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ISO 9001
ISO 14001

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

Instruction Manual

Free Float Steam Trap
J7B

Contents

Introduction

Thank you for purchasing the TLV free float steam trap.

This product has been thoroughly inspected before being shipped from the factory. When the product is delivered, before doing anything else, check the specifications and external appearance to make sure nothing is out of the ordinary. Also be sure to read this manual carefully before use and follow the instructions to be sure of using the product properly.

This free float steam trap is suitable for condensate discharge from process and steam-using equipment. It automatically and continuously discharges the inflowing condensate that is continuously generated by the steam-using equipment, preventing the collection of condensate and thereby improving the heat transfer efficiency of the equipment.

If detailed instructions for special order specifications or options not contained in this manual are required, please contact TLV for full details.

This instruction manual is intended for use with the model(s) listed on the front cover. It is necessary not only for installation but for subsequent maintenance, disassembly/reassembly and troubleshooting. Please keep it in a safe place for future reference.

Safety Considerations

- Read this section carefully before use and be sure to follow the instructions.
- Installation, inspection, maintenance, repairs, disassembly, adjustment and valve opening/closing should be carried out only by trained maintenance personnel.
- The precautions listed in this manual are designed to ensure safety and prevent equipment damage and personal injury. For situations that may occur as a result of erroneous handling, three different types of cautionary items are used to indicate the degree of urgency and the scale of potential damage and danger: DANGER, WARNING and CAUTION.
- The three types of cautionary items above are very important for safety: be sure to observe all of them as they relate to installation, use, maintenance, and repair. Furthermore, TLV accepts no responsibility for any accidents or damage occurring as a result of failure to observe these precautions.

Symbols

	**Indicates a DANGER, WARNING or CAUTION item.**
DANGER	Indicates an urgent situation which poses a threat of death or serious injury
WARNING	Indicates that there is a potential threat of death or serious injury
CAUTION	Indicates that there is a possibility of injury or equipment/product damage

WARNING	**NEVER apply direct heat to the float.** The float may explode due to increased internal pressure, causing accidents leading to serious injury or damage to property and equipment.
CAUTION	**Install properly and DO NOT use this product outside the recommended operating pressure, temperature and other specification ranges.** Improper use may result in such hazards as damage to the product or malfunctions that may lead to serious accidents. Local regulations may restrict the use of this product to below the conditions quoted.
	DO NOT use this product in excess of the maximum operating pressure differential. Such use could make discharge impossible (blocked).
	Use hoisting equipment for heavy objects (weighing approximately 20 kg (44 lb) or more). Failure to do so may result in back strain or other injury if the object should fall.

Continued on the next page

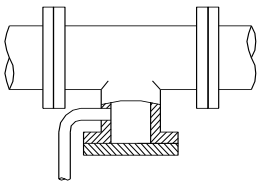
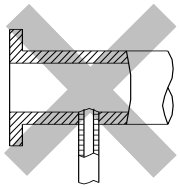
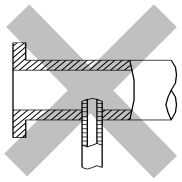
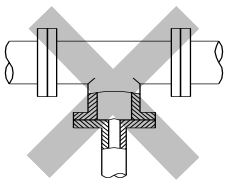
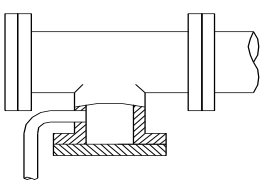
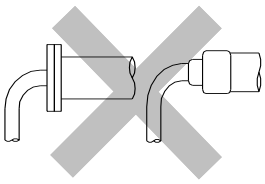
⚠CAUTION	**Take measures to prevent people from coming into direct contact with product outlets.** Failure to do so may result in burns or other injury from the discharge of fluids.
	When disassembling or removing the product, wait until the internal pressure equals atmospheric pressure and the surface of the product has cooled to room temperature. Disassembling or removing the product when it is hot or under pressure may lead to discharge of fluids, causing burns, other injuries or damage.
	Be sure to use only the recommended components when repairing the product, and NEVER attempt to modify the product in any way. Failure to observe these precautions may result in damage to the product and burns or other injury due to malfunction or the discharge of fluids.
	Do not use excessive force when connecting threaded pipes to the product. Over-tightening may cause breakage leading to fluid discharge, which may cause burns or other injury.
	Use only under conditions in which no freeze-up will occur. Freezing may damage the product, leading to fluid discharge, which may cause burns or other injury.
	Use only under conditions in which no water hammer will occur. The impact of water hammer may damage the product, leading to fluid discharge, which may cause burns or other injury.
	Use gloves when operating the lock release valve and keep all body parts well clear of the product. Failure to do so could result in burns, other injury or damage from the blowing of small amounts of steam and condensate.

