



# Instruction Manual

Free Float Steam Trap

**QuickTrap®**  
**FS21-L/FS21-H**

**Trap Unit**  
**S21-L/S21-H**

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## Introduction

Thank you for purchasing the TLV free 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 free float steam trap uses a universal flange, a precision-ground float and three-point support for the valve body. 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 universal flange allows the trap to be installed in either horizontal or vertical piping. This flexibility greatly reduces the time required for installation and removal, as compared to conventional steam traps, and also facilitates repair and maintenance operations.

The trap contains a built-in air vent, allowing a large amount of initial condensate and air to be discharged, significantly reducing start-up time.







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 <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><br>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><br>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><br>Such use could make discharge impossible (blocked).  |
|   | <b>Take measures to prevent people from coming into direct contact with product outlets.</b><br>Failure to do so may result in burns or other injury from the discharge of fluids.   |

Continued on the next page

|   |  |
|---|--|
|  | <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><br/>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><br/>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><br/>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><br/>The impact of water hammer may damage the product, leading to fluid discharge, which may cause burns or other injury.</p>   |

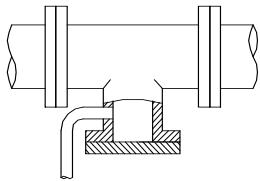
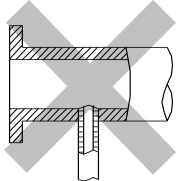
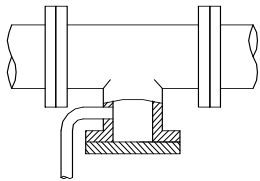
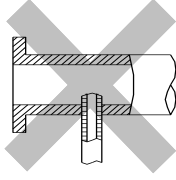
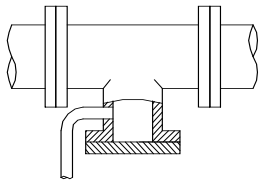
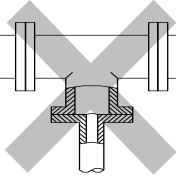
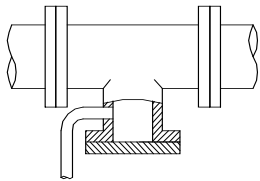
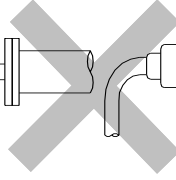
## Checking the Piping



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 product have been installed properly.

1. Is the pipe diameter suitable?
2. Is the trap unit installed horizontally?
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 (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?
7. Using the appropriate tools, have the screws been tightened enough?

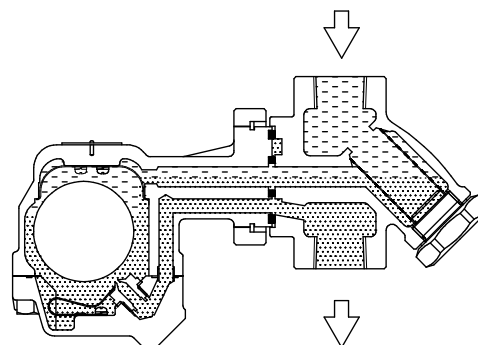
| Requirement  | Correct   | Incorrect  |
|--|---|--|
| Install catchpot with the proper diameter.   |  | <br>Diameter is too small.   |
| Make sure the flow of condensate is not obstructed.  |  | <br>Diameter is too small and inlet protrudes into pipe interior. |
| To prevent rust and scale from flowing into the trap, the inlet pipe should be connected 25 to 50 mm (1 to 2 in) above the base of the T-pipe. |  | <br>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.  |  | <br>Condensate collects in the pipe.                              |

## Operation

Principles of air and condensate discharge:

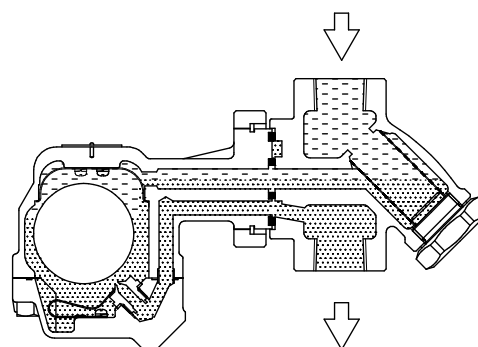
### 1. Air and Cold Condensate Discharge at Startup

At startup, before steam is supplied, the system is cold and the bimetal air vent strip is contracted, holding the float off the valve seat. This allows for the rapid discharge of air and cold condensate through the valve when steam is first supplied to the system.



