azbil

CM2-ADV100-2001

CV3000 Alphaplus series Top-Bottom Guided Double Seated Control Valve Model ADVB, ADVM

User's Manual

Azbil Corporation

NOTICE

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Introduction

Thank you for purchasing this top-bottom guided double-seated control valve model ADVB_ _ _ /ADVM_ _ _. This is a control device mainly used for a low differential pressure, large-diameter pipe control system.

Unpacking and Storing the Product

Unpacking

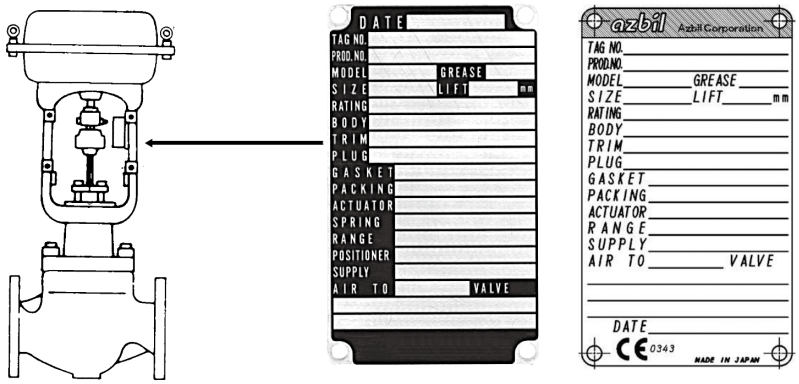
This valve is a precision instrument. Take special care in handling the valve to prevent accidents, damage, etc.

When unpacking, check for the following items.

- The valve, actuator, and parts to be mounted
- Any auxiliary devices that you ordered

Checking the Specifications

Check that the fluid conditions, valve number (tag No.), and the specifications printed on the name plate are correct and appropriate. The location of the product's nameplate is shown in the figure below.



Position of the nameplate

Inquiries

For inquiries concerning this device, contact the azbil Group.

When making an inquiry, have your model number and product number ready.

Compliance with Regulations

This product complies with the directive below.

■ Pressure Equipment Directive (PED) 2014/63/EU

Requirements for workers (installation, operation, maintenance)

To ensure safety, only specialists who are skilled in instrumentation work should carry out the installation, operation, and maintenance of this device.

Precautions for Storage

Observe the following precautions in order to store the purchased valve properly.

- If the valve is packed in a cardboard box, store it indoors at room temperature and humidity.
- A valve packed in a wooden crate should also generally be stored indoors at room temperature and humidity. For outdoor storage, after unpacking the valve and checking the specifications, cover it with a polyethylene protective sheet to keep rain water out.

To store a valve that has been used, follow the instructions below.

1. Wash out any fluid stuck to or remaining in the interior of the valve.
2. If it is likely that the valve will corrode, take preventive measures.
3. Cover the openings for air supply and electrical conduit connections with waterproof caps or tape to keep water out.
   In addition, protect the threads on the connectors.
4. Protect the ends of pipe connections (flanges, welded surfaces) using flange caps or the like.

Storing your CV3000 Alphaplus

Precautions

When not in service, CV3000 Alphaplus should be stored:

■ indoors at normal temperature and humidity and in a place safe from vibration or shock.

■ in the same condition and container as it was received from the factory.

Procedure

Used CV3000 Alphaplus valves must be treated before storage as follows:

Step	Action
1	Rinse the inside of the control valve body with water to remove residual fluid, then allow to dry. Anti- corrosive treatment is recommended for control valves with car- bon steel bodies.
2	Attach caps to air piping connections, and electrical conduit connections of accessories to prevent moisture from entering.
3	Protect flange surface with flange-caps or other safeguards.
4	Store the CV3000 Alphaplus indoors at normal temperature and humid- ity in a place safe from vibration or shock

Table of Contents

Chapter 1. General Description

1-1. Scope

This manual contains the instructions on the use and safe handling of top and bottom guided double seated control valves (model ADVB/ADVM).
For instructions on the valve positioner, refer to the following Operator's Manuals:

- OM2-8320-0100 (for model SVP3000 Alphaplus)
- OM2-8313-0100 (for model HEP15/16/17)
- OM2-8310-0200 (for model HTP)

1-2. Main components

Each control valve is comprised of two main components a valve body and an actuator. Combinations of valve body and actuator sizes, pressure ratings, types of materials, and actuator sizes differ depending on the process requirements.
For detailed specifications, refer to Specification sheet (SS2-ADV100-0100).

1-3. Structures

A typical CV3000 Alphaplus series control valve is shown in Fig. 1-1.
The valve body is connected to the bonnet by stud bolts and nuts. Gaskets mounted between body and bonnet act as a seal for the internal fluid, making the valve body a pressure vessel.
The valve plug is supported by the guide bushing and driven by the actuator. The multi-spring actuator and a diaphragm convert the pneumatic control signal into a mechanical control action that positions the valve plug.

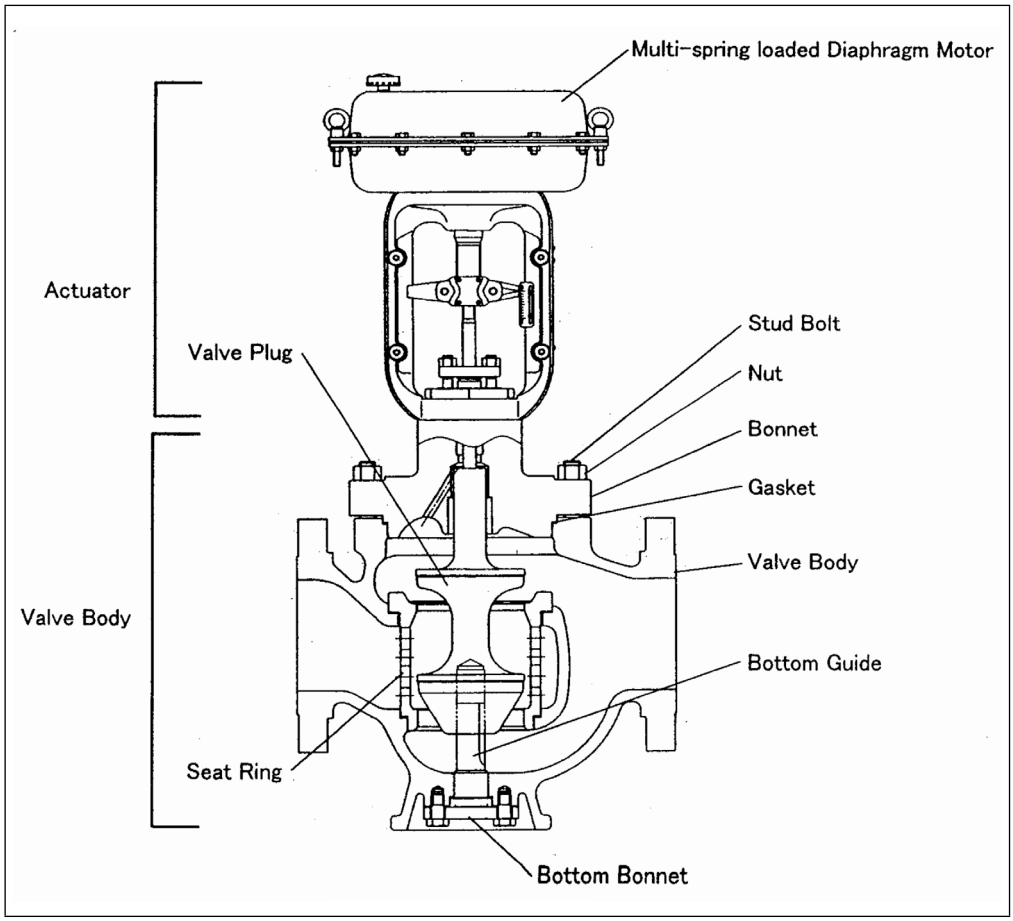


Fig. 1-1. Model ADVB / ADVM

Chapter 2. Installation

2-1. Installing the valve on a process pipe

(1) Before installing the valve, remove scaling, welding chips or any other contaminants from both the upstream and downstream sides of the process pipe.

(2) Confirm that the direction of process fluid flow conforms to the arrowhead mark on the valve body.