Checking the Piping

⚠CAUTION **Use only under conditions in which no water hammer will occur. The impact of water hammer may damage the product, leading to fluid discharge, which may cause burns or other injury.**

Check to make sure that the pipes to be connected to the product have been installed properly.

1. Is the pipe diameter suitable?
2. Is the piping where the product is to be installed horizontal?
3. Has sufficient space been secured for maintenance?
4. Have maintenance valves been installed at the inlet and outlet? If the outlet is subject to back pressure, has a check valve (TLV-CK) been installed?
5. Is the inlet pipe as short as possible, with as few bends as possible, and installed so the liquid will flow naturally down into the product?
6. Has the piping work been done correctly, as shown in the figures below?

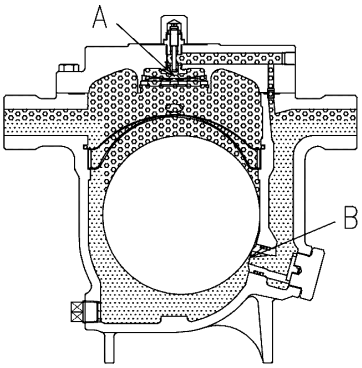
Requirement	Correct	Incorrect
Install catchpot with the proper diameter.		 Diameter is too small.
Make sure the flow of condensate is not obstructed.		 Diameter is too small and inlet protrudes into pipe interior.
To prevent rust and scale from flowing into the trap, the inlet pipe should be connected 25 to 50 mm (1 to 2 in) above the base of the T-pipe.		 Rust and scale flow into the trap with the condensate.
When installing on the blind end, make sure the flow of condensate is not obstructed.		 Condensate collects in the pipe.

Operation

Principles of air and condensate discharge:

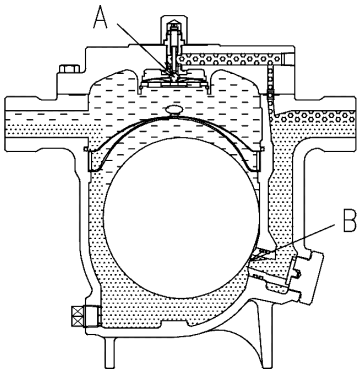
1. Start-up Air and Cold Condensate Discharge

At start-up, before steam is supplied the system is cold and the bimetal plate is flexed downward, keeping the air vent valve (A) open. This allows for the rapid discharge of air and cold condensate through the vent (A) when steam is first supplied to the system.



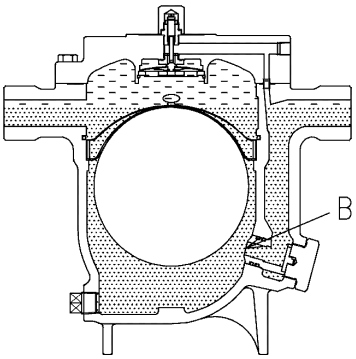
2. Condensate Discharge

After the discharge of initial air and cold condensate, the heat of the inflowing steam and condensate cause the bimetal plate to flex upward, closing the air vent valve (A). The rising condensate level causes the float to rise due to buoyancy, opening the orifice (B) and allowing condensate to be discharged.



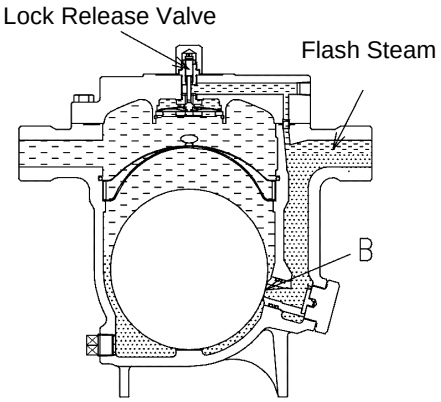
3. Discharge of Large Quantities of Condensate

Increases in the condensate inflow rate cause the condensate level in the trap to rise. The float consequently rises and enlarges the opening of the orifice (B), allowing more condensate to be discharged. In this manner, continuous condensate discharge occurs while the opening size of the orifice varies depending on the condensate flow rate.



