



Instruction Manual

Process Lever Float Steam Trap SW1U-A / SW1U-B

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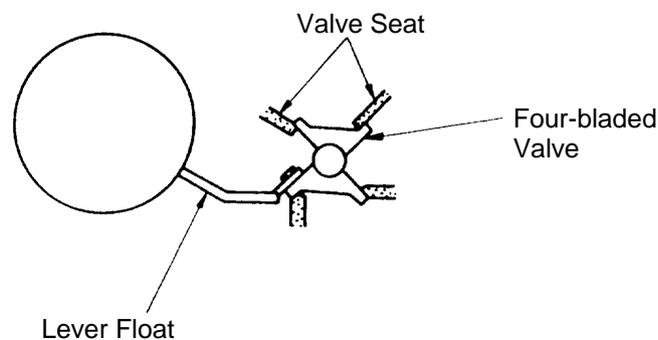
Introduction

Thank you for purchasing the TLV process lever 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 steam trap employs TLY[®] (Tetra-Leaf & Yoke) construction, which affords it stable operation and long service life. TLY construction was developed for process lever float steam traps, and comprises a four-bladed valve connected directly to a lever float.

As the valve opening and closing forces created by the pressure differential between inlet and outlet pressures are balanced, a four-bladed valve ensures stable trap operation at all times.



This trap is ideal for applications requiring the removal of condensate from equipment using large quantities of steam and from process machinery. Additionally, it quickly and automatically discharges large quantities of condensate at a temperature slightly lower than saturation temperature.

For products with special order specifications or options, if detailed instructions for the special order specifications or options are not contained in this manual, 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.

TLY is a registered trademark of TLV CO., LTD.

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 | <p>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.</p> |
|  CAUTION | <p>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.</p> <p>DO NOT use this product in excess of the maximum operating pressure differential. Such use could make discharge impossible (blocked).</p> <p>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.</p> |

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. Has a bypass line been installed properly?
6. 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?

Operation

Principles of condensate discharge:

At start-up, open the bypass valve to remove any initial condensate or air at 100°C (212°F) or less. (This step must be performed in order to ensure smooth start-up.)

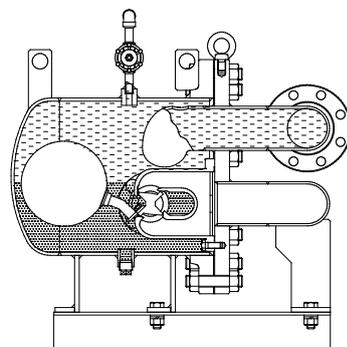
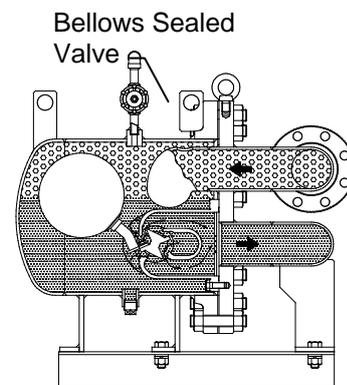
Air binding occurs when the inflow of steam is accompanied by the inflow of air during normal operation. Whenever air binding occurs, it can be released by opening the bellows sealed valve to discharge the air.

After air is discharged, the bellows sealed valve must be closed.

As condensate flows into the trap, the rising condensate level causes the float to rise due to buoyancy, automatically opening the valve and allowing condensate to be continuously discharged. When this occurs, the opening size of the valve varies depending on the condensate flow rate.

As the condensate is discharged, the condensate level falls, causing the float to fall, thereby automatically closing the valve.

The valve remains closed as long as no condensate enters 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.