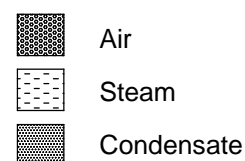
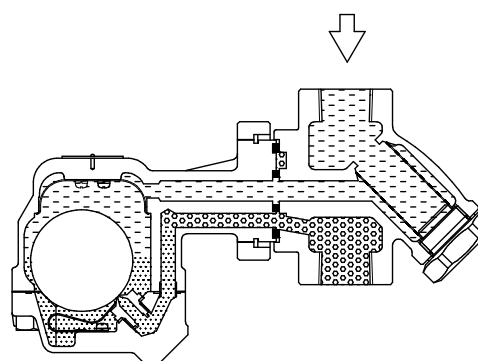
### 2. Condensate Discharge

If the temperature of the condensate rises above 90°C (194 °F), the bimetal air vent strip expands allowing the float to block the valve seat. Rising condensate levels cause the float to rise due to buoyancy, opening the valve and allowing hot condensate to be discharged.



### 3. Closed Position

When the condensate flow rate decreases, the float falls, closing off the valve seat opening. A water seal is maintained at all times over the valve seat opening to prevent steam loss.



## 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.

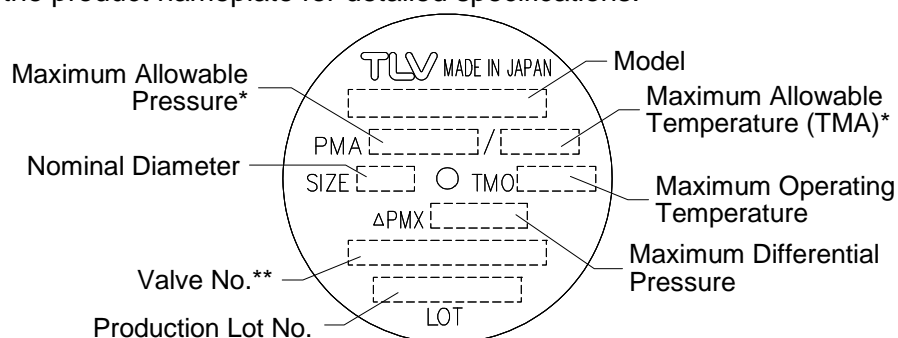


**DO NOT** use this product in excess of the maximum operating pressure differential; such use could make discharge impossible (blocked).



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.



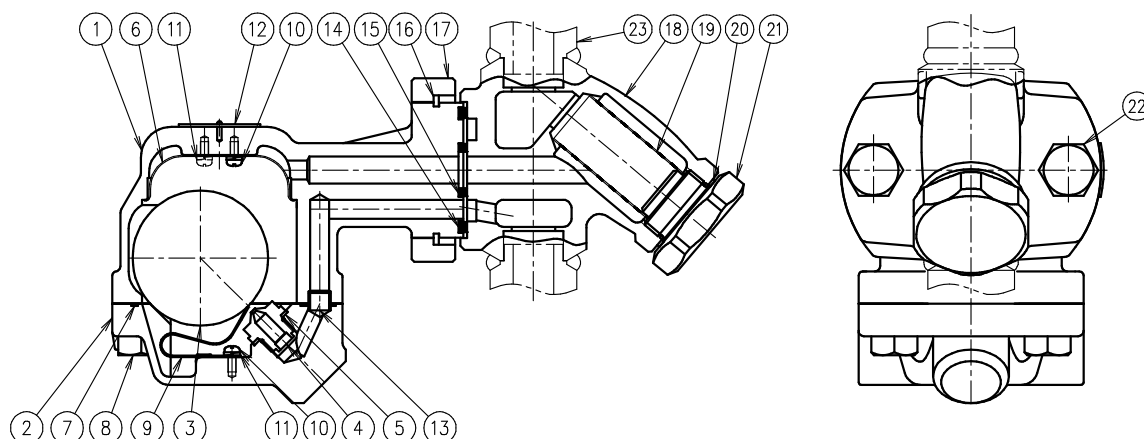
\* Maximum allowable pressure (PMA) and maximum allowable temperature (TMA) are PRESSURE SHELL DESIGN CONDITIONS, **NOT** OPERATING CONDITIONS.

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

## Compatibility

- The FS21-L/FS21-H QuickTraps employ a unique TLV connector unit (F46J) and are not compatible with QuickTraps using connector unit F32 or others.
- Trap and connector units must only be used with compatible models.
- The unit name is embossed on the connector body.

