



Manufacturer

TLV. CO., LTD.

Kakogawa, Japan

is approved by LRQA LTD. to ISO 9001/14001



Instruction Manual

Free Float Drain Trap
SS1VG-M / SS1VG-R

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Introduction

Thank you for purchasing the **TLV** 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 free float gas trap (drain trap) 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.

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

Safety considerations continued on 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>
	<p>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.</p>

Checking the Piping



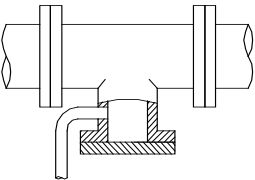
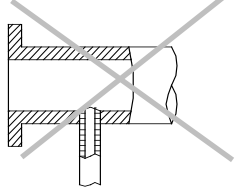
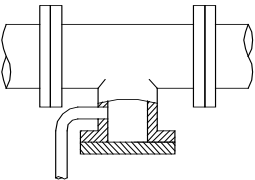
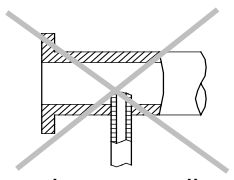
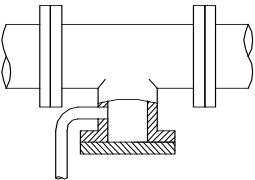
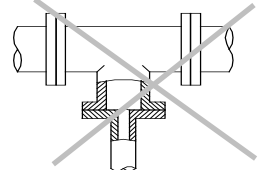
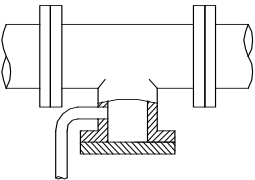
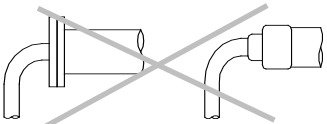
When used with toxic, flammable or otherwise hazardous fluids, manage properly and take appropriate safety measures for the hazardous fluids in use. Failure to do so may result in serious injury and/or severe damage to property caused by blockage or fluid leakage.



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 vertical?
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?
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 – 50 mm (1 – 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.

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.

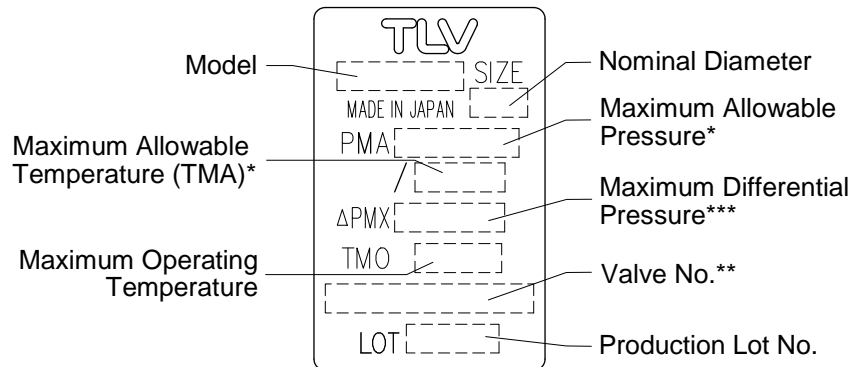


DO NOT use this product in excess of the maximum operating pressure differential; such use could make discharge impossible (blocked).



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.

Minimum Required Condensate Load

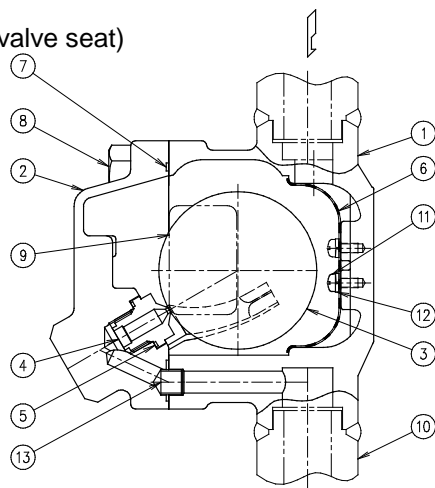
For products with a metal valve seat, a minimum required condensate load is necessary to maintain a liquid seal. There is a chance of air/gas leak if the condensate load falls below this rate. Please refer to the chart below.