4. Closed Position

When the condensate flow rate decreases, the float falls, closing off the orifice (B) opening. A water seal is maintained at all times over the orifice to prevent steam loss. On equipment where steam-locking or air-binding tend to occur, system integrity can be maintained by operating the properly adjusted lock release valve (see p. 9).



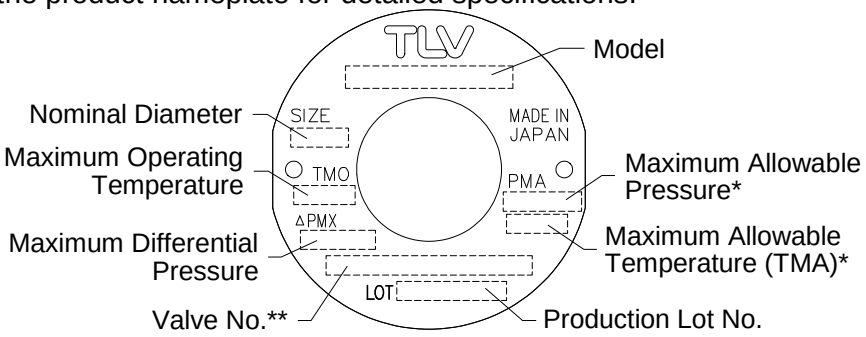
Specifications

CAUTION **Install properly and DO NOT use this product outside the recommended operating pressure, temperature and other specification ranges. Improper use may result in such hazards as damage to the product or malfunctions which may lead to serious accidents. Local regulations may restrict the use of this product to below the conditions quoted.**

CAUTION **DO NOT use this product in excess of the maximum operating pressure differential; such use could make discharge impossible (blocked).**

CAUTION **Use only under conditions in which no freeze-up will occur. Freezing may damage the product, leading to fluid discharge, which may cause burns or other injury.**

Refer to the product nameplate for detailed specifications.

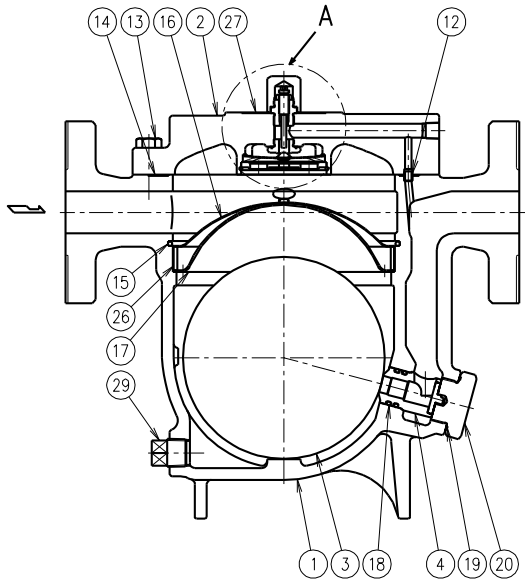


* Maximum allowable pressure (PMA) and maximum allowable temperature (TMA) are PRESSURE SHELL DESIGN CONDITIONS, **NOT** OPERATING CONDITIONS.

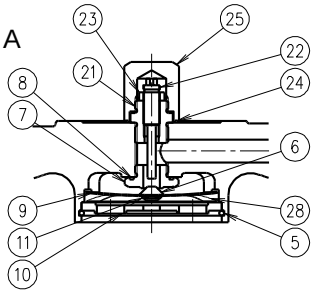
** Valve No. is displayed for products with options. This item is omitted from the nameplate when there are no options.

Configuration

J7B



Detail A



No.	Name
16	Screen
17	Screen Holder
18	Orifice O-ring
19	Orifice Plug Gasket
20	Orifice Holder Plug
21	Valve Holder
22	Valve Push Rod
23	Lock Nut
24	Cap Nut Gasket
25	Cap Nut
26	Screen Holder Retainer
27	Nameplate
28	Wave Spring
29	Drain Plug

No.	Name	No.	Name	No.	Name
1	Body	6	Air Vent Valve Plug	11	Snap Ring
2	Cover	7	Air Vent Valve Seat	12	Connector
3	Float	8	Air Vent Valve Seat Gasket	13	Cover Bolt
4	Orifice	9	Bimetal Plate	14	Cover Gasket
5	Snap Ring	10	Air Vent Cover	15	Snap Ring

