



Instruction Manual

Float Dynamic Steam Trap

J10

Manufacturer

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TLV CORPORATION

Contents

Introduction	1
Safety Considerations	2
Checking the Piping	4
Specifications	4
Operation	5
Configuration	6
Installation	7
Operation	8
Lock Release Valve Operation.....	8
Maintenance.....	9
Disassembly / Reassembly	10
Troubleshooting	13
TLV EXPRESS LIMITED WARRANTY	14

Introduction

Thank you for purchasing the TLV float dynamic 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 steam trap is designed to automatically discharge condensate from the steam space. This trap is ideal for use on heaters or dryers or other steam equipment on applications where large quantities of condensate are generated.







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.
	Indicates an urgent situation which poses a threat of death or serious injury
	Indicates that there is a potential threat of death or serious injury
	Indicates that there is a possibility of injury or equipment / product damage
	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.
	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	<p>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.</p>
	<p>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.</p>
	<p>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.</p>
	<p>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.</p>
	<p>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.</p>

Checking the Piping



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.

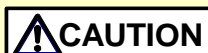
Check to make sure that the pipes to be connected to the trap have been installed properly.

1. Is the pipe diameter suitable?
2. Is the piping where the trap is to be installed horizontal?
3. Has sufficient space been secured for maintenance?
4. Have isolation valves been installed at the inlet and outlet? If the outlet is subject to back pressure, has a check valve 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 trap?

Specifications



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.

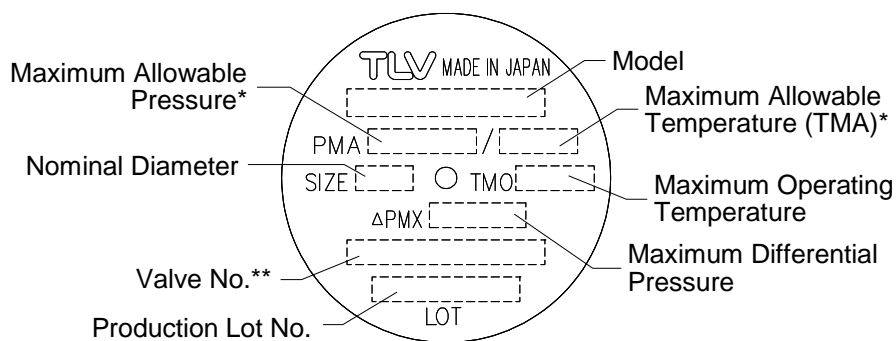


DO NOT use this product in excess of the maximum operating pressure differential; such use could make discharge impossible (blocked).



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.

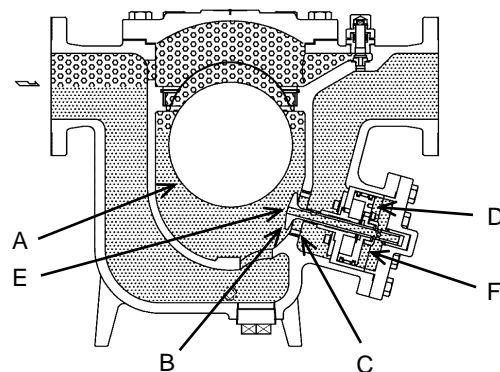
NOTE: The minimum differential pressure is 0.05 MPa. Do not use this product with a differential pressure less than this.

Operation

Principles of air and condensate discharge:

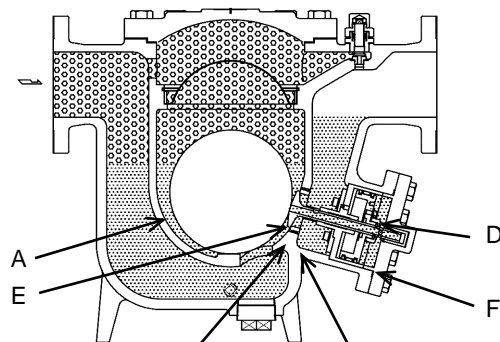
1. Valve Opening & Initial Condensate Discharge

At start-up, when a large quantity of condensate flows into the trap, the float (A) rises by buoyancy, opening the pilot orifice (E). Condensate flows through the pilot orifice (E) into the control chamber (F), increasing the pressure there. The increased pressure causes the piston (D), and accordingly the main valve (B), to move up. The orifice on the main valve seat (C) is then opened to discharge condensate.