Model	SS1VG-M
Minimum Required Condensate Load	0.5 kg/h (1 lb/h)

Configuration

SS1VG-M

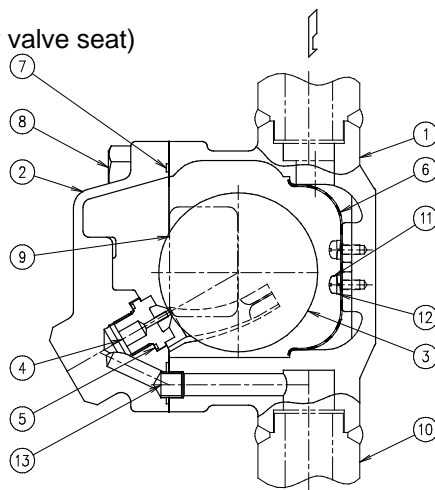
(with metal valve seat)



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

SS1VG-R

(with rubber valve seat)



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

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.

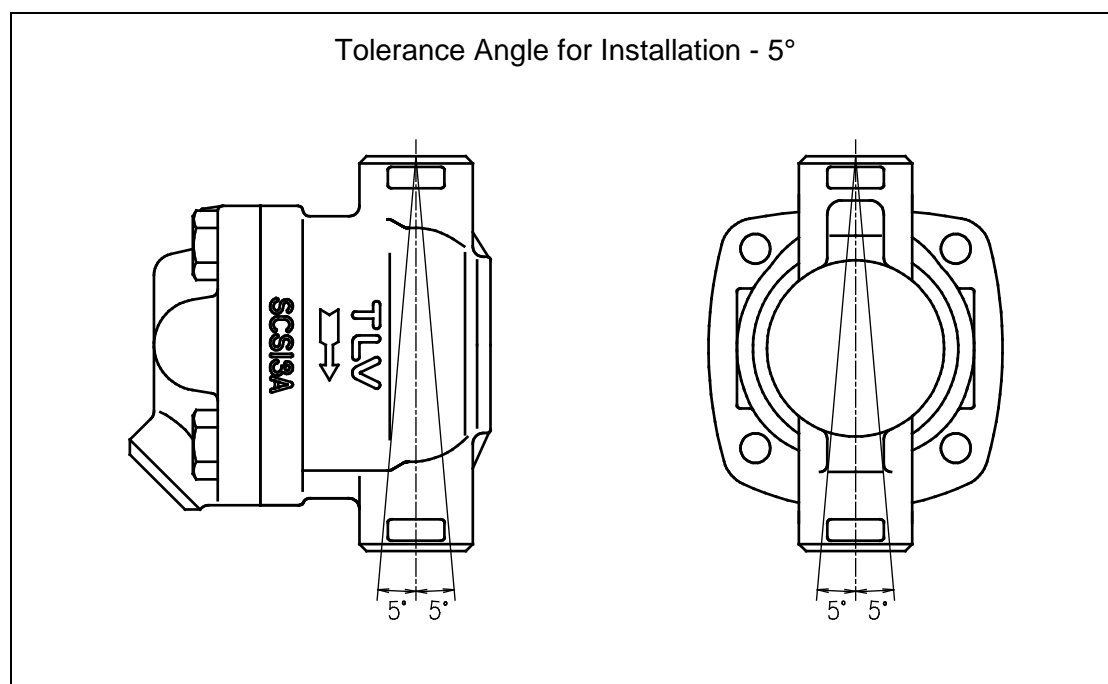


Take measures to prevent people from coming into direct contact with product outlets. Failure to do so may result in burns or other injury from the discharge of fluids.

