

ISO 9001
ISO14001



Manufacturer

TLV CO., LTD.

Kakogawa, Japan

is approved by LRQA Ltd. to ISO 9001/14001



Instruction Manual

Free Float Drain Trap

Featured models: SS1VG-M/SS1VG-R

172-65393M-07

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Introduction

Thank you for purchasing the free float drain 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.

If this product is used with toxic, flammable or otherwise hazardous fluids, all responsibility for regulatory compliance, product selection (including materials), handling, safety measures, etc. for the hazardous fluid(s) must be borne by the customer. Under no circumstances will TLV CO., LTD. be liable for consequential economic loss damage or consequential damage to property or persons caused by explosions, poisoning or other accidents due to use with hazardous fluids.

This product uses a precision-polished float and three-point support for the valve body. With no hinges or levers, the trap continuously discharges condensate, preventing it from collecting. The three-point seating for the valve body supports the precision-ground float securely at three points and ensures a high degree of sealing for even minute quantities of condensate. The trap can also be disassembled and reassembled while still installed in the piping. This results in considerable time savings and facilitates repair and maintenance. The outstanding features of the precision-ground float and 3-point valve body support, combined with a mechanism that has a proven record of success, make it suitable for condensate discharge from a variety of gas systems.

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.

Cautionary items and definitions



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

Safety Considerations for the product



Danger

When used with toxic, flammable or otherwise hazardous fluids, manage properly and take appropriate safety measures for the hazardous fluids in use. Failure to do so may result in serious injury and/or severe damage to property caused by blockage or fluid leakage.



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.



Caution

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



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**

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**

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.

**Caution**

Take measures to ensure the proper handling, such as recovery or dilution, of hazardous fluids discharged at product outlets. Outflow of fluid or fluid leaks may lead to hazards such as flammable conditions or corrosion, which may result in injury, fires, damage or other accidents.

**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.

**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.

Checking the Piping



Danger

When used with toxic, flammable or otherwise hazardous fluids, manage properly and take appropriate safety measures for the hazardous fluids in use. Failure to do so may result in serious injury and/or severe damage to property caused by blockage or fluid leakage.

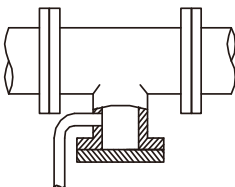
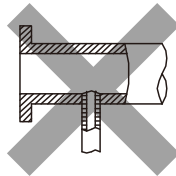
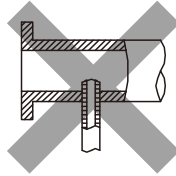
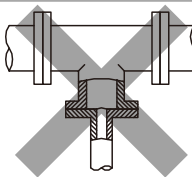
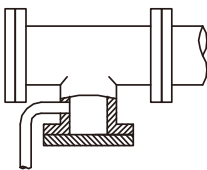
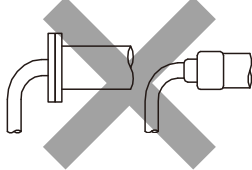


Caution

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 vertical?
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 product, the inlet pipe should be connected 25 to 50 mm 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.

Specifications



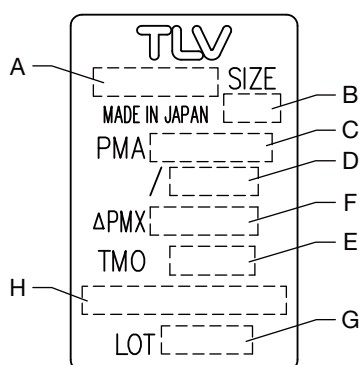
Caution

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 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 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.



A	Model	E	Maximum Operating Temperature (TMO)
B	Nominal Diameter	F	Maximum Differential Pressure (PMX)
C	Maximum Allowable Pressure (PMA) ⁰¹	G	Production Lot No.
D	Maximum Allowable Temperature (TMA) ⁰¹	H	Valve No. ⁰²

⁰¹Maximum allowable pressure (PMA) and maximum allowable temperature (TMA) are PRESSURE SHELL DESIGN CONDITIONS, **NOT** OPERATING CONDITIONS.