(3) Ensure that the pipe connection gaskets do not protrude into the process pipe.

(4) Gasket materials suitable for the process fluid must be selected with care.

(5) Ensure that excessive stress is not transferred from the process pipe onto the valve body. Uniformly tighten the bolts of the process pipe connection flanges.

(6) Before connecting pneumatic pipes to the actuator and positioner, blow the pipes clean.

(7) Do not install any heating or cooling equipment on the bonnet.

2-2. Check after installation and before starting operation

(1) Check all air pipes for leakage.

(2) Check that the bolts and nuts on the diaphragm case are tight.

(3) Tighten the packing flange nuts to prevent leakage from the gland part. Standard tightening torques are given in Table 2-1.

(4) Check the process pipe for leakage.

Table 2-1. Tightening torque of packing flange nuts

Valve stem diameter (mm)	Yarn packing N·m {kgf/cm}	PTFE chevvron packing N·m {kgf/cm}
16	15 to 17 {153 to 176}	0.8 to 1.0 {8 to 10}
20	23 to 27 {235 to 276}	0.8 to 10 {8 to 10}

Note) These tightening torques are only reference values, and may vary depending on the packing used.

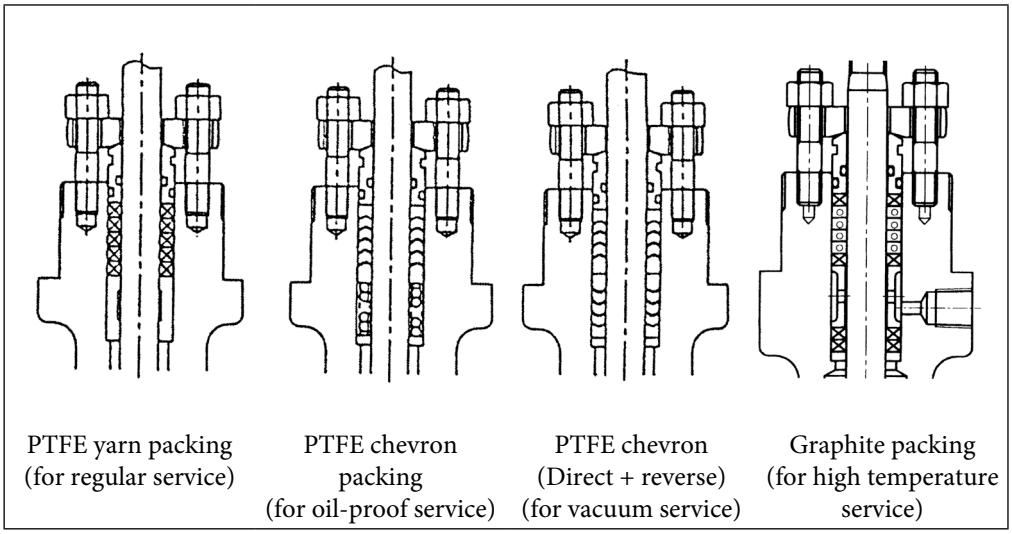


Fig. 2-1. Gland section

Chapter 3. Inspection and Maintenance

3-1. Inspection

Inspect and service the control valve as follows:

(1) Tightening the gland:

Tighten the gland approximately every 6 months. Follow the tightening procedures given in "2-2. Check after installation and before starting operation".

(2) Check for valve position hunting. Refer to "Chapter 7. Troubleshooting".

(3) Check for abnormal noise and vibration. Refer to "Chapter 7. Troubleshooting".

Chapter 4. Disassembly and Assembly

This section covers the disassembly and assembly procedures for its overhaul or modification.

4-1. Detaching actuator from valve body (refer to Fig. 4-1.)

(1) Apply air pressure to the actuator so that the valve positioner is 10% to 20% open.

(2) Loosen the clamping bolts on of the stem connector and remove it. Detach the actuator stem from the vale stem.

(3) Remove the yoke clamping nut.

(4) Raise the actuator to detach it from the valve body.

⚠ CAUTION
(1) Before detaching the actuator from a valve that has already been installed on the process pipe, be sure to shut down the process and release the process pressure. (2) Ensure that the valve body has cooled before detaching. (3) Loosen all process piping bolts and nuts so that excessive stress will not be transferred to the eyebolts when detaching the control valve from the process pipe.

4-2. Disassembly and assembly of valve body

To disassemble or assemble the valve body, refer to figures and proceed as described below.

4-2-1. Disassembly procedure

(1) Loosen the hex nuts on the packing flange.

(2) Remove the hex nuts from the bonnets.

(3) Lift and detach the bonnet from the valve body.

(4) A seat ring is threaded in to the valve body. To remove the seat ring special tools are required (available as options).

4-2-2. Inspection

Inspection the disassembled parts for any damage before assembly. If any damage is found, replace the parts. When ordering parts, refer to the PROD. No. of the valve written on the nameplate.

(1) Do not reuse the gland packing once it has been removed. Use new packing when reassembling the valve. In case of vacuum service, verify the gland packing composition by referring to Fig. 2-1.

(2) Check that the seating surfaces of the plug seat ring are not damaged.

(3) Check that the gasket-contacting surfaces of valve body and bonnet are not damaged.

(4) Do not reuse the same gasket. Always use a new gasket when reassembling the valve.

(5) Check that the plug guide section, the stem and the internal guiding sections of the guide bushing are not damaged.

4-2-3. Assembly procedure

(1) Securely fasten the seat ring onto the threaded valve body, using the special tools (optionally available). For the tightening torque, see Table 4-1. Apply the lubricant "Neverseize" to the threaded sections, except those of oil free valves.

(2) Place the plug on the seat ring.

(3) Place the bonnet onto the valve body and check that the bonnet is properly mated with the indented section of the valve body. Tighten the nuts alternately and evenly. For the tightening torque, see Table 4-2.

(4) Insert the gland packing as shown in Fig. 2-1.

(5) Install the packing follower and packing flange, and tighten the nuts. For the tightening torque, see Table 2-1.

(6) Ensure that the external O-ring of the packing follower is installed on the bonnet gland box.

Table 4-1. Seat ring tightening torques

Body size (inches)	Torque N·m {kgf/cm}
6	1230 to 1400 {12100 to 13800}
8	1870 to 2140 {18400 to 21000}
10	2250 to 2570 {22100 to 25200}
12	3930 to 4490 {38500 to 44000}

Table 4-2. Tightening torques of bonnet stud bolts

Body size (inches)	Bolt size	Torque N·m {kgf/cm}
6	M20	140 to 150 {1380 to 1470}
8	M24	240 to 260 {2350 to 2550}
10 / 12	M27	340 to 370 {3330 to 3630}

Table 4-3. Tightening torques of bottom bonnet stud bolts

Body size (inches)	Bolt size	Torque N·m {kgf/cm}
6 / 8	M16	88 to 97 {860 to 950}
10 / 12	M20	140 to 150 {1370 to 1470}