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 trap must be installed vertically, 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.

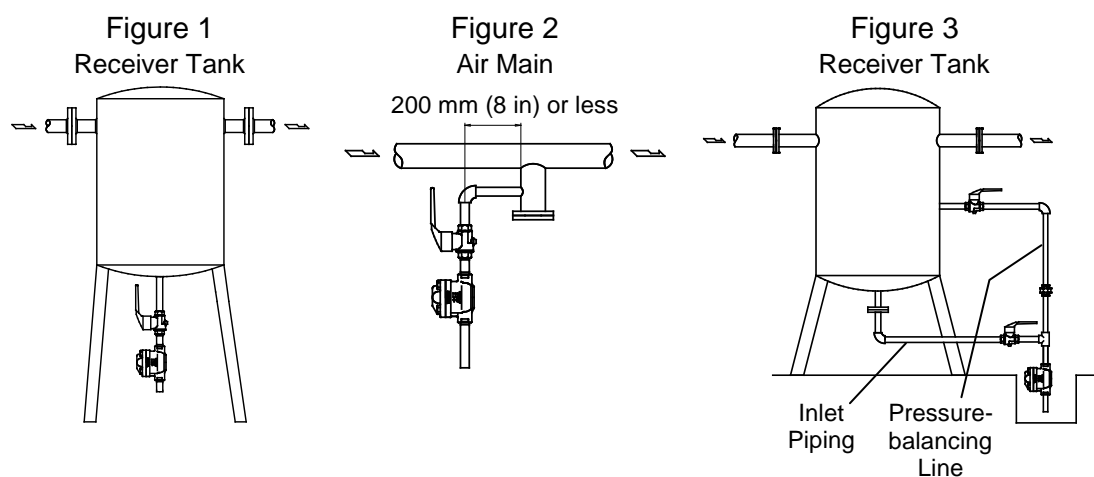


The Need for a Pressure-balancing Line

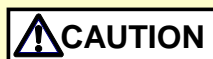
In principle, drain traps automatically and continuously discharge condensate that flows in. However, air or gas caught in the piping or trap body may obstruct condensate flow. This phenomenon is called “air binding”. Air binding occurs more often in piping with long horizontal lengths, smaller diameters 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 trap 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 ($\frac{1}{2}$ in).

- 1) The inlet piping must be straight, vertical and as short as possible (see fig. 1).
- 2) If the point of condensate discharge requires horizontal piping, it should be kept as short as possible, no more than 200 mm (8 in) long, then arrange vertical inlet piping (see fig. 2).
- 3) If a longer horizontal length of piping is unavoidable, then a pressure-balancing line must be installed (see fig. 3).



Secondary Side Precautions



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



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 trap is operating properly or has failed. Periodically (at least biannually) the operation should also be checked by using diagnostic equipment, such as a stethoscope or thermometer.

If the trap 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 and no sound is made.
- Blowing : Air or gas continually flows from the outlet and there is a continuous metallic sound.
- Air or Gas Leakage* : Air or gas is discharged through the trap outlet together with condensate, accompanied by a high-pitched sound.

* The SS1VG –M with metal valve seat has a minimum condensate load requirement to ensure proper sealing (see “Specifications”).

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: check for warping or scratches
Screen: Check for clogging or damage
Valve Seat: check for warping or scratches
Float: check for scratches or dents
Check for build-up inside the body
Valve Seat Opening: check for dirt, oil film, wear or scratches

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.