Installation

⚠CAUTION **Install properly and DO NOT use this product outside the recommended operating pressure, temperature and other specification ranges. Improper use may result in such hazards as damage to the product or malfunctions which may lead to serious accidents. Local regulations may restrict the use of this product to below the conditions quoted.**

⚠CAUTION **Use hoisting equipment for heavy objects (weighing approximately 20 kg (44 lb) or more). Failure to do so may result in back strain or other injury if the object should fall.**

⚠CAUTION **Take measures to prevent people from coming into direct contact with product outlets. Failure to do so may result in burns or other injury from the discharge of fluids.**

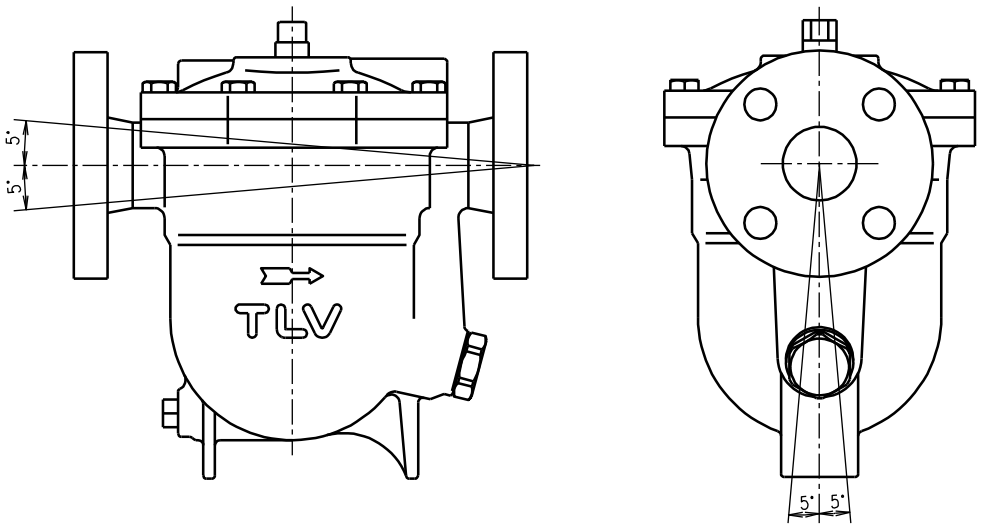
⚠CAUTION **Do not use excessive force when connecting threaded pipes to the product. Over-tightening may cause breakage leading to fluid discharge, which may cause burns or other injury.**

Installation, inspection, maintenance, repairs, disassembly, adjustment and valve opening/closing should be carried out only by trained maintenance personnel.

1. Before installation, be sure to remove all protective seals.
2. Before installing the product, blow out the inlet piping to remove any piping scraps, dirt and oil. Close the inlet valve after blowdown.
3. Install the product so the arrow on the body is pointing in the direction of flow.
4. The product should be inclined no more than 5° horizontally and front-to-back.
5. Connect the outlet piping.
6. Open the inlet valve, and check to make sure that the product functions properly.

If there is a problem, determine the cause using the “Troubleshooting” section in this manual.

Tolerance Angle for Installation: 5°



Make sure the trap is installed with the raised TLV lettering on the body horizontal.

Maintenance

⚠CAUTION **Take measures to prevent people from coming into direct contact with product outlets. Failure to do so may result in burns or other injury from the discharge of fluids.**

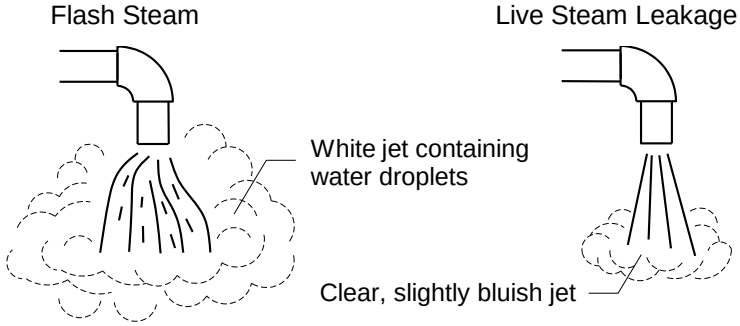
⚠CAUTION **Be sure to use only the recommended components when repairing the product, and NEVER attempt to modify the product in any way. Failure to observe these precautions may result in damage to the product or burns or other injury due to malfunction or the discharge of fluids.**

Operational Check

A visual inspection of the following items should be done on a daily basis to determine whether the product is operating properly or has failed. Periodically (at least biannually) the operation should also be checked by using diagnostic equipment, such as a stethoscope, thermometer, TLV Pocket TrapMan or TLV TrapMan.

