



Manufacturer  
**TLV** CO., LTD.

Kakogawa, Japan



# Instruction Manual

## Clean Steam Trap SS5-P / SS5-EP

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## Introduction

Thank you for purchasing the **TLV** clean 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 clean steam trap is suitable for applications requiring condensate discharge from steam transport lines, process systems and equipment (steam-using equipment).

This clean steam trap automatically and continuously discharges the inflowing condensate that is continuously generated inside the equipment, thus preventing the accumulation of condensate and thereby improving the heat transfer efficiency of the equipment.

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.

## 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 <b>DANGER, WARNING or CAUTION</b> 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

	<b>NEVER apply direct heat to the float.</b> The float may explode due to increased internal pressure, causing accidents leading to serious injury or damage to property and equipment.
	<b>Install properly and DO NOT use this product outside the recommended operating pressure, temperature and other specification ranges.</b> 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. <b>DO NOT use this product in excess of the maximum operating pressure differential.</b> Such use could make discharge impossible (blocked). <b>Take measures to prevent people from coming into direct contact with product outlets.</b> Failure to do so may result in burns or other injury from the discharge of fluids.

Safety considerations continued on next page.

 <b>CAUTION</b>	<p><b>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.</b> 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><b>Be sure to use only the recommended components when repairing the product, and NEVER attempt to modify the product in any way.</b> 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><b>Use only under conditions in which no freeze-up will occur.</b> Freezing may damage the product, leading to fluid discharge, which may cause burns or other injury.</p>
	<p><b>Use only under conditions in which no water hammer will occur.</b> 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.

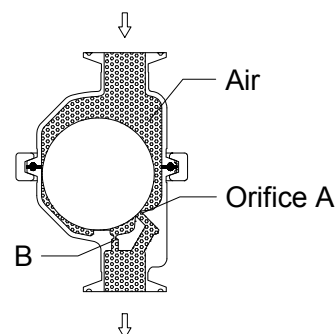
1. Is the pipe diameter suitable?
2. Has sufficient space been secured for maintenance?
3. Have maintenance valves been installed at the inlet and outlet? If the outlet is subject to back pressure, has a check valve been installed?
4. Is the inlet pipe as short as possible, with as few bends as possible, and installed so the liquid will flow naturally down into the trap?
5. Is there any vibration in the piping?

## Operation

Principles of air and condensate discharge:

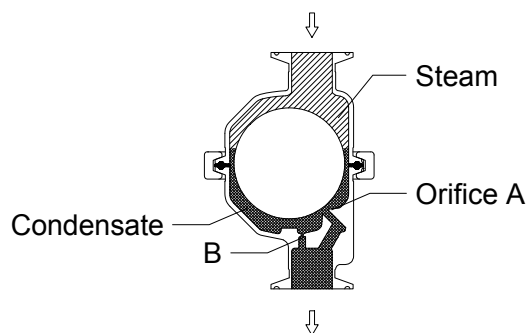
### 1. Initial Air Discharge

At start-up, before steam is supplied the system is cold and air occupies the system. When steam is first supplied to the system, air is discharged through the drain hole (B) while the orifice (A) is closed by the float.



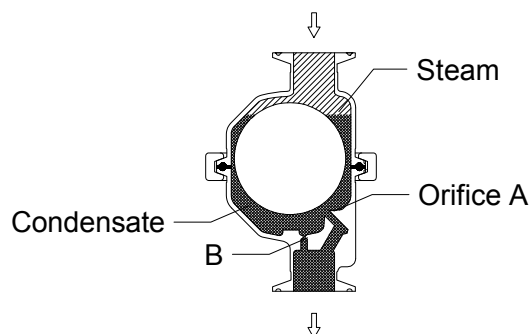
### 2. Condensate Discharge

As steam is supplied, condensate flow begins. The rising condensate level causes the float to rise due to buoyancy, opening the orifice (A) and allowing condensate to be discharged. In this manner, continuous condensate discharge occurs while the opening size of the orifice varies depending on the condensate flow rate.