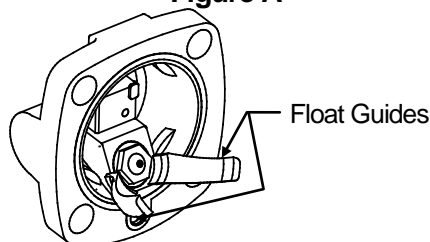
CAUTION When disassembling or removing the product, wait until the internal pressure equals atmospheric pressure and the surface of the product has cooled to room temperature. Disassembling or removing the product when it is hot or under pressure may lead to discharge of fluids, causing burns, other 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	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; 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 (Fig. A)
Float	Remove being careful not to scratch its polished surface	Insert being careful not to scratch or misshape

Figure A



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	During Disassembly	During Reassembly
Connector	Remove	Insert into hole in cover
Cover Gasket	Remove	Replace with a new gasket if warped or damaged
Valve Seat	Remove with a socket wrench	Consult the table of tightening torques and tighten to the proper torque
Valve Seat Gasket	Remove	Replace with a new gasket if warped or damaged; apply anti-seize

Disassembly / Reassembly of Components Inside the Body

Part	During Disassembly	During Reassembly
Screw & Washer	Remove with a Philips screwdriver	Consult the table of tightening torques and tighten to the proper torque
Screen	Remove without bending	Insert the screen with the proper orientation, aligning screw holes (Fig. B)