If the product should fail, it may cause damage to piping and equipment, resulting in faulty or low quality products or losses due to steam leakage.

Normal	: Condensate is discharged continuously with flash steam and the sound of flow can be heard. If there is very little condensate, there is almost no sound of flow.
Blocked (Discharge Impossible)	: No condensate is discharged. The product is quiet and makes no noise, and the surface temperature of the product is low.
Blowing	: Live steam continually flows from the outlet and there is a continuous metallic sound.
Steam Leakage	: Live steam is discharged through the trap outlet together with the condensate and there is a high-pitched sound.



(When conducting a visual inspection, flash steam is sometimes mistaken for steam leakage. For this reason, the use of a steam trap diagnostic instrument [TLV: TrapMan] in conjunction with the visual inspection is highly recommended.

Parts Inspection

When parts have been removed, or during periodic inspections, use the following table to inspect the parts and replace any that are found to be defective.

	Procedure
Gaskets, O-ring:	Check for warping or scratches
Screen:	Check for clogging or corrosion
Bimetal Plate, Air Vent Valve Plug, Air Vent Valve Seat: Check for scratches	
Float:	Check for scratches or dents
Body Interior:	Check for buildup
Orifice Valve Opening:	Check for dirt, oil film, wear or scratches

Lock Release Valve

⚠CAUTION **Use gloves when operating the lock release valve and keep all body parts well clear of the product. Failure to do so could result in burns, other injury or damage from the blowing of small amounts of steam and condensate.**

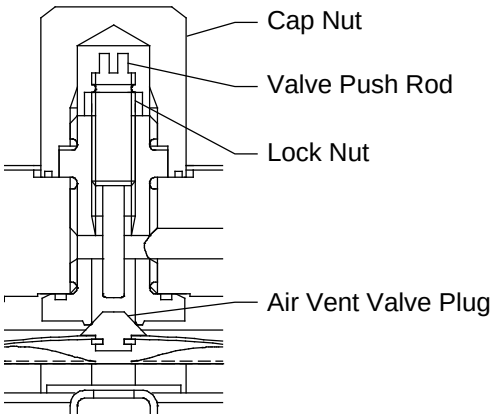
Use on equipment where steam-locking or air-binding, which slows the discharge of condensate and reduce equipment efficiency, tends to occur (cylindrical dryers, air fin heater, etc.).

Operation

1. Remove the cap nut.
2. Loosen the lock nut slightly and screw the valve push rod in 1.5 turns clockwise. This causes the tip of the valve push rod to com into contact with the air vent valve plug. Further turning the valve push rod causes the air vent valve to open.
3. Adjust the degree of opening as necessary.
   (clockwise: increase opening; counterclockwise: decrease opening)
4. After adjustment, be sure to retighten the lock nut.
5. Reattach the cap nut.

NOTE:

1. While use of the lock release valve eliminates the problem of steam-locking and improves heat transfer efficiency, a small amount of steam is lost.
2. When the product is shipped from the factory, the lock release valve is in the position indicated in Figure 1, and does not operate. To operate, adjust according to the procedure outlined in the “Operation” section above.



Tools Required	Part Name
Flat-head screwdriver (blade thickness: max.1.2 mm ($^{3}/_{64}$ in))	Valve Push Rod
Wrench (Distance across flats: 8 mm ($^{5}/_{16}$ in))	Lock Nut (Torque 10 N·m (7 lbf·ft))
Wrench (Distance across flats: 17 mm ($^{21}/_{32}$ in))	Cap Nut (Torque 15 N·m (11 lbf·ft))

Disassembly/Reassembly

WARNING **NEVER apply direct heat to the float. The float may explode due to increased internal pressure, causing accidents leading to serious injury or damage to property and equipment.**

CAUTION **When disassembling or removing the product, wait until the internal pressure equals atmospheric pressure and the surface of the product has cooled to room temperature. Disassembling or removing the product when it is hot or under pressure may lead to discharge of fluids, causing burns, other injuries or damage.**

CAUTION **Use hoisting equipment for heavy objects (weighing approximately 20 kg (44 lb) or more). Failure to do so may result in back strain or other injury if the object should fall.**

Use the following procedures to remove components. Use the same procedures in reverse to reassemble. (Installation, inspection, maintenance, repairs, disassembly, adjustment and valve opening/closing should be carried out only by trained maintenance personnel.)