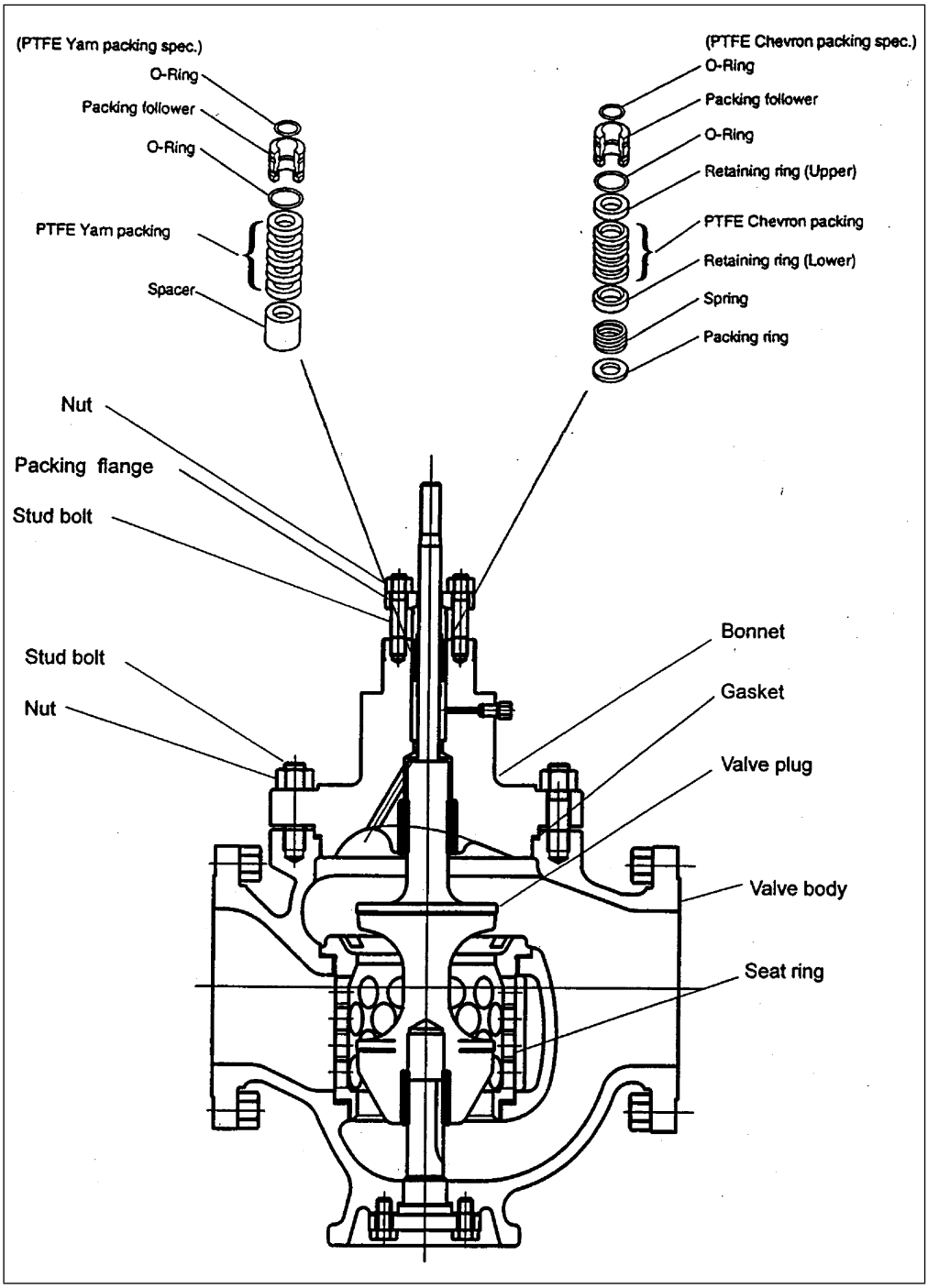


Fig. 4-1. Model ADVB/ADVM control valve

4-3. Disassembly and assembly of actuator

Normally, the actuator should require no adjustment. However, at certain times the actuator should be disassembled and reassembled. Reassembly is recommended when installing it on a valve body, when modifying its specifications, or when replacing damaged parts. The disassembly and reassembly procedures for the actuator in such cases are covered in subsections "4-4. Disassembly and assembly of model PSA3, 4".
When disassembling the actuator, refer to Fig. 4-2. to Fig. 4-9.
When disassembling or assembling the actuator, keep it in a vertical position.
For the tightening torque for bolts and nuts, see Table 4-2.
For the names of the parts, see Fig. 4-9.

4-3-1. Notes before disassembly

(1) Only the nuts for the eyebolts are made of stainless steel. Keep these nuts separate from the other nuts when disassembling the diaphragm case.

(2) Make locating marks on the top and bottom diaphragm cases before disassembling the valve. This will help you to find the air piping connector location easily.

(3) Store the removed parts in a clean place.

⚠ CAUTION
Use extreme care when removing the bolts and nuts from the actuator. The actuator contains powerful compressed springs that may result in physical injury or damage to equipment. When removing the bolts and nuts, be sure to closely follow the instructions given for the disassembly and assembly of the actuator and top handwheel.

4-4. Disassembly and assembly of model PSA3, 4

4-4-1. Disassembly procedure

A. Direct action model (see Fig. 4-2.)

(1) Disconnect the air piping and detach the accessories from the actuator.
(2) Remove the stem connector.
(3) Remove the clamping bolts (except the pair of eyebolts) from the diaphragm case.
(4) Alternately and evenly loosen the pair of eyebolts. The initial setting of the springs is achieved using these eyebolts.
(5) Remove the diaphragm case. Pull the actuator rod upward and out together with the diaphragm.
(6) Take out the springs.

B. Reverse action model (see Fig. 4-3.)

(1) Disconnect the air piping and detach the accessories from the actuator.
(2) Remove the stem connector.
(3) Remove the clamping bolts (except the pair of eyebolts) from the diaphragm case.
(4) Alternately and evenly loosen the pair of eyebolts. The initial setting of the springs is achieved using these eyebolts.
(5) Remove the diaphragm case. Take out the springs.
(6) Pull the actuator rod upward and out together with the diaphragm.

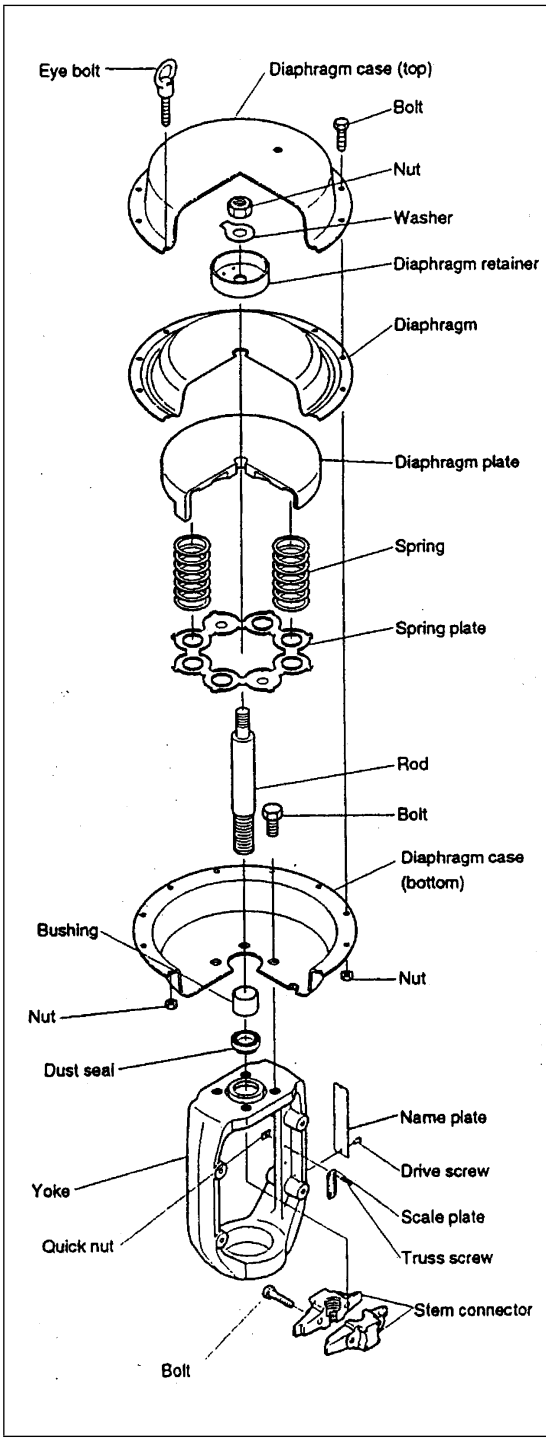


Fig. 4-2. Direct action mode (PSA3D, 4D)

