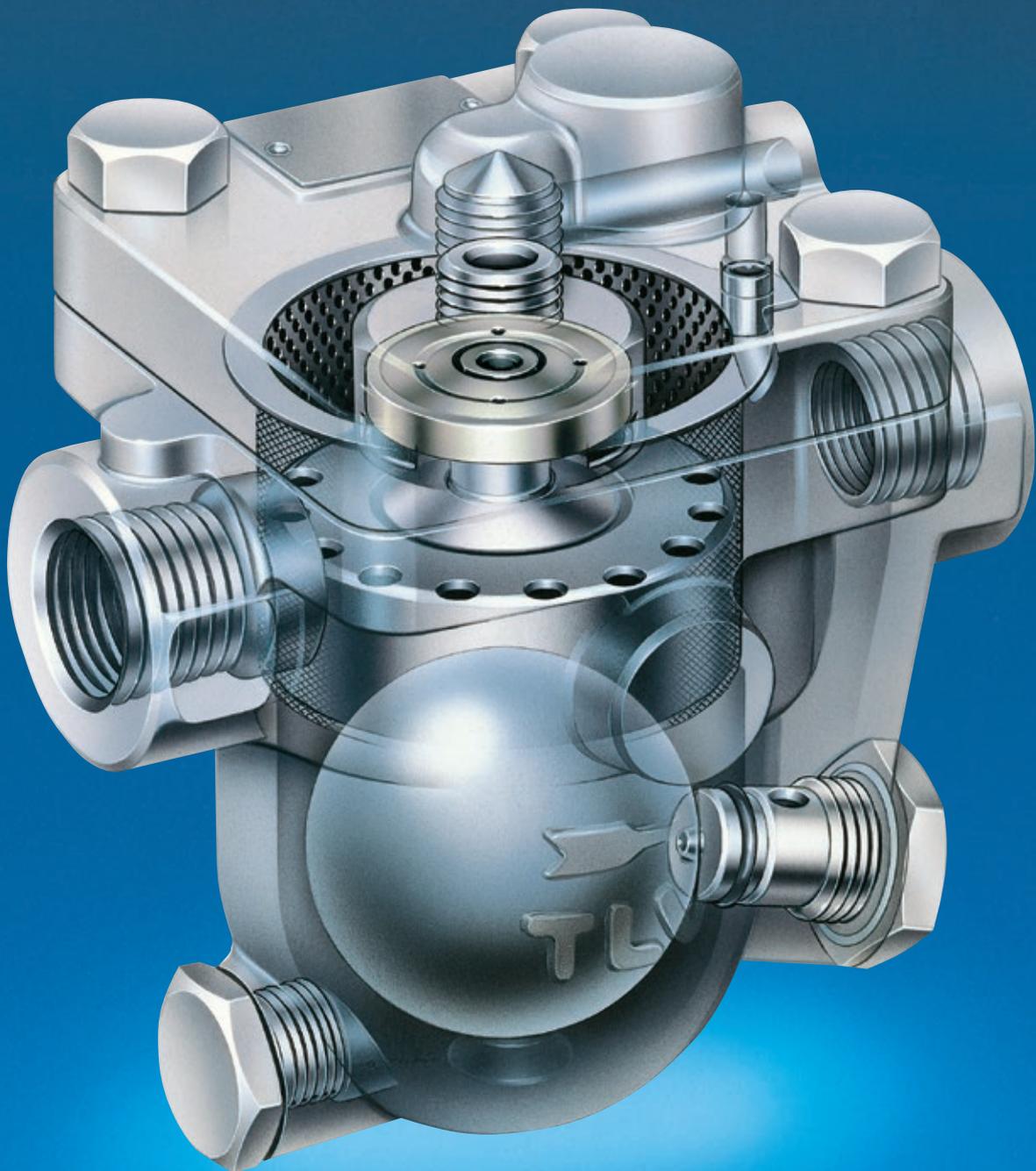


# TLV<sup>®</sup>

## Free Float<sup>®</sup> Steam Trap Series



# Free Float® Steam Traps Revolutionizing Fluid Control Technology



## “Free Float®”

**More than 50 years have passed since TLV introduced the free float concept to the steam industry. Now being used in increasing numbers within manufacturing plants throughout the world, TLV free floats are ensuring that process plant performance is maximised.**

### **Free Float® Principle**

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The failure of mechanical steam traps is related to the number of their moving parts. Compared to the inverted bucket trap, with its complex mechanism incorporating bucket, lever and hinge, the TLV free float, with only one moving part, guarantees long life and reliability.

### **Precision-ground Spherical Float**

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The high quality manufacturing process produces floats which are almost perfectly spherical. The result is a free float steam trap with unmatched sealing performance, even when operating under conditions of low condensate flow at high pressure and temperature.

### **“Simple is best”**

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The uncomplicated yet sophisticated technology of TLV’s free float trap encapsulates the TLV philosophy that simple is best.

# The First Choice for Process Efficiency

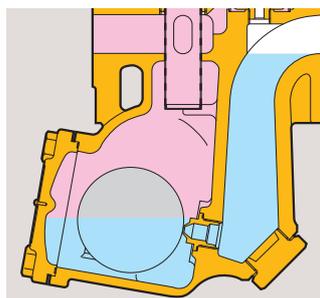
## The Reasons are Simple

### 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 where condensate is to be recovered.

### 2 Energy Conservation

A valve orifice positioned below the "water level" and three-point seating in some models eliminate steam leakage, even under low-load conditions.



