ISO 9001
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Manufacturer
TLV CO., LTD.
Kakogawa, Japan
is approved by LRQA Ltd. to ISO 9001/14001

Instruction Manual

Temperature Control Trap (with Bimetal Element)
QuickTrap

Featured Model: FX1

Trap Unit: X1 (For F46 Connector Body)

172-65502M-04
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Introduction

Thank you for purchasing the TLV temperature control 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.

Unlike most steam traps, this temperature control trap (with bimetal element) is an innovative product which enables the desired condensate discharge temperature to be set.

Note
Only the temperature of condensate discharged can be controlled; this temperature control trap does not control product temperature nor temperature of condensate accumulating in the system.

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. This temperature control trap is also ideal for heating of heavy oil tanks and oil feed pipe lines, and for the tracing of valves, instrumentation, etc.

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 needed not only for installation, but for subsequent maintenance, disassembly/reassembly and troubleshooting. Please keep it in a safe place for future reference.

Safety Considerations

- Read this section carefully before use and be sure to follow the instructions.
- Installation, inspection, maintenance, repairs, disassembly, adjustment and valve opening/closing should be carried out only by trained maintenance personnel.
- The precautions listed in this manual are designed to ensure safety and prevent equipment damage and personal injury. For situations that may occur as a result of erroneous handling, three different types of cautionary items are used to indicate the degree of urgency and the scale of potential damage and danger: DANGER, WARNING and CAUTION.
- The three types of cautionary items above are very important for safety: be sure to observe all of them as they relate to installation, use, maintenance and repair. Furthermore, TLV accepts no responsibility for any accidents or damage occurring as a result of failure to observe these precautions.

Cautionary items and definitions

Danger
Indicates an urgent situation which poses a threat of death or serious injury

Warning
Indicates that there is a potential threat of death or serious injury

Caution
Indicates that there is a possibility of injury or equipment/product damage

Safety Considerations for the Product

Caution
Install properly and DO NOT use this product outside the recommended operating pressure, temperature and other specification ranges. Improper use may result in such hazards as damage to the product or malfunctions that may lead to serious accidents. Local regulations may restrict the use of this product to below the conditions quoted.

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

Caution
When disassembling or removing the product, wait until the internal pressure equals atmospheric pressure and the surface of the product has cooled to room temperature. Disassembling or removing the product when it is hot or under pressure may lead to discharge of fluids, causing burns, other injuries or damage.

Caution
Do not remove cap nut or cover while the product is under pressure. Allow the product body temperature to cool to room temperature before removing cap nut or cover. Failure to do so may result in burns or other injury.

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

Caution

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

Caution

The pressure and temperature values displayed on the nameplate of the connector body are the values for the connector body itself and not for the entire product. Improper use may result in such hazards as damage to the product or malfunctions that may lead to serious accidents.

Caution

Use only under conditions in which no water hammer will occur. The impact of water hammer may damage the product, leading to fluid discharge, which may cause burns or other injury.

Checking the Piping

Caution
Use only under conditions in which no water hammer will occur. The impact of water hammer may damage the product, leading to fluid discharge, which may cause burns or other injury.

Check to make sure that the pipes to be connected to the product have been installed properly.

1. Is the pipe diameter suitable?
2. Has sufficient space been secured for maintenance?
3. 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?
4. Has the product been installed so that condensate will easily flow naturally down into the product by gravity?

Specifications

Caution

Install properly and DO NOT use this product outside the recommended operating pressure, temperature and other specification ranges. Improper use may result in such hazards as damage to the product or malfunctions that may lead to serious accidents. Local regulations may restrict the use of this product to below the conditions quoted.

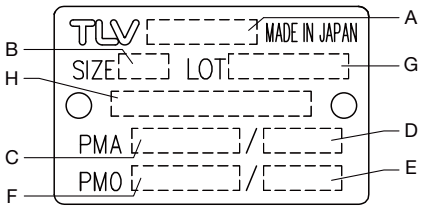
Use only under conditions in which no freeze-up will occur. Freezing may damage the product, leading to fluid discharge, which may cause burns or other injury.

The pressure and temperature values displayed on the nameplate of the connector body are the values for the connector body itself and not for the entire product. Improper use may result in such hazards as damage to the product or malfunctions that may lead to serious accidents.

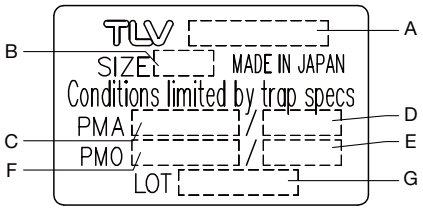
Refer to the product nameplate for detailed specifications.