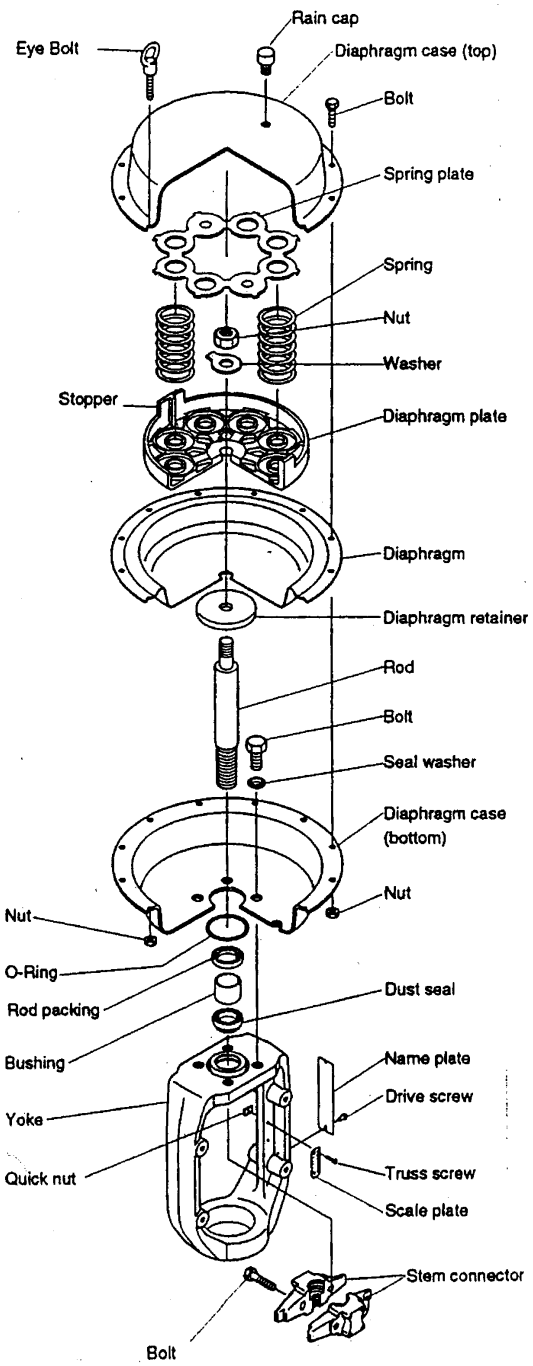


Fig. 4-3. Reverse action model (PSA3R, 4R)

4-4-2. Assembly procedure

Before assembly, check the parts for scratches, damage, deformation, peeling paint or any other abnormalities. To assemble the actuator, proceed as follows:

A. Direct action models (see Fig. 4-4. and Fig. 4-5.)

(1) Secure the diaphragm case (bottom) with the four bolts to the yoke. At the same time, set air vent hole as shown in Fig. 4-4. and Fig. 4-5. For PSA3D and PSA4D actuators, secure the spring plate to the diaphragm case and yoke.

(2) Fasten the spring plate and install the springs onto the spring plate (see Fig. 4-4. and Fig. 4-5.).

(3) Insert the actuator rod (with diaphragm connected) into the bushing. Be careful to prevent the bushing's inside surface or dust seal from being damaged by the threaded section of the rod. If possible, cover the threaded section with adhesive tape.

(4) Rotate the actuator rod, locating the diaphragm plate stopper as shown in Fig. 4-4. and Fig. 4-5.

(5) Place the top diaphragm case and secure it with pair of eyebolts.

Note) Set the air pipe connection port to the location shown in Fig. 4-4. and Fig. 4-5. Tighten the pair of eyebolts uniformly and alternately. The initial setting of the spring is completed by tightening these eyebolts.

(6) Clamp the diaphragm case with clamping bolts.

(7) Install the stem connector. Connect the air pipe to its connection port at the top diaphragm case.

(8) After completing assembly, check the following:

- Apply air pressure of 490 kPa {5 kgf/cm^2} through the air pipe connection port at the top diaphragm case, and check the diaphragm periphery for air leakage with soapy water.
- Check that the actuator operates smoothly through to its full stroke by operating it as an independent unit.

⚠ CAUTION
Install packing for the rod and dust-seal in the correct direction. Refer to Fig. 4-4. and Fig. 4-5.

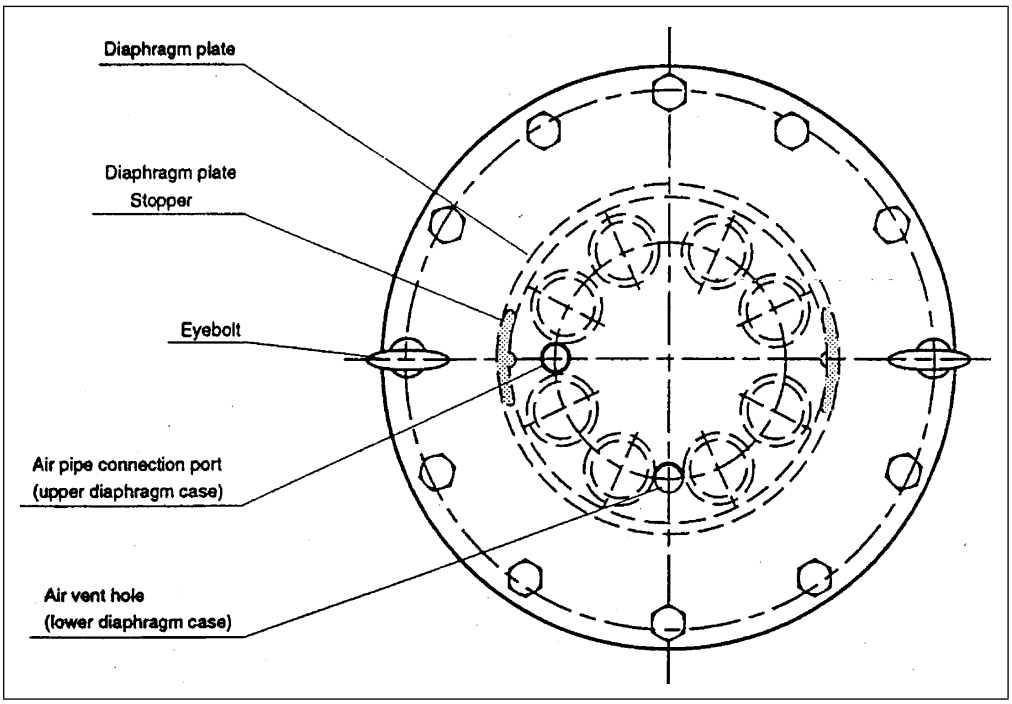


Fig. 4-4. Direct action model: PSA3D actuator

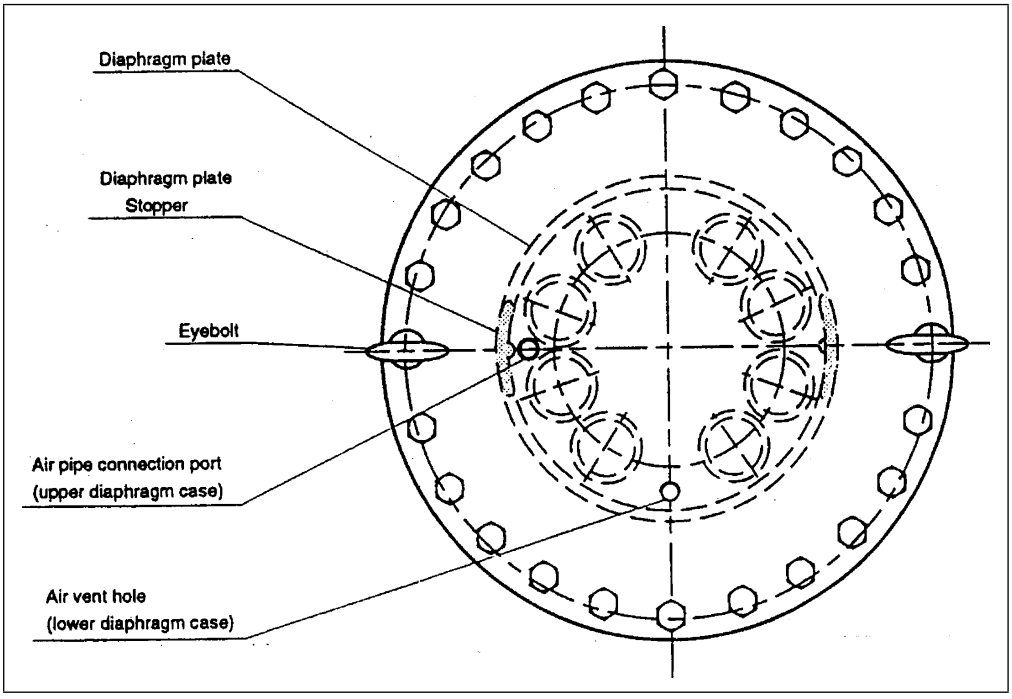


Fig. 4-5. Direct action model: PSA4D actuator

B. Reverse action models (see Fig. 4-6. and Fig. 4-7.)

(1) Secure the bottom diaphragm case with the four bolts to the yoke. At the same time, set the air pipe connection port in the location shown in Fig. 4-6. and Fig. 4-7.