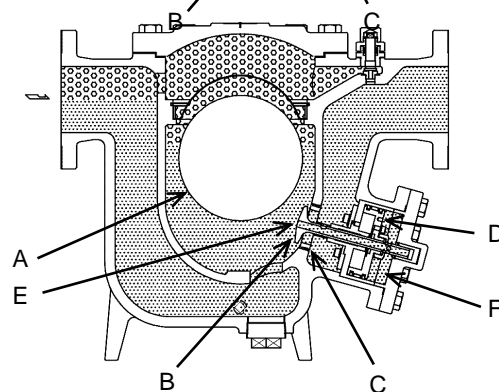
2. Valve Closing & Water Seal

When condensate has been discharged, the float (A) falls, closing the pilot orifice (E). Pressure in the control chamber (F) decreases due to leakage through small holes. The main valve (B) moves downward, closing the orifice of the main valve seat (C). The orifices are completely water-sealed during operation, permitting no steam leakage.



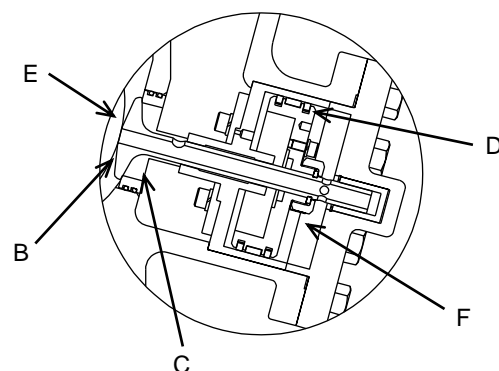
3. Regular Operation

After the large quantity of initial condensate formed at start-up has been discharged, the equipment reaches a thermally balanced state, forming condensate in accordance with the load. The trap then discharges condensate by a modulating float dynamic principle.



Float Dynamic Principle

When a large quantity of condensate flows into the trap, the float (A) rises immediately, opening the pilot 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 main valve (B), opening the large orifice on the main valve seat (C) instantly. As condensate discharges through the main valve seat orifice at a high velocity, condensate in the equipment and trap inlet pipe is also discharged.

