



Manufacturer

TLV. CO., LTD.

Kakogawa, Japan

is approved by LRQA LTD. to ISO 9001/14001



Instruction Manual

PowerDyne®

Thermodynamic Steam Trap

QuickTrap®

Trap Unit

P46UC-Y

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Introduction

Thank you for purchasing the **TLV PowerDyne** thermodynamic 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 trap unit is of a revolutionary design that uses a high-performance universal flange and features a built-in automatic blow-off function and will function as a trap when installed onto a two bolt connector in the existing pipeline. As it includes a built-in screen with a large surface area this trap unit is intended for use with connector units that do not have a built-in screen (Spirax Sarco: PC10, Armstrong: Standard Connector). 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 **PowerDyne** thermodynamic steam trap features a bimetal ring for thermostatic air venting, which allows the quick, automatic discharge of large quantities of initial air and cold condensate immediately after operation start-up, thereby greatly reducing start-up time. This **PowerDyne** thermodynamic steam trap, with its superior features listed above, in combination with the proven performance record of the bimetal thermostatic air vent, increases heating efficiency and reduces manpower requirements for maintenance and bypass blowdown.

If detailed instructions for special order specifications or options not contained in this manual are required, please contact **TLV** for full details.

This instruction manual is intended for use with the model(s) listed on the front cover. It is necessary not only for installation, but for subsequent maintenance, disassembly/reassembly and troubleshooting. Please keep it in a safe place for future reference.

Safety Considerations

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

Symbols

	Indicates a DANGER, WARNING or CAUTION item.
	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

	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.
	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.

Safety considerations continued on next page.

 CAUTION	<p>Be sure to use only the recommended components when repairing the product, and NEVER attempt to modify the product in any way. Failure to observe these precautions may result in damage to the product and burns or other injury due to malfunction or the discharge of fluids.</p> <p>Use only under conditions in which no freeze-up will occur. Freezing may damage the product, leading to fluid discharge, which may cause burns or other injury.</p> <p>Use only under conditions in which no water hammer will occur. The impact of water hammer may damage the product, leading to fluid discharge, which may cause burns or other injury.</p>
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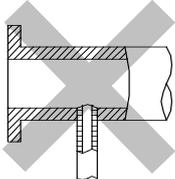
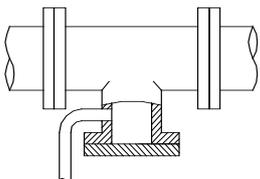
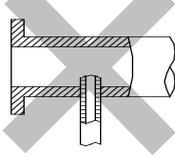
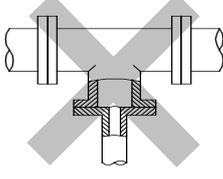
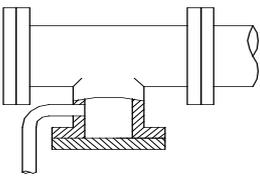
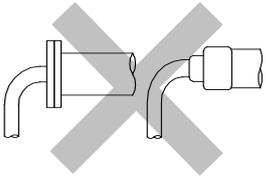
Checking the Piping



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 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. 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. Has the piping work been done correctly, as shown in the figures below?

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

Specifications

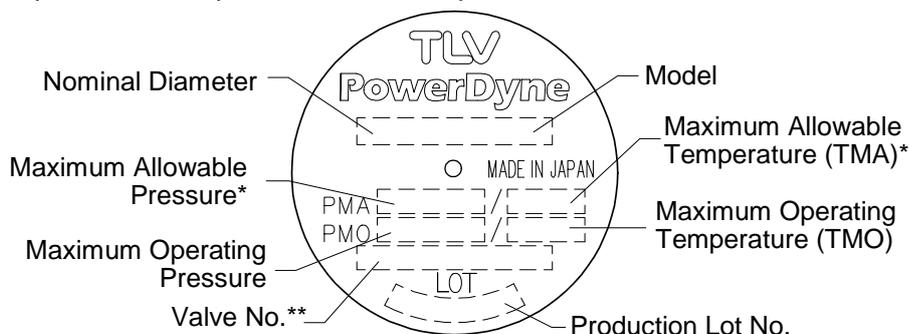


Install properly and **DO NOT** use this product outside the recommended operating pressure, temperature and other specification ranges. Improper use may result in such hazards as damage to the product or malfunctions which may lead to serious accidents. Local regulations may restrict the use of this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



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.