### 3 Long Life

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



### 4 Built-in Strainer

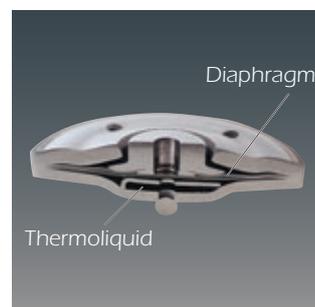
All internals are protected by an integral perforated stainless steel strainer screen.

### 5 Rapid Start-up

A balanced pressure X-element is included in the JX, JH-X, SJFX and SJHX free float traps, for improved air venting. Other models are equipped with an integral bimetal air vent.



Bimetal



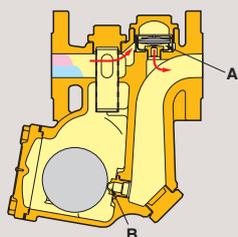
X-element

### 6 Easy maintenance

Free float traps, with the exception of the maintenance-free SS3/SS5 series, can be repaired inline.

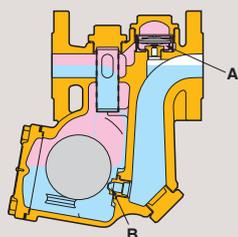
## FREE FLOAT® OPERATION (X-element)

### 1 Start-up



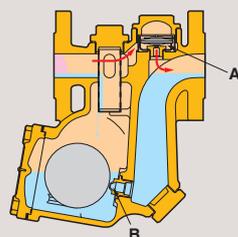
When the trap is cool, a thermo-static capsule (X-element) contracts and valve port (A) opens wide to continuously discharge initial air. As cold condensate enters the trap, the float rises to allow discharge of condensate from valve port (B) and both air and condensate from valve port (A).

### 2 Hot Condensate Discharge



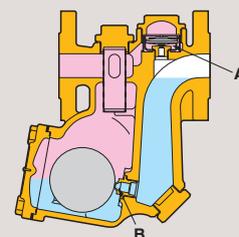
Once all initial air and cold condensate have been discharged, hot condensate heats the X-element which closes valve port (A) before steam reaches the trap. Condensate which simultaneously enters the trap continues to be discharged through valve port (B).

### 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



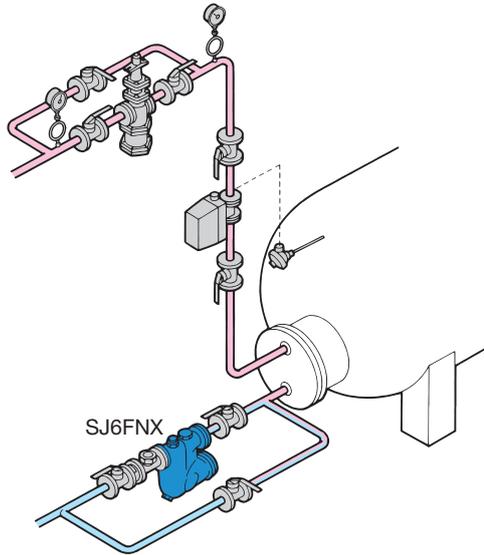
When condensate flow to the trap ceases, the float closes valve port (B) which is always sealed below the water level. The upper section fills with steam and the X-element closes valve port (A). The trap is then completely sealed, preventing any steam leakage.

# SJX/FS/FJ Series

## SJX Series

Medium Pressure	Process
Medium Temperature	Small-to-Large Equipment

### Sample Application: Heat Exchanger



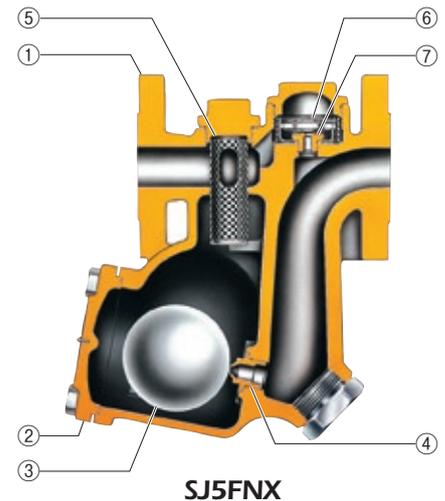
- Ductile cast iron PN 40 steam traps for pressures up to 22 barg.
- Automatic X-element air vent for fast start-up and venting air at close-to-steam temperature.
- The SJFNX models are for horizontal installation, the SJFVX models for vertical installation.
- SJ3V-X with screwed connection for vertical installation only.