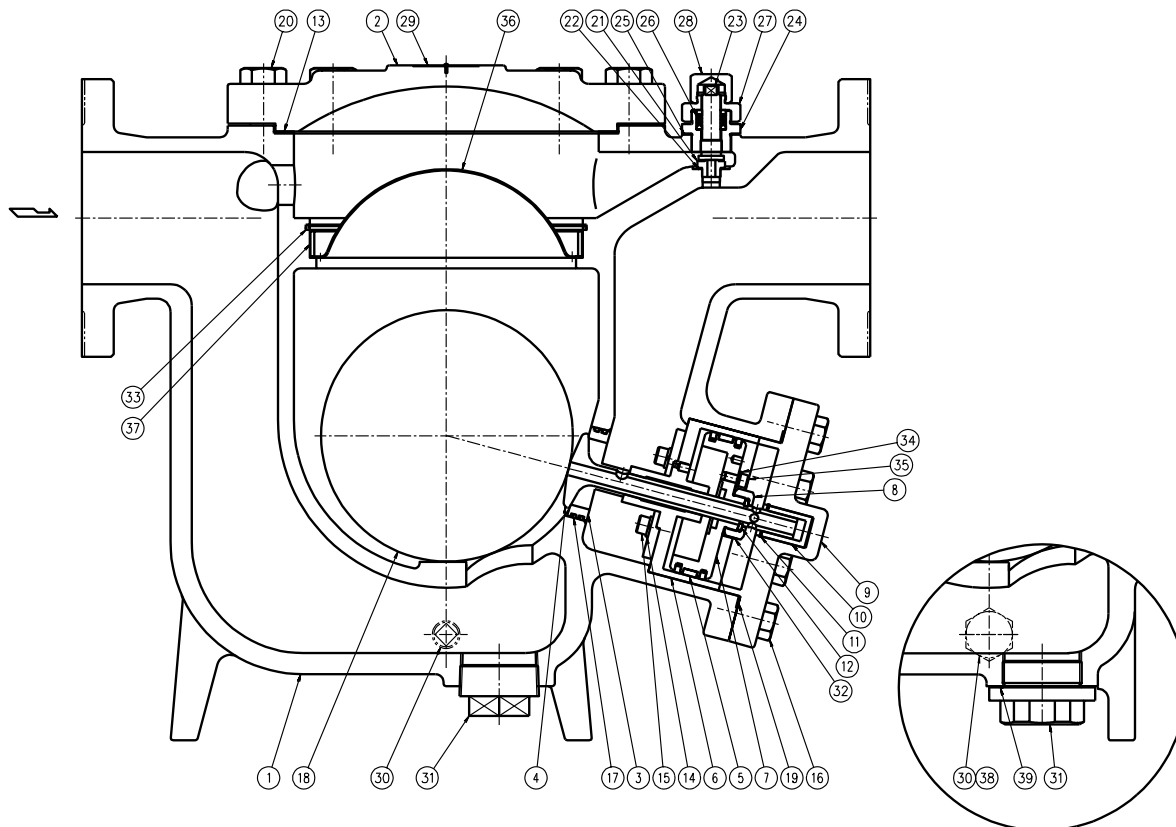


Steam



Condensate

Configuration



For Steel Body J10

No.	Name	No.	Name	No.	Name
1	Body	14	Spring Washer	27	Packing Holder Nut
2	Cover	15	Main Valve Seat Bolt	28	Lock Release Valve Cap
3	Main Valve Seat	16	Valve Cover Bolt	29	Nameplate
4	Main Valve	17	O-ring	30	Drain Plug
5	Piston Ring Set	18	Float	31	Plug
6	Cylinder	19	Valve Cover Gasket	32	Turn Stopper
7	Piston	20	Cover Bolt	33	Snap Ring
8	U-Nut	21	Lock Release Valve Seat	34	Spring Washer
9	Valve Cover	22	Lock Release Valve Seat Gasket	35	Turn Stopper Bolt
10	Sleeve	23	Lock Release Valve Stem	36	Float Cover
11	Snap Ring	24	Lock Release Valve Body	37	Float Cover Retainer
12	Stopper Ring	25	Lock Release Valve Body Gasket	38	Drain Plug Gasket
13	Cover Gasket	26	V-ring Packing	39	Plug Gasket

Installation



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.



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.