(2) Insert the actuator rod (with diaphragm connected) into the bushing. Be careful to prevent the bushing's inside surface or dust seal from being damaged by the threaded section of the rod. If possible, cover the threaded section with adhesive tape.

(3) Rotate the actuator rod, locating its diaphragm plate stopper as shown in Fig. 4-6. and Fig. 4-7.

(4) Fasten the spring plate and install the spring onto the springs plate (see Fig. 4-6. and Fig. 4-7.)

(5) Place the top diaphragm case and secure it with the pair of eyebolts.

Note) Set the air vent hole to the location shown in Fig. 4-6. and Fig. 4-7. Uniformly and alternately tighten the eyebolts. The initial setting of the springs is completed by tightening these eyebolts.

(6) Clamp the diaphragm case with clamping bolts.

(7) Install the stem connector.

(8) Install the rain cap onto the air vent port.

(9) Connect the air pipe to its connection port at the bottom diaphragm case.

(10) After completing of assembly, check the following.

- Apply air pressure of 490 kPa {5 kgf/cm^2} through the air pipe connection port at the bottom diaphragm case, and check the diaphragm periphery for air leakage with soapy water.
- Check that the actuator operates smoothly through to its full stroke by operating the actuator as an independent unit.

⚠ CAUTION
Install packing for the rod and dust-seal in the correct direction. Refer to Fig. 4-6. and Fig. 4-7.