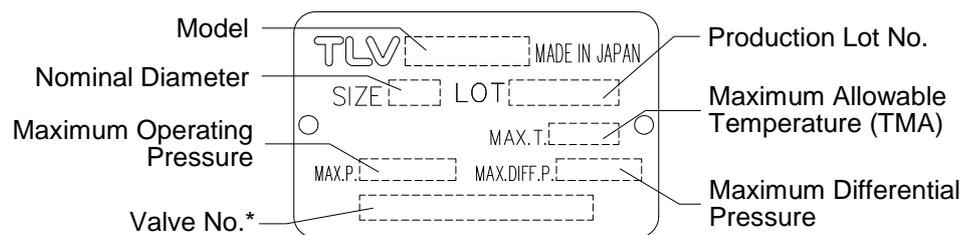


DO NOT use this product in excess of the maximum operating pressure differential; such use could make discharge impossible (blocked).



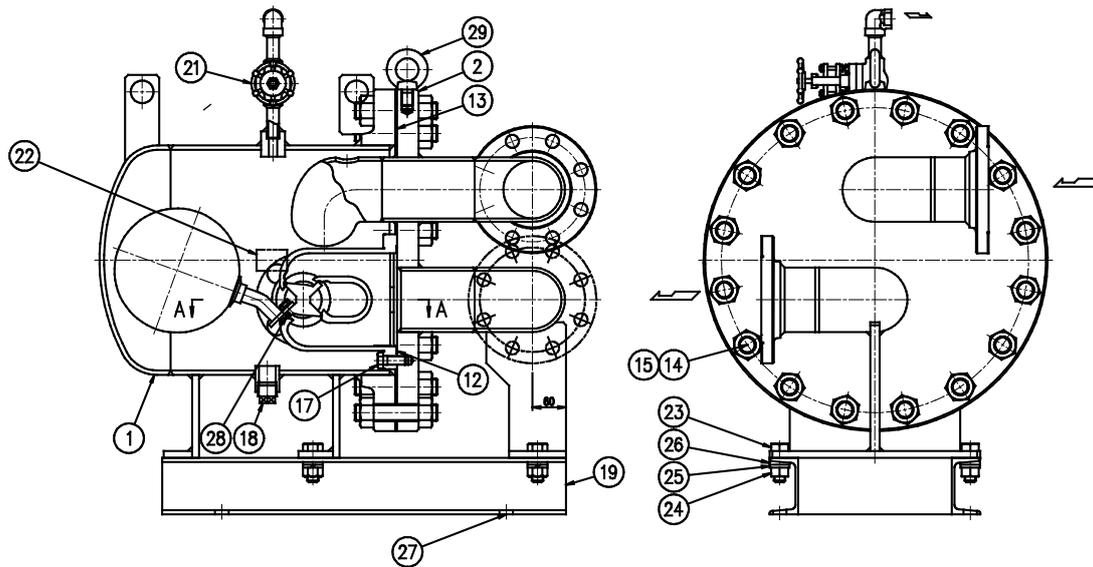
Use only under conditions in which no freeze-up will occur. Freezing may damage the product, leading to fluid discharge, which may cause burns or other injury.

Refer to the product nameplate for detailed specifications.



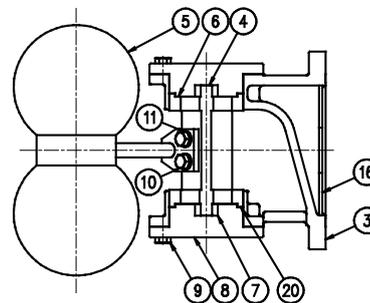
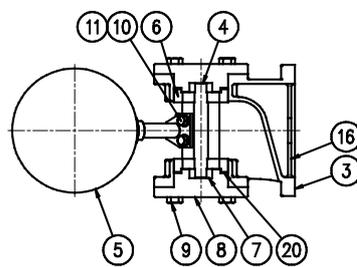
* Valve No. is displayed for products with options. This item is omitted from the nameplate when there are no options.

