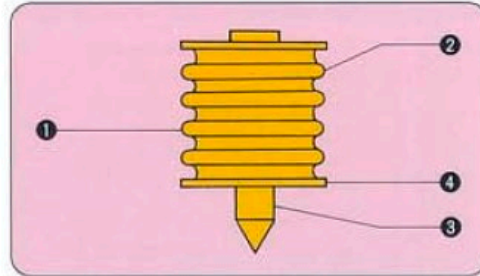
# "X-element" versus Bellows Type

## "X-ELEMENT"



- ① Welded, heavy duty all stainless steel case resists water hammer.
- ② Case withstands excessive internal pressure generated by surges or superheat.
- ③ Matching contour of case supports diaphragms and prevents deformation, even under severe pressure.
- ④ Shape of valve seat protects diaphragms from shock and supports them to prevent deformation from superheat and water hammer.

## BELLOWS



- ① Thin-walled element has no protective case to resist water hammer.
- ② No external case promotes element rupture under superheat, and deforms when subjected to shock.
- ③ Bellows units can fail either open or closed, without consistency.
- ④ Bellows can be made of welded stainless, but are often just of soldered bronze or monel manufacture.

## "L-SERIES" BALANCED PRESSURE THERMOSTATIC STEAM TRAPS SUMMARY

Maintainable steel-bodied, thermostatic traps with high air venting capability and light to medium condensate capacity for steam mains, tracing and process equipment.

1. Patented "fail open" design for critical service performance.
2. Hardened stainless steel valve head and seat for maximum life.
3. Positive open-close operation reduces valve wear.
4. "Pressure-to-close" valve design increases longevity.
5. Valve, four diaphragms and casing have matching contours for high superheat capability and water hammer resistance.
6. Large screen area promotes trouble-free service.
7. Self-draining for freeze protection in vertical installations.
8. Flat mirror-finish valve head provides tightest sealing for energy efficiency and life.
9. Compact and capable of self-adjusting to wide flow variations.
10. Cleanable and repairable design lowers maintenance costs.

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Manufacturer  
**TLV** CO., LTD.  
 Kakogawa, Japan  
 is approved by URDA Ltd. to ISO 9001/14001

ISO 9001/ISO 14001



# TLV<sup>®</sup>

## TEMPERATURE CONTROL STEAM TRAPS

### LEX3N-TZ

**With Built-in Scale Removal Function**

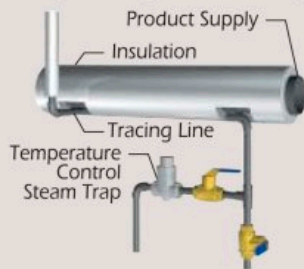


# Maintain the proper temperature of oils and other fluids in supply piping and heating tanks.

## What is a Temperature Control Steam Trap?

Temperature control steam traps can control the temperature of discharged condensate\*. Condensate with temperatures above the adjustable set temperature is held back in the piping, allowing the sensible heat in the condensate to be used for various heating applications.

The temperature control trap is useful for maintaining the fluidity of heavy oils, facilitating fluid pumping and transportation, preventing chemical or physical changes in the product due to cooling and preventing water from freezing in transportation pipes in cold areas.



\* Temperature of the condensate accumulating in the equipment or pipe and the product temperature cannot be set.

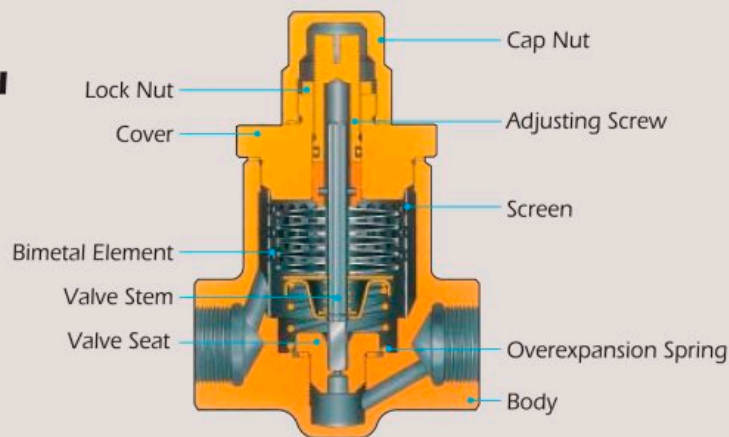
## Benefits

1. Maintains temperature at preset levels by adjusting the valve closing temperature.
2. Saves steam by heating the fluid to the optimum temperature utilizing the sensible heat of condensate.
3. No steam leakage.
4. Condensate discharge temperature can be adjusted without disconnecting the trap from the piping.
5. Initial air and cold condensate can be discharged quickly, with no air binding.
6. Scale removal function can eliminate obstructive buildup from the valve seat, even during operation.
7. All stainless construction.
8. The overexpansion mechanism prevents possible damage to the bimetal from superheated steam.
9. Built-in screen ensures trouble-free operation.
10. Easy, inline access to internal parts simplifies cleaning and maintenance.
11. Can be used as an automatic non-freeze valve.
12. Quiet operation.
13. No restriction in installation orientation.