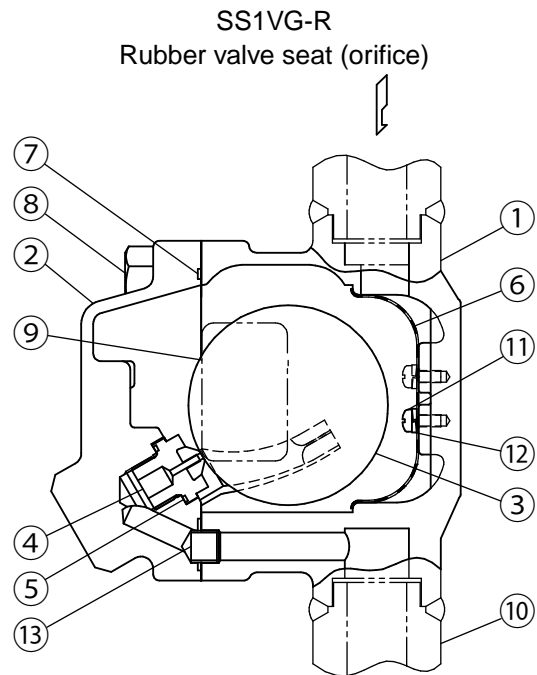
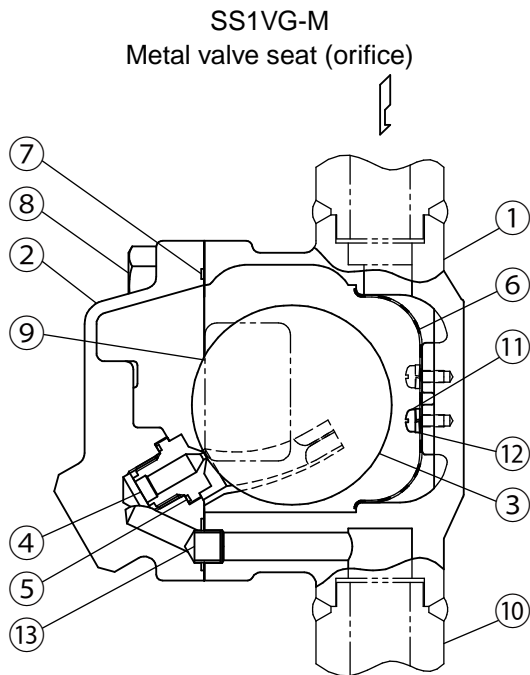
⁰²Valve No. is displayed for products with options. This item is omitted from the nameplate when there are no options.

Minimum Required Condensate Load

For products with a metal valve seat (orifice), a minimum required condensate load is necessary to maintain a liquid seal. There is a chance of air/gas leak if the condensate load falls below this rate. Please refer to the chart below.

Model	Minimum Required Condensate Load
SS1VG-M	0.5 kg/h

Configuration



No.	Part Name	No.	Part Name
1	Body	8	Cover Bolt
2	Cover	9	Nameplate
3	Float	10	Flange
4	Valve Seat (Orifice)	11	Screw
5	Valve Seat (Orifice) Gasket	12	Spring Washer
6	Screen	13	Connector
7	Cover Gasket		

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 that may lead to serious accidents. Local regulations may restrict the use of this product to below the conditions quoted.

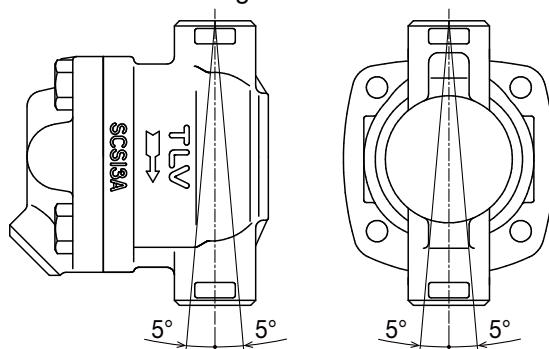
Take measures to prevent people from coming into direct contact with product outlets. Failure to do so may result in burns or other injury from the discharge of fluids.

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. 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.
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. Install a condensate outlet valve and outlet piping.
6. Open the inlet and outlet valves 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°



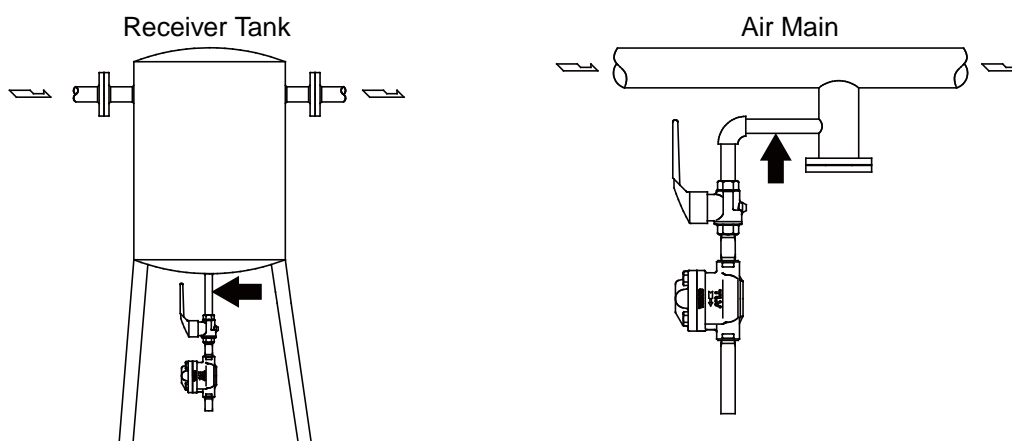
Make sure the product is installed with the raised TLV lettering on the body horizontal.

