ISO 9001
ISO14001

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

Instruction Manual

Control Valve
Featured model: CV10 (for Valve Unit with Actuator)

172-65097M-07
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Introduction

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.

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 also 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
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.

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 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
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.

Specifications

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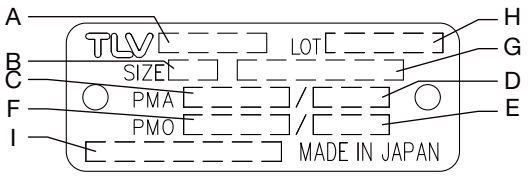
Install properly and DO NOT use this product outside the recommended operating pressure, temperature and other specification ranges. Improper use may result in such hazards as damage to the product or malfunctions that may lead to serious accidents. Local regulations may restrict the use of this product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

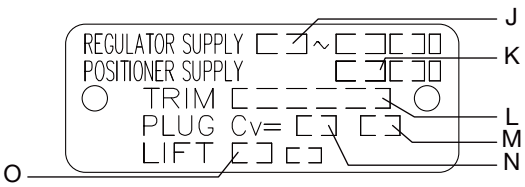
Use only under conditions in which no freeze-up will occur. Freezing may damage the product, leading to fluid discharge, which may cause burns or other injury.

Refer to the product nameplate for detailed specifications.

Valve



Actuator



A	Model	I	Valve No. [01]
B	Nominal Diameter	J	Pressure supplied to regulator
C	Maximum Allowable Pressure (PMA) [02]	K	Pressure supplied to positioner
D	Maximum Allowable Temperature (TMA) [02]	L	Valve Material
E	Maximum Operating Temperature (TMO)	M	Valve Characteristic
F	Maximum Operating Pressure (PMO)	N	Cv Value
G	Operating direction	O	Stroke
H	Production Lot No.		

[01]Valve No. is displayed for products with options. This item is omitted from the nameplate when there are no options.

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

Valve (partial list of standard specifications)

Connection	IEC534.3-1 (long face-to-face)
Applicable Fluids [01]	Steam, water, air, gas (non-hazardous fluid)
Valve Construction	Single-seat globe valve
Rangeability	For sizes 15 to 50 mm: 50:1 For sizes 65 to 150 mm: 30:1
Valve Leakage Rate	Rated Cv value capacity × % Metal seat: 0.01% or less (ANSI B16 104-1976 Class IV) PTFE seat: 0.0001% or less (ANSI B16 104-1976 Class VI)

[01]DO NOT use for toxic, flammable or otherwise hazardous fluids.

Actuator

Actuator	Pneumatic
Pneumatic Connection	For sizes 15 to 40 mm: Rc(PT)$^{1}/_{4}$ For sizes 50 to 150 mm: Rc(PT)$^{3}/_{8}$
Ambient Temperature	50 °C

Direct Action (Air-to Close) (partial list of standard specifications)

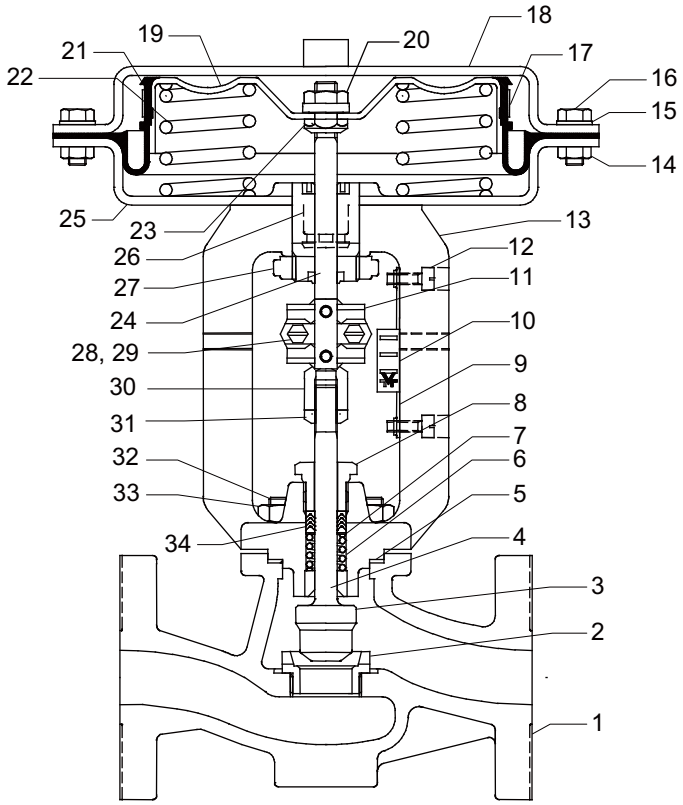
Size (mm)	Pressure supplied to filter/regulator	Air pressure supplied to positioner	Air pressure supplied to actuator (spring range)	Air pressure supplied during lift adjustment
15	0.16 to 0.9 MPaG	0.14 MPaG	0.02 to 0.1 MPaG	0.09 MPaG
20	0.24 to 0.9 MPaG	0.24 MPaG		
25	0.24 to 0.9 MPaG	0.24 MPaG		
40	0.24 to 0.9 MPaG	0.24 MPaG		
50	0.24 to 0.9 MPaG	0.24 MPaG		
65	0.24 to 0.9 MPaG	0.24 MPaG		
80	0.41 to 0.9 MPaG	0.4 MPaG		
100	0.24 to 0.9 MPaG	0.24 MPaG		
150	0.41 to 0.9 MPaG	0.4 MPaG		

Reverse Action (Air-to-Open) (partial list of standard specifications)

Size (mm)	Pressure supplied to filter/regulator	Air pressure supplied to positioner	Air pressure supplied to actuator (spring range)	Air pressure supplied during lift adjustment
15	0.16 to 0.9 MPaG	0.14 MPaG	0.02 to 0.1 MPaG	0.01 MPaG
20	0.25 to 0.9 MPaG	0.22 MPaG	0.04 to 0.2 MPaG	0.03 MPaG
25	0.25 to 0.9 MPaG	0.22 MPaG	0.04 to 0.2 MPaG	0.03 MPaG
40	0.37 to 0.9 MPaG	0.35 MPaG	0.09 to 0.33 MPaG	0.08 MPaG
50	0.28 to 0.9 MPaG	0.26 MPaG	0.08 to 0.24 MPaG	0.07 MPaG
65	0.4 to 0.9 MPaG	0.38 MPaG	0.12 to 0.36 MPaG	0.11 MPaG
80	0.37 to 0.9 MPaG	0.35 MPaG	0.21 to 0.33 MPaG	0.2 MPaG
100	0.27 to 0.9 MPaG	0.25 MPaG	0.14 to 0.23 MPaG	0.13 MPaG
150	0.37 to 0.9 MPaG	0.35 MPaG	0.21 to 0.33 MPaG	0.2 MPaG