### 3. Discharge of Large Quantities of Condensate

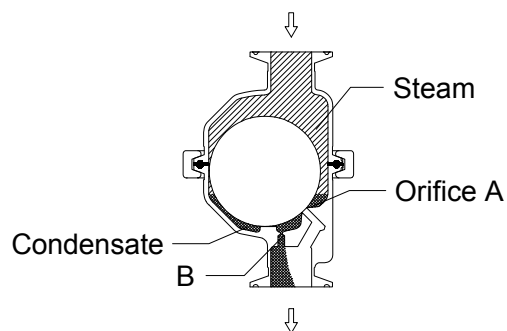
Increases in the condensate inflow rate cause the condensate level in the trap to rise. The float consequently rises and enlarges the opening of the orifice (A), allowing more condensate to be discharged.



### 4. Closed Position

When the condensate flow rate decreases, the float falls, closing off the orifice opening (A). When condensate flow rate becomes less than the minimum amount of condensate required to prevent steam discharge, some amount of steam is discharged from the drain hole (B).

Once the system stops operating, condensate remaining in the trap drains through the drain hole (B) by gravity.



## 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.

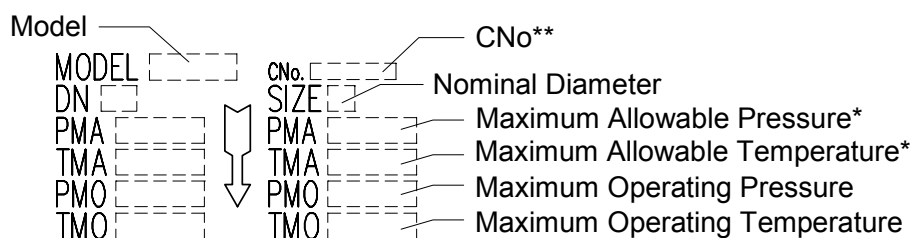


**DO NOT** use this product in excess of the maximum operating pressure differential; such use could make discharge impossible (blocked).



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.

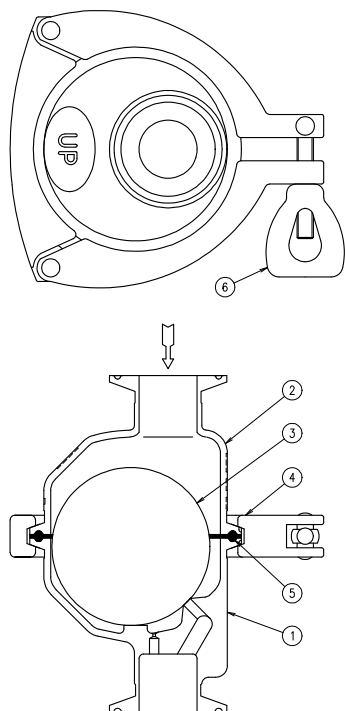
Refer to the indication on the body and cover for detailed specifications.



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

\*\* CNo. (Charge/Mill No.) is displayed for products with options. This item is omitted when there are no options.