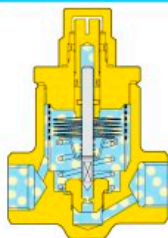
## Construction

### LEX3N-TZ

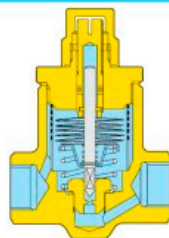
### All Stainless Steel



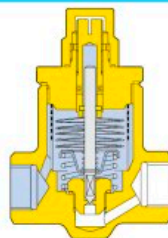
## Operation



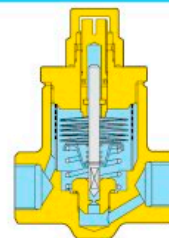
At startup, the bimetal element is contracted. The coil spring holds the valve open, quickly discharging the cold air and initial condensate.



When the condensate temperature rises, the bimetal begins to expand. The valve begins to close, allowing less condensate to flow.



When the condensate reaches the preset temperature, the valve shuts tightly, stopping all condensate discharge.



When the condensate temperature drops below the preset level, the element contracts. The coil spring opens the valve, allowing condensate to be discharged. Steps 3 and 4 alternate as condensate temperature changes.

## Scale Removal Function

**Clogs in the valve seat can be eliminated by simply isolating the trap, no need to remove the trap from the line.**

The temperature control steam trap used in tracing lines has a small opening in the valve seat designed to reduce the flow velocity – a functional requirement. However, because of this, the possibility of the valve clogging due to the scale and other buildup is higher than for other traps. The scale removal device enables the elimination of obstructions from the valve seat.

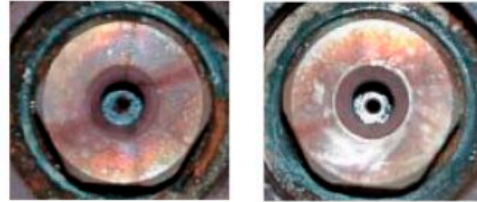
### Operating Scale Removal Device

1. Using a flat-head screwdriver, turn the adjusting screw. The sharp edge of the valve head shaves off scale and other buildup blocking the valve seat orifice.
2. By raising the adjustment screw, steam or condensate blows off the residue. This also cleans the other surfaces on the valve seat.



Clogging due to Scale

After Cleaning

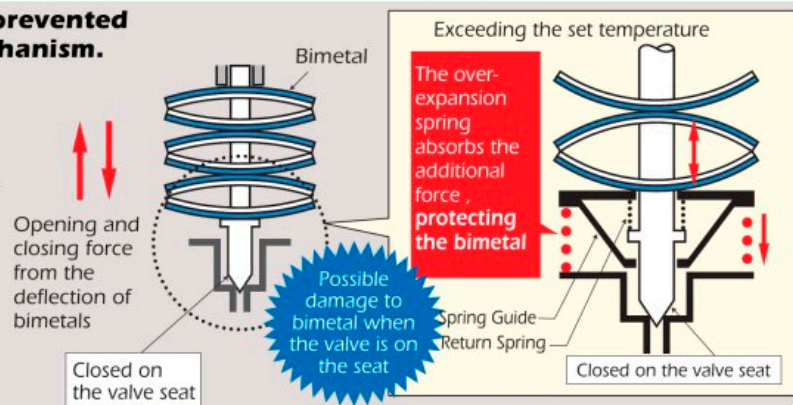


Not only is the obstruction removed from the orifice, but the surrounding valve seat surface is cleaned as well, a result of loosening the buildup followed by steam and condensate blowdown.

## Overexpansion Mechanism

**Damage to the bimetal is prevented by the overexpansion mechanism.**

Temperature control steam traps function through the deflection of bimetals due to rising or falling temperature, allowing the valve to open and close. Due to the possibility of damage to the bimetal following temperature rises when the valve is already on the seat, the LEX-TZ employs a coil spring to allow further expansion of the bimetal while the valve is closed: up to 390°F above the set value.



## Temperature Setting

**The discharge temperature can be adjusted and set to the desired temperature by simply adjusting the screw on the upper part of the LEX-TZ with a flat-head screwdriver.**

### Increasing the set temperature

Turn the screw:

▶ **Counterclockwise**

### Decreasing the set temperature

Turn the screw:

▶ **Clockwise**

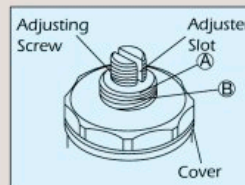
### Standard Factory Setting ("0" Position)

The standard "0" position is the position where point (A), the bottom of the adjusting screw slot is even with point (B), the top surface of the cap threads.