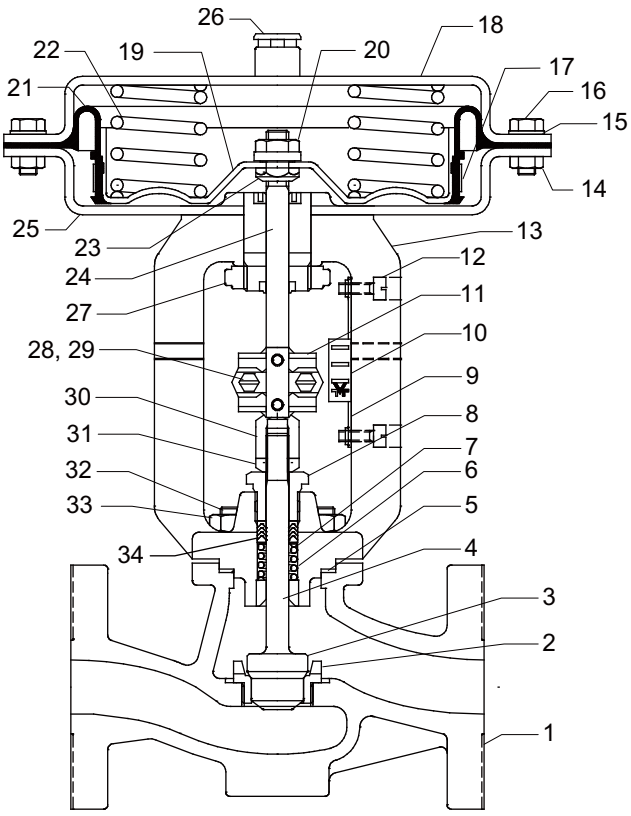
Configuration

Direct Action (Air-to-Close, Fail Open)



No.	Part Name	No.	Part Name
1	Body	18	Bellowphragm Case (Upper Cover)
2	Valve Seat	19	Bellowphragm Holder
3	Valve	20	Nut with Seal Gasket
4	Valve Stem	21	Bellowphragm
5	Gasket	22	Coil Spring
6	Coil Springs	23	Bellowphragm Holder Nut
7	Washer	24	Actuator Stem
8	Gland Retainer	25	Bellowphragm Case (Lower Cover)
9	Stroke Gauge Holding Plate	26	Exhaust Tap
10	Stroke Gauge	27	Fixing Nut
11	Connecting Support Plate	28	Hex Bolt
12	Stroke Gauge Mounting Bolt	29	Nut (15 to 40 mm)
13	Bonnet	30	Coupling Nut
14	Nut	31	Locknut
15	Washer	32	Stud Bolt
16	Bolt	33	Nut
17	Bellowphragm Retaining Band	34	V-rings

Direct Action (Air-to-Close, Fail Open)



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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.

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.

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 and adjustment should be done only by trained maintenance personnel. Check to make sure that the piping where the product is to be installed is constructed properly. If the piping is not correctly constructed, the product may not perform optimally.

1. When installing the product, in order to facilitate installation and removal of the actuator, leave a space of at least 150 mm above the top of the actuator, and a space of at least 100 mm to allow for positioner cover removal.
2. Make sure that the temperature of the flow medium and the ambient temperature of the installation location do not exceed the valve and actuator temperature limits.
3. Before installing the product, blow out the inlet piping to remove any piping scraps, dirt, welding chips, etc.
4. This product is a control valve. Though it adequately performs the function of a shutoff valve at start-up, frequent use as a shutoff valve causes a drop in performance. Be sure to install a manual or automated shutoff valve or self-operating valve at inlet and outlets.
5. Do not install the product in locations in the piping where foreign matter accumulates or where impact from water hammer occurs.
6. Wherever possible, install the product in horizontal piping, making sure that the actuator is in a position as close to perpendicular to the piping as possible.
7. Be sure to install the product so that the arrow showing on the body is pointing in the direction of flow.
8. Be careful that the piping gaskets do not protrude outside the inner bore of the flange. The type of medium being used and the temperature must be taken into account in order to select a gasket of a suitable material.
9. Make sure that the product is not bearing excessive weight from the piping and avoid uneven tightening by making sure that all the bolts on the flange connection are tightened evenly.
10. Before connecting the air lines for the air that is to be piped to the positioner/actuator, blow out the air in the lines to remove any dirt, foreign matter, oil or water from inside of the piping.

    Don’t use air that contains water or oil. If air that contains water or oil is used, install an air filter/regulator (non-lubricator) to prevent the flow of water or oil into the positioner.

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.

Inspection Item	Inspection Method	Remedy
Leakage from valve (when valve is closed)	Visual Inspection or Stethoscope Inspection: Is the outlet side pressure or temperature elevated?	Replace with a new valve and/or new a valve seat
Leakage from gland area	Visual Inspection: Is liquid leaking from the slit between the gland and the valve stem?	Coat the gland and the valve stem thoroughly with grease; thoroughly grease the V-ring slot; or replace with a new V-ring
Leakage from actuator	Visual Inspection: Is air leaking from the actuator area or the exhaust tap during stable actuator operation?	Replace with a new bellowphragm
Leakage from gasket between body and bonnet	Visual Inspection: Is fluid leaking from the body or bonnet?	Apply additional tightening (consult stipulated torque) or replace with a new gasket
Leakage from pressure-bearing parts such as body and bonnet	Visual Inspection: Is fluid leaking from the body or bonnet?	Replace pressure-bearing parts
Operating conditions	Visual Inspection: Is the valve opening (travel) undergoing frequent change?	Adjust the controller and positioner

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.

Gaskets: Check for warping or scratches (must be replaced with new gasket when product is disassembled)

V-ring (Gland): Check for warping or damage

Valve, Valve Seat: Check for scratches or damage

Body, Bonnet: Check for corrosion or damage

Bellowphragm: Check for scratches or damage

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.

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.

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.) Consult the Exploded View and Table of Tightening Torques for actuator disassembly/reassembly. Be sure to coat all threaded portions of the valve seat and bolts with anti-seize before reassembly.

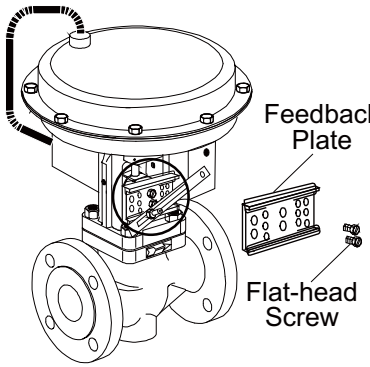
Perform the following procedure before disassembly.

