172-65200MA-07 (PCV-1) 8 October 2021

ISO 9001
ISO 14001

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

Instruction Manual

Surplussing Valve
(Primary Pressure Control Valve)
for Steam and Steam Condensate
PCV-1

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Contents

Introduction

Thank you for purchasing the TLV surplussing valve (primary pressure control valve) for steam and steam condensate.

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.

TLV PCV-1 surplussing valve is a primary pressure adjusting valve for steam and steam condensate. It features excellent responsiveness and stable operation with its “direct acting pressure balance single-seated valve structure” that balances the spring force and the primary pressure forcing through the pressure balance single-seated valve and the piston.
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.
	Use hoisting equipment for heavy objects (weighting approximately 20 kg (44 lb) or more). Failure to do so may result in back strain or other injury if the object should fall.
	Take measures to prevent people from coming into direct contact with product outlets. Failure to do so may result in burns or other injury from the discharge of fluids.
	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.

Continued on the next page

⚠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 or burns or other injury due to malfunction or the discharge of fluids.
	When carrying out pressure adjustment etc., do not tighten the adjustment screw further than its lower limit (when the coil spring is fully compressed and the adjustment screw cannot turn any further). Failure to observe this precaution may damage the product, leading to fluid discharge, which may cause burns or other injury.
	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.
	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.

Operation

NOTE: See the “Configuration” section for details.

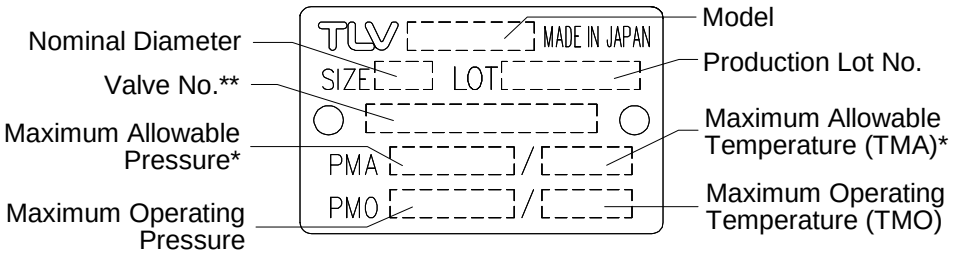
Pressure on the primary side pressurizes the piston side through the pressure passing port on the valve body. When the pressure exceeds the set pressure set by the adjustment screw, the piston pushes the spring to open the valve and consistently maintains pressure on the primary side by letting through the pressure on the primary side to the secondary side.

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 which may lead to serious accidents. Local regulations may restrict the use of this product to below the conditions quoted.**