The specifications displayed on each nameplate apply only to the unit on which it is mounted. When a trap unit is installed on a connector unit and the PMA/TMA and/or PMO/TMO values displayed on the two nameplates differ, the specifications for the assembled products are restricted to the lower values.

Trap Unit



Connector Unit (mounted only on F46)



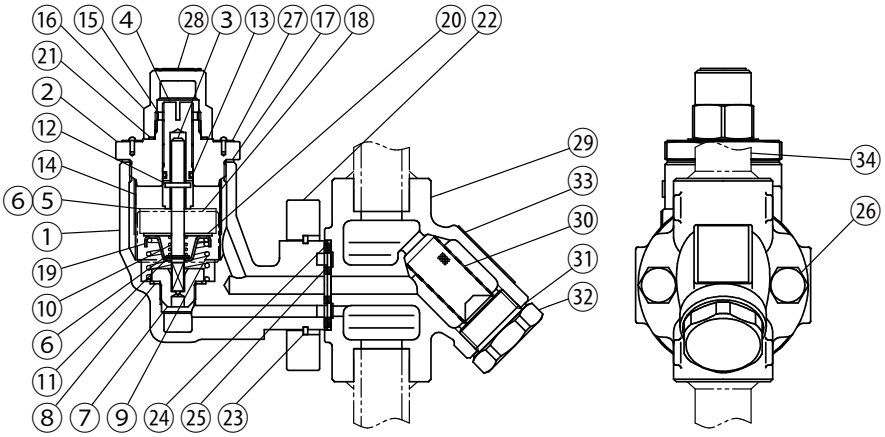
A	Model	E	Maximum Operating Temperature (TMO)
B	Nominal Diameter[01]	F	Maximum Operating Pressure (PMO)
C	Maximum Allowable Pressure (PMA)[02]	G	Production Lot No.
D	Maximum Allowable Temperature (TMA)[02]	H	Valve No.[03]

[01]The nominal diameter is not printed on the trap unit nameplate when the trap unit is shipped by itself.
[02]Maximum allowable pressure (PMA) and maximum allowable temperature (TMA) are PRESSURE SHELL DESIGN CONDITIONS, **NOT** OPERATING CONDITIONS.
[03]Valve No. is displayed for products with options. This item is omitted from the nameplate when there are no options.

Compatibility

Trap unit X1 is designed for use with TLV F46 and F32 connector units, trap stations (V1/V2/V1P/V2P Series) and QuickStation QS10.The connector unit name is indicated on the connector body.

Configuration



No.	Part Name	T[01]	M[02]	R[02]	No.	Part Name	T[01]	C[03]	M[02]	R[02]
1	Trap Body	✓			18	Nameplate	✓			
2	Cover	✓			19	Spring Guide	✓			✓
3	Valve Stem	✓		✓	20	Thrust Plate	✓			✓
4	Adjusting Screw	✓			21	Cap Nut Gasket	✓		✓	✓
5	Bimetal Element	✓		✓	22	Connector Flange	✓			
6	Washer	✓		✓	23	Snap Ring	✓			
7	Valve Seat	✓		✓	24	Outer Connector Gasket	✓		✓	✓
8	Valve Seat Gasket	✓	✓	✓	25	Inner Connector Gasket	✓		✓	✓
9	Overexpansion Spring	✓		✓	26	Connector Bolt	✓			
10	Return Spring	✓		✓	27	Caution Plate A	✓			
11	Snap Ring	✓		✓	28	Caution Plate B	✓			
12	Spring Pin	✓		✓	29	Connector Body		✓		
13	Seal Ring	✓	✓	✓	30	Screen		✓		
14	Screen	✓		✓	31	Screen Holder Gasket		✓	✓	✓
15	Locknut	✓			32	Screen Holder		✓		
16	Cap Nut	✓			33	Connector Nameplate		✓		
17	Cover Gasket	✓	✓	✓	34	Flange		✓		

[01]T = Trap Unit (X1)
[02]Replacement parts are available only in the following kits: M = Maintenance Kit, R = Repair Kit
[03]C = Connector Unit (F46)

Note
Replacement parts for former connector body F32 differ from those for F46. When ordering replacement parts, please include the trap unit name, size, connection type and the connector unit name.

Installation

Caution
Install properly and DO NOT use this product outside the recommended operating pressure, temperature and other specification ranges. Improper use may result in such hazards as damage to the product or malfunctions that may lead to serious accidents. Local regulations may restrict the use of this product to below the conditions quoted.