SJ5FNX

SJ5FVX

No.	Description/Material
①	Body/Ductile Cast Iron
②	Cover/Ductile Cast Iron
③	Float/Stainless Steel
④	Orifice/ —
⑤	Screen/Stainless Steel
⑥	X-element/Stainless Steel
⑦	Air Vent Seat/Stainless Steel

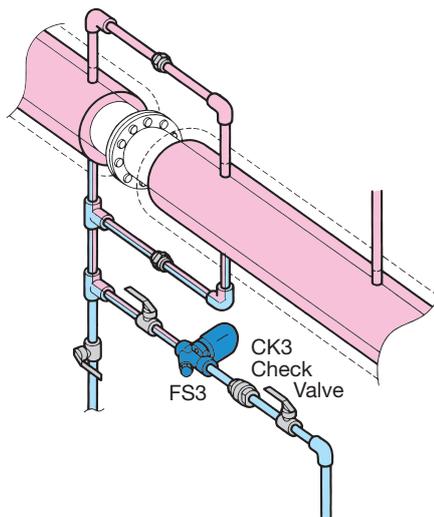


SJ5FNX

## FS Series

Medium Pressure	Small Process
Medium Temperature	Drip/Tracer

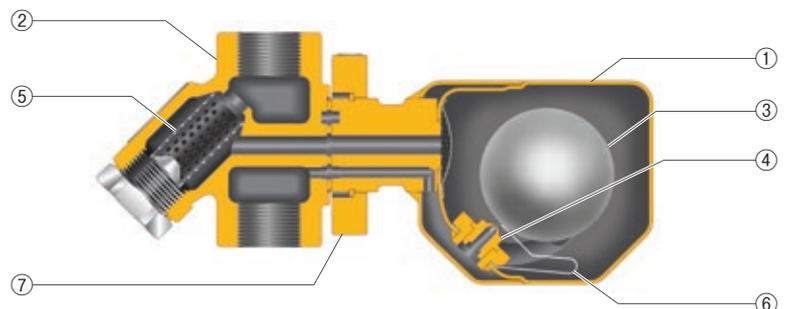
### Sample Application: Jacketed Tracer



- Stainless steel traps with two-bolt universal connector facilitate installation and replacement.
- Universal flange permits correct installation in vertical and horizontal piping.
- Automatic bimetal air vent for fast start-up. (QuickTrap)



FS3



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

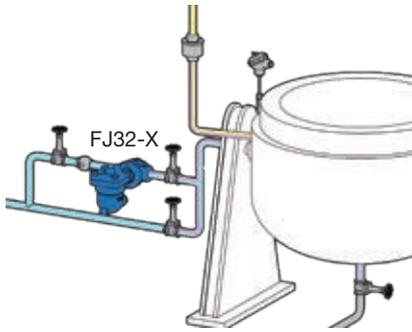
Model	SJ3V-X	SJ3FN/VX	SJ5FN/VX	SJ6FN/VX	SJ7FN/VX	FS3	FS5	FS5H
Connection <sup>1)</sup>	S	F	F	F	F	S, W, F	W, F	W, F
Maximum Operating Pressure (barg)	22	22	22	22	22	21	32	46
Maximum Operating Temperature (°C)	220	220	220	220	220	400	400	400 <sup>2)</sup> /425

<sup>1)</sup> S = Screwed, W = Socket Welded, F = Flanged <sup>2)</sup> With PN flange

# FJ Series

<b>Medium Pressure</b>	<b>Small Process<sup>1)</sup></b>
<b>Medium Temperature</b>	<b>Drip<sup>2)</sup></b>

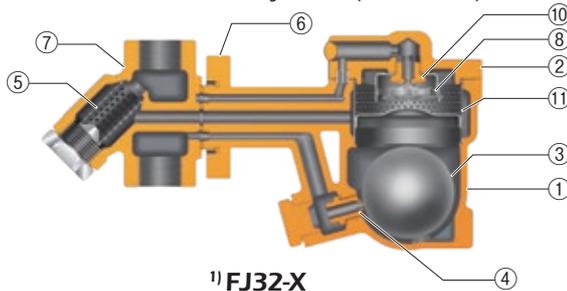
## Application: Jacketed Kettle



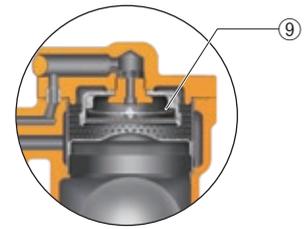
- Universal flange allows trap to be positioned in the correct attitude, regardless of the pipeline configuration.
- Built-in screens in connector and trap body protect and keep trap module replacement costs low.
- FJ32-X: Thermostatic capsule (X-element) with “fail open” feature vents air automatically at close-to-steam temperature.
- FJ32-B: Thermostatic bimetal air vent valve vents air automatically for rapid startup.



FJ32-X/FJ32-B



<sup>1)</sup> FJ32-X



<sup>2)</sup> FJ32-B

No.	Description/Material	No.	Description/Material	No.	Description/Material
①	Trap Body/Stainless Steel	⑤	Screen/Stainless Steel (F46)	⑨	Bimetal Plate/ —
②	Trap Cover/Stainless Steel	⑥	Flange/Forged Carbon Steel	⑩	Air Vent Valve Seat/ —
③	Float/Stainless Steel	⑦	Connector Body/Stainless Steel	⑪	Screen/Stainless Steel (J32)
④	Orifice/ —	⑧	X-element/ —		

Model	FJ32-X	FJ32-B
Connection <sup>3)</sup>	S, W, F	S, W, F
Maximum Operating Pressure (barg)	32	32
Maximum Operating Temperature (°C)	240	350