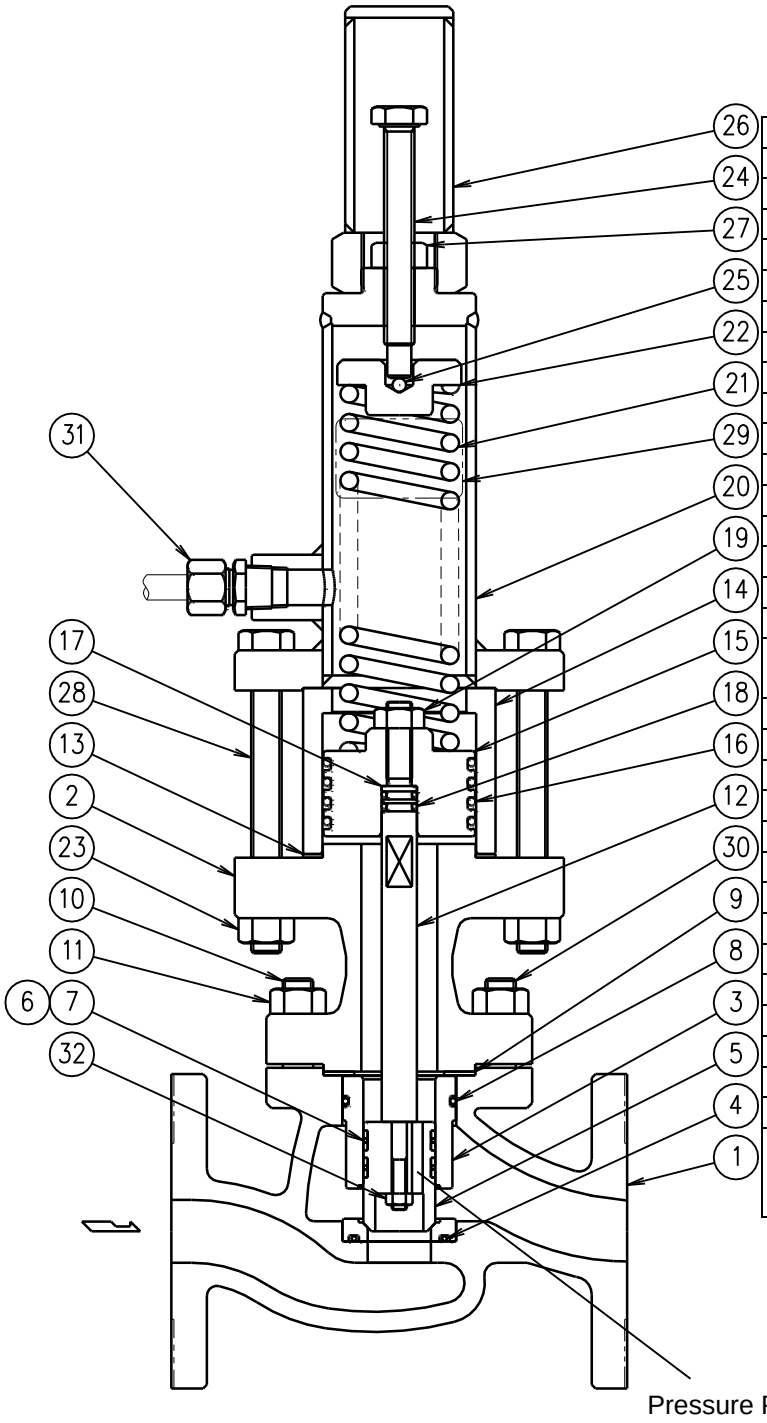
⚠CAUTION **Use only under conditions in which no freeze-up will occur. Freezing may damage the product, leading to fluid discharge, which may cause burns or other injury.**

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.

Configuration



No.	Name
1	Body
2	Bonnet
3	Valve Seat
4	O-ring (under Valve Seat)
5	Valve Body
6	O-ring (Valve Body)
7	Back-up Ring
8	O-ring (side of Valve Seat)
9	Gasket (Body/Bonnet)
10	Bolt (Body/Bonnet)
11	Nut (Body/Bonnet)
12	Connecting Rod
13	Gasket (Bonnet/Cylinder)
14	Cylinder
15	Piston
16	O-ring (Piston)
17	Gasket (Connecting Rod/Piston)
18	O-ring (Connecting Rod)
19	Nut (Connecting Rod/Piston)
20	Cover
21	Coil Spring
22	Spring Retainer
23	Nut (Bonnet/Cover)
24	Adjustment Screw
25	Steel Ball
26	Cap
27	Locknut
28	Bolt (Bonnet/Cover)
29	Nameplate
30	Bolt (Body/Bonnet)
31	Bite Type Tube Fitting
32	Nut (Connecting Rod/Valve Body)

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 which may lead to serious accidents. Local regulations may restrict the use of this product to below the conditions quoted.**

⚠CAUTION **Use hoisting equipment for heavy objects (weighing approximately 20 kg (44 lb) or more). Failure to do so may result in back strain or other injury if the object should fall.**

⚠CAUTION **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 flow.
4. Support the inlet and outlet pipes securely to prevent vibration.
5. Leave sufficient space for adjusting the set pressure, maintenance, inspection and repair.
6. Install a bypass valve for maintenance and inspection.
7. Install copper tube to the bite type tube fitting on the side of the cover and make sure that the piping leads to a safe location such as a pit.
   (Steam may blow when o-rings at piston are damaged.)
8. Do not install the product at locations where foreign matter accumulates in the piping or water hammer occurs.
9. When installing the product on piping, make sure that the adjustment screw is vertical to the horizontal piping and the cap stays at the top position.