## Configuration



| No. | Name           | T | C | M | R | F | No. | Name                   | T | C | M | R | F |
|-----|----------------|---|---|---|---|---|-----|------------------------|---|---|---|---|---|
| 1   | Trap Body      | ✓ |   |   |   |   | 13  | Connector              | ✓ |   |   |   |   |
| 2   | Cover          | ✓ |   |   |   |   | 14  | Outer Connector Gasket | ✓ |   | ✓ | ✓ |   |
| 3   | Float          | ✓ |   |   |   | ✓ | 15  | Inner Connector Gasket | ✓ |   | ✓ | ✓ |   |
| 4   | Orifice        | ✓ |   |   | ✓ |   | 16  | Snap Ring              | ✓ |   |   |   |   |
| 5   | Orifice Gasket | ✓ |   | ✓ | ✓ |   | 17  | Connector Flange       | ✓ |   |   |   |   |
| 6   | Screen         | ✓ |   |   | ✓ |   | 18  | Connector Body         |   | ✓ |   |   |   |
| 7   | Cover Gasket   | ✓ |   | ✓ | ✓ |   | 19  | Screen                 |   | ✓ |   | ✓ |   |
| 8   | Cover Bolt     | ✓ |   |   |   |   | 20  | Screen Holder Gasket   |   | ✓ | ✓ | ✓ |   |
| 9   | Air Vent Strip | ✓ |   |   | ✓ |   | 21  | Screen Holder          |   | ✓ |   |   |   |
| 10  | Screw          | ✓ |   |   | ✓ |   | 22  | Connector Bolt         | ✓ |   |   |   |   |
| 11  | Spring Washer  | ✓ |   |   | ✓ |   | 23  | Flange                 |   | ✓ |   |   |   |
| 12  | Nameplate      | ✓ |   |   |   |   |     |                        |   |   |   |   |   |

\*Replacement parts are available only in the following kits:

T = Trap unit: S21-L/S21-H

C = Connector body: F46J

M = Maintenance kit

R = Repair kit

F = Float



## 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.

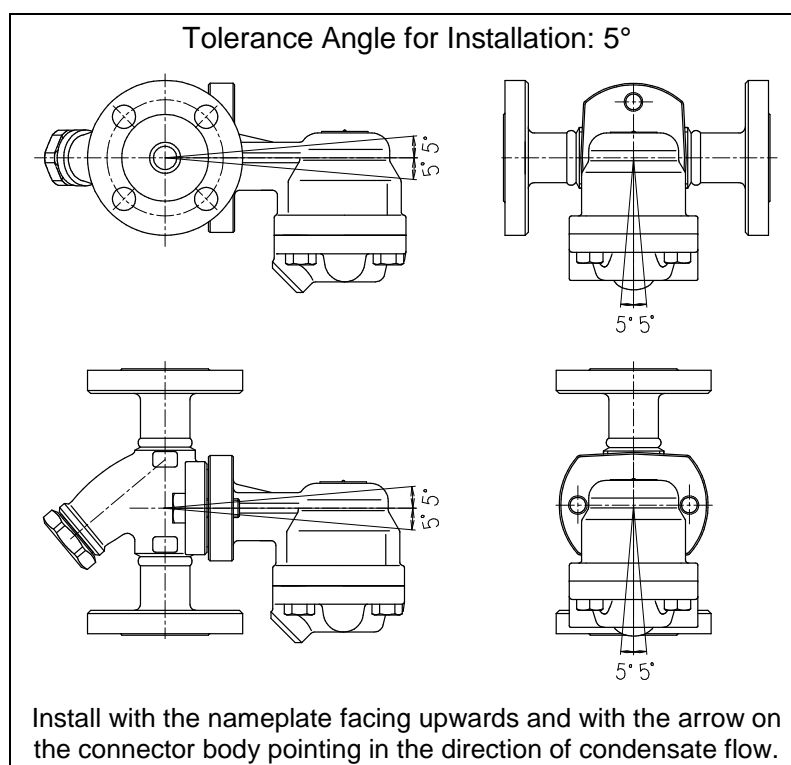


Take measures to prevent people from coming into direct contact with product outlets. Failure to do so may result in burns or other injury from the discharge of fluids.

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 so the arrow on the body is pointing in the direction of condensate flow.
4. The connector body has no restrictions on installation orientation except for the following conditions: the universal flange face (for connecting to the trap unit) must be in the vertical plane, and the trap unit must be installed with the nameplate facing upwards.
5. The trap unit must be installed with the nameplate facing upward, and should be inclined no more than 5° in any plane. Use the two connector bolts to adjust the angle of the trap unit.
6. Install a condensate outlet valve and outlet piping.
7. Open the inlet and outlet valves and ensure that the product functions properly.