Configuration



A-A Cut View (SW1U-A)

A-A Cut View (SW1U-B)



| No. | Name | No. | Name | No. | Name |
|-----|-------------------|-----|------------------------|-----|----------------------|
| 1 | Body Unit | 11 | Spring Washer | 21 | Bellows Sealed Valve |
| 2 | Cover Unit | 12 | Valve Seat Body Gasket | 22 | Nameplate |
| 3 | Valve Seat Body | 13 | Cover Gasket | 23 | Mounting Bolt |
| 4 | TLY Valve | 14 | Cover Bolt | 24 | Mounting Nut |
| 5 | Float Unit | 15 | Cover Nut | 25 | Spring Washer |
| 6 | Seal Ring | 16 | Baffle | 26 | Washer |
| 7 | Bearing | 17 | Valve Seat Body Bolt | 27 | Foundation Bolt |
| 8 | Valve Holder | 18 | Drain Plug | 28 | Set Screw |
| 9 | Valve Holder Bolt | 19 | Mounting Base | 29 | Eye Bolt |
| 10 | Lever Bolt | 20 | Wave Spring | | |

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.



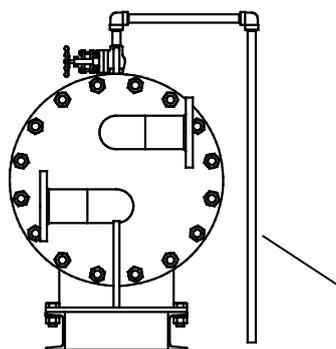
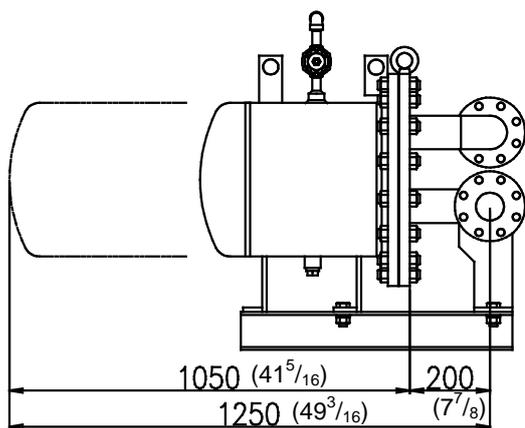
Take measures to prevent people from coming into direct contact with product outlets. Failure to do so may result in burns or other injury from the discharge of fluids.

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. When installing the product, be sure to install a bypass line. At start-up, open the bypass valve to remove initial condensate and air of less than 100°C (212°F).
3. Install an inlet valve and strainer at the trap inlet.
4. 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.
5. Install an outlet pipe with consideration for maintenance work from the bellows sealed valve for the discharge of air safely to a drainage vessel or ditch. Make sure the end of the pipe is above the waterline, so that dirt and water cannot be sucked up by vacuum when the system shuts down and the bellows sealed valve is open.
6. Secure the product to the mounting base using the 4 foundation bolts.
7. A shut-off valve should be installed at the product outlet.
8. Install the product so the arrow on the body is pointing in the direction of condensate flow.
9. Install the product into the piping in a manner that lets the condensate flow naturally down into the trap.
10. Secure the necessary space to perform a complete disassembly and inspection. (See the figures on the next page.)

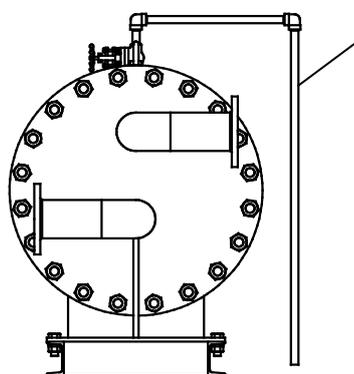
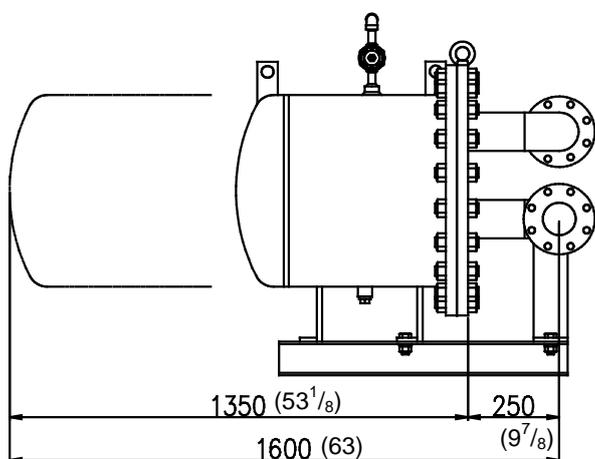
If there is a problem, determine the cause using the “Troubleshooting” section in this manual.