The Need for a Pressure-balancing Line

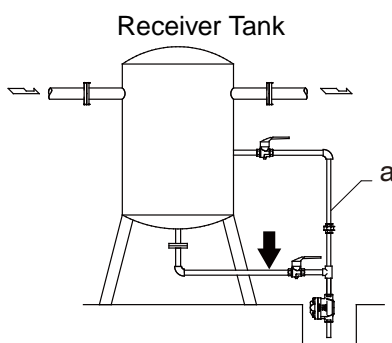
This product is designed to automatically discharge inflowing condensate. However, if the condensate completely fills the inlet path of the product, air or gas in the product body will not be able to escape, preventing displacement by condensate, and thus preventing condensate from entering the product. This phenomena is called air binding. Air binding occurs more often in piping with long horizontal lengths, smaller diameters or multiple bends. To prevent air binding and ensure air or gas can be displaced by incoming condensate, a pressure-balancing line should be installed between the product cover and the dry portion of the receiver tank.

Since the SS1VG is installed vertically, a balancing line is not generally required. However, to prevent air binding, follow the instructions below, using inlet piping with a minimum nominal diameter of 15 mm.

1. The inlet piping must be straight, vertical and as short as possible.
2. If the point of condensate discharge requires horizontal piping, it should be kept as short as possible, no more than 200 mm long, then arrange vertical inlet piping.



If a longer horizontal length of piping is unavoidable, then a pressure-balancing line (a) must be installed.



Secondary Side Precautions



Caution

Take measures to ensure the proper handling, such as recovery or dilution, of hazardous fluids discharged at product outlets. Outflow of fluid or fluid leaks may lead to hazards such as flammable conditions or corrosion, which may result in injury, fires, damage or other accidents.

Be sure to take precautions on the secondary side when using flammable, toxic or other hazardous gases.

Sample precautionary procedures:

1. Flare method
2. Collection in a seal pot
3. Collection in a sealed container

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.

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.

Operational Check

A visual inspection according to 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 a diagnostic equipment, such as a stethoscope or thermometer.

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

Normal: Condensate is discharged continuously 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.

Blowing: Air/gas continuously blows from the outlet and there is a continuous metallic sound.

Air/Gas Leakage ¹: Air or gas 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, inspect the parts and replace any that are found to be defective.

Gaskets: Check for warping or scratches

Screen: Check for clogging or corrosion

Valve Seat (Orifice): Check for warping or scratches

Float: Check for scratches or dents

Body Interior: Check for build-up

Valve Seat (Orifice): Opening: Check for dirt, oil film, wear or scratches

¹The product with metal valve seats (orifice) has a minimum condensate load requirement to ensure proper sealing (see "Specifications").

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

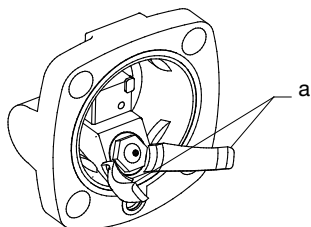
When disassembling or removing the product, wait until the internal pressure equals atmospheric pressure and the surface of the product has cooled to room temperature.

Disassembling or removing the product when it is hot or under pressure may lead to discharge of fluids, causing burns, other injuries or damage.

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.)

Detaching/Reattaching the Cover

Part Name & No.		During Disassembly	During Reassembly
Cover Bolt	8	Remove with a socket wrench	Consult the table of tightening torques and tighten to the proper torque
Cover	2	Remove; take care to prevent any damage to the float, which may fall out when the cover is removed	Make sure there are no pieces of the old gasket left on the sealing surfaces, then reattach; be careful not to bend the float guides (a)
Float	3	Remove being careful not to scratch its polished surface	Insert being careful not to scratch or misshape



Note

The float guides are correctly positioned when shipped from the factory, so be careful when handling them. Tight sealing cannot be guaranteed if the float guides have been moved out of position.