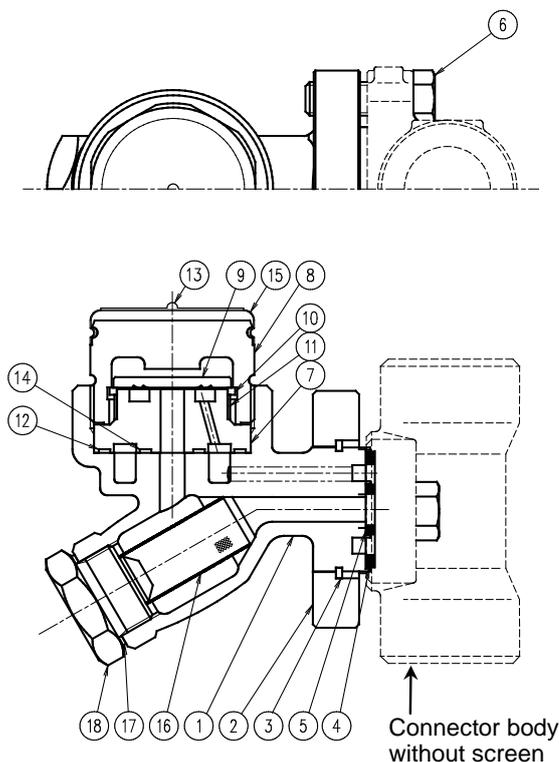
Minimum Operating Pressure: 0.03 MPaG (5 psig)

Maximum Allowable Back Pressure: 80% of the inlet pressure

* 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.

Configuration



No.	Name	M	R
1	Trap Body		
2	Connector Flange		
3	Snap Ring		
4	Outer Connector Gasket	✓	✓
5	Inner Connector Gasket	✓	✓
6	Connector Bolt		
7	Module Valve Seat		✓
8	Cover		✓
9	Disc		✓
10	Disc Holder Ring		✓
11	Air Vent Ring		✓
12	Outer Module Gasket	✓	✓
13	Nameplate		✓
14	Inner Module Gasket	✓	✓
15	Cap		✓
16	Screen		✓
17	Screen Holder Gasket	✓	✓
18	Screen Holder		

*Replacement parts are available only in the following kits:

M: Maintenance Kit

R: Repair Kit

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.

The installation procedures shown below are only for the P46UC-Y (trap unit). Please follow the instruction manual provided by the manufacturer when installing the connector unit itself.

Applicable connector units: Spirax Sarco PC10, Armstrong standard connector (neither includes a screen)

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

1. Install the product, onto the connector unit only if the connector unit is at ambient temperature and there are no scratches or dirt on the seating surface of the gasket.
2. Before installation, be sure to remove all protective seals.
3. When installing the product onto the connector unit, 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. Refer to the "Detaching / Reattaching the Trap Unit" in the "Disassembly / Reassembly" section described later in this manual.
4. Open the inlet and outlet valves and check to make sure that the product functions properly.

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

Installation Examples: Horizontal Piping

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

Installation Examples: Vertical Piping

Correct	Incorrect	
	Nameplate is not facing upwards	

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.

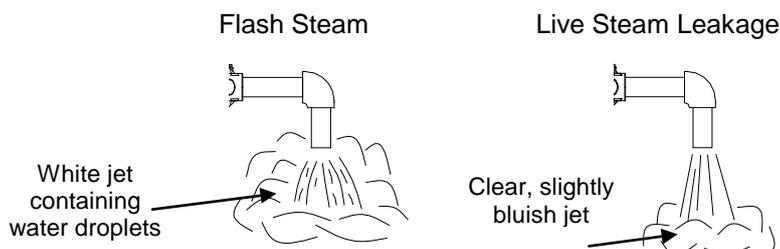
Operational Inspection

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 (at least biannually) 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 : Condensate is discharged continuously, together with flash steam, and the sound of flow can be heard. If there is very little condensate, there is almost no sound of flow.
- Blocked (Discharge Impossible) : No condensate is discharged. The trap is quiet and makes no noise, and the surface temperature of the trap is low.
- Blowing : Live steam continually flows from the outlet and there is a continuous metallic sound.
- Steam Leakage : Live steam is discharged through the trap outlet together with condensate, accompanied by a high-pitched sound.