<sup>3)</sup> S = Screwed, W = Socket Welded, F = Flanged

## Common Features

### Three-point Seating

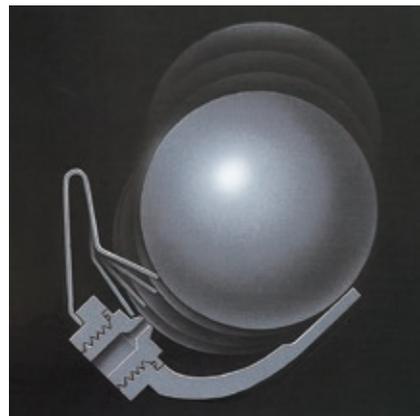
These designs include “three-point” seating of the float for seal-tight shutoff with no steam loss even under low condensate flow condition.

### Three-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.

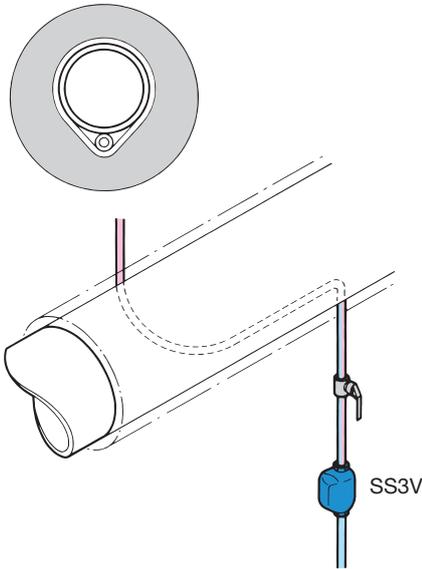


# SS Series

## SS3/SS5 Series

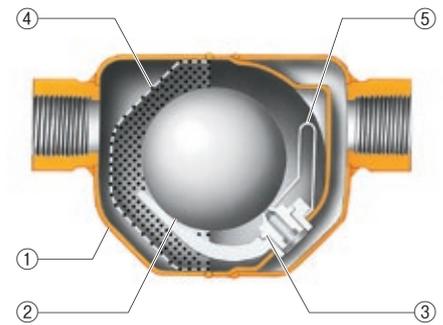
Medium Pressure	Small Process
Medium Temperature	Drip/Tracer

### Sample Application: Tracer



- All stainless steel PN 40; (SS5H: PN 63) Maintenance-free steam traps for pressures up to 46 barg.
- Automatic bimetal air vent for fast start-up.
- SS3N, SS5N, and SS5NH for horizontal installation, SS3V, SS5V, and SS5VH for vertical installation.
- Optional stainless steel insulating cover with ceramic fiber available for SS3N and SS3V.
- Can be used on superheated steam.

No.	Description/Material
①	Body/Stainless Steel
②	Float/Stainless Steel
③	Orifice/ —
④	Screen/Stainless Steel
⑤	Air Vent Strip/Bimetal

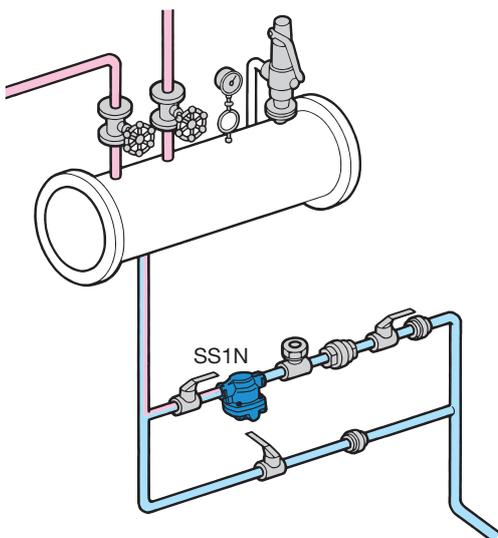


SS3N

## SS1 Series

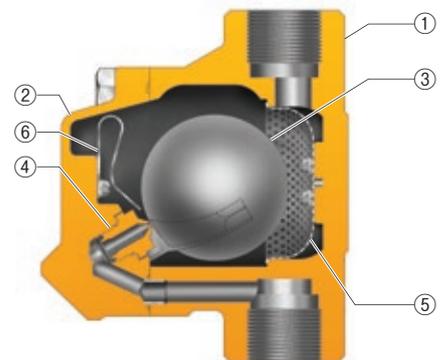
Medium Pressure	Small Process
Medium Temperature	Drip/Tracer

### Sample Application: Steam Header



- All stainless steel PN 40 steam traps for pressures up to 21 barg.
- Removable cover allows easy inspection and maintenance.
- Automatic bimetal air vent for fast start-up.
- The SS1N models are for horizontal installation, the SS1V models for vertical installation.
- Can be used on superheated steam.