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

Adjustment

⚠ CAUTION

When carrying out pressure adjustment etc., do not tighten the adjustment screw further than its lower limit (when the coil spring is fully compressed and the adjustment screw cannot turn any further). Failure to observe this precaution may damage the product, leading to fluid discharge, which may cause burns or other injury.

At the time of shipment, the product is not adjusted to the customer's specified set pressure.
By following the procedures below, adjust the primary pressure by adjusting the adjustment screw of the PCV-1.
After removing the cap and loosening the locknut of the PCV-1, tightening the adjustment screw clockwise increases the primary set pressure, and tightening it counterclockwise decreases the primary set pressure.

1. After the PCV-1 is installed on the pipe, temporarily set the adjustment screw to the desired primary pressure by referring to the graph "Relationship between the Set Pressure and the Number of Turns of the Adjustment Screw" shown below. The number of turns of the adjustment screw "0" on the graph is the position where the adjustment screw starts to compress the coil spring.
   In addition, follow this step when making adjustments before installing the product, and follow the procedures below after installing the product.
2. Start supplying fluid slowly and watch the pressure on the primary side with a pressure gauge.
3. When the pressure is different from the desired pressure, adjust the pressure to the desired pressure by operating the adjustment screw.
4. After the pressure has been adjusted, retighten the locknut and replace the cap.

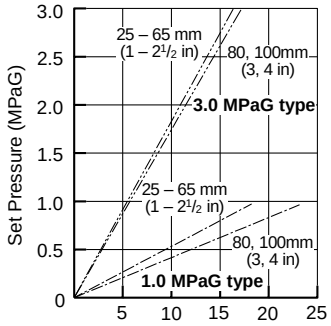
NOTE:

Set the pressure based on the number of turns of the adjustment screw corresponding to the set pressure, as obtained in Step 1 (see graph below).

If the set pressure cannot be obtained even when the number of turns exceeds this reference value by ± 2 turns, there may be some sort of abnormality.
Make sure the number of turns does not exceed the reference value by +2 turns, and completely loosen the adjustment screw. Disassemble and clean the product following the remedies in the "Troubleshooting" section, then reassemble the product.
After confirming that the adjustment screw is loose, set the number of turns again according to the steps mentioned above.

The same steps are taken when there is an abnormal leak while the valve is fully closed.

Relationship between the set pressure and the number of turns of the adjustment screw (Reference value)



No. of Turns of the Adjustment Screw*
(Clockwise)

Please refer to the PMO Value on the nameplate to determine if 3.0 MPaG type or 1.0 MPaG type.

* Number of turns is from where the adjustment screw starts to compress the coil spring.

(1 MPa = 10.197 kg/cm^2)
(1 MPa = 145 psi)

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.

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 or burns or other injury due to malfunction or the discharge of fluids.

CAUTION When carrying out pressure adjustment etc., do not tighten the adjustment screw further than its lower limit (when the coil spring is fully compressed and the adjustment screw cannot turn any further). Failure to observe this precaution may damage the product, leading to fluid discharge, which may cause burns or other injury.

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 or pressure gauge.

Normal: Sound of fluid flow can be heard, and the primary pressure is maintained as designed.

When the primary pressure is changed, readjust with the PCV-1 adjustment screw.

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
Coil Spring:	Check for eccentricity, warping or scratches
Piston, Valve Body:	Check if the piston and valve body move smoothly in the cylinder against the valve seat
Piston:	Check for deformation or scratches
Valve Body:	Check for deformation or scratches
O-ring:	Check for damages
Back-up Ring:	Check for damages
Nut:	Check if it is loosened
Valve Seat:	Check for deformation, scratches or build-up

Product Inspection

After performing maintenance work etc. which requires the removal of the product from the installation location, confirm that any location where the product is to be installed for any purpose or application (such as conducting a service check), is within the service environment of the product specifications. After which, adjustment should be carried out according to the “Adjustment” section.
When there is an abnormal leak even while the valve is fully closed, disassembly and cleaning should be carried out according to the remedies in the “Troubleshooting” section.
Do not tighten the adjustment screw +2 turns or more than the reference position.