(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
Disc:	Check for scratches or wear Check dirt, oil film, wear and damage
Disc Holder Ring:	Check for scratches or wear
Air Vent Ring:	Check for scratches or wear
Module Valve Seat	Check for scratches or wear
Body Interior:	Check for build-up of scale

Disassembly/Reassembly



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.

The Disassembly/Reassembly procedures shown below are only for the P46UC-Y (trap unit). Please follow the instruction manual provided by the manufacturer when disassembling / assembling the connector unit itself.

Use the following procedures to remove the product and 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

Part	During Disassembly	During Reassembly
Connector Bolts	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)
Inner/Outer Connector Gaskets	Remove with a scraper and clean the connector flange with a soft tool	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 Unit (Fig. 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 unit. 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.

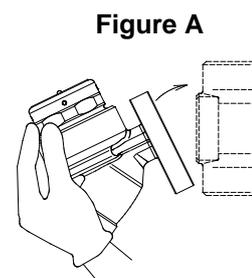


Figure A

Disassembly / Reassembly of Components (Screen) Inside the Trap 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	Replace with a new gasket only if warped or damaged
Screen	Remove with needle-nose pliers	Insert securely into the trap body

Removing / Reattaching of Components (Valve Seat Unit) Inside the Trap Body

Part	During Disassembly	During Reassembly
Cover	Remove with a socket wrench. If the cover is seized do not try to force it loose as this could result in damage to the piping. If the cover appears to be seized, loosen and remove the connector bolts and remove the entire trap unit from the connector unit. Then secure the trap unit in a vice before attempting to remove the cover.	Consult the table of tightening torques and tighten to the proper torque
Disc	Remove, being careful not to scratch the lapped surface	Make sure that the seat surface (lapped side with groove) is facing down, toward the valve seat (Fig. B)
Disc Holder Ring	Remove without bending	Set on the air vent ring and make sure that it does not sit on the valve seat surface
Air Vent Ring	Remove without bending, as it will not return to its proper shape	Reinsert without bending
Module Valve Seat	Remove, being careful not to scratch the lapped surface	Insert into the body levelly, being careful not to tilt it or to scratch the seat surface
Outer Module Gasket	Remove with a scraper and clean the gasket housing	Replace with a new gasket if misshapen or damaged
Inner Module Gasket		