1. Disconnect the positioner signal wire.
2. Stop air from being supplied to the positioner.

Disassembly/Reassembly (Direct Action/Air-to-Close)

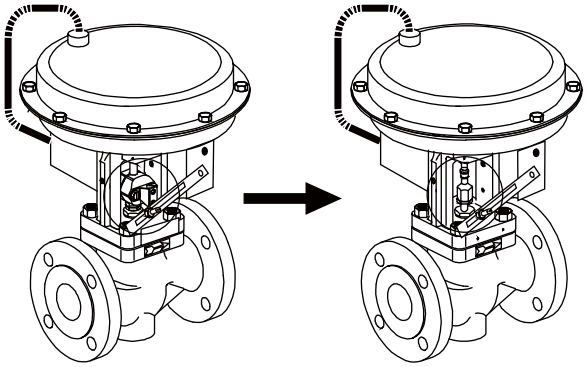
Detaching/Reattaching the Feedback Plate

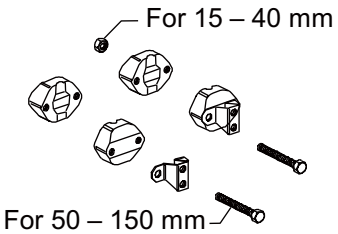
Part Name	During Disassembly	During Reassembly
Flat-head Screw	Remove with a flat-head screwdriver	Consult the table of tightening torques and tighten to the proper torque
Feedback Plate	Remove, being careful not to bend the wires attached to the plate	Make sure to insert the positioner's span adjustment pin in the correct place; **it is to be inserted in the opening at the bottom edge of the plate**



Detaching/Reattaching the Connecting Support Plate

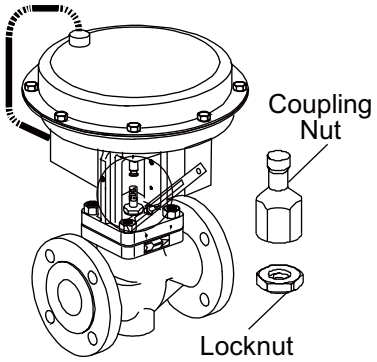
Part Name	During Disassembly	During Reassembly
Hext Bolt Nut (for sizes 15 to 40 mm only)	Remove the hex bolt with a flat-head screwdriver	Consult the table of tightening torques and tighten to the proper torque
Connecting Support Plate	—	Consult the table of tightening torques and tighten to the proper torque; make sure to tighten evenly





Detaching/Reattaching the Coupling Nut and Locknuts (Stroke Adjustment)

Part Name	During Disassembly	During Reassembly
Locknut Coupling Nut	Holding the coupling nut securely with a wrench, loosen the locknut; **DO NOT disassemble with the valve in contact with the valve seat, make sure that the valve is slightly suspended**	DO NOT apply air pressure in that is in excess of the pressure supplied during lift adjustment; consult the table of tightening torques and tighten to the proper torque; if the instructions given below are not followed when reassembly is carried out, malfunctions such as insufficient lift (insufficient flow capacity) and/or insufficient closing force (valve leakage) may result; give the proper attention to the adjustment procedure



Instructions for Direct Action Stroke Adjustment

1. Make sure that the valve is securely seated in the valve seat.
2. Screw the locknut and coupling nut onto the valve stem until they are just short of coming into contact with the gland retainer. (Fig. 1)
3. Supply a lift adjustment supply air pressure of 0.09 MPaG to the actuator (refer to the “Specifications” section). The actuator stem will descend. (Fig. 2)
4. Screw the coupling nut up until it comes into contact with the actuator stem. Hold the coupling nut securely in place with a tool such as a wrench and tighten the locknut. (Fig. 3)
5. Shut off the air supply to the actuator. The actuator stem will ascend. Pull up the coupling nut (valve stem) until it comes into contact with the actuator stem. (Fig. 4)

Figure 1

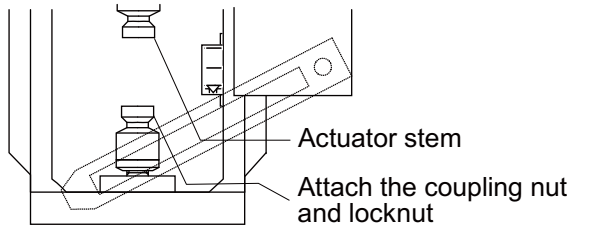


Figure 2

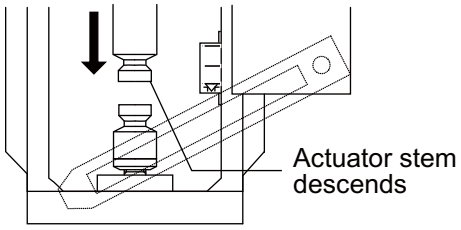


Figure 3

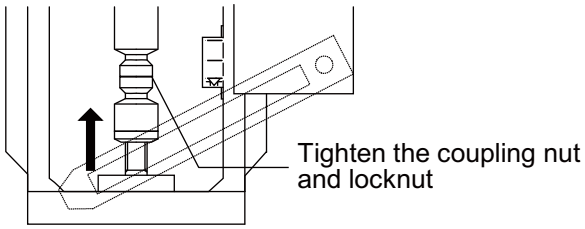
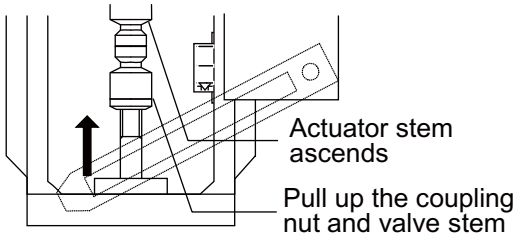
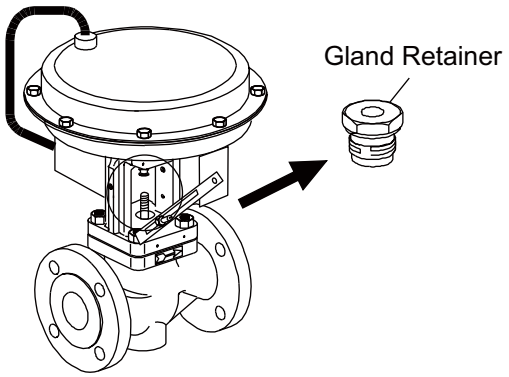


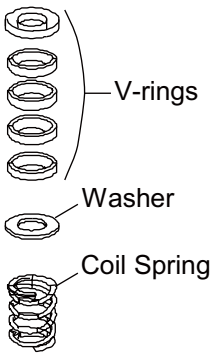
Figure 4

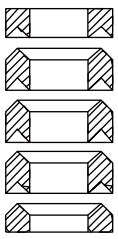


Disassembling/Reassembling the Gland Section

Part Name	During Disassembly	During Reassembly
Gland Retainer	Remove with a socket wrench	Consult the table of tightening torques and tighten to the proper torque
V-rings	Pull up and off	Coat the groove with heat-resistant grease (silicon grease) making sure the V-rings are in the proper orientation; reattach the V-rings with their **grooves facing downward**
Washer	Pull up and off	—
Coil Spring	Pull up and off	—