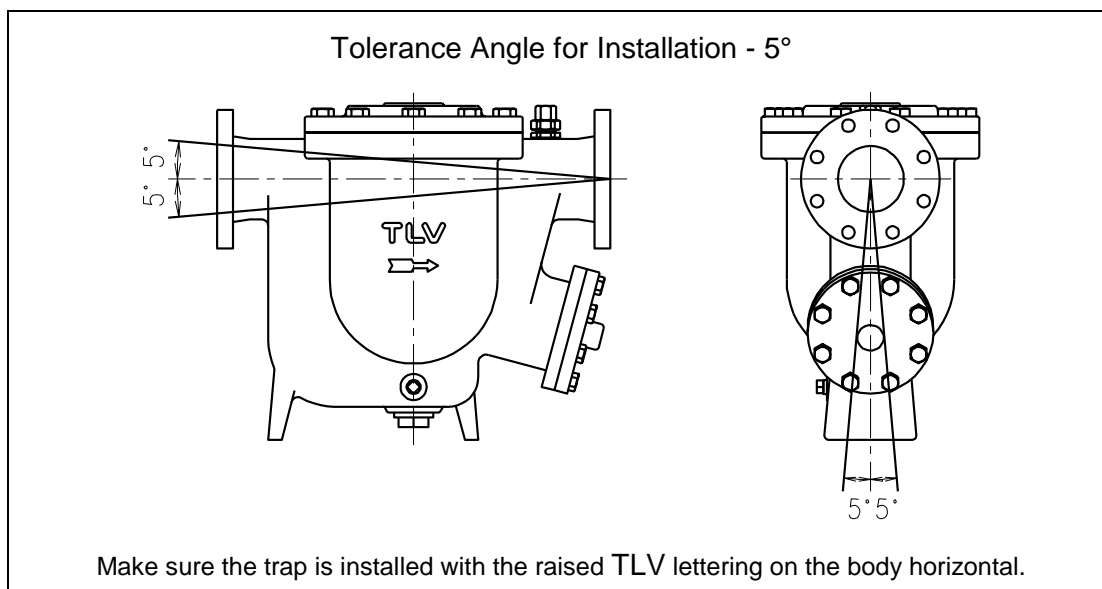


Take measures to prevent people from coming into direct contact with product outlets. Failure to do so may result in burns or other injury from the discharge of fluids.

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. Install inlet and outlet valves to isolate the trap and a bypass valve to discharge condensate from equipment and piping in the event of trap failure and when performing maintenance.
3. Before installing the product, open the inlet valve and blow out the piping to remove any piping scraps, dirt and oil. Close the inlet valve after blowdown.
4. Make sure the inlet and outlet valves are closed before beginning installation.
5. Install a strainer (40 mesh or finer) at the inlet side of the product. The strainer should be installed horizontally with the basket horizontal to the piping.
6. Install the product into the piping in a manner that allows condensate flow naturally down into the trap, with the arrow on the product body pointing in the direction of condensate flow.
7. The trap should be inclined no more than 5° horizontally and front-to-back.
8. When the trap is operating (when the main valve is opening and closing), the discharging condensate may cause shocks or recoil, so make sure that the piping before and after the trap is securely supported.
9. Secure sufficient space for inspection and maintenance.

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



Operation

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

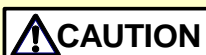
1. For Start-up Operation

- (1) Just after the trap is installed or when it has been idle for a long period of time, be sure to blow out the rust and scale from the inside of the piping before opening the trap inlet valve.
- (2) After opening the outlet valve, slowly open the inlet valve, being very careful not to open it too suddenly. When this is done, the steam trap will begin operation automatically. It will shortly stabilize into normal operation. If air binding or steam-locking occurs, or to more rapidly vent large quantities of initial air in the piping, use the lock release valve (see "Lock Release Valve Operation" below).
- (3) Reconfirm the status of the trap operation (see the "Operational Check" section). If status is normal and stable, continue use with the valve open as it is.
- (4) When the trap will not be used for long periods of time, be sure to discharge any residual condensate to prevent the pipes from rusting.

2. Corrective Measures When a Malfunction Occurs

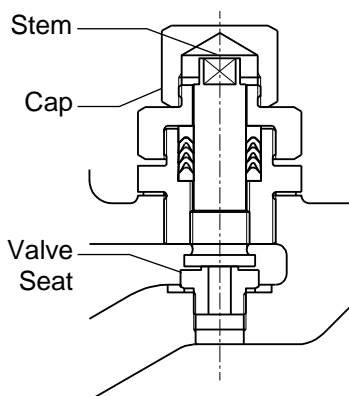
- (1) In the event of an abnormality, first carry out the following:
 - a) Close the inlet valve and outlet valves.
 - b) Open the bypass valve and discharge the condensate from the equipment and pipes using the bypass.
- (2) Let the trap body cool thoroughly and, being careful of residual pressure and hot condensate, take the appropriate corrective measures in line with the remedial procedures described in the troubleshooting section.

Lock Release Valve Operation



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.

Installation, inspection, maintenance, repairs, disassembly, and adjustment should be done only by trained maintenance personnel.



To operate the lock release valve:

1. Remove the lock release valve cap with a 27 mm (1 $\frac{1}{16}$ ") wrench.
2. Using a 10 mm ($\frac{3}{8}$ ") wrench, turn the lock release valve stem counter-clockwise.
3. With an appropriate number of turns air binding or steam-locking will cease and the trap will function normally. If necessary, increase the degree of valve opening further.
4. After having checked that the trap continues working normally, close the lock release valve by turning the stem clockwise, and reinstall the cap (tighten to a torque of 15 N·m (11 ft·lb)).



Do not leave the lock release valve open during regular operation. Always be sure to close the lock release valve after eliminating air binding or steam-locking.