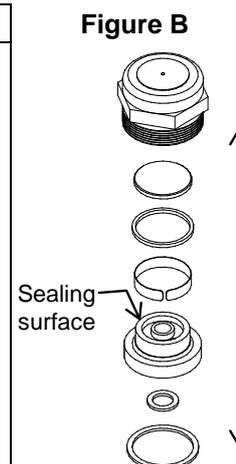


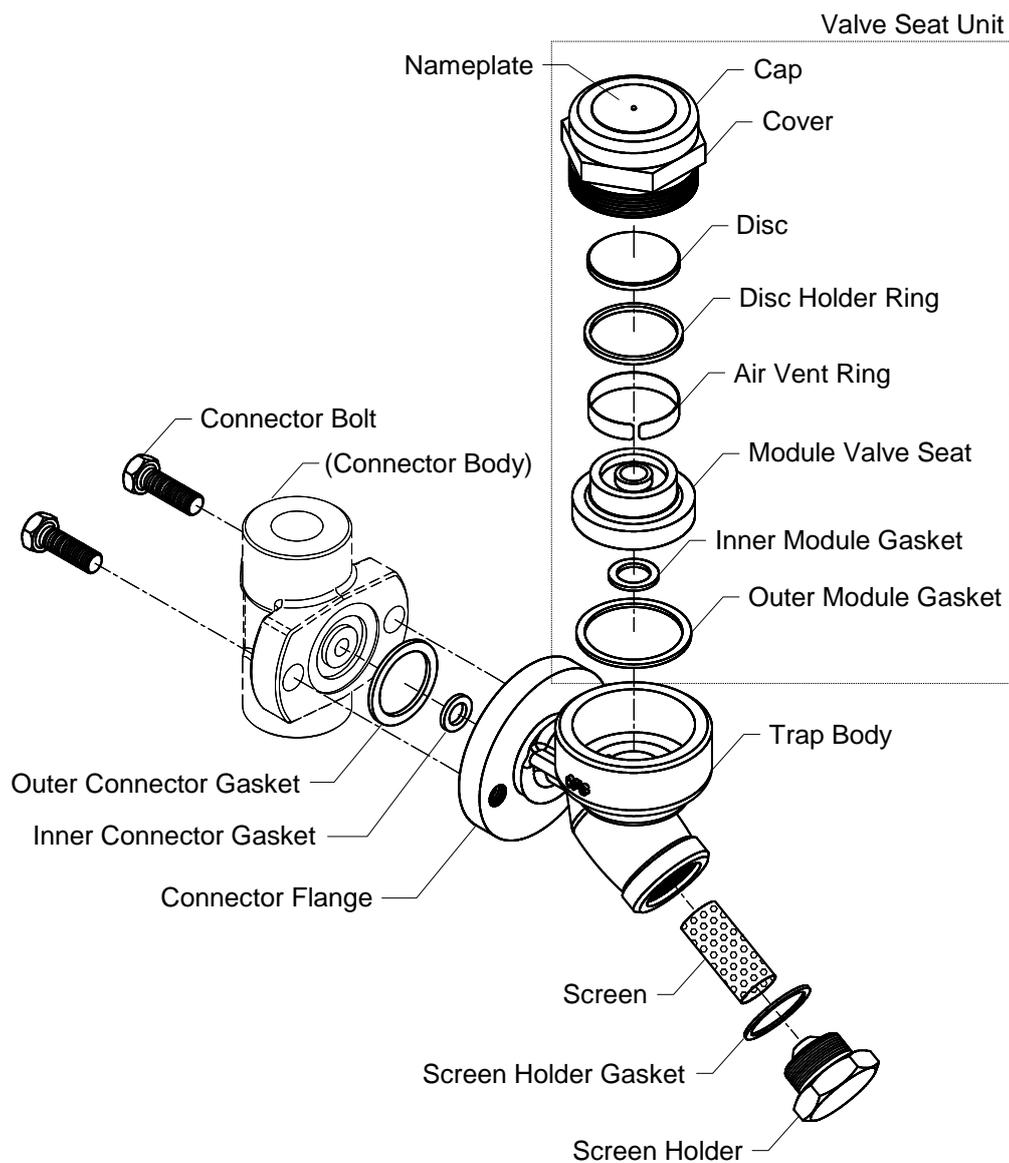
Table of Tightening Torques

Part Name	Torque		Distance Across Flats	
	N·m	(lbf·ft)	mm	(in)
Cover	250	(185)	46	(1 ¹³ / ₁₆)
Connector Bolt	39	(28)	14	(⁹ / ₁₆)
Screen Holder	100	(73)	30	(1 ³ / ₁₆)

(1 N·m ≈ 10 kg·cm)

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.