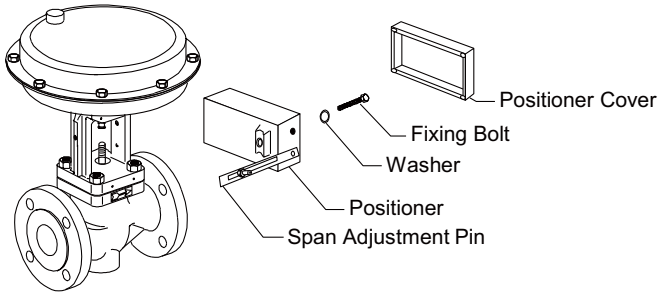




Cross-section view of V-rings

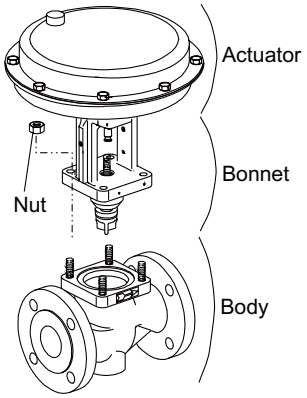
Disassembling/Reassembling the Positioner

Part Name	During Disassembly	During Reassembly
Air Line	Disconnect with a wrench	—
Positioner Cover	Remove with a flat-head screwdriver	Consult the table of tightening torques and tighten to the proper torque; make sure to tighten evenly
Fixing Bolt	Remove with a socket wrench	Consult the table of tightening torques and tighten to the proper torque
Washer	—	—
Span Adjustment Pin	DO NOT loosen or remove, as **displacement of the zero point and span will result**	If the pin has been removed, be sure to carry out zero point and span adjustment



Disassembling/Reassembling the Bonnet

Part Name	During Disassembly	During Reassembly
Nut	Remove with a socket wrench	Consult the table of tightening torques and tighten to the proper torque; make sure to tighten evenly
Bonnet	Pull up and off, being careful not to damage the valve or valve seat	Reattach, being careful not to damage the valve or valve seat; insert the bonnet securely into the gasket housing without tilting; **check to make sure that there is no catching or biting when the valve is seated in the valve seat, and that the valve is securely seated in the valve seat**
Gasket	Remove the gasket and clean sealing surfaces	Replace with a new gasket; make sure that the gasket does not protrude from the housing in the body; **DO NOT coat with anti-seize**

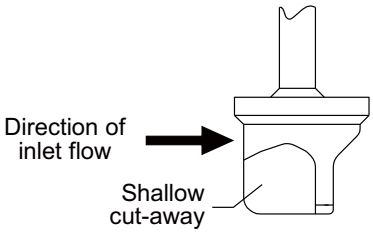


Removing/Reinserting the Valve

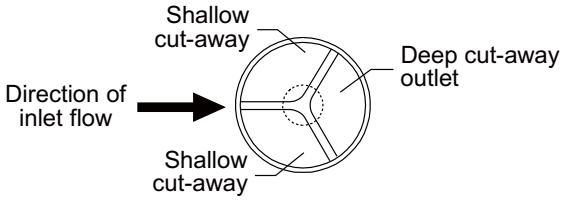
Part Name	During Disassembly	During Reassembly
Valve	—	When the Cv value is 30 or greater, be careful of the orientation of the valve wing-blades during reassembly; improper orientation can result in noise or erosion of the valve and/or valve seat

Note
Valve reassembly orientation for Cv values of 30 or greater (When the Cv value is 20 or less, there is no designated reassembly orientation.)

Valve: Viewed from side

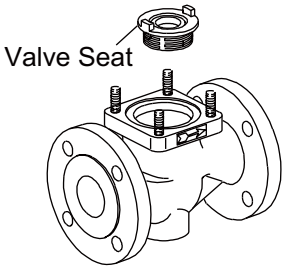


Valve: Viewed from bottom



Removing/Reinserting the Valve Seat (Special tool is required)

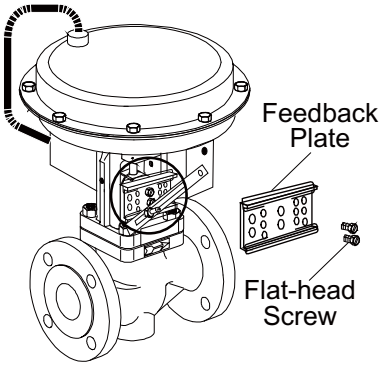
Part Name	During Disassembly	During Reassembly
Valve Seat	This procedure requires a specialized tool; a power wrench is useful when replacing a valve seat of 40 mm or larger; when using a power wrench, be sure to follow the manufacturer's instructions	Over-tightening could result in damage to the valve seat and body; consult the table of tightening torques and tighten to the proper torque



Disassembly/Reassembly (Reverse Action/Air-to-Open)

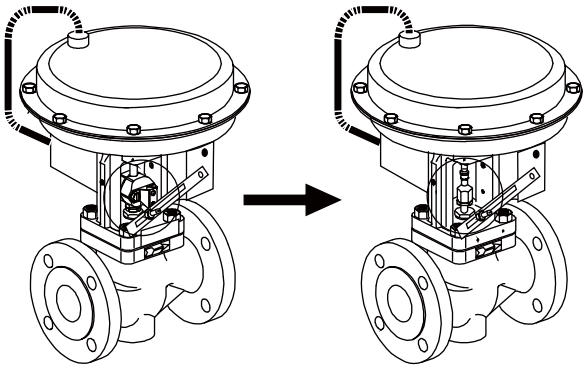
Detaching/Reattaching the Feedback Plate

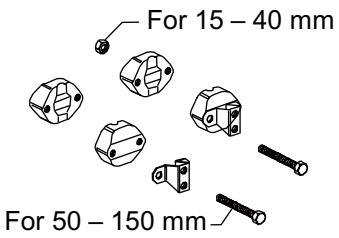
Part Name	During Disassembly	During Reassembly
Flat-head Screw	Remove with a flat-head screwdriver	Consult the table of tightening torques and tighten to the proper torque
Feedback Plate	Remove, being careful not to bend the wires attached to the plate	Make sure to insert the positioner's span adjustment pin in the correct place; **it is to be inserted in the opening at the bottom edge of the plate**



Detaching/Reattaching the Connecting Support Plate

Part Name	During Disassembly	During Reassembly
Hext Bolt Nut (for sizes 15 to 40 mm only)	Remove the hex bolt with a flat-head screwdriver	Consult the table of tightening torques and tighten to the proper torque
Connecting Support Plate	—	Consult the table of tightening torques and tighten to the proper torque; make sure to tighten evenly

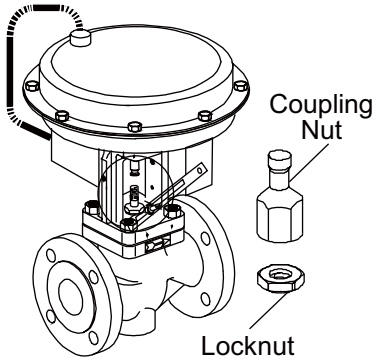




Detaching/Reattaching the Coupling Nut and Locknuts (Stroke Adjustment)

Supply to the positioner an air pressure that is within the spring range. This will cause the actuator stem to rise. Remove the coupling nut and locknut while the actuator stem is in the raised position.