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



### Installation Examples: Horizontal Piping

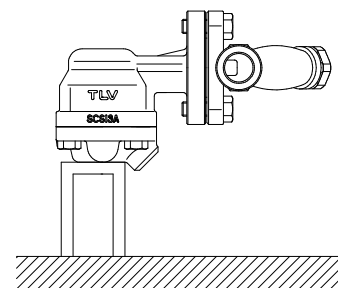
| Correct | Incorrect                       |        |   |        |
|---------|---------------------------------|--------|---|--------|
|         | Nameplate is not facing upwards |        | Universal Connector Flange is not in the vertical plane |        |
|         |                                 |        |   |        |
| Ground  | Ground                          | Ground | Ground  | Ground |

### Installation Examples: Vertical Piping

| Correct | Incorrect                       |        |
|---------|---------------------------------|--------|
|         | Nameplate is not facing upwards |        |
|         |                                 |        |
| Ground  | Ground                          | Ground |

**Note for Screwed Connection:**

When products with screwed connections are installed on horizontal piping, there is a danger that the weight of the trap unit will cause the connector body to rotate on the pipe, putting the trap mechanism out of the horizontal plane. To prevent this, tighten the screws securely. In cases where the product is affected by vibrations or by external contact, it is recommended that the trap unit be supported as shown.



## Maintenance



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



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

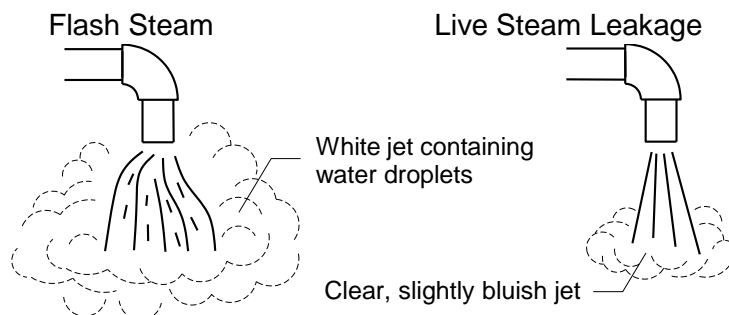
## Operational Check

A visual inspection of the following items should be done on a daily basis to determine whether the product is operating properly or has failed. Periodically (at least biannually) the operation should also be checked by using diagnostic equipment such as a stethoscope, thermometer, TLV Pocket TrapMan or TrapMan.

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:<br>(Discharge Impossible) | No condensate is discharged. The product is quiet and makes no noise, and the surface temperature of the product 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.   |

(When conducting a visual inspection, flash steam is sometimes mistaken for steam leakage. For this reason, the use of a steam trap diagnostic instrument [such as TLV TrapMan if appropriate] in conjunction with the visual inspection is highly recommended.)



## 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        |
| Screens:         | Check for clogging or corrosion       |
| Float:           | Check for scratches or dents          |
| Body Interior:   | Check for build-up                    |
| Orifice opening: | Check dirt, oil film, wear and damage |

## 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.)

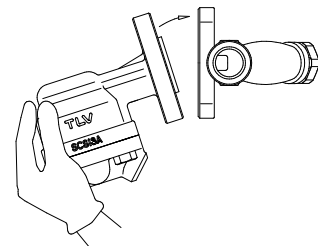
### Detaching/Reattaching the Trap Unit and Connector Body

| Part              | During Disassembly   | During Reassembly  |
|-------------------|--|--|
| Connector Bolts   | Remove with a socket wrench                                    | Consult the table of tightening torques and tighten to the proper torque   |
| Connector Gaskets | Remove with a flat-head screwdriver and clean sealing surfaces | Replace with new gaskets; to facilitate assembly and prevent loosening of the gaskets, apply a small amount of adhesive at 120° intervals around the outer edge of the gaskets |

### Attaching the Trap Unit to the Connector Body (Figure A)

1. If attaching a new trap unit, be sure to remove the protective cap from the connector flange. Be careful not to drop the gaskets when removing the cap.
2. Grasp the end of the trap unit and align its gasket housing with the indentation on the connector body. Be sure to have the nameplate facing upwards.
3. Once aligned, insert and finger tighten the connector bolts. Verify that the trap unit is within the allowable inclination.