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

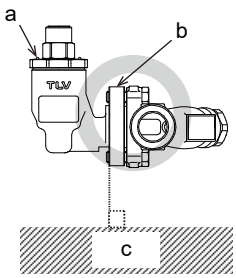
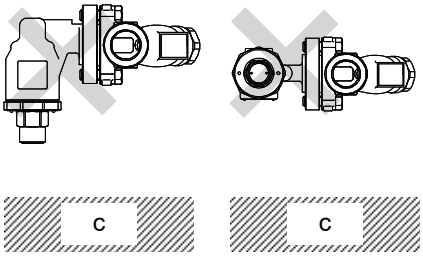
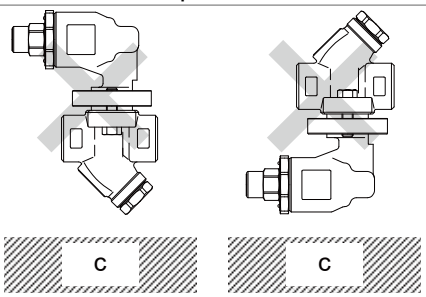
Installation, inspection, maintenance, repairs, disassembly, adjustment and valve opening/closing should be carried out only by trained maintenance personnel.

1. Before 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.
2. Before installation, be sure to remove all protective seals.
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 caution plate facing upwards.
5. Install a condensate outlet valve and outlet piping.
6. Open the inlet valve gradually 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.

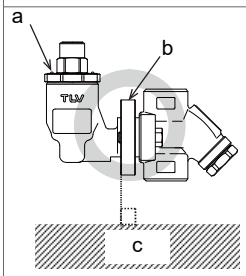
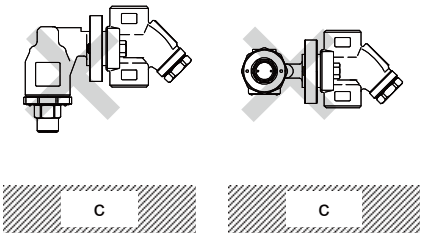
Installation Examples

Horizontal Piping

Correct	Incorrect	
	Caution plate is not facing upwards	Connector Flange is not in the vertical plane
		

a: Caution plate, b: Connector Flange, c: Ground

Vertical Piping

Correct	Incorrect
	Caution plate is not facing upwards
	

a: Caution plate, b: Connector Flange, c: Ground

Adjusting the Set Temperature

Caution
Do not remove cap nut or cover while the product is under pressure. Allow the product body temperature to cool to room temperature before removing cap nut or cover. Failure to do so may result in burns or other injury.

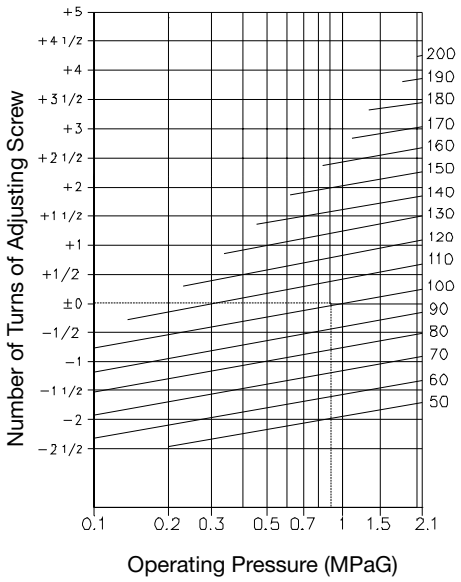
Always wear heat-insulated gloves when handling products with high body temperatures, such as when in operation. Failure to do so may result in burns.

Follow the procedure below to adjust.

1. For your safety, wear heat-insulated gloves or eye protectors, etc. to prevent burns.
2. Close the external valve from which the steam and condensate flow to the product (the “inlet isolation valve”).
3. Close the external valve to which the condensate flows from the product (the “outlet isolation valve”).
4. Wait until the pressure between the inlet isolation valve and the product equals atmospheric pressure (when the product body temperature cools to room temperature).
5. Hold the cover with one wrench and use another wrench to slowly loosen the cap nut carefully checking for any steam leaks that might occur. In the event steam leaks are detected, immediately stop the work and proceed with maintenance referring to “Disassembly/Reassembly” section.
6. Remove the cap nut.
7. Hold the adjusting screw in place with a flat-head screwdriver and loosen the locknut slowly carefully checking for any steam leaks that might occur. In the event steam leaks are detected, immediately stop the work and proceed with maintenance referring to “Disassembly/Reassembly” section.
8. Remove the locknut.
9. Use a flat-head screwdriver to turn the adjusting screw to adjust temperature. To raise the temperature setting, turn the adjusting screw counterclockwise. To lower the temperature setting, turn the adjusting screw clockwise. Refer to set temperature adjustment chart for the number of turns required from the “0” position to reach the desired temperature.
10. After completing the adjustment, replace the locknut. Hold the adjusting screw in place with a flat-head screwdriver and tighten the locknut securely.
11. Replace the cap nut and tighten it to the proper torque (see “Table of Tightening Torques”). Hold the cover with one wrench and use another wrench to tighten.
12. First fully open the outlet isolation valve slowly.
13. Slowly open the inlet isolation valve carefully checking for any steam leaks that might occur. In the event steam leaks are detected, immediately close the inlet isolation valve, then the outlet isolation valve, and repair the source of leakage.
14. Check the temperature setting by observing an inline temperature sensor or by measuring the temperature at the wrench flat on the product’s inlet side at least 30 minutes after supplying steam with the new setting. The product set temperature will be approximately 10 to 20 °C higher than the surface reading. If the resultant temperature is not as required, repeat procedure from step “2” above.
15. Fully open the outlet isolation valve slowly.
16. Slowly open the inlet isolation valve carefully checking for any steam leaks that might occur.