## Configuration



No.	Name
1	Body
2	Cover
3	Float
4	Body Clamp
5	Cover Gasket
6	Wing Nut

## 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.

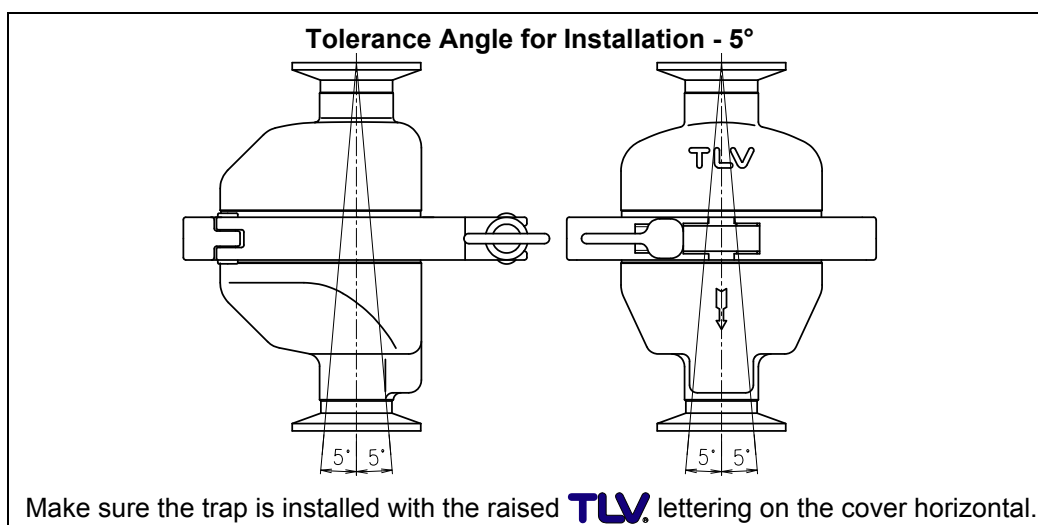


Take measures to prevent people from coming into direct contact with product outlets. Failure to do so may result in burns or other injury from the discharge of fluids.

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, blow out the inlet piping to remove any piping scraps, dirt and oil. Close the inlet valve after blowdown.
3. Install the product vertically with the inlet at the top and the outlet at the bottom within the allowable inclination as shown below, and with the arrow on the body pointing in the direction of flow.
4. Install condensate outlet valve and outlet piping.
5. The outlet pipe should lead to a safe place such as a drainage vessel, pit, etc. Make sure the end of the pipe is above the water level, so that dirt and water cannot be sucked up by vacuum when the system shuts down.
6. Open the inlet and outlet valves and check to make sure that the product functions properly.
7. After steam has passed through the piping, allow the trap to cool by closing the inlet valve and then further tighten the clamp.
8. Open the inlet valve again for normal operation.

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





## 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 Inspection

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 the operation should also be checked by using diagnostic equipment such as a stethoscope, thermometer, TLV Pocket TrapMan or TLV TrapMan.

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

- Normal : During either intermittent or continual condensate discharge flash steam is discharged and the sound of flow can be heard.
- Blocked (Discharge Impossible) : No condensate is discharged. The trap is quiet, making 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: The SS5-P/SS5-EP clean steam traps have a small built-in drain hole to ensure no condensate remains in the trap after operation. Therefore, a minimum condensate load is required during operation to prevent any steam discharge. If the condensate load is less than the minimum condition, a small amount live steam will be discharged along with any condensate.

### 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.

Part	Inspection and Maintenance Frequency
Cover Gasket	Check for warping or scratches
Float	Check for warping or scratches
Body	Check for build-up inside the body Check for dirt, oil film, wear or scratches Make sure opening of the orifice and a drain hole are not plugged with foreign matter

## 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.



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.

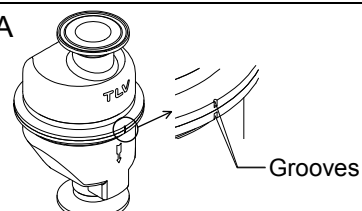
Use the following procedures to remove components. Use the same procedures in reverse to reassemble.

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

### Detaching/Reattaching the Body and the Cover

Part	During Disassembly	During Reassembly
Wing Nut Body Clamp	Loosen the wing nut with a tool such as an adjustable wrench, then remove the body clamp	Consult the table of tightening torques and tighten the wing nut to the proper torque; open inlet valve and allow live steam to enter and heat the trap, then close the inlet valve; after the internal and atmospheric pressures have equalized and the trap surface has cooled, tighten wing nut to the proper torque again; Steam may leak if the wing nut is not re-tightened
Body/Cover	Remove, being careful not to scratch the surface	With gasket in place, align grooves and gently place the cover on the body (Fig. A)
Cover Gasket	—	Replace with a new gasket if damaged

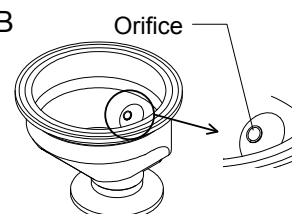
Figure A



### Detaching/Reassembly of Components Inside the Cover

Part	During Disassembly	During Reassembly
Float	Remove being careful not to scratch the polished surfaces of the float, the cover and the body	Insert into body, being careful not to scratch its polished surface, take care not to scratch or damage the seating surface of the orifice (Fig. B)