Figure A



### Detaching/Reattaching the Cover and Float

| 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 carefully; 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 on the sealing surfaces, align the cover with the body and connector and reattach |
| Float        | Remove, being careful not to scratch the surface   | Place inside the body (or on the cover), being careful not to scratch the surface   |
| Cover Gasket | FS21-H: Remove the gasket and clean sealing surfaces   | Replace with a new gasket   |
|              | FS21-L: Remove only if damaged   | Replace with a new gasket if damaged  |

**Disassembly/Reassembly of Components Inside the Trap Body**

| Part                 | During Disassembly                        | During Reassembly  |
|----------------------|---|--|
| Screw, Spring Washer | Remove screws with a Phillips screwdriver | Consult the table of tightening torques and tighten to the proper torque |
| Screen               | Remove without bending                    | Reassemble after removing any scale build-up on the surface              |

**Disassembly/Reassembly of Components Inside the Cover**

| Part                     | During Disassembly                           | During Reassembly  |
|--------------------------|--|--|
| Connector                | Remove the connector                         | Reinsert the connector   |
| Screw, Spring Washer     | Remove with a Phillips screwdriver           | Consult the table of tightening torques and tighten to the proper torque |
| Air Vent Strip (Bimetal) | Remove without bending                       | Reinstall without bending  |
| Orifice                  | Remove with a socket wrench                  | Consult the table of tightening torques and tighten to the proper torque |
| Orifice Gasket           | Remove the gasket and clean sealing surfaces | Replace with a new gasket  |

**Disassembly/Reassembly of Components Inside the Connector Body**

| Part                 | During Disassembly                           | During Reassembly  |
|----------------------|--|--|
| Screen Holder        | Remove with a socket wrench                  | Consult the table of tightening torques and tighten to the proper torque |
| Screen Holder Gasket | Remove the gasket and clean sealing surfaces | Replace with a new gasket; coat surfaces with anti-seize                 |
| Screen               | Remove with needle-nose pliers               | Insert securely into the connector body                                  |