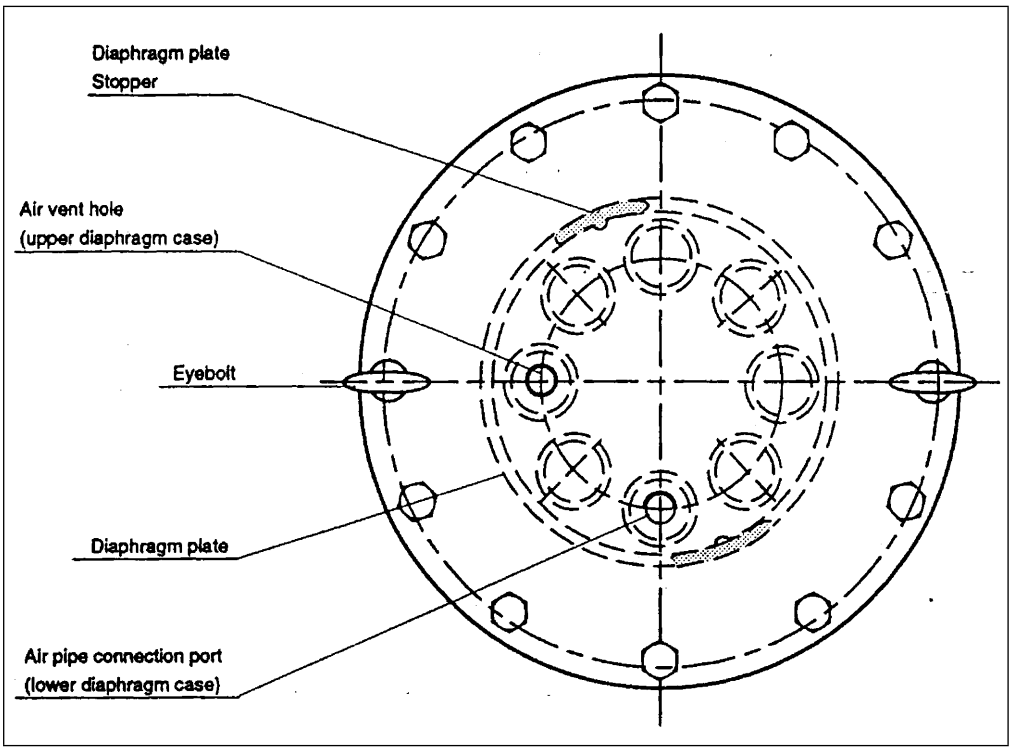


Fig. 4-6. Reverse action model: PSA3R actuator

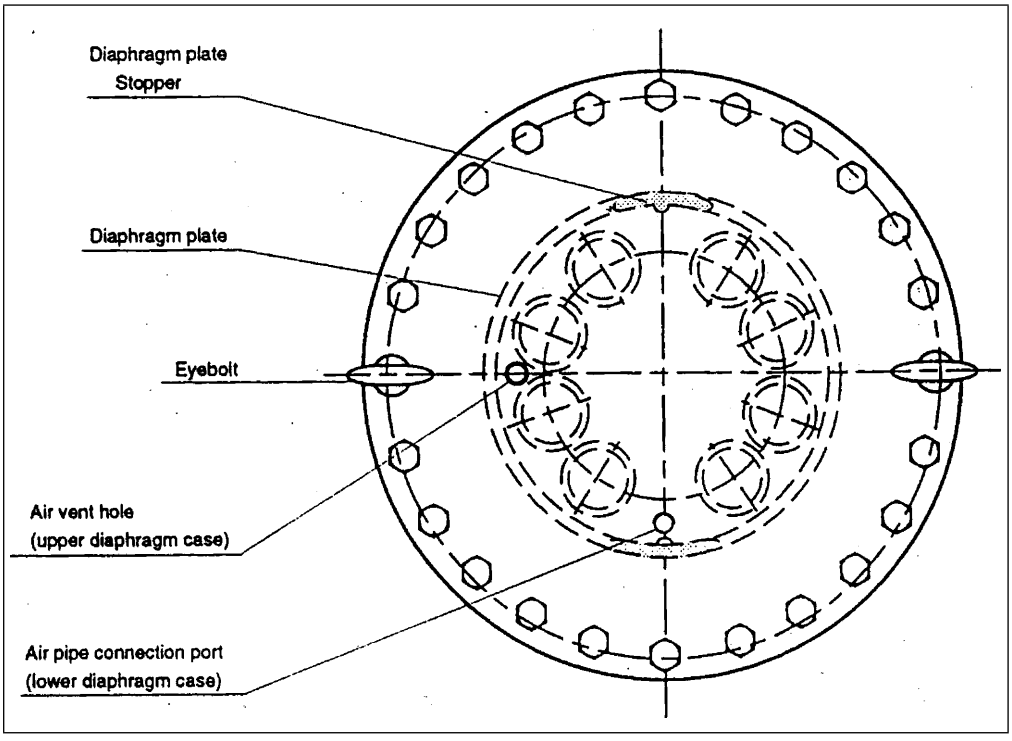


Fig. 4-7. Reverse action model: PSA4R actuator

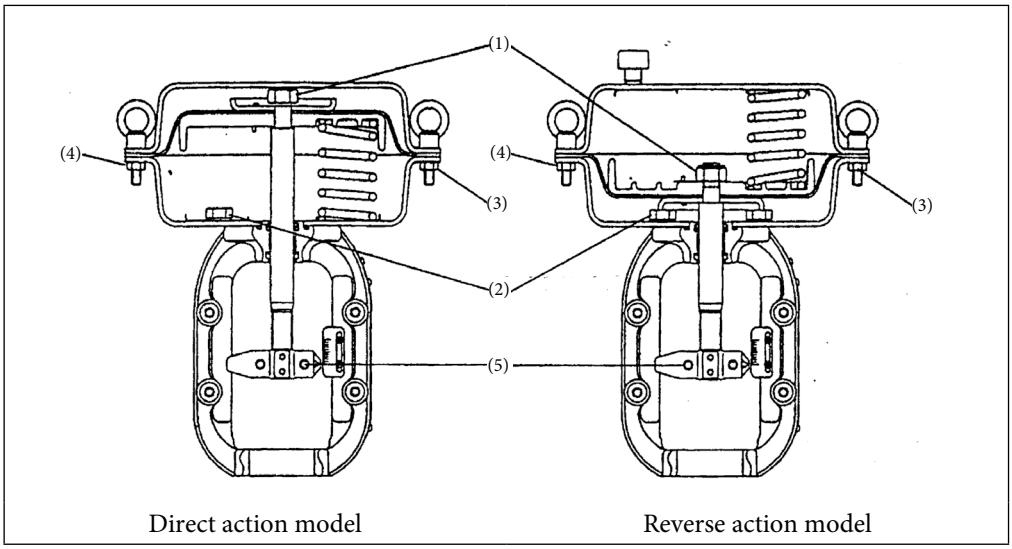


Fig. 4-8. Bolts and nuts of actuator

Table 4-4. Tightening torques of bolts and nuts of actuator

Key no.	Material	PSA3		PSA4	
(1)	S45C SK5	M20	160 to 215 {1,600 to 2,200}	M20	265 to 358 {2,700 to 3,650}
(2)	S30C	M16	90 to 120 {920 to 1,220}	M16	90 to 120 {920 to 1,220}
(3)	S30C	M8	15 to 20 {150 to 200}	M12	50 to 60 {510 to 610}
(4)	SUS304	M8	50 to 60 {510 to 610}	M12	50 to 60 {510 to 610}
(5)	S30C	M10	30 to 40 {300 to 400}	M10	30 to 40 {300 to 400}

Note) Install the rain cap on the reverse actuator as follows. Drive the cap into the diaphragm case until the shoulder (brim) of the cap is brought into contact with the diaphragm case, then drive the cap further into the diaphragm case by half a turn.

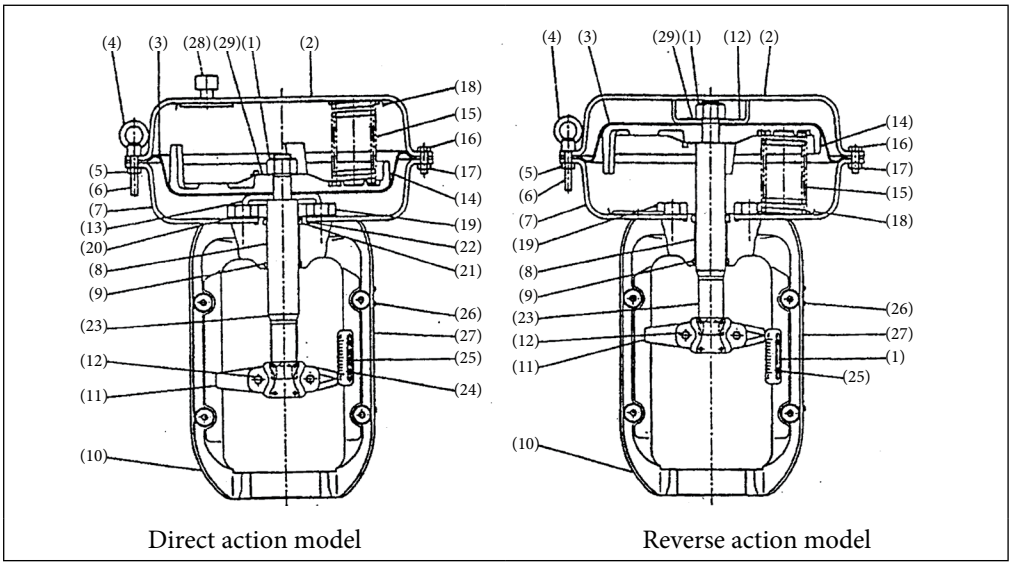


Fig. 4-9. Model PSA actuator

No.	Item	Material
(1)	Nut	S45C, SK5
(2)	Diaphragm case (top)	SAPH370
(3)	Diaphragm	EPDM, Polyaimid
(4)	Eyebolt	S20C
(5)	Nut	SUS304
(6)	Bolt	SUS304
(7)	Diaphragm case (bottom)	SAPH370
(8)	Bushing	SPCC, bronze, PTFE, lead
(9)	Dust seal	NBR
(10)	Yoke	S25C
(11)	Stem connector	S25C
(12)	Bolt	S30C
(13)	Diaphragm retainer	SS400
(14)	Diaphragm plate	AC4A / AC4C
(15)	Spring	SWOSM-B / SWOSC-V
(16)	Bolt	S30C
(17)	Nut	S20C
(18)	Spring plate	SPCC
(19)	Bolt	S30C
(20)	Seal washer	NBR, SPCC
(21)	Packing for rod	NBR
(22)	O-ring	NBR
(23)	Rod	SUS304
(24)	Truss screw	SUS304, SK5
(25)	Scale plate	SUS304
(26)	Drive screw	SUS304
(27)	Name plate	SUS304
(28)	Rain cap	SUS304
(29)	Washer	SUS304

Chapter 5. Adjustment

As a general rule, diaphragm control valves do not require adjustment. However, adjustment of travel (stroke) is necessary when coupling an actuator to a valve body, after removing the actuator for overhaul, or for other purposes. For this adjustment, refer to Fig. 4-1. and Fig. 5-1. and proceed as follows:

(1) Connect the actuator to the valve body by securely tightening the yoke clamping nut using a chisel and hammer.

(2) Connect an adjustable air pressure source (with a pressure regulator) to the actuator to the top diaphragm case (direct action) or to the bottom diaphragm case (reverse action).

(3) Lower the valve seat and check that it comes into contact with the valve seat.

A. Direct action models

(4) Apply the maximum air pressure to the actuator corresponding to the spring range given on the nameplate.

(5) Increase the air pressure to the supply pressure and check that the actuator stem responds by moving 1 to 2 mm. This movement represents the stroke allowance.

(6) Decrease the air pressure once. Then increase it again to the maximum value corresponding to the spring range, in the increasing direction.

(7) In this state, align the actuator stem and valve stem in a straight line, adjust so that the thread of the stem connector mates with those of the actuator stem and valve stem, and securely tighten the clamping bolts of the stem connector. (See Fig. 5-1.)

B. Reverse action models

(4) Apply the minimum air pressure to the actuator corresponding to the spring range given on the nameplate, and check that the actuator stem moves by 1 to 2 mm in response.

(5) Increase the air pressure once. Then decrease it again to the minimum value corresponding to the spring range, in the decreasing direction.

(6) Perform a procedure identical with that of Step (7) of Item A “Direct Action models” above. (See Fig. 5-1.)

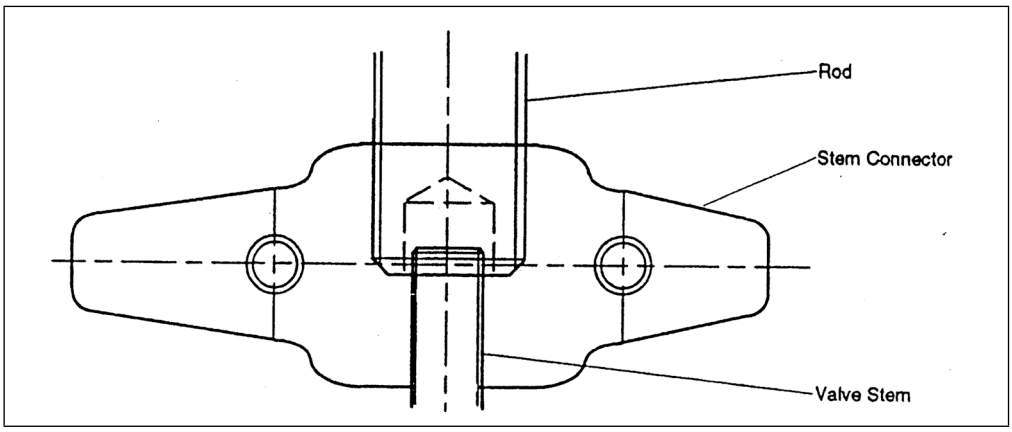


Fig. 5-1. Adjustment for direct or reverse action models

Chapter 6. SECURE-SEAL Certified ISO 15848-1 – Compliant Low-Emission Gland Packing System

6-1. Overview

SECURE-SEAL employs a live-loaded packing system to maintain valve seal performance for a long period of time. The gland packing system has acquired third-party certification for compliance with ISO15848-1, which is the international standard for low-emission performance of valves. For the structure of the gland, see Fig. 6-1. and Fig. 6-2.