No.	Description/Material
①	Body/Stainless Steel
②	Cover/Stainless Steel
③	Float/Stainless Steel
④	Orifice/ —
⑤	Screen/Stainless Steel
⑥	Air Vent Strip/Bimetal



SS1V

Model	SS3N/V	SS5N/V	SS5NH/VH	SS1NL/VL	SS1 NH/VH
Connection <sup>1)</sup>	S, W, F	S, W, F	S, W, F	S, W, F	S, W, F
Maximum Operating Pressure (barg)	21	32	46	21	21
Maximum Operating Temperature (°C)	400	400 <sup>2)</sup> /425	400 <sup>2)</sup> /425	220	400

<sup>1)</sup> S = Screwed, W = Socket Welded, F = Flanged    <sup>2)</sup> With PN flange

# JX/JH-X/JH-B/JH-P Series

## JX Series

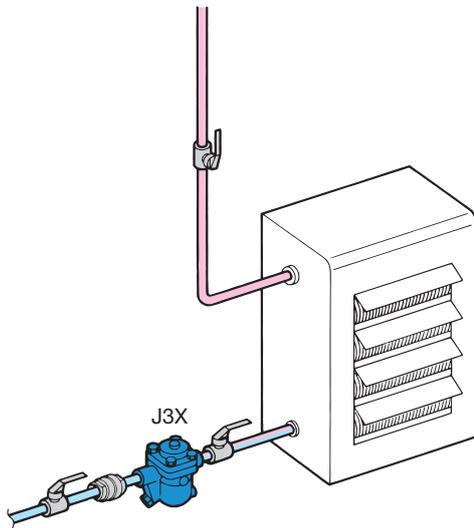
Low-to-Medium Pressure

Process

Medium Temperature

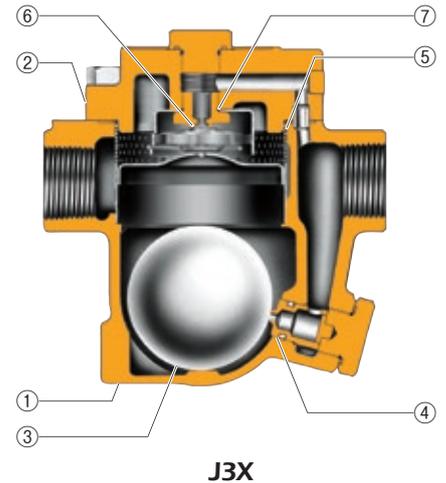
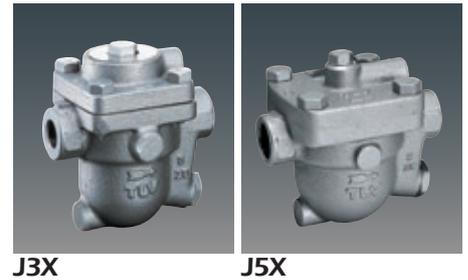
Small-to-Large Equipment

### Sample Application: Air Handling Coil



- Cast iron/ductile cast iron, PN 16 or Stainless steel PN 40 steam traps for pressures up to 13 or 21 barg.
- J3S-X, J5S-X and J6S-X have stainless steel bodies, and three-point seating design which ensures a steam-tight seal.
- Automatic X-element air vent for fast start-up and venting air at close-to-steam temperature.
- Externally removable orifice for inline inspection and repair.
- Reusable cover gaskets on J3X, J5X, J3S-X, J5S-X, J6S-X and J7X save maintenance costs.

No.	Description/Material
①	Body/Cast Iron, Ductile Cast Iron, Stain. Steel
②	Cover/Cast Iron, Ductile Cast Iron, Stain. Steel
③	Float/Stainless Steel
④	Orifice/ —
⑤	Screen/Stainless Steel
⑥	X-element/Stainless Steel
⑦	Air Vent Seat/Stainless Steel



## JH-X Series

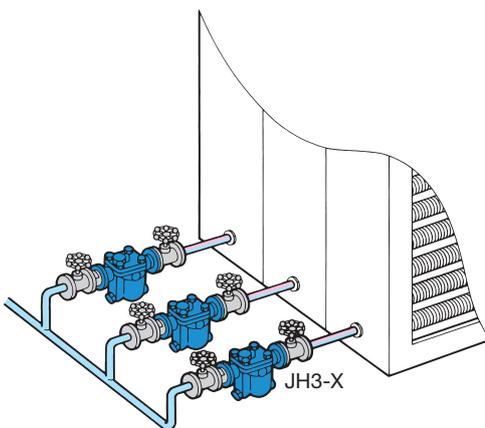
Low-to-High Pressure

Process

Medium-to-High Temperature

Small-to-Large Equipment

### Sample Application: Heater Batteries

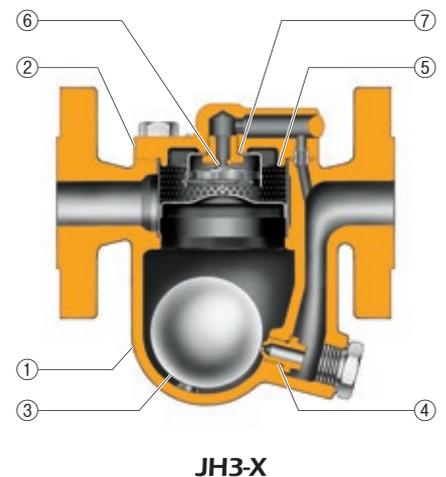


- Cast steel or stainless steel traps for low-to-high pressure.
- Automatic X-element air vent for fast start-up and venting air at close-to-steam temperature.
- On most models, three-point seating design ensures a steam-tight seal.
- Externally removable orifice for inline inspection and repair.
- Internal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