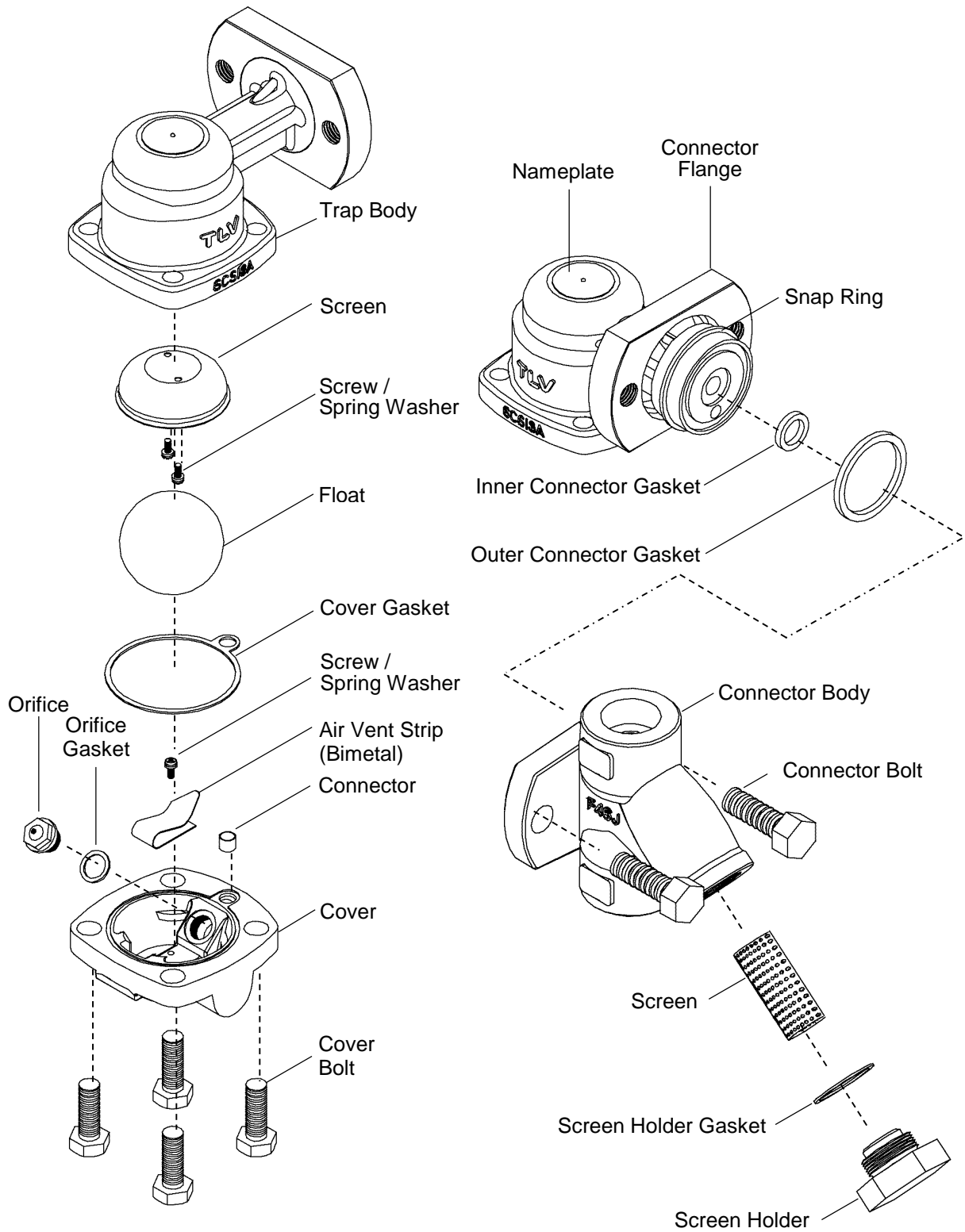
**Table of Tightening Torques**

| Part Name                       | Torque |          | Distance Across Flats |                                   |
|---------------------------------|--------|----------|-----------------------|-----------------------------------|
|                                 | N·m    | (lbf·ft) | mm                    | (in)                              |
| Orifice                         | 20     | (15)     | 13                    | ( <sup>1</sup> / <sub>2</sub> )   |
| Cover Bolt                      | 45     | (33)     | 17                    | ( <sup>21</sup> / <sub>32</sub> ) |
| Screw, Spring Washer            | 0.3    | (0.2)    | +                     |                                   |
| Screen Holder                   | 150    | (110)    | 38                    | ( <sup>1</sup> / <sub>2</sub> )   |
| Bolt (Trap Body/Connector Body) | 80     | (59)     | 19                    | ( <sup>3</sup> / <sub>4</sub> )   |

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.

Exploded View

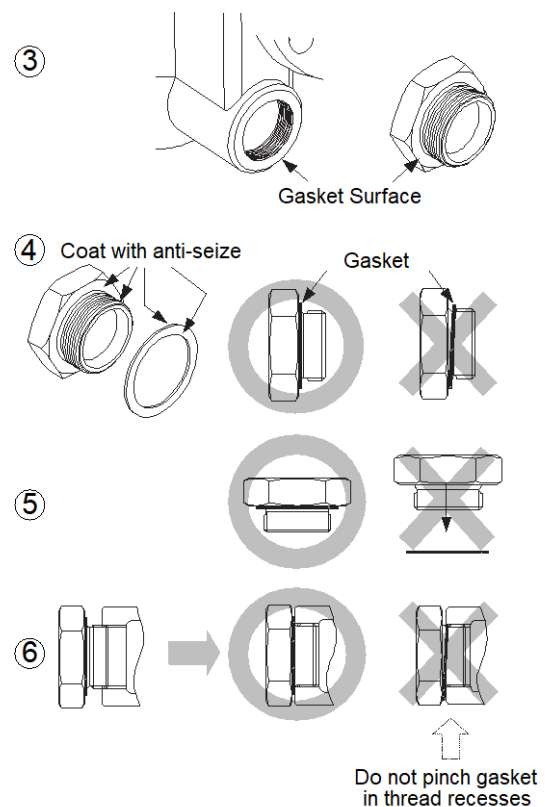


## Instructions for Plug/Holder Disassembly and Reassembly

The seal on the threaded plugs/holders found on TLV products is formed by a flat metal gasket. There are various installation orientations for the gaskets, such as horizontal, diagonal and downward, and the gasket may be pinched in the thread recesses during assembly.

### Instructions for Disassembly and Reassembly

- ① Remove the plug/holder using a tool of the specified size (distance across flats).
- ② The gasket should not be reused. Be sure to replace it with a new gasket.
- ③ Clean the gasket surfaces of the plug/holder and the product body using a rag and/or cleaning agents, then check to make sure the surfaces are not scratched or deformed.
- ④ Coat both the gasket surface of the plug/holder and the threads of the plug/holder with anti-seize, then press the gasket onto the center of the gasket surface of the plug/holder, making sure the anti-seize affixes the gasket tightly to the plug/holder. Check to make sure the gasket is not caught in the recesses of the threads.
- ⑤ Hold the plug/holder upside down to make sure that the anti-seize makes the gasket stick to the plug/holder even when the plug/holder is held upside down.
- ⑥ Screw the plug/holder by hand into the product body while making sure that the gasket remains tightly affixed to the center of the gasket surface of the plug/holder. Make sure the entire gasket is making contact with the gasket surface of the product body. It is important at this point to make sure the gasket is not pinched in the thread recesses of the plug/holder.
- ⑦ Tighten the plug/holder to the proper torque.
- ⑧ Next, begin the supply of steam and check to make sure there is no leakage from the part just tightened. If there is leakage, immediately close the inlet valve and, if there is a bypass valve, take the necessary steps to release any residual pressure. After the surface of the product cools to room temperature, repeat the procedure beginning from step 1.