Part Name	During Disassembly	During Reassembly
Locknut Coupling Nut	Holding the coupling nut securely with a wrench, loosen the locknut; **DO NOT disassemble with the valve in contact with the valve seat, make sure that the valve is slightly suspended**	DO NOT apply air pressure in that is in excess of the pressure supplied during lift adjustment; consult the table of tightening torques and tighten to the proper torque; if the instructions given below are not followed when reassembly is carried out, malfunctions such as insufficient lift (insufficient flow capacity) and/or insufficient closing force (valve leakage) may result; give the proper attention to the adjustment procedure



Instructions for Reverse Action Stroke Adjustment

1. Make sure that the valve is securely seated in the valve seat. (Fig. 1)
2. Supply the spring range’s maximum air pressure to the actuator (refer to the "Specifications" section). The actuator stem will ascend. Perform the rest of the procedure with the actuator stem in this raised position. (Fig. 2)
3. Screw the locknut and coupling nut onto the valve stem until they are just short of coming into contact with the gland retainer.
4. Supply a lift adjustment supply air pressure to the actuator. (Supply pressure that is 0.01 MPa lower than the lower limit value of the spring range pressure. The lower limit (value) of the spring range pressure varies depending on the valve specification. Refer to the drawing for the spring range. The actuator stem will descend lower than in step 2 described above. (Fig. 3)
5. Screw the coupling nut up until it comes into contact with the actuator stem. Hold the coupling nut securely in place with a tool such as a wrench and tighten the locknut. (Fig. 4)
6. Shut off the air supply to the actuator.

Figure 1	Figure 2

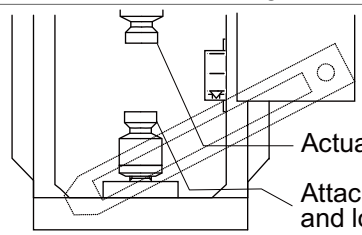
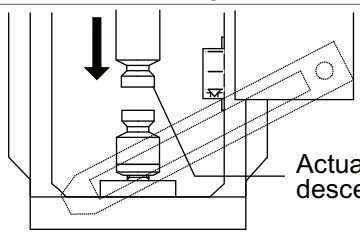
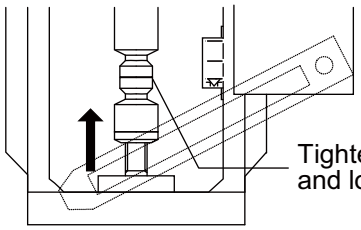
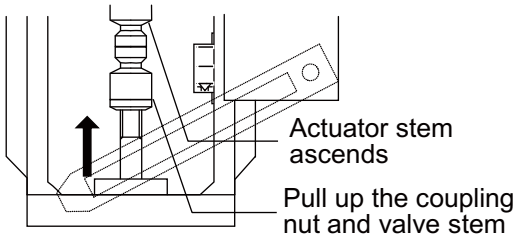
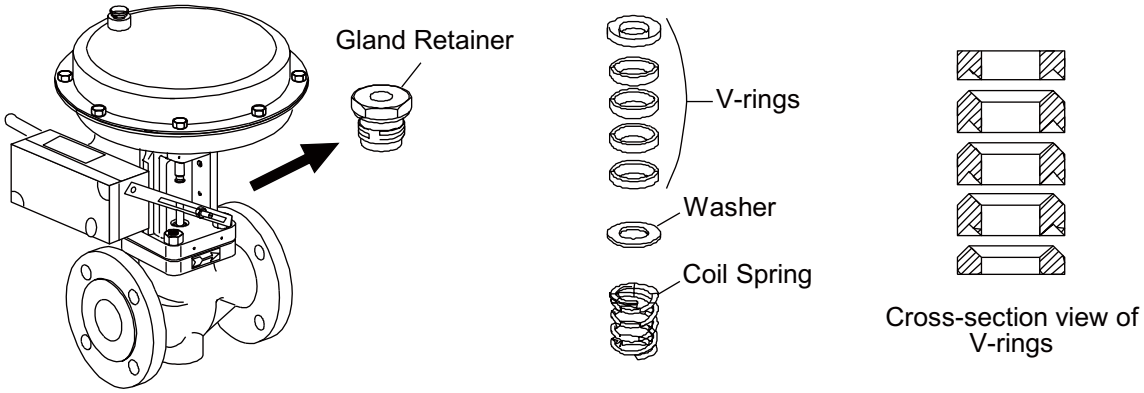

	

Figure 3	**Figure 4**
	

Disassembling/Reassembling the Gland Section

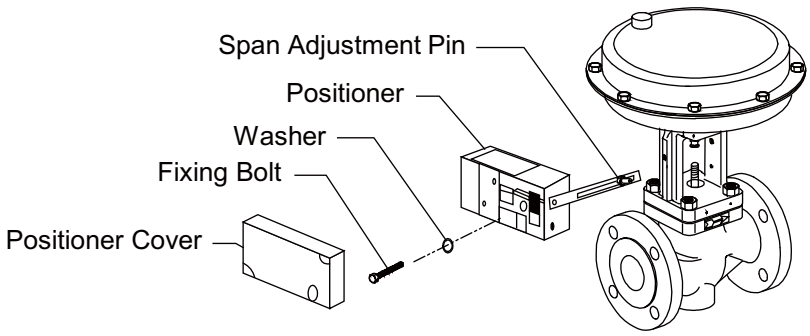
Of the parts and procedures listed in this step, at this stage only partially loosen the gland retainer. Come back to this step and proceed with removal of each of the parts listed here only after having first removed the bonnet (refer to "Disassembling/Reassembling the Bonnet" and "Removing/Reinserting the Valve").