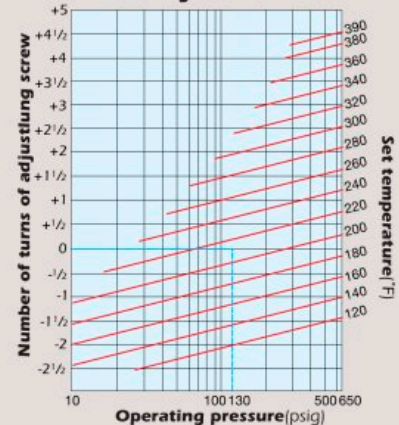
LEX3N-TZ : 212°F at 130 psig

From "0" on the graph, adjust the screw to the desired temperature

- counterclockwise
- clockwise



### LEX3N-TZ Adjustment chart



**DO NOT REMOVE CAP NUT OR COVER WHILE TRAP IS UNDER PRESSURE.** Allow trap body temperature to cool to room temperature before removing cap nut or cover. Failure to do so may result in burns or other injury. READ INSTRUCTION MANUAL CAREFULLY.



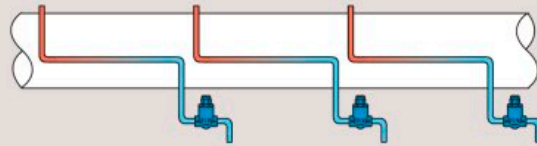
## Correct Usage of Temperature Control Steam Traps

### Examples of Correct Use:

**✓ Applications designed to utilize sensible heat of condensate**

- **SUITABLE** for steam tracing lines or storage tank coils **ONLY IF** the required product viscosity will be maintained when the condensate is sub-cooled at least 27 F, even to the point of the condensate having a lower temperature than the product temperature.
- **SUITABLE** for use on instrument enclosures **ONLY IF** the steam or condensate temperature in the enclosures will **NOT** damage the instrument.
- **SUITABLE** for use as an external air vent for TLV steam traps, or as a non-freeze valve for freeze protection of condensate lines.

Example: Steam tracing on an oil supply pipe



### Examples of Incorrect Use:

**✗ Applications requiring the rapid removal of condensate or applications designed to use latent heat of steam**

- **DO NOT USE** on any application **except** steam tracing lines, storage tank coils, instrument enclosures, steam trap air venting, and freeze protection of condensate lines.
- **NOT SUITABLE FOR USE** on steam tracing lines or storage tank coils **IF** the required product viscosity will **NOT** be maintained when the condensate is sub-cooled at least 27 F.
- **NOT SUITABLE FOR USE** on steam tracing lines or storage tank coils **IF** the heated product will solidify at temperatures of 176 F or higher. (e.g., asphalt or sulfur).
- **NOT SUITABLE FOR USE** on steam tracing lines or storage tank coils designed to use only the latent heat of steam to maintain product fluidity at temperatures of 176 F or less. (e.g., certain heavy oils).

Incorrect use of a temperature control steam trap could lead to significant system problems. Careful consideration is required, bearing the following in mind.

**Heating with sensible heat**

➔ Temperature control steam trap

**Heating with latent heat**

➔ General purpose steam trap

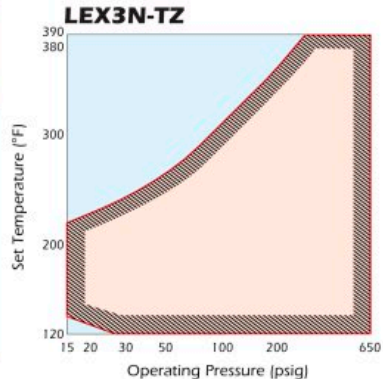
## Specifications

Model	Connection	Size (in)	Maximum Operating Pressure (psig)	Minimum Operating Pressure (psig)	Maximum Operating Temperature (°F)	Condensate Temperature Setting Range (°F)	Maximum Discharge Capacity** (lb/h)
<b>LEX3N-TZ</b>	Screwed	3/8, 1/2 3/4, 1	650	15	662	120 - 390*	970
	Socket Weld						
	Flanged	1/2, 3/4 1					

\* Set temperature should be more than 27 °F below the steam saturation temperature; see graph, right  
 \*\* Actual discharge capacity will vary depending on operating conditions; see specification data sheet (SDS) for details

PRESSURE SHELL CONDITIONS (NOT OPERATING CONDITIONS): Maximum Allowable Pressure (psig) PMA: 900  
 Maximum Allowable Temperature (°F) TMA: 800

## Temperature Setting Range



To avoid abnormal operation, accidents or serious injury, **DO NOT** use this product outside the specification range. Local regulations may restrict the use of this product to below the conditions quoted.