## Troubleshooting



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 valve seat   | Clean parts  |
|  | The valve seat opening, screen or piping are clogged with rust and scale  | Clean parts  |
|  | The capacity of the product is insufficient   | Compare specifications and actual operating conditions                             |
|  | The product operating pressure exceeds the maximum specified pressure or there is insufficient pressure differential between the product 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) | The valve seat opening is clogged or there is rust or scale build-up on the surface of the float  | Clean parts  |
|  | The valve seat is damaged   | Replace with a new valve seat  |
|  | The float is damaged  | Replace with a new float   |
|  | Improper installation   | Correct the installation   |
|  | The bimetal air vent strip is damaged   | Replace with a new bimetal strip   |
|  | Trap vibration  | Lengthen the inlet piping and fasten it securely                                   |
| Steam is leaking from a place other than the outlet                    | Gasket deterioration or damage  | Replace with a new gasket  |
|  | Improper tightening torques were used   | Tighten to the proper torque   |
| Float frequently becomes damaged                                       | Water hammer has occurred   | Study and correct the piping   |

NOTE: If parts need replacement, refer to the parts list in this manual and select the appropriate kit/unit for replacement parts. Parts are only available as a part of the kits/units shown.



## 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**

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#### **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.

## Service

For Service or Technical Assistance: Contact your TLV representative or your regional TLV office.

### In Europe:

#### **TLV EURO ENGINEERING GmbH**

Daimler-Benz-Straße 16-18, 74915 Waibstadt, **Germany**

Tel: [49]-(0)7263-9150-0  
Fax: [49]-(0)7263-9150-50

#### **TLV EURO ENGINEERING UK LTD.**

Units 7 & 8, Furlong Business Park, Bishops Cleeve, Gloucestershire GL52 8TW, **U.K.**

Tel: [44]-(0)1242-227223  
Fax: [44]-(0)1242-223077

#### **TLV EURO ENGINEERING FRANCE SARL**

Parc d'Ariane 2, bât. C, 290 rue Ferdinand Perrier, 69800 Saint Priest, **France**

Tel: [33]-(0)4-72482222  
Fax: [33]-(0)4-72482220

### In North America:

#### **TLV CORPORATION**

13901 South Lakes Drive, Charlotte, NC 28273-6790, **U.S.A.**

Tel: [1]-704-597-9070  
Fax: [1]-704-583-1610

### In Mexico and Latin America:

#### **TLV ENGINEERING S. A. DE C.V.**

Av. Jesús del Monte 39-B-1001, Col. Hda. de las Palmas, Huixquilucan, Edo. de México, 52763, **Mexico**

Tel: [52]-55-5359-7949  
Fax: [52]-55-5359-7585

### In Oceania:

#### **TLV PTY LIMITED**

Unit 8, 137-145 Rooks Road, Nunawading, Victoria 3131, **Australia**

Tel: [61]-(0)3-9873 5610  
Fax: [61]-(0)3-9873 5010

### In East Asia:

#### **TLV PTE LTD**

36 Kaki Bukit Place, #02-01/02, **Singapore** 416214

Tel: [65]-6747 4600  
Fax: [65]-6742 0345

#### **TLV SHANGHAI CO., LTD.**

Room 5406, No. 103 Cao Bao Road, Shanghai, **China** 200233

Tel: [86]-(0)21-6482-8622  
Fax: [86]-(0)21-6482-8623

#### **TLV ENGINEERING SDN. BHD.**

No.16, Jalan MJ14, Taman Industri Meranti Jaya, 47120 Puchong, Selangor, **Malaysia**

Tel: [60]-3-8065-2928  
Fax: [60]-3-8065-2923

#### **TLV PRIVATE LIMITED**

252/94 (K-L) 17th Floor, Muang Thai-Phatra Complex Tower B, Rachadaphisek Road, Huaykwang, Bangkok 10310, **Thailand**

Tel: [66]-2-693-3799  
Fax: [66]-2-693-3979

#### **TLV INC.**

#302-1 Bundang Technopark B, 723 Pangyo-ro, Bundang, Seongnam, Gyeonggi, 13511, **Korea**

Tel: [82]-(0)31-726-2105  
Fax: [82]-(0)31-726-2195

### In the Middle East:

#### **TLV ENGINEERING FZCO**

Building 2W, No. M002, PO Box 371684, Dubai Airport Free Zone, Dubai, **UAE**

Email: sales-me@tlv.co.jp

### In Other Countries:

#### **TLV INTERNATIONAL, INC.**

881 Nagasuna, Noguchi, Kakogawa, Hyogo 675-8511, **Japan**

Tel: [81]-(0)79-427-1818  
Fax: [81]-(0)79-425-1167

### Manufacturer:

#### **TLV CO., LTD.**

881 Nagasuna, Noguchi, Kakogawa, Hyogo 675-8511, **Japan**

Tel: [81]-(0)79-422-1122  
Fax: [81]-(0)79-422-0112

## Options

### With Blowdown Valve (TLV-BD2)



Always wear eye protection and heat-resistant gloves when operating the blowdown valve. Failure to do so may result in burns or other injury.