Disassembly/Reassembly of Components Inside the Cover

Part Name & No.		During Disassembly	During Reassembly
Connector	13	Remove the connector	Insert into the hole in the cover
Cover Gasket	7	Remove the gasket and clean sealing surfaces	Replace with a new gasket if misshapen or damaged
Valve Seat (orifice)	4	Remove with a socket wrench	Consult the table of tightening torques and tighten to the proper torque
Valve Seat (orifice) Gasket	5	Remove the gasket and clean sealing surfaces	Replace with a new gasket if misshapen or damaged

Disassembly/Reassembly of Components Inside the Body

Part Name & No.		During Disassembly	During Reassembly
Screw	11	Remove the connector	Consult the table of tightening torques and tighten to the proper torque
Spring Washer	12		
Screen	6	Remove without bending	Insert the screen with the proper orientation, aligning screw holes

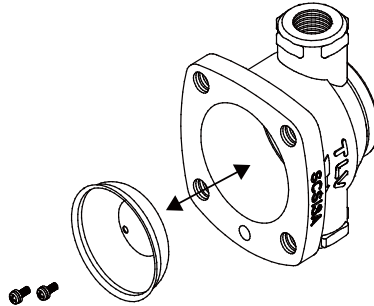


Table of Tightening Torques

Part Name & No.		Torque N·m	Distance Across Flats mm
Cover Bolt	8	45	16/17 ⁰¹
Valve Seat (Orifice)	4	15	13
Screw	11	0.3	+

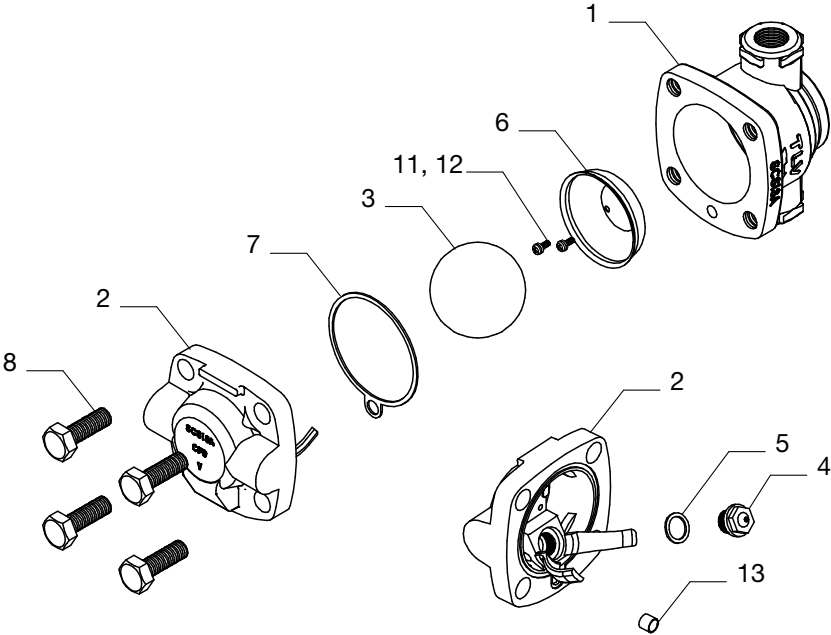
⁰¹Size depends on bolt standard



Note

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

Exploded View



No.	Part Name	No.	Part Name
1	Body	8	Cover Bolt
2	Cover	9	Nameplate
3	Float	10	Flange ⁰¹
4	Valve Seat (Orifice)	11	Screw
5	Valve Seat (Orifice) Gasket	12	Spring Washer
6	Screen	13	Connector
7	Cover Gasket		

⁰¹Not shown

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 valve seat (orifice) opening or piping are clogged with rust and scale	Clean parts
	The product operating pressure exceeds the maximum specified pressure, or whether there is insufficient pressure differential between the product inlet and outlet	Compare specifications and actual operating conditions
	The specific gravity of the condensate is not suitable for this product	Compare the specific gravity when the product is initially selected with actual operating conditions
	Air binding has occurred (standard installation)	Inlet piping must be at least 15 mm, straight, vertical and as short as possible
	Air binding has occurred (horizontal inlet piping was used)	Use only vertical inlet piping if possible, otherwise install a pressure-balancing line
Air/gas is discharged or leaks from the outlet ⁰¹ (blowing) (air/gas leakage)	Clogged valve seat (orifice) opening or rust and scale build-up beneath the float	Clean parts
	Scratches on the valve seat (orifice)	Replace with a new valve seat (orifice)
	The float is misshapen or has some build-up	Clean or replace with a new float
	Improper installation orientation	Correct the installation
	Product vibration	Lengthen the inlet piping and fasten it securely
Air/gas 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

⁰¹The product with metal valve seat (orifice) has a minimum condensate load requirement to ensure proper sealing (see the "Specifications" section).

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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