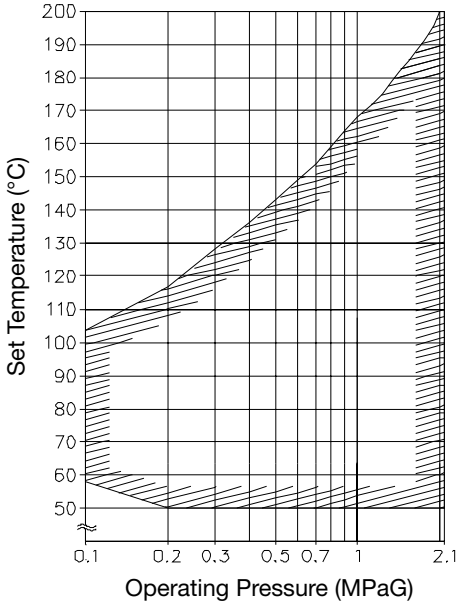
17. In the event steam leaks are detected, immediately close the inlet isolation valve, then the outlet isolation valve, and repair the source of leakage. In the event steam leaks are detected somewhere other than the outlet piping, immediately close the inlet isolation valve, then the outlet isolation valve and repair the leaks referring to “Disassembly/ Reassembly” section.

    Set Temperature Adjustment Chart



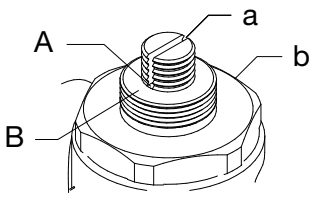
> **Caution**
> The standard factory setting is 100 ℃ at 0.9 MPaG. Change from this to the desired setting, as indicated in the Adjustment Chart.

Temperature Setting Range



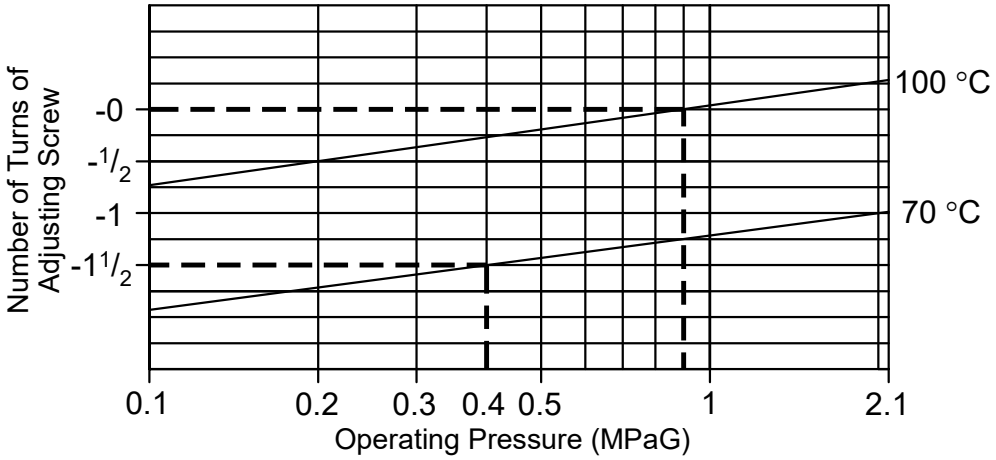
Temperature Setting Example

As shown in the figure on the right, this temperature control trap is positioned with the bottom of the adjuster slot in the adjusting screw (A) even with the very top of the cover (B), which represents the 100 ℃ at 0.9 MPaG setting. This is the standard factory setting.



a	Adjuster slot
b	Cover

For example, to set the trap to 70 ℃ at 0.4 MPaG, refer to the adjustment chart below to determine the number of turns.