No.	Name
(1)	Gland stud
(2)	Gland nut
(3)	Packing flange
(4)	Belleville spring
(5)	Packing follower
(6)	Carbon ring (P6210C2FS)
(7)	Adapter packing (P6720)
(8)	Main packing (P4519)
(9)	Spacer
(10)	Stem
(11)	O-ring for inner side of packing follower (optional)
(12)	O-ring for outer side of packing follower (optional)
(13)	Stuffing box

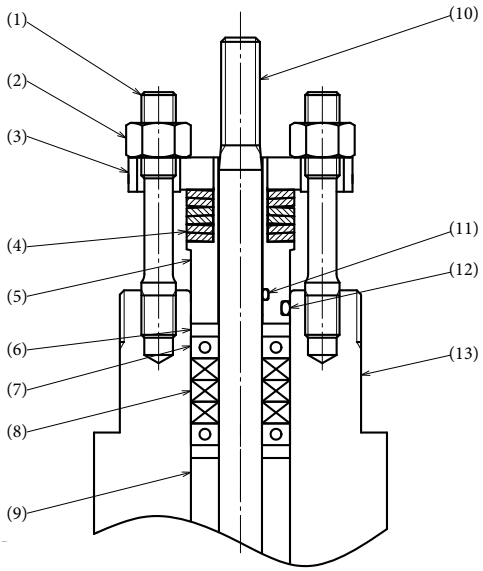


Fig. 6-1. Structure of SECURE-SEAL (for PTFE yarn)

No.	Name
(1)	Gland stud
(2)	Gland nut
(3)	Packing flange
(4)	Belleville spring
(5)	Packing follower
(6)	Carbon ring (P6210)
(7)	Adapter packing (P6720)
(8)	Main packing (P6617CL)
(9)	Spacer
(10)	Stem
(11)	O-ring for inner side of packing follower (optional)
(12)	O-ring for outer side of the packing follower (optional)
(13)	Stuffing box

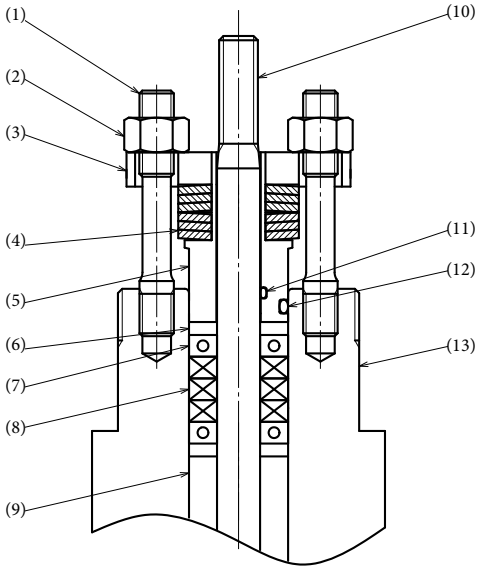


Fig. 6-2. Structure of SECURE-SEAL (for expanded graphite)

6-2. Structure

The main packing (No. P4519) is PTFE yarn with a carbon fiber core. It features low friction and can be used for various types of fluids. The main packing (No. P6617CL) is an expanded graphite packing. The part of it that slides is aligned with an expanded graphite sheet that was specially modified and lubricated. The adapter packing (No. P6720) is made by braiding expanded graphite yarn reinforced with PTFE fiber, and features low friction.

These gland packings are tightened by the live-loaded packing system, which is composed of Belleville springs and other parts. With other systems, in the course of valve operation, seal performance deteriorates due to loosening of the gland packing. The force of the Belleville springs reduces the release of tension to maintain the seal. The load on the Belleville springs can be observed from the position of the packing flange and packing follower.

6-3. Starting Operation

Before operating the valve, tighten (or retighten) the gland. For instructions, refer to 6-4-2, "(3) Tightening".

If leakage from the gland continues even after proper tightening, obtain and prepare parts as indicated in "6-4-1. Preparation for assembly", and follow the procedure given in "6-4-2. Assembly".

6-4. Assembling the parts of the gland

6-4-1. Preparation for assembly

(1) Checking the surface condition of the parts

Any flaw or the like on the surface of the parts may cause leakage from that area, resulting in a total amount of leakage from the gland that exceeds the specified value. Therefore, check the surface of the following parts.

Table 6-1. Parts to be checked for surface condition

Part	Checkpoints	Possible problems
Stem Stuffing box Both ends of the spacer Packing follower Packing contact surface O-ring groove	• No flaws or defects, including scratches and dents • No rust or corrosion • The entire surface is even. • No burrs • Clean surface, with no adhering coating material, powder, or dirt. • If necessary, take necessary measures such as cleaning with alcohol.	If the problems stated on the left remain, fluid leaks from flawed areas may cause the total amount of leakage from the gland to exceed the specified value.
Packing flange Gland nut contact surface		The total amount of leakage from the gland may exceed the specified value because of insufficient tightening.
Packing flange (entire surface) Gland stud Gland nut	• No flaws, rust, or defects	The problems on the left, if they remain, can cause control valve damage, leading to injuries.

(2) New parts

When assembling or reassembling, for the parts indicated in the table below, be sure to use new parts.

Table 6-2. Parts requiring treatment

Part name	Checkpoints	Possible problems
Gland packing (main packing and adapter packing) Carbon ring	• No flaws. • No coating materials or dirt stuck to the surface.	Fluid leaks from flawed areas can cause the total amount of leakage from the gland to exceed the specified value.
Belleville spring		The total amount of leakage from the gland may exceed the specified value in a short period of time because of insufficient tightening.

(3) Lubricating grease and anti-seizing agent

Have an appropriate amount of the following lubricating grease and anti-seizing agent (or equivalent) on hand.

Table 6-3. Lubricating grease and anti-seizing agent

Product name	Applied area	Gland for PTFE yarn	Gland for expanded graphite
Krytox GPL207 fluoropolymer grease made by DuPont Co.	Entire surface of the gland packing (main packing and adapter packing)	Needed	-
Plastilube No. 3 non-dripping grease, made by Sulflo Inc.	Entire surface of the O-rings	Needed	Needed
Never-Seez anti-seizing agent, made by Bostik Inc.	Threads of the gland studs	Needed	Needed
	Bottom of the gland nuts	Needed	Needed

6-4-2. Assembly

(1) Applying lubricating grease

Step 1

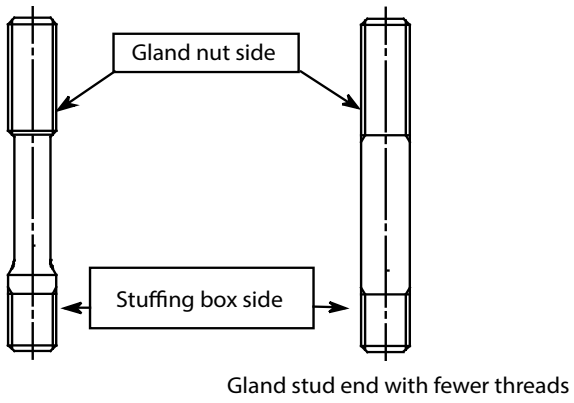
For SECURE-SEAL for PTFE yarn, apply a thin film of grease Krytox GPL207 indicated in Table 6-3 to the surface of all gland packings (main packing and adapter packing). For SECURE-SEAL for expanded graphite, greasing is not necessary.

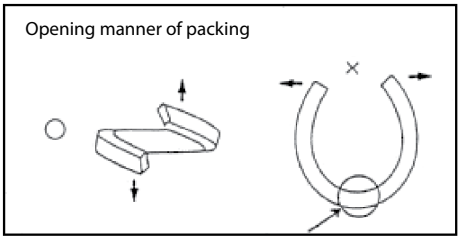
Step 2

For SECURE-SEAL with two O-rings, which are placed inner and outer sides of the packing follower, apply grease Plastilube No.3 made by Sulflo Inc. indicated in Table 6-3 to both rings.