Part Name	During Disassembly	During Reassembly
Gland Retainer	Remove with a socket wrench	Consult the table of tightening torques and tighten to the proper torque
V-rings	Pull up and off	Coat the groove with heat-resistant grease (silicon grease) making sure the V-rings are in the proper orientation; reattach the V-rings with their **grooves facing downward**
Washer	Pull up and off	—
Coil Spring	Pull up and off	—



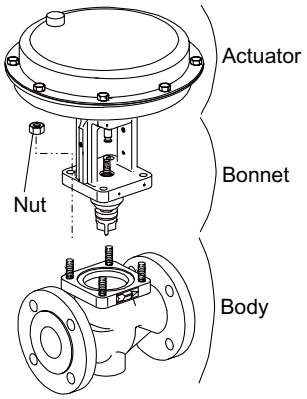
Disassembling/Reassembling the Positioner

Part Name	During Disassembly	During Reassembly
Air Line	Disconnect with a wrench	—
Positioner Cover	Remove with a flat-head screwdriver	Consult the table of tightening torques and tighten to the proper torque; make sure to tighten evenly
Fixing Bolt	Remove with a socket wrench	Consult the table of tightening torques and tighten to the proper torque
Washer	—	—
Span Adjustment Pin	DO NOT loosen or remove, as **displacement of the zero point and span will result**	If the pin has been removed, be sure to carry out zero point and span adjustment



Disassembling/Reassembling the Bonnet

Part Name	During Disassembly	During Reassembly
Nut	Remove with a socket wrench	Consult the table of tightening torques and tighten to the proper torque; make sure to tighten evenly
Bonnet	Pull up and off, being careful not to damage the valve or valve seat	Reattach, being careful not to damage the valve or valve seat; insert the bonnet securely into the gasket housing without tilting; **check to make sure that there is no catching or biting when the valve is seated in the valve seat, and that the valve is securely seated in the valve seat**
Gasket	Remove the gasket and clean sealing surfaces	Replace with a new gasket; make sure that the gasket does not protrude from the housing in the body; **DO NOT coat with anti-seize**

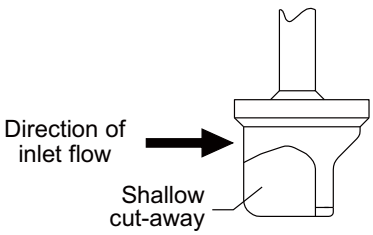


Removing/Reinserting the Valve

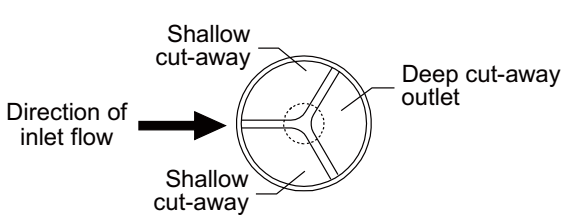
Part Name	During Disassembly	During Reassembly
Valve	—	When the Cv value is 30 or greater, be careful of the orientation of the valve wing-blades during reassembly; improper orientation can result in noise or erosion of the valve and/or valve seat

Note
Valve reassembly orientation for Cv values of 30 or greater (When the Cv value is 20 or less, there is no designated reassembly orientation.)

Valve: Viewed from side

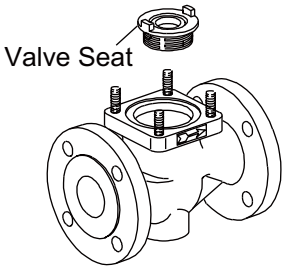


Valve: Viewed from bottom

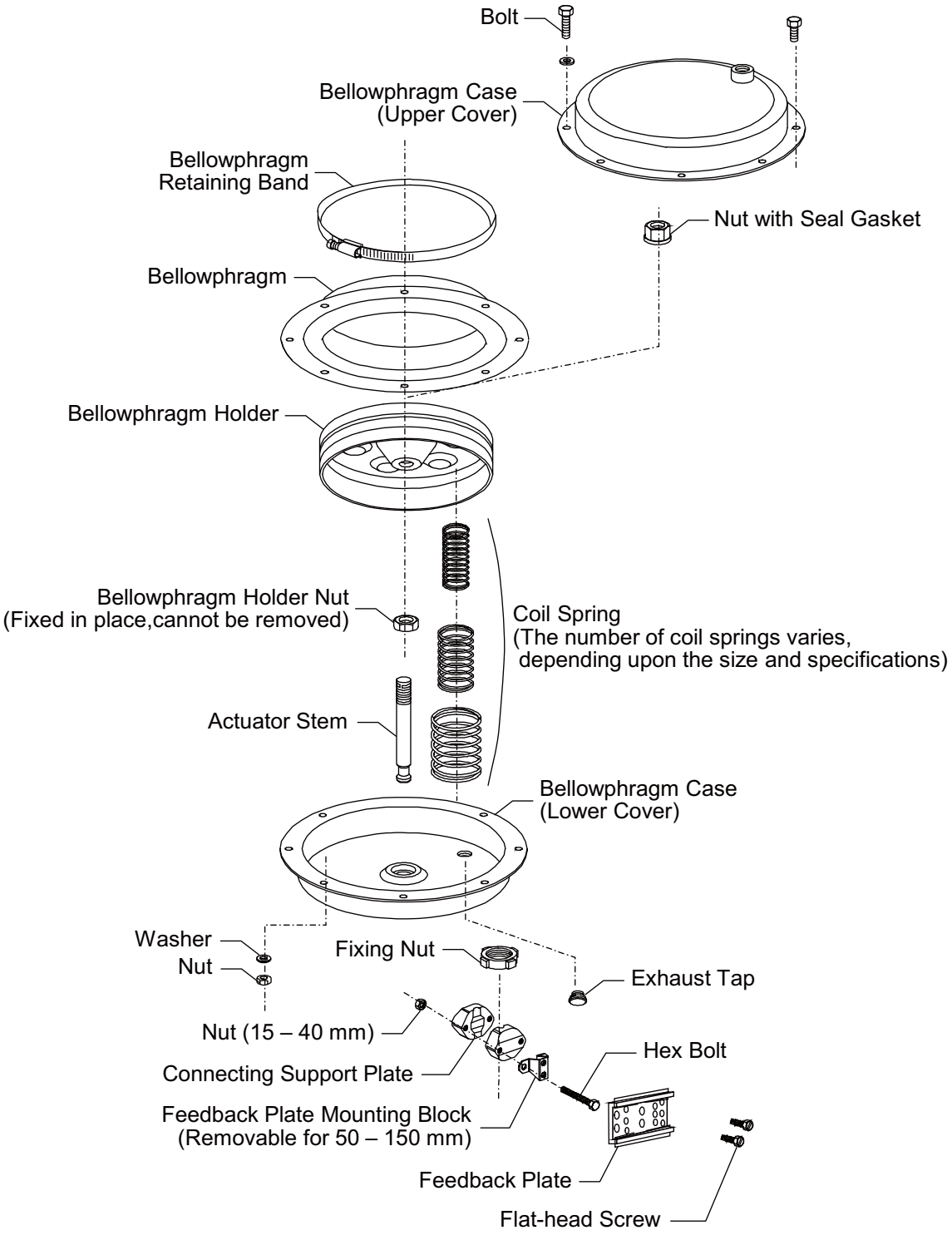


Removing/Reinserting the Valve Seat (Special tool is required)