Drain Plug

Part	During Disassembly	During Reassembly
Drain Plug	Remove with a socket wrench	Wrap 3 – 3.5 turns of sealing tape around threads, consult the table of tightening torques and tighten to the proper torque

Detaching/Reattaching the Cover

Part	During Disassembly	During Reassembly
Cover Bolt	Remove with a socket wrench	Consult the table of tightening torques and tighten to the proper torque
Cover	Remove by lifting up and off	Reattach, lining up with the connector
Connector	Remove the connector	Insert into hole in body
Cover Gasket	Remove the gasket and clean sealing surfaces on the body and cover	Replace with a new gasket

Disassembly/Reassemby of Components Inside the Cover

Part	During Disassembly	During Reassembly
Snap Ring	Pinch ends and pull towards inside, and remove from cover	Insert securely into the groove
Air Vent Cover	Remove from the cover	Set in cover with proper orientation (Screen is inside)
Wave Spring	Remove the wave spring	Insert the wave spring
Bimetal Plate/ Air Vent Valve Plug/ Snap Ring	Remove air vent parts from cover	Make sure to reinsert in the proper top-bottom orientation (Air Vent Valve Plug is inside)
Air Vent Valve Seat	Remove with a socket wrench	Consult the table of tightening torques and tighten to the proper torque
Air Vent Valve Seat Gasket	Remove the gasket and clean sealing surfaces	Replace with a new gasket if warped or damaged

Disassembly/Reassemby of the Lock Release Valve

Part	During Disassembly	During Reassembly
Cap Nut	Remove with a wrench	Consult the table of tightening torques and tighten to the proper torque
Cap Nut Gasket	Remove the gasket and clean sealing surfaces	Replace with a new gasket if misshapen or damaged
Valve Holder	Remove with a wrench	Consult the table of tightening torques and tighten to the proper torque
Lock Nut	Remove with a wrench	Consult the table of tightening torques and tighten to the proper torque
Valve Push Rod	Remove with a flat-head screw driver	Screw into the valve holder; be careful not to screw in far enough to prevent the air vent valve from closing

Disassembly/Reassemby of Components Inside the Body

Part	During Disassembly	During Reassembly
Snap Ring	Pinch the insides together and remove	Insert securely into the snap ring groove
Screen	Lift straight up and out	Place on the screen holder retainer, making sure the rounded side is on top
Screen Holder Retainer	Lift straight up and out	Insert into the body straight
Screen Holder	Lift straight up and out	Insert into the body, making sure the rounded side is on top
Float	Remove being careful not to scratch the polished surface	Insert, being careful not to scratch or misshape
Orifice Holder Plug	Remove with a socket wrench	Consult the table of tightening torques and tighten to the proper torque
Orifice Plug Gasket	Remove the gasket and clean sealing surfaces on the body and orifice plug	Replace with a new gasket if damaged
Orifice	From inside the body, push out through the orifice holder plug opening	Insert with the proper orientation: insert from the outside, pushing in until it contacts the stopper inside; if the condensate discharge hole is pointing sideways, extended use may result in a hole in the body
Orifice O-ring	Be careful not to damage the rubber orifice O-ring	Coat with heat-resistant grease; use new orifice O-ring whenever replacing the orifice

Table of Tightening Torques

Part Name	Torque		Distance Across Flats	
	N·m	(lbf·ft)	mm	(in)
Orifice Holder Plug	80	(59)	32	($1^1/_4$)
Drain Plug	30*	(22*)	12	($^{15}/_{32}$)
Air Vent Valve Seat	30	(22)	17	($^{21}/_{32}$)
Cover Bolt	80	(59)	22	($1^1/_4$)
Cap Nut	15	(11)	17	($^{21}/_{32}$)
Valve Holder	20	(15)	17	($^{21}/_{32}$)

* These values represent tightening torques for threads that are wrapped with 3 to 3.5 turns of sealing tape. (1 N·m ≈ 10 kg·cm)

NOTE: -Coat all threaded portions with anti-seize.
-If drawings or other special documentation were supplied for the product, any torque given there takes precedence over values shown here.