For this example, the number of turns is -1½. Because this is a negative number, turn the adjusting screw clockwise (tighten) one and a half turns.

Maintenance

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

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

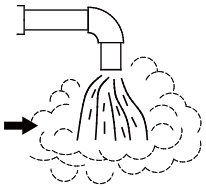
Operational Check

A visual inspection 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 TrapMan or TLV Pocket 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.

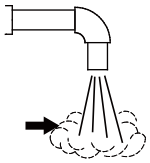
Normal:	Condensate is being discharged from the discharge outlet. Condensate temperature should be around the set temperature. (The surface temperature of the product should be about 10 to 20 ℃ lower than the set temperature.)
Blocked (Discharge Impossible):	No condensate is discharged and the surface temperature of the product is low.
Blowing:	Live steam continually flows from the outlet and there is a continuous hissing sound of flow.

Flash Steam



White jet containing water droplets

Live Steam Leakage



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.

Gasket(s): Check for warping and damage

Seal Ring: Check for scratches and wear

Valve Stem: Check for scratches and wear

Bimetal Element: Check wear and deformation

Over-expansion and Return Springs: Check for wear

Screen: Check for clogging and corrosion

Valve Seat: Check the seating surfaces for damage or wear

(After cleaning inside the body) Check gasket for warping and damage Check valve seat for damage or wear

Disassembly/Reassembly

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.

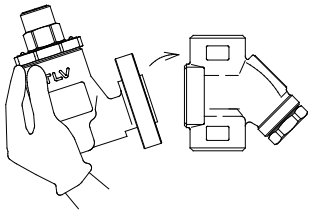
(Installation, inspection, maintenance, repairs, disassembly, adjustment and valve opening/closing should be carried out only by trained maintenance personnel.)

Detaching/Reattaching the Trap Unit and Connector Body

Part Name & No.	During Disassembly	During Reassembly
Connector Bolts 26	Remove with a socket wrench	Consult the table of tightening torques and tighten to the proper torque
Trap Unit	Remove the trap unit	Follow the special instructions below (Fig. A)
Connector Gaskets 24,25	Remove gasket with a scraper and clean sealing surfaces	Replace with new gaskets. To facilitate assembly and prevent loosening of the gaskets, apply a small amount of adhesive at 120º intervals around the outer edge of the gaskets

Attaching the Trap Unit to the Connector Body

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 in proper orientation.
   Figure A



Detaching/Reattaching the Cap Nut, Locknut and Cover Unit

Part Name & No.	During Disassembly	During Reassembly
Cap Nut 16	Remove with a spanner or socket wrench	Consult the table of tightening torques and tighten to the proper torque
Cap Nut Gasket 21	Remove the gasket and clean sealing surfaces	Replace with a new gasket if warped or damaged
Locknut 15	Remove with a spanner or socket wrench	Tighten enough to prevent the adjustment screw from turning
Cover 2	Remove with a spanner or socket wrench	Consult the table of tightening torques and tighten to the proper torque
Cover Gasket 17	Remove the gasket and clean sealing surfaces	Replace with a new gasket; coat surfaces with anti-seize
Adjusting Screw 4 Seal Ring 13	Screw in by using a flat-head screwdriver	Be careful not to damage the seal ring during reassembly and coat seal ring surface with heat resistant silicon grease

Disassembly/Reassembly of the Valve Unit

Part Name & No.	During Disassembly	During Reassembly
Snap Ring 11	Remove the snap ring from the valve stem	Reattach to the valve stem
Washer 6	Remove the washer from the valve stem by lifting up and off	Slide onto the valve stem
Return Spring 10	Remove the return spring from the valve stem by lifting up and off	Place on the valve stem
Thrust Plate 20	Remove the thrust plate from the valve stem by lifting up and off	Slide onto the valve stem
Bimetal Element 5 (2 discs)[01]	Remove the bimetal element from the valve stem by lifting up and off	Reassemble the bimetal elements, paying special attention to the proper orientation (the TLV marks on the outside)
Washer 6[01]	Remove the washer from the valve stem by lifting up and off	Place 1 washer between each pair of bimetal disks

[01]5 sets

Disassembly/Reassembly of Components Inside the Trap Body

Part Name & No.	During Disassembly	During Reassembly
Screen 14	Remove without bending	Reinsert without bending
Spring Guide 19	Remove from the trap body	Reassemble, being extremely careful to reinsert in the correct orientation
Overexpan-sion Spring 9	Remove from the trap body	Reassemble, being careful not to place it on the valve seat
Valve Seat 7	The surfaces of the valve seat are highly polished; remove by using a socket wrench, being careful not to scratch the sealing surfaces	Consult the table of tightening torques and tighten to the proper torque; be careful not to scratch the seating surfaces during reassembly
Valve Seat Gasket 8	Remove without bending and clean sealing surfaces	Replace with a new gasket; coat surfaces with anti-seize