No.	Description/Material
①	Body/Cast Steel or Stainless Steel
②	Cover/Cast Steel or Stainless Steel
③	Float/Stainless Steel
④	Orifice/ —
⑤	Screen/Stainless Steel
⑥	X-element/Stainless Steel
⑦	Air Vent Seat/Stainless Steel



JH3-X



JH3-X

Model	J3X to J8X <sup>2)</sup>	J3S-X, J5S-X	J6S-X	JH3-X to JH8R-X <sup>2)</sup>
Connection <sup>1)</sup>	S, F	S, F	S	S, W, F
Maximum Operating Pressure (barg)	13	21	21	32
Maximum Operating Temperature (°C)	200	220	220	240

<sup>1)</sup> S = Screwed, W = Socket Welded, F = Flanged <sup>2)</sup> Refer to Specification Data Sheets (SDS) for each model's specifications. Not all connections are available for all models.

# JH-B Series

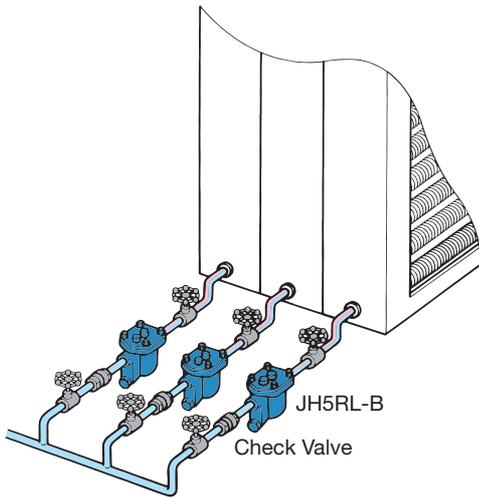
**Low-to-High Pressure**

**Process Heater**

**Med.-to-High Temperature**

**Small-to-Large Process**

## Application: Heater Batteries

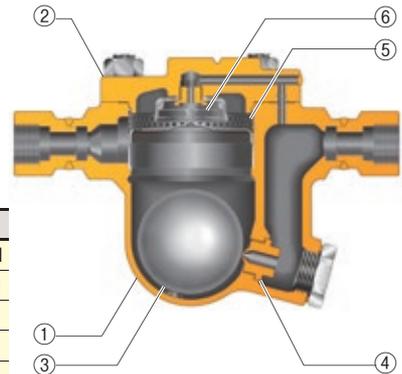


- Cast steel or stainless steel traps for low-to-high pressure.
- Automatic bimetal air vent for fast start-up.
- On most models, three-point seating design ensures a steam-tight seal.
- Externally removable orifice for inline inspection and repair.
- Internal float cover shields and protects float from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



JH7RH-B



JH5RL-B

# JH-P Series

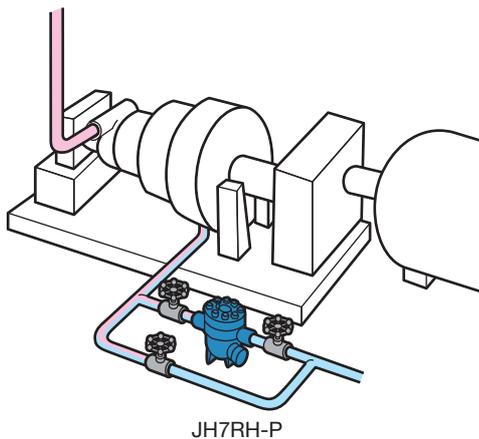
**High Pressure**

**Steam Mains**

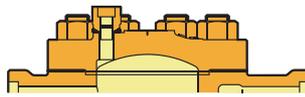
**High Temperature**

**Steam Turbine**

## Application: Steam Turbine



- JH7RH-P is low alloy cast steel suitable for extremely high temperature and pressure applications.
- The JH7RH-P is equipped with a screwed plug on the cover.
- Equipped with the same features as the JH-B Series other than material and air venting.
- JH7RH-W with a socket weld connection also available for installing an external valve, pressure balancing line, etc.

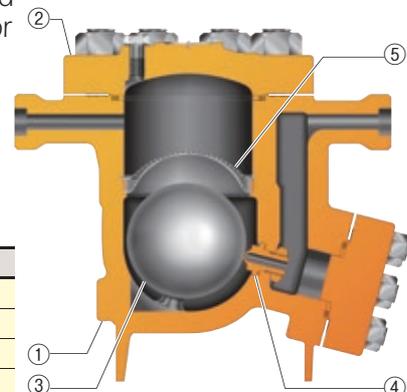


JH7RH-W (optional)

No.	Description/Material
①	Body/Low Alloy Cast Steel
②	Cover/Low Alloy Cast Steel
③	Float/Stainless Steel
④	Orifice/ —
⑤	Screen/Stainless Steel