Troubleshooting

WARNING **NEVER apply direct heat to the float. The float may explode due to increased internal pressure, causing accidents leading to serious injury or damage to property and equipment.**

CAUTION **When disassembling or removing the product, wait until the internal pressure equals atmospheric pressure and the surface of the product has cooled to room temperature. Disassembling or removing the product when it is hot or under pressure may lead to discharge of fluids, causing burns, other injuries or damage.**

When the product fails to operate properly, use the following table to locate the cause and remedy.

Problem	Cause	Remedy
No condensate is discharged (blocked) or discharge is poor	The float is damaged or filled with condensate	Replace with a new float
	The orifice valve opening, screen or piping are clogged with rust and scale	Clean parts
	Steam-locking has occurred	Operate the lock release valve
	The bimetal plate is scratched or damaged	Replace with a new bimetal plate
	The trap operating pressure exceeds the maximum specified pressure, or whether there is insufficient pressure differential between the trap inlet and outlet	Compare specifications and actual operating conditions
Steam is discharged or leaks from the outlet (blowing) (steam leakage)	Clogged orifice valve opening or rust and scale build-up on the float	Clean parts
	Scratches on the orifice	Replace with a new orifice
	The float has scale build-up or is misshapen	Clean or replace with a new float
	Improper installation orientation	Correct the installation
	Trap vibration	Lengthen the inlet piping and fasten it securely
	The bimetal plate is scratched or damaged	Replace with a new bimetal plate
	The air vent valve plug or air vent valve seat have dirt build-up or are damaged	Clean or replace with a new air vent valve plug or air vent valve seat
	The lock release valve is operating	If the lock release valve operation is not necessary, close the lock release valve
Steam is leaking from a place other than the outlet	Gasket deterioration or damage	Replace with new gasket(s)
	Improper tightening torques were used	Tighten to the proper torque

TLV EXPRESS LIMITED WARRANTY

Subject to the limitations set forth below, TLV CO., LTD., a Japanese corporation ("**TLV**"), warrants that products which are sold by it, TLV International Inc. ("**TII**") or one of its group companies excluding TLV Corporation (a corporation of the United States of America), (hereinafter the "**Products**") are designed and manufactured by TLV, conform to the specifications published by TLV for the corresponding part numbers (the "**Specifications**") and are free from defective workmanship and materials. The party from whom the Products were purchased shall be known hereinafter as the "**Seller**". With regard to products or components manufactured by unrelated third parties (the "**Components**"), TLV provides no warranty other than the warranty from the third party manufacturer(s), if any.

Exceptions to Warranty

This warranty does not cover defects or failures caused by:

1. improper shipping, installation, use, handling, etc., by persons other than TLV, TII or TLV group company personnel, or service representatives authorized by TLV; or
2. dirt, scale or rust, etc.; or
3. improper disassembly and reassembly, or inadequate inspection and maintenance by persons other than TLV or TLV group company personnel, or service representatives authorized by TLV; or
4. disasters or forces of nature or Acts of God; or
5. abuse, abnormal use, accidents or any other cause beyond the control of TLV, TII or TLV group companies; or
6. improper storage, maintenance or repair; or
7. operation of the Products not in accordance with instructions issued with the Products or with accepted industry practices; or
8. use for a purpose or in a manner for which the Products were not intended; or
9. use of the Products in a manner inconsistent with the Specifications; or
10. use of the Products with Hazardous Fluids (fluids other than steam, air, water, nitrogen, carbon dioxide and inert gases (helium, neon, argon, krypton, xenon and radon)); or
11. failure to follow the instructions contained in the TLV Instruction Manual for the Product.

Duration of Warranty

This warranty is effective for a period of one (1) year after delivery of Products to the first end user. Notwithstanding the foregoing, asserting a claim under this warranty must be brought within three (3) years after the date of delivery to the initial buyer if not sold initially to the first end user.

ANY IMPLIED WARRANTIES NOT NEGATED HEREBY WHICH MAY ARISE BY OPERATION OF LAW, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND ANY EXPRESS WARRANTIES NOT NEGATED HEREBY, ARE GIVEN SOLELY TO THE INITIAL BUYER AND ARE LIMITED IN DURATION TO ONE (1) YEAR FROM THE DATE OF SHIPMENT BY THE SELLER.