Table of Tightening Torques

Part Name & No.			Torque N·m	Distance Across Flats mm
Cap Nut 16			35	24
Cover 2			250	46
Valve Seat 7			30	19
Connector Bolt 26			39	14
Screen Holder 32 (when F46 is used)			100	30
Screen Holder 32 (when F32 is used)	Flanged	15 to 25 mm	60	22
	Screwed Socket Welded	15, 20 mm	60	22
		25 mm	150	38

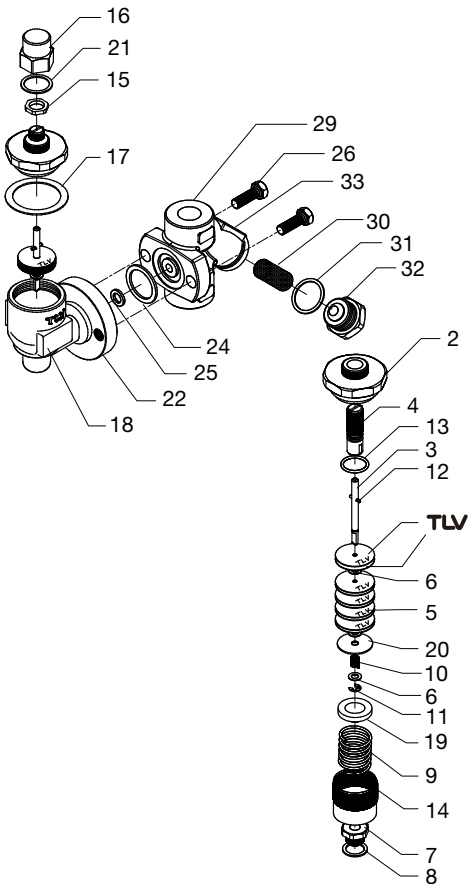
Note

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

Screen Holder for Connector Units F32 and F46 can be used only with their respective connector body.

When disassembling and reassembling the components, make sure that the correct connector unit (F32 or F46) is used. The type of connector unit can be identified by the name embossed on its body.

Exploded View



No.	Part Name	No.	Part Name
1	Trap Body	18	Nameplate
2	Cover[01]	19	Spring Guide
3	Valve Stem[02]	20	Thrust Plate[02]
4	Adjusting Screw[01]	21	Cap Nut Gasket
5	Bimetal Element[02]	22	Connector Flange
6	Washer[02]	23	Snap Ring
7	Valve Seat	24	Outer Connector Gasket
8	Valve Seat Gasket	25	Inner Connector Gasket
9	Overexpansion Spring	26	Connector Bolt
10	Return Spring[02]	27	Caution Plate A
11	Snap Ring[02]	28	Caution Plate B
12	Spring Pin[02]	29	Connector Body
13	Seal Ring[01]	30	Screen
14	Screen	31	Screen Holder Gasket
15	Locknut	32	Screen Holder
16	Cap Nut	33	Connector Nameplate
17	Cover Gasket[01]	34	Flange

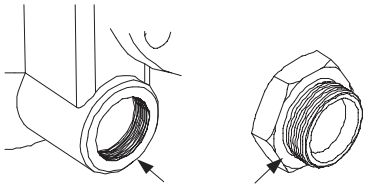
[01]Cover Unit
[02]Valve Unit

Instructions for Plug/Holder Disassembly and Reassembly

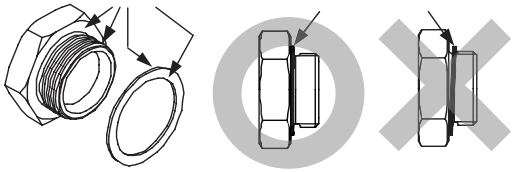
The seal on the threaded plugs/holders found on TLV products is formed by a flat metal gasket. There are various installation orientations for the gaskets, such as horizontal, diagonal and downward, and the gasket may be pinched in the thread recesses during assembly.

Instructions for Disassembly and Reassembly

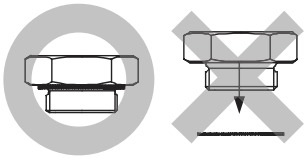
1. Remove the plug/holder using a tool of the specified size (distance across flats).
2. The gasket should not be reused. Be sure to replace it with a new gasket.
3. Clean the gasket surfaces of the plug/holder and the product body using a rag and/or cleaning agents, then check to make sure the surfaces are not scratched or deformed.