Maintenance



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.



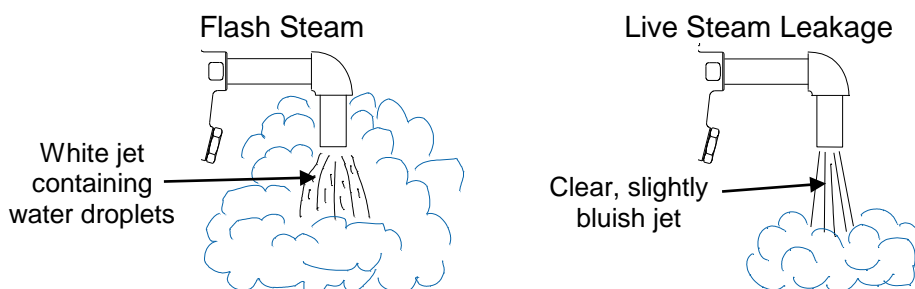
Be sure to use only the recommended components when repairing the product, and NEVER attempt to modify the product in any way. Failure to observe these precautions may result in damage to the product or burns or other injury due to malfunction or the discharge of fluids.

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 sound of operation and the trap surface temperature should also be checked by using diagnostic equipment, such as a stethoscope or thermometer. A complete disassembly and inspection should be performed at least once every 3 years.

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 intermittently and there is no leakage when the valve is closed. After the sound of the flow of condensate continues for some time, the sound of the valve closing on the valve seat can be heard. This is followed by an interval in which the trap makes no sound, after which the cycle is again repeated.
- Blocked (Discharge Impossible)** : No condensate is discharged. The trap is quiet and makes no noise, and the surface temperature of the trap 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 product outlet together with condensate, accompanied by a high-pitched sound.



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-rings:	Check for warping or damage
Sleeve:	Check for wear
Main Valve Seat (shaft):	Check for dirt, oil film, wear or damage
Main Valve, Main Valve Seat:	Check for build-up or wear on seating surfaces
Piston Ring Set:	Check for wear, warping or damage
Float:	Check for deformation, scratches or dents
Body Interior:	Check for the build-up of scale
V-ring Packing:	Check for warping or damage
Lock Release Valve Stem:	Check for build-up or wear on seating surfaces
Lock Release Valve Seat:	Check for build-up, damage or wear

Disassembly / Reassembly



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.



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.



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.

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.)

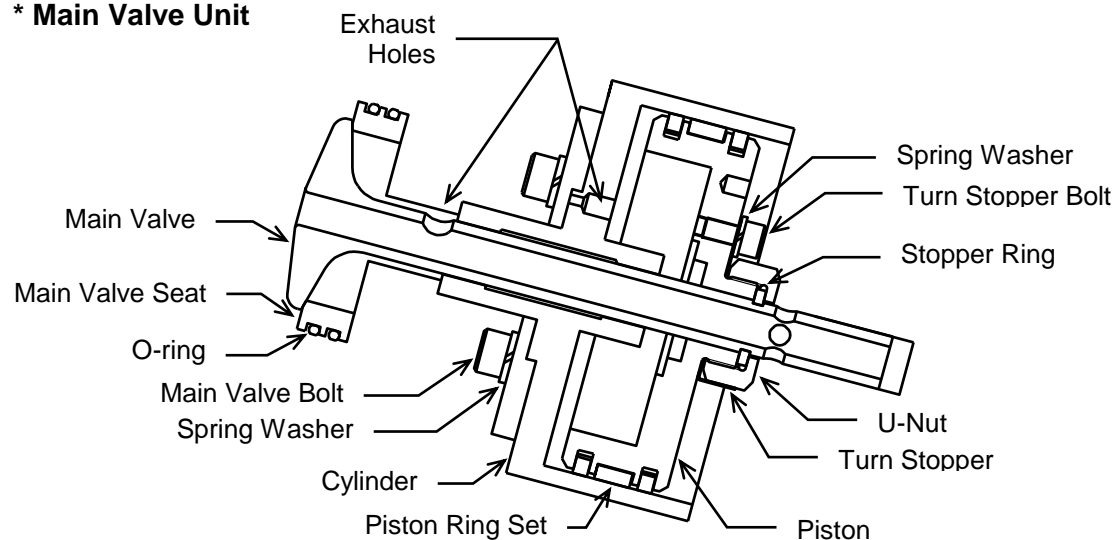
Disassembly / Reassembly of General Components