Exclusive Remedy

THE EXCLUSIVE REMEDY UNDER THIS WARRANTY, UNDER ANY EXPRESS WARRANTY OR UNDER ANY IMPLIED WARRANTIES NOT NEGATED HEREBY (INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE), IS **REPLACEMENT**; PROVIDED: (a) THE CLAIMED DEFECT IS REPORTED TO

THE SELLER IN WRITING WITHIN THE WARRANTY PERIOD, INCLUDING A DETAILED WRITTEN DESCRIPTION OF THE CLAIMED DEFECT AND HOW AND WHEN THE CLAIMED DEFECTIVE PRODUCT WAS USED; AND (b) THE CLAIMED DEFECTIVE PRODUCT AND A COPY OF THE PURCHASE INVOICE IS RETURNED TO THE SELLER, FREIGHT AND TRANSPORTATION COSTS PREPAID, UNDER A RETURN MATERIAL AUTHORIZATION AND TRACKING NUMBER ISSUED BY THE SELLER. ALL LABOR COSTS, SHIPPING COSTS, AND TRANSPORTATION COSTS ASSOCIATED WITH THE RETURN OR REPLACEMENT OF THE CLAIMED DEFECTIVE PRODUCT ARE SOLELY THE RESPONSIBILITY OF BUYER OR THE FIRST END USER. THE SELLER RESERVES THE RIGHT TO INSPECT ON THE FIRST END USER'S SITE ANY PRODUCTS CLAIMED TO BE DEFECTIVE BEFORE ISSUING A RETURN MATERIAL AUTHORIZATION. SHOULD SUCH INSPECTION REVEAL, IN THE SELLER'S REASONABLE DISCRETION, THAT THE CLAIMED DEFECT IS NOT COVERED BY THIS WARRANTY, THE PARTY ASSERTING THIS WARRANTY SHALL PAY THE SELLER FOR THE TIME AND EXPENSES RELATED TO SUCH ON-SITE INSPECTION.

Exclusion of Consequential and Incidental Damages

IT IS SPECIFICALLY ACKNOWLEDGED THAT THIS WARRANTY, ANY OTHER EXPRESS WARRANTY NOT NEGATED HEREBY, AND ANY IMPLIED WARRANTY NOT NEGATED HEREBY, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, DO NOT COVER, AND NEITHER TLV, TII NOR ITS TLV GROUP COMPANIES WILL IN ANY EVENT BE LIABLE FOR, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO LOST PROFITS, THE COST OF DISASSEMBLY AND SHIPMENT OF THE DEFECTIVE PRODUCT, INJURY TO OTHER PROPERTY, DAMAGE TO BUYER'S OR THE FIRST END USER'S PRODUCT, DAMAGE TO BUYER'S OR THE FIRST END USER'S PROCESSES, LOSS OF USE, OR OTHER COMMERCIAL LOSSES. WHERE, DUE TO OPERATION OF LAW, CONSEQUENTIAL AND INCIDENTAL DAMAGES UNDER THIS WARRANTY, UNDER ANY OTHER EXPRESS WARRANTY NOT NEGATED HEREBY OR UNDER ANY IMPLIED WARRANTY NOT NEGATED HEREBY (INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE) CANNOT BE EXCLUDED, SUCH DAMAGES ARE EXPRESSLY LIMITED IN AMOUNT TO THE PURCHASE PRICE OF THE DEFECTIVE PRODUCT. THIS EXCLUSION OF CONSEQUENTIAL AND INCIDENTAL DAMAGES, AND THE PROVISION OF THIS WARRANTY LIMITING REMEDIES HEREUNDER TO REPLACEMENT, ARE INDEPENDENT PROVISIONS, AND ANY DETERMINATION THAT THE LIMITATION OF REMEDIES FAILS OF ITS ESSENTIAL PURPOSE OR ANY OTHER DETERMINATION THAT EITHER OF THE ABOVE REMEDIES IS UNENFORCEABLE, SHALL NOT BE CONSTRUED TO MAKE THE OTHER PROVISIONS UNENFORCEABLE.

Exclusion of Other Warranties

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, AND ALL OTHER WARRANTIES, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSLY DISCLAIMED.

Severability

Any provision of this warranty which is invalid, prohibited or unenforceable in any jurisdiction shall, as to such jurisdiction, be ineffective to the extent of such invalidity, prohibition or unenforceability without invalidating the remaining provisions hereof, and any such invalidity, prohibition or unenforceability in any such jurisdiction shall not invalidate or render unenforceable such provision in any other jurisdiction.

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