Disassembly/Reassembly

⚠CAUTION **Use hoisting equipment for heavy objects (weighing approximately 20 kg (44 lb) or more). Failure to do so may result in back strain or other injury if the object should fall.**

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

⚠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 or burns or other injury due to malfunction or the discharge of fluids.**

When the product is disassembled or reassembled, make sure to loosen the adjustment screw fully so that there will be no load on the coil spring.
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.)

Part	During Disassembly	During Reassembly
Cover	Loosen nuts (bonnet/cover) and take out the spring retainer, steel ball and the coil spring from the inside after bolts (bonnet/cover) and cover have been removed	Coat steel ball surface with heat resistant grease before reassembly; for bolts and nuts (bonnet/cover), consult the table of tightening torques and tighten to the proper torque
Cylinder	Pull out vertically against the body	Remove and clean the remaining gasket on the sealing surface and reassemble
Gasket (Bonnet/Cylinder)	Remove the gasket and clean sealing surfaces	Replace with a new gasket; make sure that the sealing surfaces are clean
Nut (Connecting Rod/ Piston)	Pull up the piston by hand until it stops and hold the connecting rod with a wrench at the two flat surfaces on the rod, then remove the piston by loosening the nut on the upper part of connecting rod	Consult the table of tightening torques and tighten to the proper torque
O-rings (Piston)	Remove o-rings on the piston	Replace with new o-rings; be sure to coat surfaces with heat resistant grease
O-rings (for Connecting Rod)	Remove o-rings	Replace with new o-rings; be sure to coat surfaces with heat resistant grease
Bonnet	Remove nuts (body/bonnet) and pull out the bonnet vertically. Be careful not to scratch the sealing surface	Remove and clean the remaining gasket on the sealing surface and reassemble; consult the table of tightening torques and tighten to the proper torque
Connecting Rod	Pull out the connecting rod together with the valve body vertically against the body	Insert the valve body connected to the connecting rod in the valve seat by making sure that o-rings of the valve body are in appropriate places

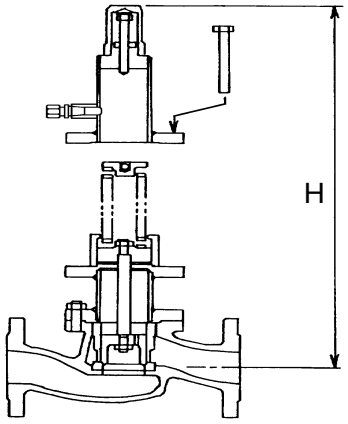
Part	During Disassembly	During Reassembly
Valve Body Nut (Connecting Rod/ Valve Body)	Hold the connecting rod with a wrench at the two flat surfaces on the rod and remove the valve body with a socket wrench by removing the nut connecting the valve body	Consult the table of tightening torques and tighten to the proper torque
O-rings Back-up Rings (Valve Body)	Remove o-rings/back-up rings on the valve body	Replace with new o-rings; be sure to coat surfaces with heat resistant grease
Valve Seat	Remove the valve seat from the body	Insert the valve seat slowly by making sure that o-rings are in appropriate places
O-rings (Valve Seat: 2 types)	Remove o-rings on the side and the bottom of the valve seat	Replace with new o-rings; be sure to coat surfaces with heat resistant grease

Table of Tightening Torques

Part Name	Size (mm)	Size (in)	Distance Across Flats (mm)	Distance Across Flats (in)	Torque (N·m)	Torque (lbf·ft)
Nut (Bonnet/Cover)	25 - 65	(1 – 2 1/2)	16	(5/8)	80	(59)
	80 - 100	(3 – 4)	19	(3/4)	180	(130)
Nut (Body/Bonnet)	25	(1)	19	(3/4)	100	(81)
	40 - 50	(1 1/2 – 2)	19	(3/4)	200	(150)
	65	(2 1/2)	24	(15/16)	200	(150)
	80 - 100	(3 – 4)	24	(15/16)	300	(220)
Nut (Connecting Rod/Piston)	25 - 65	(1 – 2 1/2)	17	(21/32)	40	(29)
	80 - 100	(3 – 4)	19	(3/4)	60	(44)
Nut (Connecting Rod/ Valve Body)	25	(1)	10	(3/8)	25	(19)
	40 - 65	(1 1/2 – 2 1/2)	17	(21/32)	40	(29)
	80 - 100	(3 – 4)	19	(3/4)	60	(44)
Connecting Rod (at two flat surfaces)	25 - 65	(1 – 2 1/2)	10	(3/8)	–	–
	80 - 100	(3 – 4)	17	(21/32)	–	–