Part	During Disassembly	During Reassembly
Drain Plug (cast iron body)	Remove with a wrench and drain remaining condensate	Wrap 3 – 3.5 turns of sealing tape around the threads or coat with sealing compound and tighten to the proper torque
Drain Plug (steel body)	Remove with a wrench and drain remaining condensate	Coat threads with anti-seize; consult the table of tightening torques and tighten to the proper torque
Drain Plug Gasket (steel body)	Remove the gasket and clean sealing surfaces	Replace with a new gasket; coat surfaces with anti-seize
Cover Bolt	Remove with a socket wrench	Coat threads with anti-seize; tighten evenly, being careful not to tighten one side more than the other; consult the table of tightening torques and tighten to the proper torque
Cover	Remove the cover	Align the arrows on cover and body, then reattach
Cover Gasket	Remove the gasket and clean sealing surfaces	Replace with a new gasket; make sure there are no pieces of the old gasket left on the sealing surfaces of the body or cover
Snap Ring	Remove with appropriate pliers	Insert securely into its groove
Float Cover Retainer	Lift up and out	Place the retainer in the body on top of the float cover
Float Cover	Lift up and out	Place on the ledge inside 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

Disassembly / Reassembly of the Main Valve Unit and its Components

Part	During Disassembly	During Reassembly
Valve Cover Bolts	Remove with a socket wrench	Coat threads with anti-seize; tighten evenly, being careful not to tighten one side more than the other; tighten to the proper torque
Valve Cover	Remove the cover	Reattach
Valve Cover Gasket	Remove and clean sealing surfaces	Replace with a new gasket if warped or damaged
Main Valve Unit*	Remove from the body (pull out)	Reinsert into body; make sure that the exhaust holes in both the main valve stem and the cylinder face up
Turn Stopper Bolt/Spring Washer	Remove with an Allen wrench	Coat threads with anti-seize and tighten to the proper torque
Turn Stopper	Bend the tab over	Replace if the tab is warped or damaged; return the tab to locked position
U-nut	Loosen and remove	Coat with anti-seize and tighten to the proper torque
Stopper Ring	Remove with appropriate pliers	Insert securely into groove
Main Valve	Remove	Reinsert into the cylinder with exhaust hole facing up
Main Valve Bolts/Spring Washers	Remove with an Allen wrench	Coat threads with anti-seize and tighten to the proper torque
Cylinder/Main Valve Seat	Disconnect	Reconnect with proper exhaust hole orientation
O-ring	Remove from the main valve seat	Replace with a new if warped or damaged; coat with heat-resistant grease and reattach to main valve seat
Piston	Remove from the cylinder	Reinsert into the cylinder being careful not to scratch the piston rings
Piston Ring Set	Remove from the piston	Replace with a new set of piston rings

* Main Valve Unit



Disassembly / Reassembly of the Lock Release Valve

Part	During Disassembly	During Reassembly
LRV Cap	Remove with a socket wrench	Coat threads with anti-seize; consult the table of tightening torques and tighten to the proper torque
Packing Holder Nut	Remove with a socket wrench	Coat threads with anti-seize; consult the table of tightening torques and tighten to the proper torque
LRV Body	Remove with a socket wrench	Coat threads with anti-seize; consult the table of tightening torques and tighten to the proper torque
LRV Body Gasket	Remove and clean all sealing surfaces	Replace with a new gasket if warped or damaged
LRV Stem	Unscrew relief valve stem from the body; remove packing	Coat the lock release valve stem threads with anti-seize and screw into the lock release valve body; replace the packing with a new; do not apply anti-seize to the V-ring packing; insert into the relief valve body after screwing in the lock release valve stem
V-ring Packing		
LRV Seat	Remove with a socket wrench	Coat threads with anti-seize; consult the table of tightening torques and tighten to the proper torque
LRV Seat Gasket	Remove	Replace with a new gasket if warped or damaged