JH7RH-P



JH7RH-P

Model	JH3S-B <sup>2)</sup>	JH5SL-B <sup>2)</sup>	JH5SH-B <sup>2)</sup>	JH5RL-B <sup>2)</sup>	JH5RH-B <sup>2)</sup>	JH7RL-B <sup>2)</sup>	JH7RM-B <sup>2)</sup>	JH7RH-B <sup>2)</sup>	JH7.2R-B	JH7.5R-B	JH8R-B	JH7RH-P <sup>2)</sup>
Connection <sup>1)</sup>	S, W, F	S, W, F	W, F	S, W, F	W, F	S, W, F	W, F	W, F	W, F	W, F	W, F	W, F
Max. Operating Pressure (barg)	32	46	65	46	80	46	65	100	46	46	46	120 <sup>3)</sup>
Max. Operating Temperature (°C)	350	400 <sup>4)</sup> /425	425	400 <sup>4)</sup> /425	400 <sup>4)</sup> /425	400 <sup>4)</sup> /425	530					

<sup>1)</sup> S = Screwed, W = Socket welded, F = Flanged

<sup>2)</sup> Three-point seating type

<sup>3)</sup> JH7RH-P is not equipped with an air vent

<sup>4)</sup> With PN flange

# SJHX/SH Series

## SJHX Series

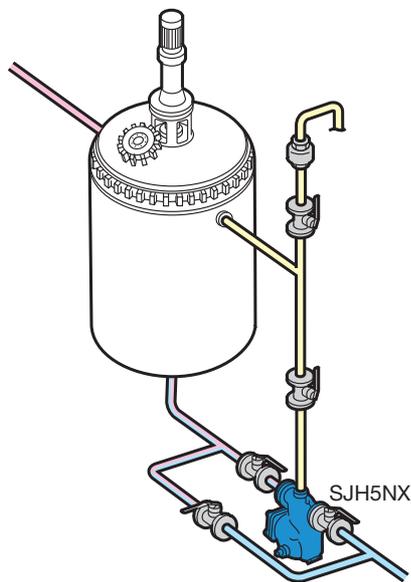
Low-to-High Pressure

Process

Medium Temperature

Small-to-Large Equipment

### Sample Application: Reactor

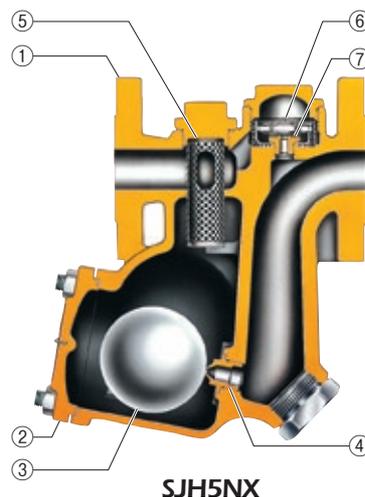


- Cast steel PN 40 steam traps for pressures up to 32 barg.
- Automatic X-element air vent for fast start-up and venting air at close-to-steam temperature.
- The SJHNX models are for horizontal installation, the SJHVX models for vertical installation.
- Models for higher pressure and temperature SJHN/V PN 40 & PN 63 with bimetal air vent are available.



SJH5NX

SJH5VX



SJH5NX

No.	Description/Material
①	Body/Cast Steel
②	Cover/Cast Steel
③	Float/Stainless Steel
④	Orifice/ —
⑤	Screen/Stainless Steel
⑥	X-element/Stainless Steel
⑦	Air Vent Seat/Stainless Steel

## SH Series

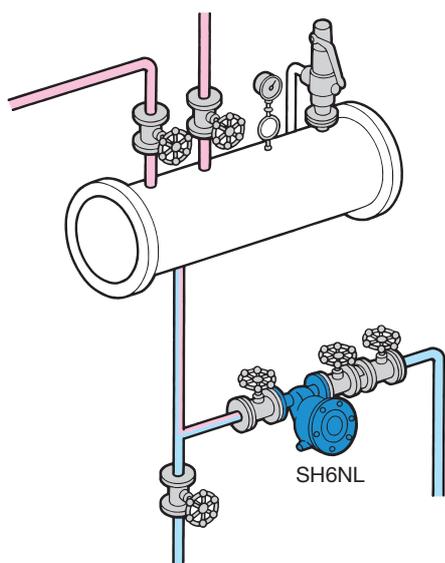
High Pressure

Small-to-Medium Process

High Temperature

Drip/Turbine

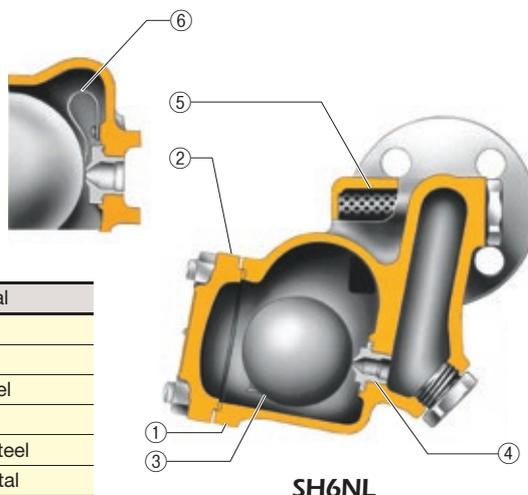
### Sample Application: Steam Header



- Cast steel PN 80, PN 100 steam traps for horizontal installation at high pressures.
- Automatic bimetal air vent for fast start-up.
- Can be used on superheated steam.
- Three-point seating design ensures a steam-tight seal.