When operating the blowdown valve, stand to the side well clear of the outlet to avoid contact with internal fluids that will be discharged. Operate the valve slowly and surely, taking care to avoid the area from which internal fluids are discharged and any fluids deflected off piping or the ground etc. Failure to do so may result in burns or other injury.

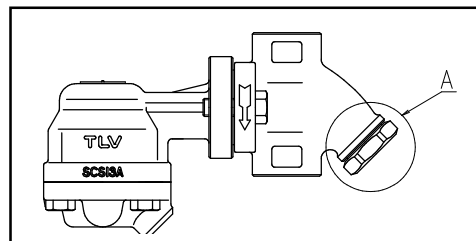


Do not tighten the BD2 valve or the BD2 valve seat in excess of the appropriate tightening torque. Over-tightening may cause breakage to threaded portions, which may cause burns, other injuries or damage.



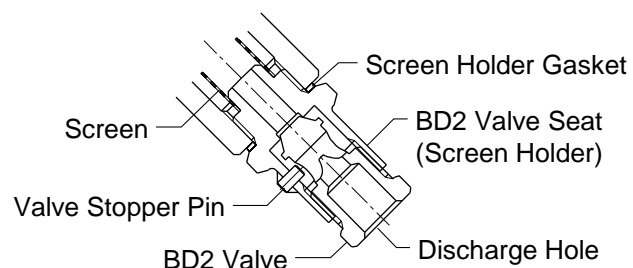
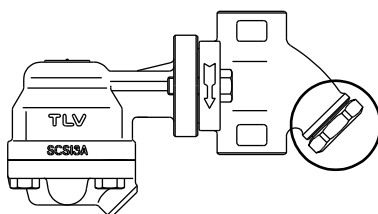
Do not excessively loosen the BD2 valve when opening the blowdown valve. The valve stopper pin installed to prevent the BD2 valve from being removed may break and internal pressure may result in the BD2 valve being blown off, leading to injuries, damage and fluid discharge, causing burns.

The options shown below are available for this product on request. Please compare with the product you received.



### Options for Area A (Screen Holder)

#### Configuration



#### TLV Blowdown Valve: BD2

The BD2 Blowdown Valve, installed in the screen area of the connector body, uses the trap's internal pressure to blow any condensate, steam, dirt or scale accumulated around the screen area out to atmosphere.

### BD2 Blowdown Valve Operation

1. The BD2 valve is in the closed position when the BD2 is shipped from the factory. Before attempting to operate the BD2, reconfirm that the BD2 valve is still in the closed position. Locate the blow outlet and, during operation, stand to the side and well clear of it, as the jet of condensate or steam could cause burns.
2. Remain in the area the entire time the BD2 valve is in the open position. Before opening the BD2 valve, grip the BD2 valve seat with a wrench and hold firmly in place so that it will not rotate when the BD2 valve is loosened. Grip the BD2 valve with another wrench and slowly loosen. Condensate and steam will discharge from the blow outlet in a jet stream. Be careful not to loosen the BD2 valve so far that it becomes removed from the BD2 valve seat. (If the valve stopper pin becomes damaged, large quantities of steam will be discharged in a jet stream.)
3. Close the BD2 valve until the flow of fluid completely stops. If the flow of fluid does not stop, re-open the BD2 valve (as in step "2") to blow out any scale or dirt that may be caught in the BD2. Re-tighten the BD2 valve until the flow of fluid stops completely.

| Tightening Torques and Distance Across Flats |        |          |                       |                                   |
|--|--------|----------|-----------------------|-----------------------------------|
| Part   | Torque |          | Distance Across Flats |                                   |
|  | N·m    | (lbf·ft) | mm                    | (in)                              |
| BD2 Valve                                    | 30     | (22)     | 17                    | ( <sup>21</sup> / <sub>32</sub> ) |
| BD2 Valve Seat (Screen Holder)               | 150    | (110)    | 38                    | (1 <sup>1</sup> / <sub>2</sub> )  |

NOTE: Avoid the use of excessive tightening torques, as threaded parts may become damaged. (1 N·m ≈ 10 kg·cm)