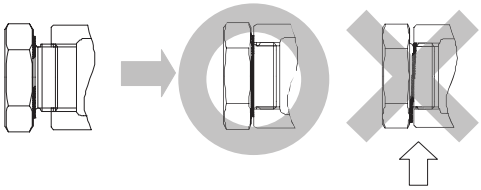
4. Coat both the gasket surface of the plug/holder and the threads of the plug/holder with anti-seize, then press the gasket onto the center of the gasket surface of the plug/holder, making sure the anti-seize affixes the gasket tightly to the plug/holder. Check to make sure the gasket is not caught 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

Caution
When disassembling or removing the product, wait until the internal pressure equals atmospheric pressure and the surface of the product has cooled to room temperature.
Disassembling or removing the product when it is hot or under pressure may lead to discharge of fluids, causing burns, other injuries or damage.

When the product fails to operate properly, use the following table to locate the cause and remedy.

Problem	Cause	Remedy
No condensate is discharged or temperature doesn't rise to the set temperature	The bimetal element is broken	Replace with a new bimetal element
	The assembly (orientation) of the bimetal elements is not correct	Correct the assembly of the bimetal elements
	There is a build-up of dirt, etc. in the spaces between the bimetal elements	Clean the bimetal elements
	The valve seat is clogged with rust and scale	Use built-in cleaning function
	The screen or piping are clogged with rust and scale	Clean parts
	The adjusting screw is not correctly positioned	Readjust the screw
Steam is blowing or the temperature rises above the set temperature	There is a build-up of dirt or scale on the valve stem or seating surfaces of the valve seat	Use built-in cleaning function
	The valve stem is worn	Replace with a new valve stem
	The valve seat is worn	Replace with a new valve seat
	The sealing surfaces of the valve stem are damaged	Replace with a new valve stem
	The sealing surfaces of the valve seat are damaged	Replace with a new valve seat
	The valve seat has loosened	Retighten to the proper torque
	The valve seat gasket is damaged	Replace with a new gasket
	The adjusting screw is not correctly positioned	Readjust the screw
There is leakage to the outside of the product	Leakage from the cap nut gasket: The gasket or the O-ring is damaged or deteriorated	Replace with a new gasket or O-ring
	Leakage from the adjusting screw: The O-ring is damaged or deteriorated	Replace with a new O-ring
	Leakage from the cover gasket: The gasket is damaged	Replace with a new gasket

Note
When replacing parts with new, use the parts list for reference, and replace with parts from the Maintenance Kit, Repair Kit, etc. Please note that replacement parts are only available as part of a replacement parts kit.

Cleaning Function

Caution

Do not remove cap nut or cover while the product is under pressure. Allow the product body temperature to cool to room temperature before removing cap nut or cover. Failure to do so may result in burns or other injury.

Always wear heat-insulated gloves when handling products with high body temperatures, such as when in operation. Failure to do so may result in burns.

Rust, scale and other buildup on the valve seat can hinder the sealing ability of the steam trap leading to steam leakage and higher product temperatures, or block the valve seat opening preventing condensate discharge and resulting in the decrease of the product temperature. Follow the steps below to remove any accumulation from around the valve opening.

1. For your safety, wear heat-insulated gloves or eye protector, etc. to prevent burns.
2. Close the external valve from which the steam and condensate flow to the product (the “inlet isolation valve”).
3. Close the external valve to which the condensate flows from the product (the “outlet isolation valve”).
4. Wait until the pressure between the inlet isolation valve and the product equals atmospheric pressure (when the product body temperature cools to room temperature).
5. Hold the cover with one wrench and use another wrench to slowly loosen the cap nut carefully checking for any steam leaks that might occur. In the event steam leaks are detected, immediately stop the work and proceed with maintenance referring to “Disassembly/Reassembly” section.
6. Remove the cap nut.
7. Hold the adjusting screw in place with a flat-head screwdriver and loosen the locknut slowly carefully checking for any steam leaks that might occur. In the event steam leaks are detected, immediately stop the work and proceed with maintenance referring to “Disassembly/Reassembly” section.
8. Remove the locknut.
9. Check the current set position of the adjusting screw.
10. Check and record the number of turns required to return to the standard factory setting (when points (A) and (B) are even with each other as shown on the figure in the “Temperature Setting Example” section).
11. Use a flat-head screwdriver to slowly turn the adjusting screw clockwise (to tighten) until it stops. (This causes the cleaning edge of the stem to reach the valve seat and loosen debris).
12. Slowly turn the adjusting screw counterclockwise (to loosen) until it stops. (This will allow flushing once the steam is safely turned on using the instructions that follow).
13. Replace the cap nut and tighten it to the proper torque (see “Table of Tightening Torques”). Hold the cover with one wrench and use another wrench to tighten.
14. First fully open the outlet isolation valve slowly.
15. Slowly open the inlet isolation valve carefully checking for any steam leaks that might occur. In the event steam leaks are detected, immediately close the inlet isolation valve, then the outlet isolation valve, and repair the source of leakage.
16. Wait 10 seconds to allow any loose scale to be flushed internally. Be aware of any external steam leak including the outlet connection if opened to atmosphere. Be careful to not come in contact with any steam that is discharging from an open outlet connection. If