SH6NL



SH6NL

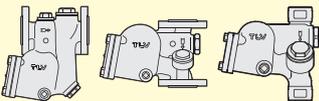
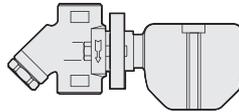
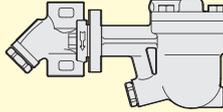
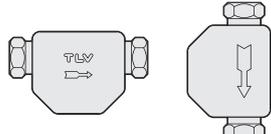
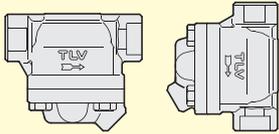
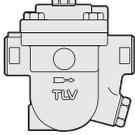
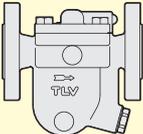
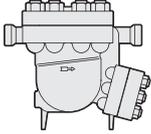
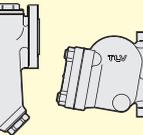
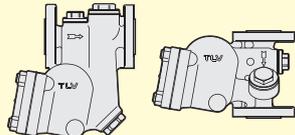
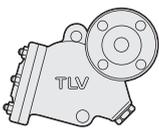
No.	Description/Material
①	Body/Cast Steel
②	Cover/Cast Steel
③	Float/Stainless Steel
④	Orifice/ —
⑤	Screen/Stainless Steel
⑥	Air Vent Strip/Bimetal

Model	SJH3N/V-X	SJH5N/V-X	SJH6N-X	SJH7N/V-X	SH3NL	SH5NL	SH5NH <sup>5)</sup>	SH6NL	SH6NH <sup>5)</sup>
Connection <sup>1)</sup>	F	F	F	F	W,F	W,F	W,F	W,F	W,F
Maximum Operating Pressure (barg)	32	32 <sup>4)</sup>	32	32 <sup>4)</sup>	45	65	80	65	100
Maximum Operating Temperature (°C)	240 <sup>2)</sup>	240 <sup>2)</sup>	240 <sup>2)</sup>	240 <sup>2)</sup>	400 <sup>3)/425</sup>				

<sup>1)</sup> S = Screwed, W = Socket Welded, F = Flanged <sup>2)</sup> 400 °C models with bimetal air vent available <sup>3)</sup> With PN Flange

<sup>4)</sup> 46 barg models with bimetal air vent and PN 63 flange available for horizontal models <sup>5)</sup> Not a standard model, contact TLV for details

# Selection Guide

Model	Max. Operating Pressure (barg) PMO	Max. Operating Temp. (°C) TMO	Max. Operating Capacity (kg/h)	Body Material	Air Venting	Application
<b>SJX Series</b> 	22	220	5000	Ductile Cast Iron	Automatic X-element	Heat Exchangers Tank Heaters Dryers Process Equipment
<b>FS Series QuickTrap®</b> 	21 to 46	400 to 425	680	Stainless Steel	Automatic Bimetal	Steam Mains Turbines Tracer Lines Small Process Equipment
<b>FJ32-X FJ32-B QuickTrap®</b> 	32	240	360	Stainless Steel	Automatic X-element	Process Equipment
		350			Automatic Bimetal	Steam Mains
<b>SS3 SS5 Series</b> 	21 to 46	400 to 425	680	Stainless Steel	Automatic Bimetal	Steam Mains Tracer Lines Small Process Equipment
<b>SS1 Series</b> 	21	220 to 400	210	Stainless Steel	Automatic Bimetal	Steam Mains Tracer Lines Small Process Equipment
<b>JX Series</b> 	13 to 21	200 to 220	26000	Cast Iron Stainless Steel	Automatic X-element	Heat Exchangers Tank Heaters Coils, Dryers Unit Heaters Process Equipment
<b>JH-X Series</b> 	32	240	28000	Cast Steel Stainless Steel	Automatic X-element	Heat Exchangers Tank Heaters Coils, Dryers Unit Heaters Process Equipment
<b>JH-B Series</b> 	32 to 100	350 to 425	27000	Cast Steel Stainless Steel	Automatic Bimetal	Tracer Lines Process Heaters Heat Exchangers Process Equipment
<b>JH7RH-P</b> 	120	530	440	Low Alloy Cast Steel	— <sup>1)</sup>	Process Equipment
<b>SJHX Series</b> 	32	240	4800	Cast Steel (Option: Stainless Steel)	Automatic X-element	Heat Exchangers Tank Heaters
					Automatic Bimetal	Coils, Dryers Unit Heaters Process Equipment
<b>SJH Series</b> 	32 to 46	400	4300			
<b>SH Series</b> 	45 to 100	400 to 425	700	Cast Steel	Automatic Bimetal	Superheated or High-Pressure Steam Mains Process Equipment

<sup>1)</sup> Instead of a built-in air vent, JH7RH-P has a threaded port for connecting to an external air vent.

1 bar = 0.1 MPa

The highest figures listed may not apply to all traps within each series. Free Float traps for special applications and traps with higher discharge capacities are available upon request.

Full product details (sizes, pressures, capacities and materials) are included in the individual datasheets.

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

Contact TLV directly or your local representative for further information.

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Manufacturer

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Kagogawa, Japan

is approved by LRQA Ltd., to ISO 9001/14001

ISO 9001  
ISO 14001