LRV: Lock Release Valve

Table of Tightening Torques

Part Name	Torque		Distance Across Flats	
	N·m	(ft·lb)	mm	(in)
Valve Cover Bolt	140	(100)	24	($1\frac{5}{16}$)
Cover Bolt	250	(185)	30	($1\frac{3}{16}$)
Packing Holder Nut	250	(185)	41	($1\frac{5}{8}$)
Lock Release Valve Cap	15	(11)	27	($1\frac{1}{16}$)
Lock Release Valve Body	250	(185)	41	($1\frac{5}{8}$)
Lock Release Valve Seat	30	(22)	19	($\frac{3}{4}$)
U-Nut	100	(73)	32	($1\frac{1}{4}$)
Main Valve Bolt	60	(44)	6	($\frac{1}{4}$)
Turn Stopper Bolt	20	(15)	5	($\frac{3}{16}$)
Drain Plug (Iron Body)	60*	(44)	14	($\frac{9}{16}$)
Plug (Iron Body)	450*	(330)	32	($1\frac{1}{4}$)
Drain Plug (Steel Body)	150	(110)	35	($1\frac{3}{8}$)
Plug (Steel Body)	1000	(730)	60	($2\frac{3}{8}$)

(1 N·m \approx 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.

* Values represent tightening torque for threads that are wrapped with 3 – 3.5 turns of sealing tape.

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.

If 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
	There is no inflow of condensate	Inspect and correct the piping
	The orifice opening or piping are clogged with rust and scale	Clean parts
	The trap operating pressure exceeds the maximum specified pressure or there is insufficient pressure differential between the trap inlet and outlet or there has been a drop in operating pressure	Compare specifications and actual operating conditions
	Air binding or steam-locking has occurred	Operate the lock release valve, perform a bypass blowdown or close the trap inlet valve and allow the trap to cool
	The piston or cylinder is damaged or the exhaust holes in the main valve stem have become enlarged	Replace with a new piston, cylinder or main valve
	The piston or cylinder has a build-up of sticky scale	Clean parts
Steam is discharged or leaks from the outlet (blowing) (steam leakage)	Build-up on the seating surface of the main valve or rust and scale build-up beneath the float	Clean parts
	The float is misshapen or has a build-up	Clean or replace with new float
	The exhaust holes in the main valve have become clogged	Clean or replace piston
	The main valve or main valve seat is worn	Replace with new parts as required
	Improper installation orientation	Correct the installation
	Trap vibration	Lengthen inlet piping and fasten securely
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
Float is frequently damaged	Water hammer has occurred	Study and correct the piping

TLV EXPRESS LIMITED WARRANTY

Subject to the limitations set forth below, TLV Corporation, a North Carolina corporation (“**TLV**”) warrants that products which are sold by it, TLV CO., LTD., a Japanese corporation (“**TLVJ**”) or TLV International, Inc., a Japanese corporation (“**TII**”), (hereinafter the “**Products**”) are designed and manufactured by TLVJ, conform to the specifications published by TLV for the corresponding part numbers (the “**Specifications**”) and are free from defective workmanship and materials. 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 other than TLV 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 other than TLV 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; 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 the earlier of: (i) three (3) years after delivery of Products to the first end user in the case of sealed SST-Series Products for use in steam pressure service up to 650 psig; (ii) two (2) years after delivery of Products to the first end user in the case of PowerTrap® units; or (iii) one (1) year after delivery of Products to the first end user in the case of all other Products. Notwithstanding the foregoing, asserting a claim under this warranty must be brought by the earlier of one of the foregoing periods, as applicable, or within five (5) 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 TLV.

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 TLV IN WRITING WITHIN THE APPLICABLE 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 TLV, FREIGHT AND TRANSPORTATION COSTS PREPAID, UNDER A RETURN MATERIAL AUTHORIZATION AND TRACKING NUMBER ISSUED BY TLV. 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. TLV 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 TLV'S REASONABLE DISCRETION, THAT THE CLAIMED DEFECT IS NOT COVERED BY THIS WARRANTY, THE PARTY ASSERTING THIS WARRANTY SHALL PAY TLV 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 TLVJ 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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