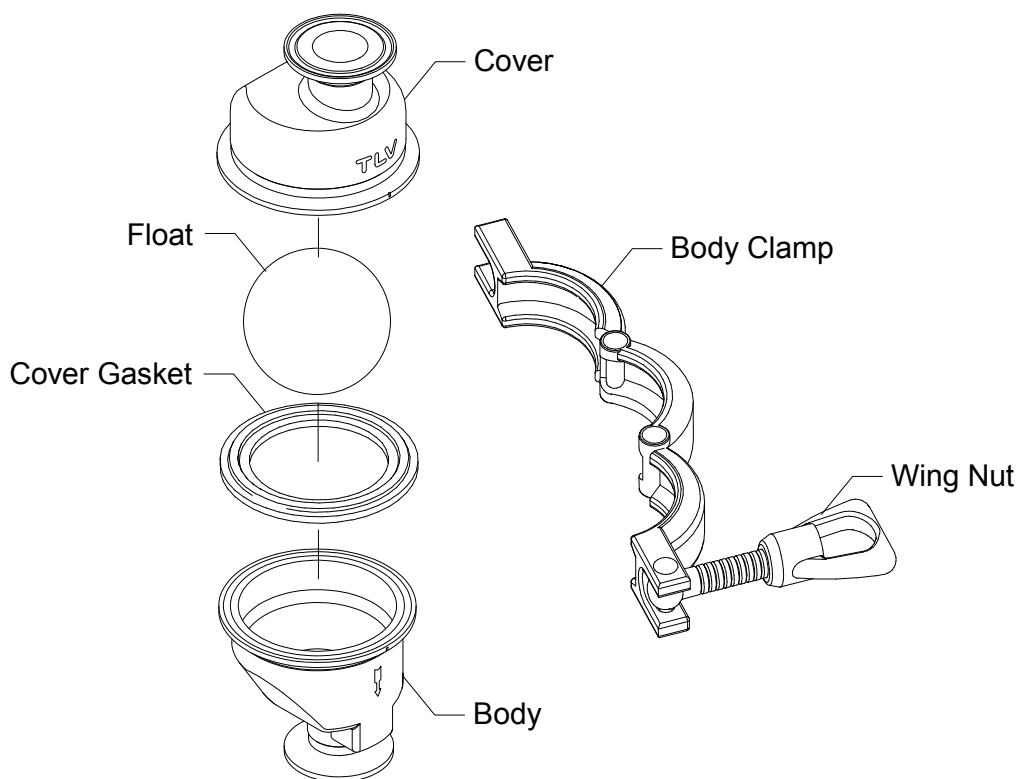
Figure B



**Table of Tightening Torques**

Part Name	Torque	
	N·m	(lbf·ft)
Wing Nut	10	(7)

(1 N·m ≈ 10 kg·cm)

**Exploded View**

## Troubleshooting



### 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 trap 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 float is sticking to the orifice	Clean parts
	The orifice opening of the drain hole or piping are clogged with rust and scale	Clean parts
	Flow exceeds trap's rate capacity	Check specifications and reselect the trap suitable for actual flow
	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
	Steam locking has occurred	Perform a bypass blowdown or close the trap inlet valve and allow the trap to cool
Steam is discharged or leaks from the outlet (blowing) (steam leakage)	Build-up on the seating surface of the orifice or rust and scale build-up beneath the float	Clean parts
	Scratches on the orifice	Replace with a new body
	The float is damaged or has build-up	Replace with a new float
	Trap is installed above the maximum allowable inclination angle	Correct the installation
	Trap vibration	Lengthen the inlet piping and fasten it securely
Steam is leaking from a place other than the outlet	There is gasket deterioration or damage	Replace with a new gasket
	Improper tightening torques was used on the body clamp wing nut	Tighten to the proper torque
Float frequently becomes damaged	Water hammer has occurred	Study and correct the piping
Some condensate is held in the trap	The small drain hole is blocked or clogged with foreign matter	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:

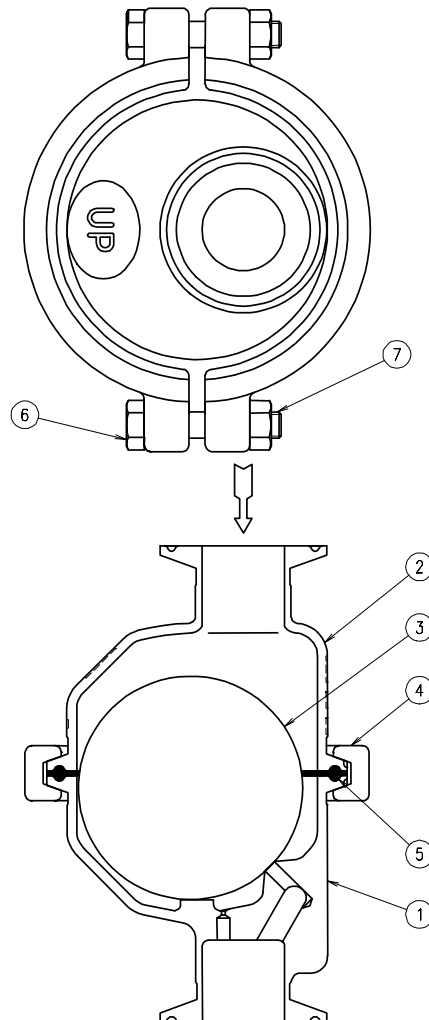
Contact your **TLV** representative or your regional **TLV** office.

## Manufacturer

**TLV** CO., LTD.  
881 Nagasuna, Noguchi  
Kakogawa, Hyogo 675-8511 JAPAN  
Tel: 81-(0)79 - 427 - 1800

## Option (2-piece Clamp with Bolts and Nuts)

### Configuration



No.	Name
1	Body
2	Cover
3	Float
4	Body Clamp
5	Cover Gasket
6	Clamp Bolt
7	Clamp Nut

## Disassembly/Assembly



**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.



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.

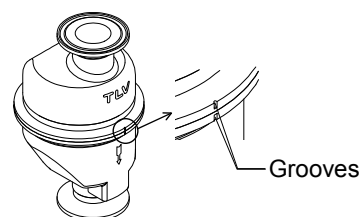
Use the following procedures to remove components. Use the same procedures in reverse to reassemble.

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

### Detaching/Reattaching the Body and the Cover

Part	During Disassembly	During Reassembly
Clamp Bolts/Nuts Body Clamp	Loosen clamp nuts with a tool such as an adjustable wrench, then remove the body clamp	When threading the clamp nut onto the clamp bolt, the direction of the clamp nut must be like that shown in the "Exploded View" section on the next page. Consult the table of tightening torques and tighten clamp nuts to the proper torque; avoid lopsided tightening by making sure that both sides are tightened evenly; open inlet valve and allow live steam to enter and heat the trap, then close the inlet valve; after the internal and atmospheric pressures have equalized and the trap surface has cooled, tighten clamp nuts to the proper torque again; Steam may leak if clamp nuts are not re-tightened
Body/Cover	Remove, being careful not to scratch the surface	With the gasket in place, align grooves and gently place the cover on the body (Fig. C)
Cover Gasket	—	Replace with a new gasket if damaged

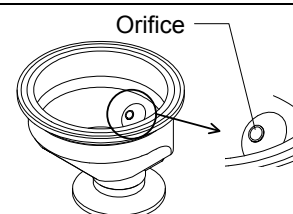
Figure C



### Detaching/Reassembly of Components Inside the Cover

Part	During Disassembly	During Reassembly
Float	Remove being careful not to scratch the polished surfaces of the float, the cover and the body	Insert into body, being careful not to scratch its polished surface, take care not to scratch or damage the seating surface of the orifice (Fig. D)

Figure D



### Table of Tightening Torques

Part Name	Torque		Distance Across Flats	
	N·m	(lbf·ft)	mm	(in)
Clamp Bolts/Nuts	10	(7)	13	( <sup>1</sup> / <sub>2</sub> )

(1 N·m ≈ 10 kg·cm)

### Exploded View