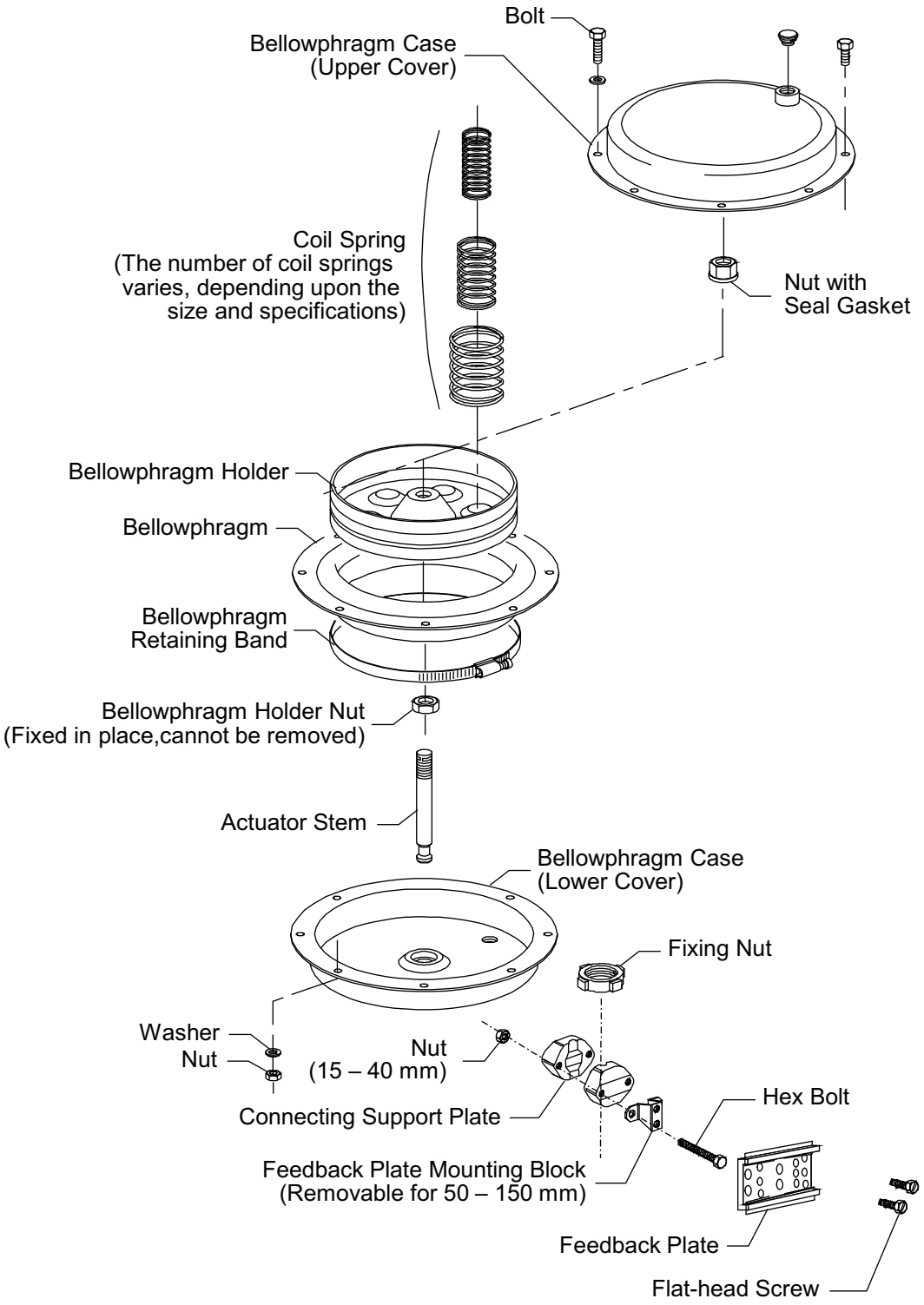
Part Name	During Disassembly	During Reassembly
Valve Seat	This procedure requires a specialized tool; a power wrench is useful when replacing a valve seat of 40 mm or larger; when using a power wrench, be sure to follow the manufacturer's instructions	Over-tightening could result in damage to the valve seat and body; consult the table of tightening torques and tighten to the proper torque



Exploded View: Actuator (Direct Action)



Exploded View: Actuator (Reverse Action)