Exploded View

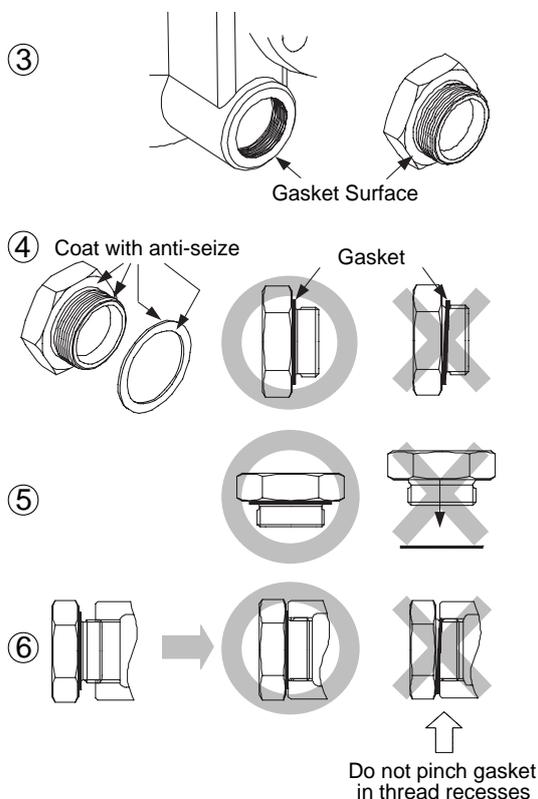


Instructions for Plug/Holder Disassembly and Reassembly

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 module valve seat, screen or piping are clogged with rust or scale	Clean parts
	The disc is stuck to the module valve seat surface	Clean parts
	Air binding has occurred	Perform a bypass blowdown, or close the trap inlet valve and allow the trap to cool
	Air binding due to wear of the disc holder ring or air vent ring	Replace with a new disc holder ring or air vent ring
	Steam-locking has occurred	Perform a bypass blowdown or close the trap inlet valve and allow the trap to cool. Piping correction may also be required.
	Trap operating pressure is below the minimum specified pressure or there is insufficient pressure differential between the trap inlet and outlet	Compare specifications and actual operating conditions
Steam is discharged or leaks from the outlet (blowing) (steam leakage)	Rust or scale on the disc or on the module valve seat	Clean parts
	Disc or module valve seat surface damage or wear	Replace with a new disc Replace with a new module valve seat or trap unit
	Improper installation orientation	Correct the installation
	Trap vibration	Lengthen the inlet piping and fasten it securely
	Trap operating pressure is less than the minimum specified pressure or the back pressure exceeds the allowable back pressure	Compare specifications and actual operating conditions
	The back pressure exceeds the allowable back pressure (50% of inlet pressure)	Compare specifications and actual operating conditions
Steam is leaking from a place other than the outlet	The gaskets have deterioration or damage	Replace the gaskets
	Improper tightening torque was used	Tighten to the proper torque

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.

Product Warranty

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

* * * * *

For Service or Technical Assistance:

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

Manufacturer

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Options

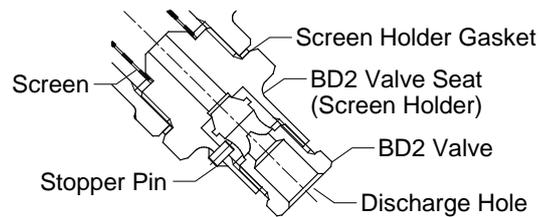


When operating the blowdown valve, stand to the side well clear of the outlet to avoid contact with internal fluids that will be discharged. Failure to do so may result in burns or other injury.



Do not use excessive force when opening the blowdown valve. Such force may break the pin equipped as a valve stopper pin, causing a blowout from internal pressure resulting in burns or other injury.

With Blowdown Valve (TLV BD2) Configuration



TLV Blowdown Valve: BD2

The BD2 Blowdown Valve, installed in the screen area of the trap 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



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.



Do not use excessive force when connecting threaded pipes to the product. Over-tightening may cause breakage leading to fluid discharge, which may cause burns or other injury.

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 grooved 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 valve (as in step "2") to blow out any scale or dirt that may be caught in the valve. Re-tighten the valve until the flow of fluid stops completely.

Tightening Torques and Distance Across Flats

Part Name	Torque		Distance Across Flats	
	N·m	(lbf·ft)	mm	(in)
BD2 Valve	30	(22)	17	(²¹ / ₃₂)
Screen Holder	100	(73)	30	(¹ ³ / ₁₆)

(1 N·m ≈ 10 kg·cm)

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