any steam leaks are detected somewhere other than the outlet piping, immediately close the inlet isolation valve, then the outlet isolation valve, and repair the source of leakage.

17. Close the inlet isolation valve.
18. Close the outlet isolation valve.
19. Wait until the pressure between the inlet isolation valve and the product equals atmospheric pressure (when the product body temperature cools to room temperature).
20. Hold the cover with one wrench and use another wrench to slowly loosen the cap nut carefully checking for any steam leaks that might occur. In the event steam leaks are detected, immediately stop the work and proceed with maintenance referring to “Disassembly/Reassembly” section.
21. Remove the cap nut.
22. Slowly turn the adjusting screw clockwise (to tighten) to return to the original position checked in step “10” above.
23. Hold the adjusting screw in place with a flat-head screwdriver and tighten the locknut securely.
24. Replace the cap nut and tighten to the proper torque (see “Table of Tightening Torques”).
25. First fully open the outlet isolation valve.
26. Slowly open the inlet isolation valve carefully checking for any steam leaks. In the event steam leaks are detected, immediately close the inlet isolation valve, then the outlet isolation valve, and repair the source of leakage.
27. Check the temperature setting by observing an inline temperature sensor or by measuring the temperature at the product inlet wrench flat at least 30 minutes after supplying steam with the new settings. The product set temperature will be approximately 10 to 20 ℃ higher than the temperature reading on the product body surface.
28. If the resultant temperature is no as desired, use the above instructions for adjusting temperature settings. (See “Adjusting the Set Temperature”)

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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.

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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.

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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

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.
5/F, Building 7, No.103 Caobao Road, Xuhui District, 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]-3-8052-2928
Fax: [60]-3-8051-0899

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

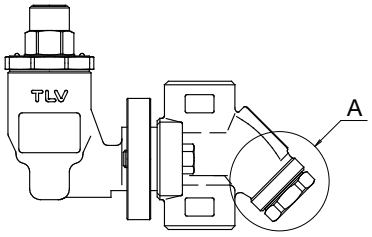
Manufacturer:

TLV CO., LTD.
881 Nagasuna, Noguchi, Kakogawa, Hyogo 675-8511, **Japan**
Tel: [81]-(0)79-427-1800
Fax: [81]-(0)79-422-2277

Options

The options shown below are available for this product on request.

Please compare with the product you received.



Options for Area A (Screen Holder)

With Blowdown Valve (TLV BD2)

Caution

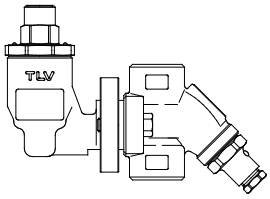
Always wear eye protection and heat-resistant gloves when operating the blowdown valve. Failure to do so may result in burns or other injury.

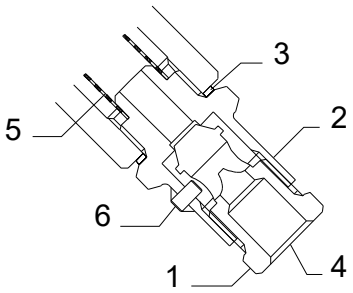
When operating the blowdown valve, stand to the side well clear of the outlet to avoid contact with internal fluids that will be discharged. Operate the valve slowly and surely, taking care to avoid the area from which internal fluids are discharged and any fluids deflected off piping or the ground etc.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

Configuration





No.	Part Name			Trque N·m	Distance Across Flats mm
1	BD2 Valve			30	17
2	BD2 Valve Seat (Screen Holder) (when F46 is used)			100	30
	BD2 Valve Seat (Screen Holder) (when F32 is used)	Flanged	15 to 25 mm	60	22
		Screwed	15,20 mm	60	22
		Socket Welded	25 mm	150	38
3	Screen Holder Gasket			—	
4	Discharge Hole			—	
5	Screen			—	
6	Valve Stopper Pin			—	

Note

Avoid the use of excessive tightening torques, as threaded parts may become damaged.

TLV Blowdown Valve: BD2

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