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Manufacturer

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ISO 9001/ISO 14001



**TLV**<sup>®</sup>

**RADIATOR TRAP**

**RT3A**



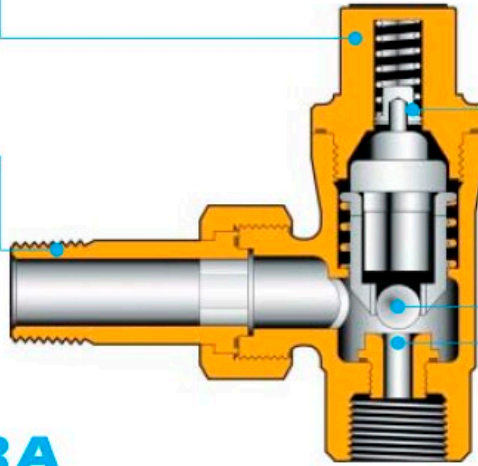
# Improved Performance – Less Maintenance

## Easy Maintenance

All internal parts can be accessed by removing the trap cover.

## Labor-Saving Design

A unique nipple is incorporated into the trap inlet to facilitate installation and removal of the trap with wrenches and channel-locks.



## Overexpansion Protection

The thermo-element is protected from overexpansion by the overexpansion spring, providing stable performance and long life.

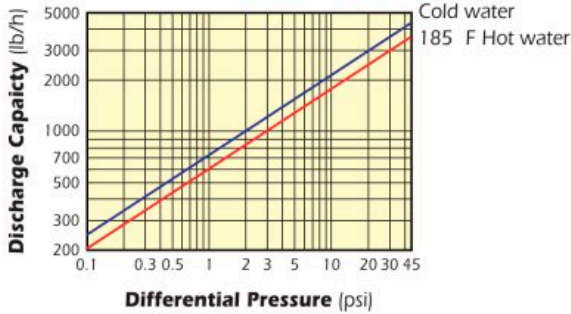
## Durable Construction

No leakage through the trap orifice, due to the durability and smooth sealing of the ball valve.

## Improved Valve Seat

A larger valve orifice permits more rapid purging of rust, scale and initial air, allowing faster warm-ups.

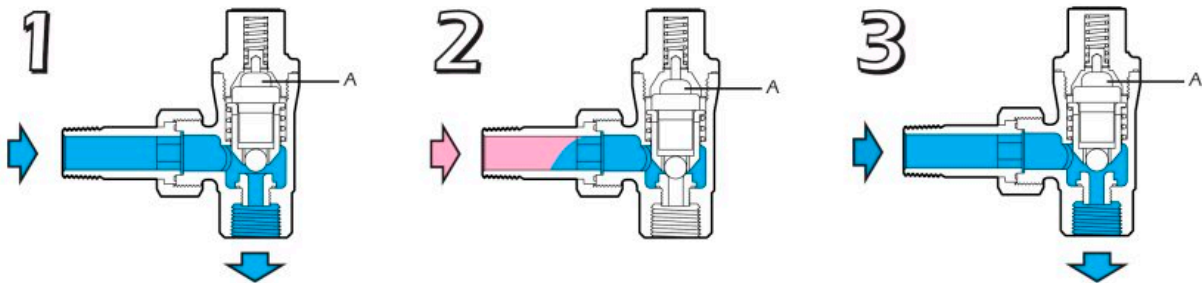
## Radiator Trap RT3A



Body Material	Brass
Connection	Screwed
Size	1/2", 3/4"
Max. Operating Pressure	PMO 45 psig
Min. Operating Pressure	1.5 psig
Max. Operating Temperature	TMO 292 F
Max. Allowable Pressure	PMA 45 psig
Max. Allowable Temperature	TMA 292 F
Open-Close Temperature	approx. 203 F – 212 F

**CAUTION** To avoid abnormal operation, accidents or serious injury, DO NOT use this product outside the specification range. Local regulations may restrict this product below the conditions quoted.

## Operation



At low temperatures during start-up, the thermo-element (A) is fully retracted, keeping the valve fully open and allowing air and condensate to be discharged.

After discharging the initial condensate from start-up, as the condensate temperature raises past approx. 212 F the thermo-element (A) expands and pushes the valve shut.

When the temperature of the condensate in the trap drops below approx. 203 F, the thermo-element (A) retracts, discharging condensate. If the temperature raises above approx. 212 F, the valve shuts again as in step 2.

**CAUTION** DO NOT DISASSEMBLE OR REMOVE THIS PRODUCT WHILE IT IS UNDER PRESSURE. Allow internal pressure of this product to equal atmospheric pressure and its surface to cool to room temperature before disassembling or removing. Failure to do so could cause burns or other injury. READ INSTRUCTION MANUAL CAREFULLY.

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