SW1U-A



Install outlet pipe for air discharge to the safe place

SW1U-B



(Units: mm (in))

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 once every six months) the operation 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 continuously, together 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 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 trap outlet together with condensate, accompanied by a high-pitched sound. |

NOTE:

Flash steam: White jet containing water droplets

Live steam: Clear, slightly bluish jet

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 damage and warping |
| Float: Check for breakage, deformation and water on the inside |
| Seal Ring, Bearing: Check for breakage and wear |
| Valve, Valve Seat Body: Check for dirt build-up, damage and deformation |

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

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

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

| Part | During Disassembly | During Reassembly |
|---------------------------|---|--|
| Bellows Sealed Valve | Slowly open before disassembling the trap and make sure no remained pressure in the trap | Close after reassembling the trap |
| Body Unit | Loosen and remove the cover nuts and bolts connecting the body unit and cover unit | Consult the table of tightening torques and tighten cover nuts to the proper torque |
| Cover Gasket | Remove the gasket and clean sealing surfaces | Replace with a new gasket |
| Valve Seat Body | Loosen the valve seat body bolts and remove from the cover unit | Consult the table of tightening torques and tighten valve seat body bolts to the proper torque |
| Valve Seat Body Gasket | Remove the gasket and clean sealing surfaces | Replace with a new gasket if warped or damaged |
| Float Unit | Remove the lever bolts, then remove from the valve | Consult the table of tightening torques and tighten lever bolts to the proper torque; |
| TLY Valve | Remove the valve holder bolts from the valve seat body, remove the valve holder and then remove the TLY valve | Consult the table of tightening torques and tighten flange bolts to the proper torque |
| Seal Ring, Bearing | Remove from the valve seat body | Replace with new rings if warped or damaged |

Table of Tightening Torques

| Part | SW1U-A | | | | SW1U-B | | | |
|----------------------|--------|----------|-----------------------|-----------------------------------|--------|----------|-----------------------|------------------------------------|
| | Torque | | Distance Across Flats | | Torque | | Distance Across Flats | |
| | N·m | (lbf·ft) | mm | (in) | N·m | (lbf·ft) | mm | (in) |
| Cover Nut | 300 | (220) | 30 | (1 ³ / ₁₆) | 1,200 | (890) | 46 | (1 ¹³ / ₁₆) |
| Valve Seat Body Bolt | 100 | (73) | 24 | (1 ⁵ / ₁₆) | 350 | (260) | 30 | (1 ³ / ₁₆) |
| Valve Holder Bolt | 100 | (73) | 24 | (1 ⁵ / ₁₆) | 120 | (88) | 24 | (1 ⁵ / ₁₆) |
| Lever Bolt | 35 | (26) | 16 | (5/ ₈) | 150 | (110) | 24 | (1 ⁵ / ₁₆) |

NOTE: -Coat all threaded portions with anti-seize. (1 N·m ≈ 10 kg·cm)
 -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 and cause the remedy.

| Problem | Cause | Remedy |
|------------------------------|---|---|
| No condensate is discharged | The float is damaged or filled with condensate | Replace with a new float unit |
| | The valve is stuck closed | Disassemble, inspect, clean |
| | The inlet strainer has become clogged | Clean the strainer |
| Condensate discharge is poor | The inlet pressure is too small or the back pressure is too large | Adjust the pressure |
| | The inlet strainer has become clogged | Clean the strainer |
| Steam is blowing | The valve or valve seat body have a build-up of dirt | Disassemble, inspect, clean |
| | The valve or valve seat body are damaged or deformed | Replace with a new valve and/or valve seat body |
| | The valve is stuck closed | Disassemble, inspect, clean |

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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