Exploded View: Valve Section

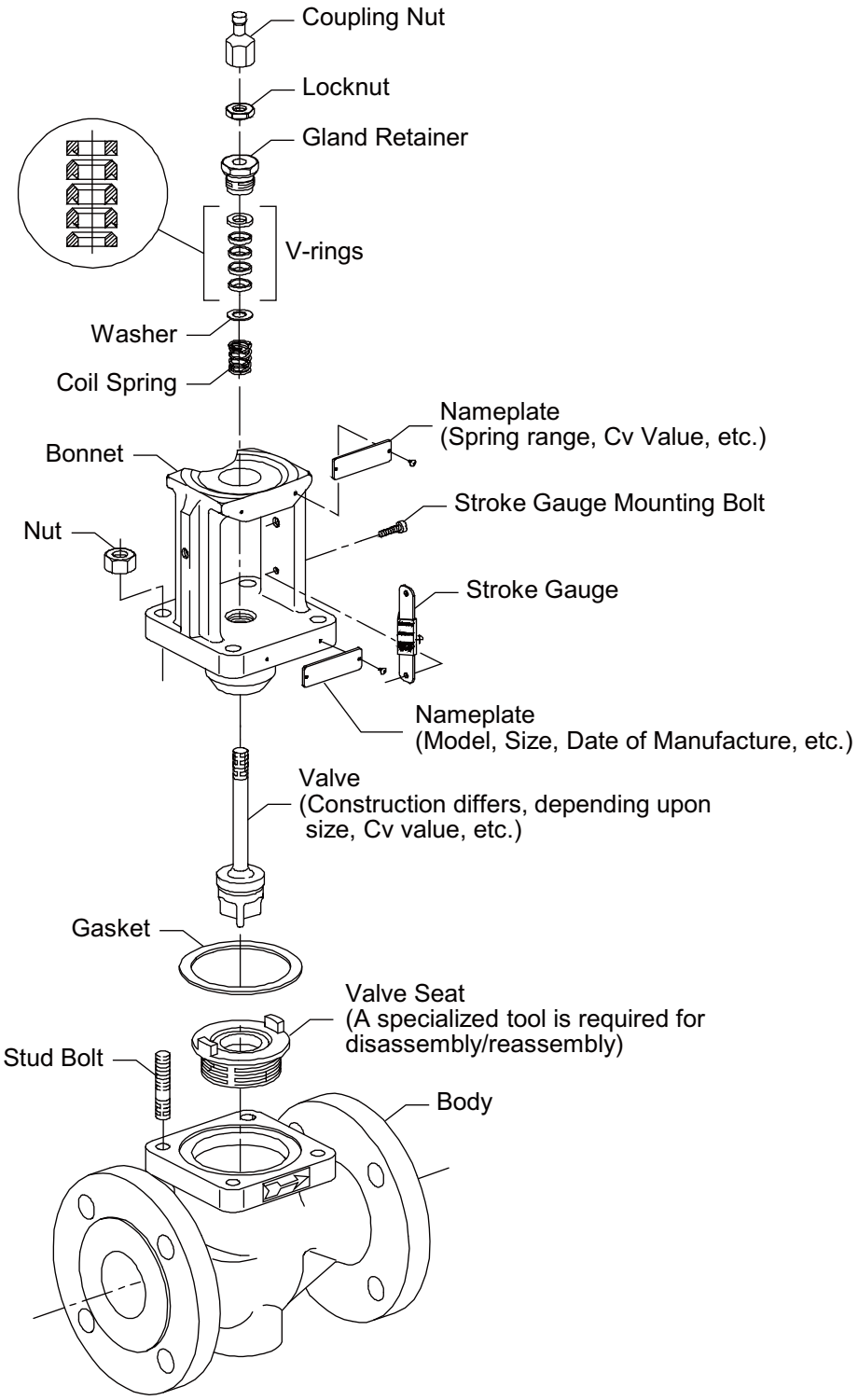


Table of Tightening Torques

A special tool is required for valve seat replacement. Please contact TLV for details.

Part Name	Sizes 15 to 25 mm		Size 40 mm		Size 50 mm	
	Torque N·m	Distance Across Flats mm	Torque N·m	Distance Across Flats mm	Torque N·m	Distance Across Flats mm
Valve Seat	170	Special tool	500	Special tool	500	Special tool
Bolt and Nut for Actuator	15	13	15	13	15	13
Nut for Bonnet	20	16	60	16	60	16
Gland Retainer	120	24	120	24	120	24
Coupling Nut and Locknut	20	17	20	17	20	17
Bolt and Nut for Connecting Support Plate	7	8	7	8	10	10
Nut with Seal Gasket for Actuator Stem	35	17	35	17	70	24
Flat-head Screw for Feedback Plate	4	Slot width: 2 mm	4	Slot width: 2 mm	4	Slot width: 2 mm
Fixing Bolt for Positioner	20	13	20	13	20	13
Bellowphragm Retaining Band	6	7	6	7	6	7

Part Name	Sizes 65 to 80 mm		Size 100 mm		Size 150 mm	
	Torque N·m	Distance Across Flats mm	Torque N·m	Distance Across Flats mm	Torque N·m	Distance Across Flats mm
Valve Seat	1050	Special tool	1550	Special tool	2600	Special tool
Bolt and Nut for Actuator	15	13	15	13	15	13
Nut for Bonnet	90	24	90	24	170	27
Gland Retainer	120	24	230	30	230	30
Coupling Nut and Locknut	20	17	20	17	70	24
Bolt and Nut for Connecting Support Plate	10	10	10	10	10	10
Nut with Seal Gasket for Actuator Stem	70	24	70	24	70	24
Flat-head Screw for Feedback Plate	4	Slot width: 2 mm	4	Slot width: 2 mm	4	Slot width: 2 mm
Fixing Bolt for Positioner	20	13	20	13	20	13

Part Name	Sizes 65 to 80 mm		Size 100 mm		Size 150 mm	
	Torque N·m	Distance Across Flats mm	Torque N·m	Distance Across Flats mm	Torque N·m	Distance Across Flats mm
Bellowphragm Retaining Band	6	7	6	7	6	7

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.

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.

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

Problem	Cause	Diagnosis/Inspection	Remedy
Valve leakage	The supply air pressure to the positioner is too high	Check the supply air pressure to the positioner (confirm product specifications)	Reset the positioner's supply air pressure; adjust the positioner's zero point
	The positioner's zero point is off	Check the pressure on the positioner's pressure gauge when the input signal is at zero	If the pressure on the pressure gauge attached to the ositioner is raised, adjust the positioner's zero point
	The inlet pressure for the control valve is too high	Check the inlet pressure for the control valve	Reduce the inlet pressure (Cv value and spring range must be changed)
	The valve and valve seat are off-center	Move the valve stem up and down and check to see if it catches	Reassemble the bonnet section correctly
	The valve and valve seat are worn	Check the valve and valve seat	Replace with a new valve and valve seat (use valve and valve seat of a different material than the ones being replaced)

Problem	Cause	Diagnosis/Inspection	Remedy
Control valve opening does not move beyond a certain point	The bellowphragm in the actuator is broken	Check to see if air is leaking from the exhaust tap or bellowphragm area	Replace with a new bellowphragm (check to make sure that the ambient temperature is not too high)
	Internal parts of the positioner are broken (the diaphragm is cracked, etc.)	Check to see if any abnormal noise is coming from the positioner	Replace with a new positioner (check to see if the valve opening (travel) is changing frequently, and the ambient temperature is too high)
	Supply air pressure to the positioner is insufficient	Check the supply air pressure for the positioner (refer to the product specifications)	Adjust the supply air pressure for the positioner (refer to the product specifications)
	Controller set incorrectly	Check to see if an input signal of 4 tp 20 mA is coming from the controller	Verify the controller setting and correct if necessary
No movement at all	Air is not being supplied to the positioner	Make sure that the compressor is operating properly; make sure that the regulator connected to the positioner inlet is set	Initiate the supply of supply air pressure to the positioner (confirm product specifications)
	The input signal wiring is incorrectly connected	Check the "+" and "-" connection terminals in the positioner; check the controller’s connections	Correct the wiring connections
	The input signal is not being input	Check that 4 to 20 mA is being output by the connection terminals inside the positioner	Adjust the controller or replace with a new controller
	There is a short in the I/P transducer coil	Check the internal resistance (approx. 200 Ω)	Replace with a new positioner (check to make sure that the ambient humidity of the installation is not too high)
	There is water or oil inside the positioner	Check to see if there is water or oil entrained in the supply air; check to see if the humidity at the location where the control valve piping location is too high	Replace with a new positioner or have the positioner repaired (improve the quality of the supply air)

Problem	Cause	Diagnosis/Inspection	Remedy
Control valve opens closes too slowly	There is water or oil inside the positioner	Check to see if there is water or oil entrained in the supply air; check to see if the humidity at the control valve piping location is too high	Replace with a new positioner or have the positioner repaired (improve the quality of the supply air)
	The nozzle and/or adjuster(s) inside the positioner are clogged	Check the control valve operation by directly manipulating the measurement spring inside the positioner	Have the positioner repaired (improve the quality of the supply air)
	The filter/regulator is clogged	Check the filter	Clean or replace with a new filter
Control valve opening is unstable	The setting of the controller is faulty	Check the set value based on the controller's PID parameters	Change the set value
	The positioner has been insufficiently adjusted	Check the positioner	Adjust the positioner's proportional band (air supply (Q) and gain adjustment (Xp))

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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
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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
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11. failure to follow the instructions contained in the TLV Instruction Manual for the Product.

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