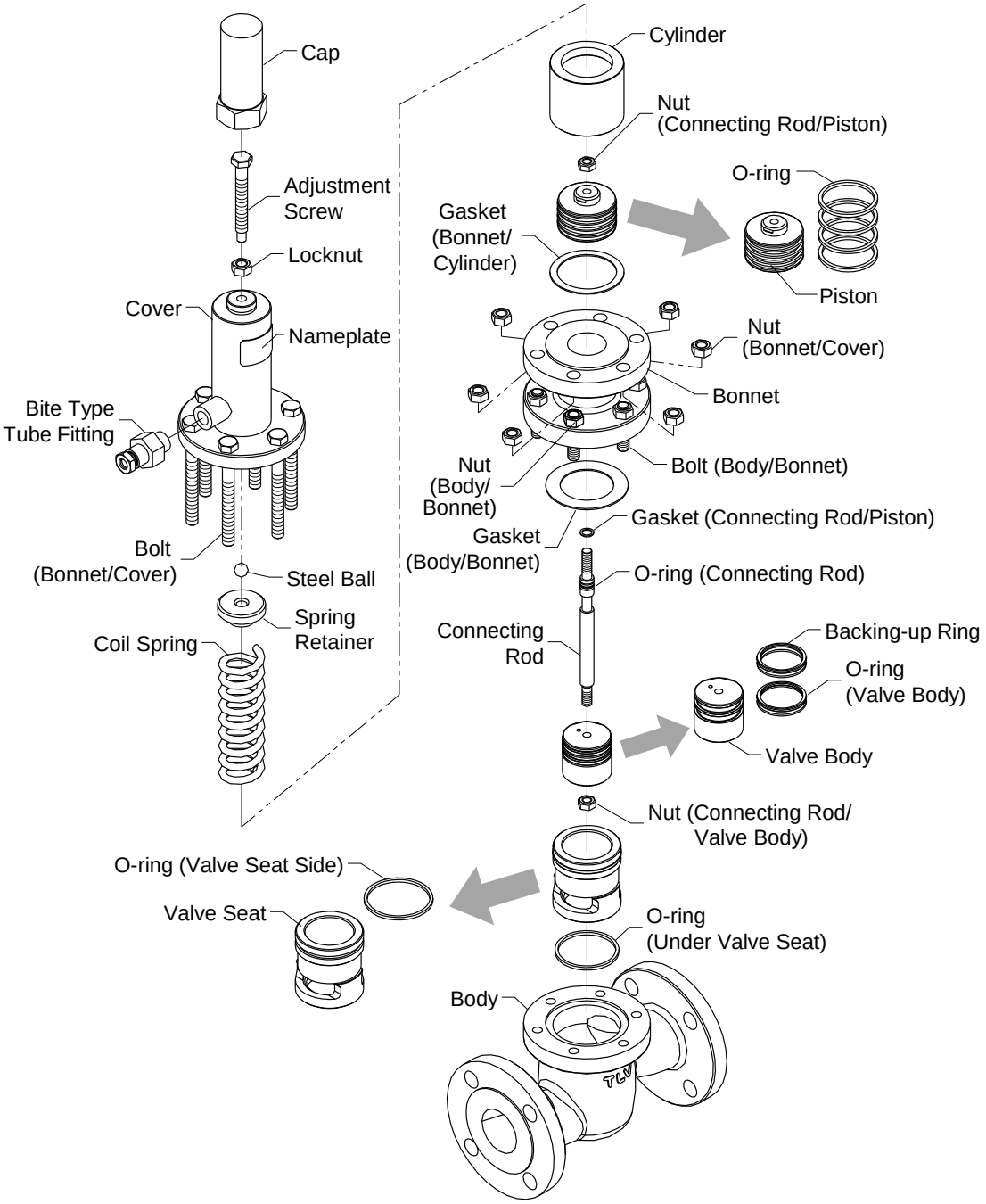
NOTE: - If a torque greater than that recommended is applied, the body or components may be damaged. (1 N·m ≈ 10 kg·cm)
- Coat all threaded portions with anti-seize.
- If drawings or other special documentation were supplied for the product, any torque given there takes precedence over values shown here.