Figure B

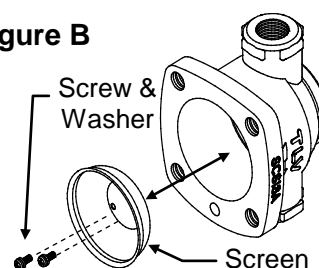


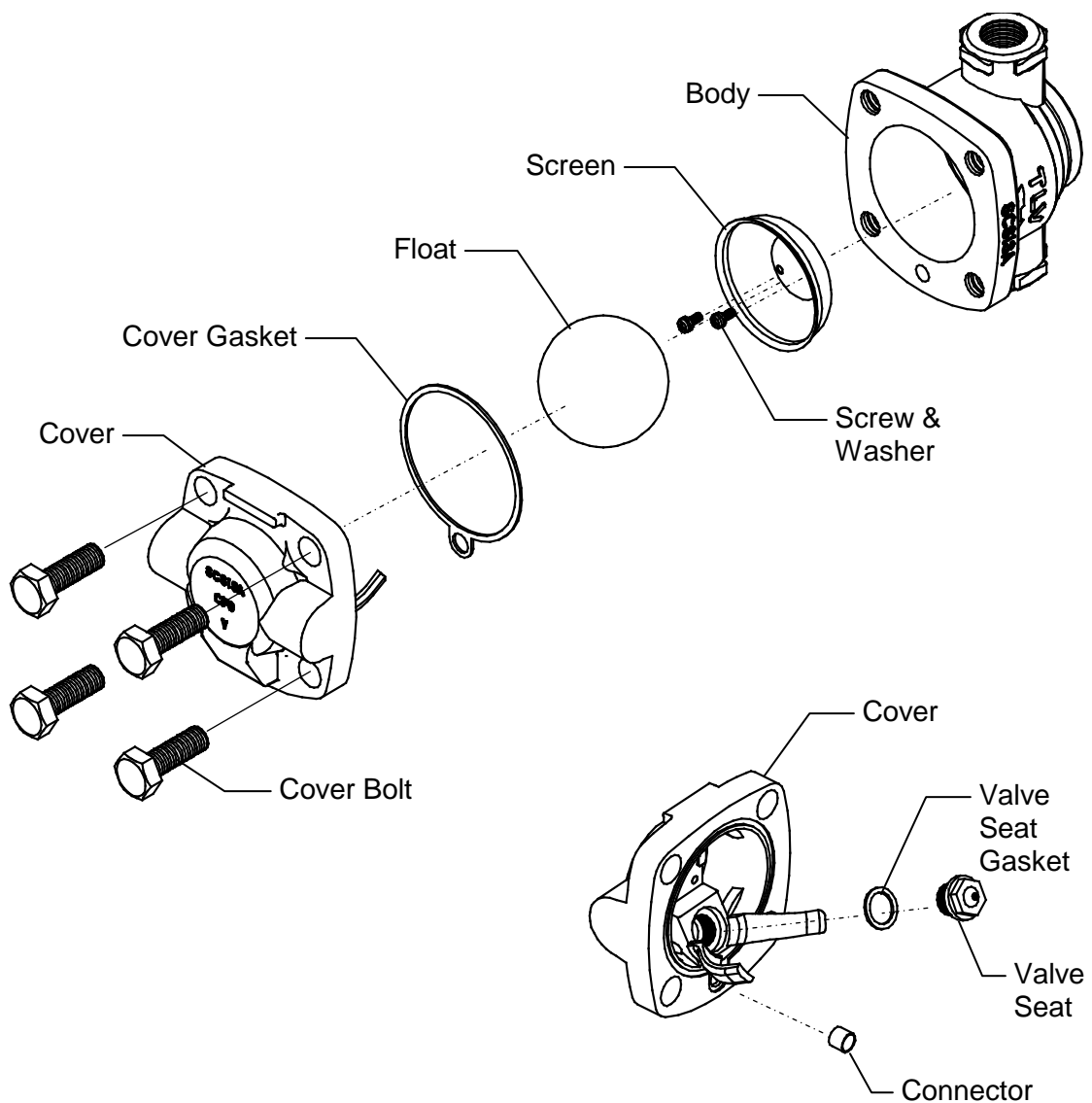
Table of Tightening Torques

Part	Torque		Distance Across Flats	
	N·m	(lbf·ft)	mm	(in)
Cover Bolt	45	(33)	17	(²¹ / ₃₂)
Valve Seat	15	(11)	13	(¹ / ₂)
Screw	0.3	(0.22)		+

(1 N·m ≈ 10 kg·cm)

NOTE: - Coat all threaded portions and valve seat 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



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 and remedy the cause.

Problem	Cause	Remedy
No condensate is discharged or discharge is poor (blocked)	The float is damaged or filled with condensate	Replace with new float
	The valve seat opening, screen 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	Compare specifications and actual operating conditions
	Air binding has occurred (standard installation)	Inlet piping must be at least 15 mm ($1/2$ in), 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
	The specific gravity of the fluid is not suitable for this product	Consult TLV
Air/gas is discharged or leaks from the outlet* (blowing) (air/gas leakage)	Rust and scale have built-up around the valve seat or beneath the float	Clean parts
	The valve seat is scratched or damaged	Replace with new valve seat
	The float is misshapen or has a build-up	Clean float or replace with new float
	Improper installation orientation	Correct the installation
Air/gas is leaking from a place other than the outlet	There is excessive trap vibration	Lengthen inlet piping and fasten securely
	Gasket(s) are deteriorated or damaged	Replace with new gasket(s)
	Improper tightening torques were used	Tighten to the proper torque

* The SS1VG–M with metal valve seat has a minimum condensate load requirement to ensure proper sealing (see “Specifications”).

Product Warranty

1. Warranty Period
One year following product delivery.
2. Warranty Coverage
TLV CO., LTD. warrants this product to the original purchaser to be free from defective materials and workmanship. Under this warranty, the product will be repaired or replaced at our option, without charge for parts or labor.
3. This product warranty will not apply to cosmetic defects, nor to any product whose exterior has been damaged or defaced; nor does it apply in the following cases:
 - 1) Malfunctions due to improper installation, use, handling, etc., by other than TLV CO., LTD. authorized service representatives.
 - 2) Malfunctions due to dirt, scale, rust, etc.
 - 3) Malfunctions due to improper disassembly and reassembly, or inadequate inspection and maintenance by other than TLV CO., LTD. authorized service representatives.
 - 4) Malfunctions due to disasters or forces of nature.
 - 5) Accidents or malfunctions due to any other cause beyond the control of TLV CO., LTD.
4. Under no circumstances will TLV CO., LTD. be liable for consequential economic loss damage or consequential damage to property.

* * * * *

For Service or Technical Assistance:

Contact your **TLV** representative or your regional **TLV** office.

Manufacturer

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