Minimum Required Space for Disassembly



Size mm	Size (in)	H mm	H (in)
25	(1)	590	(23 1/4)
40	(1 1/2)	600	(23 5/8)
50	(2)		
65	(2 1/2)	620	(24 3/8)
80	(3)	840	(33)
100	(4)		

Exploded View



Troubleshooting

CAUTION

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

CAUTION

When carrying out pressure adjustment etc., do not tighten the adjustment screw further than its lower limit (when the coil spring is fully compressed and the adjustment screw cannot turn any further). Failure to observe this precaution may damage the product, leading to fluid discharge, which may cause burns or other injury.

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

Problem	Cause	Diagnosis	Remedy
The primary pressure increases abnormally The flow rate is insufficient	Valve is not open as its initial setting	Piston/valve body do not slide due to scale or build-up	Clean piston, cylinder, valve body and valve seat Replace each o-ring/back-up ring with new one
The primary pressure decreases Fluid leaks when the valve is fully closed	Supply pressure is decreased	Check the supply pressure	Set the supply pressure back to the given pressure
	Valve isn't completely closed Valve is leaking	O-ring under the valve seat is damaged, or rust or scale on the valve seat/valve body	Replace with a new o-ring Clean the valve seat and the valve body (* See NOTE)
Fluid leaks from the bite type tube fitting on the side of the cover	Insufficient sealing of the o-rings on the piston	Piston o-rings are damaged	Replace with new o-rings

* NOTE: Leakage may occur even when the valve is completely closed during operation.
Leakage when the valve is completely closed cannot be stopped by tightening the adjustment screw.
Do not overtighten the adjustment screw to stop leakage.
If the leak does not stop even after making an adjustment based on the "Relationship between the set pressure and the number of turns of the adjustment screw", replace the applicable parts

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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.

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.

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IT IS SPECIFICALLY ACKNOWLEDGED THAT THIS WARRANTY, ANY OTHER EXPRESS WARRANTY NOT NEGATED HEREBY, AND ANY IMPLIED WARRANTY NOT NEGATED HEREBY, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, DO NOT COVER, AND NEITHER TLV, TII NOR ITS TLV GROUP COMPANIES WILL IN ANY EVENT BE LIABLE FOR, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO LOST PROFITS, THE COST OF DISASSEMBLY AND SHIPMENT OF THE DEFECTIVE PRODUCT, INJURY TO OTHER PROPERTY, DAMAGE TO BUYER'S OR THE FIRST END USER'S PRODUCT, DAMAGE TO BUYER'S OR THE FIRST END USER'S PROCESSES, LOSS OF USE, OR OTHER COMMERCIAL LOSSES. WHERE, DUE TO OPERATION OF LAW, CONSEQUENTIAL AND INCIDENTAL DAMAGES UNDER THIS WARRANTY, UNDER ANY OTHER EXPRESS WARRANTY NOT NEGATED HEREBY OR UNDER ANY IMPLIED WARRANTY NOT NEGATED HEREBY (INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE) CANNOT BE EXCLUDED, SUCH DAMAGES ARE EXPRESSLY LIMITED IN AMOUNT TO THE PURCHASE PRICE OF THE DEFECTIVE PRODUCT. THIS EXCLUSION OF CONSEQUENTIAL AND INCIDENTAL DAMAGES, AND THE PROVISION OF THIS WARRANTY LIMITING REMEDIES HEREUNDER TO REPLACEMENT, ARE INDEPENDENT PROVISIONS, AND ANY DETERMINATION THAT THE LIMITATION OF REMEDIES FAILS OF ITS ESSENTIAL PURPOSE OR ANY OTHER DETERMINATION THAT EITHER OF THE ABOVE REMEDIES IS UNENFORCEABLE, SHALL NOT BE CONSTRUED TO MAKE THE OTHER PROVISIONS UNENFORCEABLE.

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

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