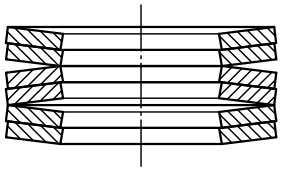
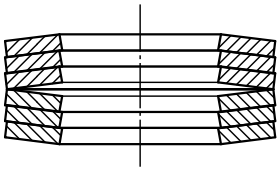
(2) Assembling

(1/3)

Step	Procedure
1	Check the correct direction of the gland studs in Fig. 6-3. Apply Never-Seez anti-seizing agent made by Bostik Inc. (indicated in Table 6-3) to the threads on the stuffing box end of the studs, and screw them into the stuffing box.  Fig. 6-3. Direction of the gland stud
2	First, insert the spacer, paying extra attention not to damage the surface of the stem.
3	Gently insert a carbon ring all the way to the bottom with a pipe, etc., taking care not to damage the ring.

Step	Procedure
4	**[SECURE-SEAL for PTFE yarn]** Insert one adapter packing ring, without opening the gap, all the way to the bottom with a pipe, etc., and push it lightly. Open the gap of the main packing rings as illustrated in Fig. 6-4 and insert one of them all the way to the bottom with a pipe, etc., and push it lightly. Insert the remaining two main packing rings with the gap position shifted by 180˚. Insert one adapter packing ring, without opening the gap, all the way to the bottom with a pipe, etc., and push it lightly.  Fig. 6-4. How to open the main packing rings **[SECURE-SEAL for expanded graphite]** Insert one adapter packing ring, without opening the gap, all the way to the bottom with a pipe, etc., and push it lightly. Insert one of the main packing rings, without opening the gap, with the marking facing upward, all the way to the bottom with a pipe, etc., and push it lightly. Insert the remaining two main packing rings in the same manner. Insert one adapter packing ring, without opening the gap, all the way to the bottom with a pipe, etc., and push it lightly.
5	Gently insert a carbon ring all the way to the bottom with a pipe, etc., taking care not to damage the ring.
6	Check the correct mounting orientation of the packing follower in Fig. 6-1. or Fig. 6-2. Insert it, paying extra attention not to damage the surface of the stem.

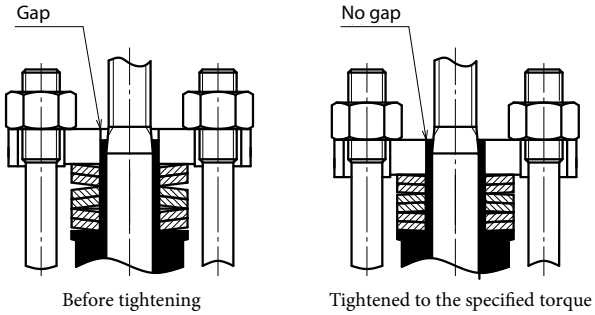
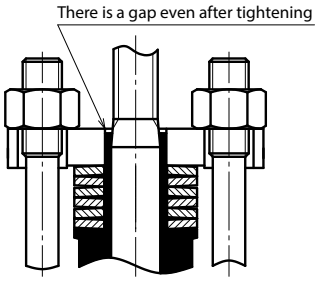
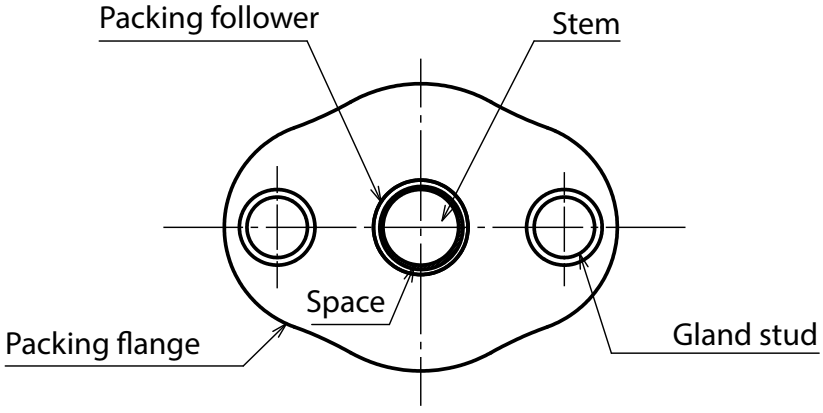
(3/3)

Step	Procedure
7	Stack the Belleville spring washers as shown in Fig. 6-5, and insert them into the packing follower.  2 same-direction washers × 3 [For PTFE yarn]  3 same-direction washers × 2 [For expanded graphite] Fig. 6-5. .
8	Place the packing flange onto the packing follower.
9	Apply anti-seizing agent Never-Seez made by Bostik Inc. (Table 6-3) to the threads on the gland nut end of the gland studs, and screw the nuts on by hand.

(3) Tightening

(1/2)

Step	Procedure
1	Tighten the left and right gland nuts alternately, making approximately a half turn each, until the torque indicated in Table 6-4 or Table 6-5 is reached. Note that if the tightening torque is insufficient, the amount of leakage may exceed the specified value. On the other hand, tightening the gland nuts with excessive torque increases the friction on the stem and causes the gland packing to wear out faster, which may lead to an amount of leakage exceeding the specified value in a short period of time. Table 6-4. Gland nut tightening torque (for PTFE yarn) **Actuator** / **Stem size** / **Tightening torque** PSA3,PSA4 / ϕ 16 mm / 25 N·m HA4 / ϕ 20 mm / 35 N·m Table 6-5. Gland nut tightening torque (for expanded graphite) **Actuator** / **Stem size** / **Tightening torque** PSA3,PSA4 / ϕ 16 mm / 25 → 0 (loosening) → 17 N·m HA4 / ϕ 20 mm / 35 → 0 (loosening) → 23 N·m

Step	Procedure
2	By tightening the gland nuts to the torque indicated in Table 6-4 or Table 6-5, the top of the packing flange and packing follower will be at almost the same level, as illustrated in Fig. 6-6 below (the level may not be exactly the same due to the tolerance of the Belleville springs and friction on the gland studs or gland nuts). If the Belleville springs are mounted in the wrong direction, or if the gland nuts are tightened to a torque that does not comply with the torque specified in Table 6-4 and Table 6-5, the level of the top of the packing flange and packing follower will not be the same (see Fig. 6-7). Check if the direction of washers of the Belleville springs and the tightening torque are correct.  Fig. 6-6. Load on Belleville springs (correctly assembled)  Fig. 6-7. Load on Belleville springs (incorrectly assembled)
3	View the assembly from above to check that the space between the stem and the packing follower is even (see Fig. 6-8).  Fig. 6-8. Top view

6-5. Application to existing control valves

If SECURE-SEAL is used for an existing control valve, please note the following:

- If there are scratches on the inner surface of the stuffing box or the surface of the stem of the current valve, the specified seal performance of SECURE-SEAL may not be achieved. If scratches are found, replace the affected parts with new ones.
- Check if SECURE-SEAL can be used for the current valve and actuator by referring to the specification sheet for SECURE-SEAL (SS2-SSL100-0100) or by contacting us. Because the resistance to sliding of SECURE-SEAL is greater than general gland packing systems, it may not be possible to use SECURE-SEAL with the current actuator. In addition, if it is used with the actuator, the shutoff differential pressure will decrease. If supply air pressure to the actuator is increased in order to meet the required shutoff differential pressure, check that the specifications for the pressure gauge of the positioner and pressure reducing valve are satisfied and that there is no effect on the pressure at the source.
- Check if the operating temperature range of the gland packing (main packing and adapter packing) of SECURE-SEAL meets the temperature requirements of the current control valve. Attention is needed for expanded graphite SECURE-SEAL in particular, because the operating temperature high limit of the main packing used for this packing system is lower than that of general expanded graphite packings.

6-6. Disposal

If this product is no longer needed, dispose of it appropriately as industrial waste, in accordance with local regulations. Do not reuse all or any part of it.

Chapter 7. Troubleshooting

This section covers the symptoms, causes, and remedies of problems that may occur.
Parts may need to be replaced. For further assistance, please contact your an Azbil Corp. representative.

Table 7-1. Troubleshooting

Symptom	Cause and remedy
Unstable valve operation Valve hunts when almost fully closed.	• Cv value is too large. • Reduce Cv value. • For a single seat valve, the valve is installed in the reverse flow direction.
Air supply pressure is unstable	• Large pneumatic equipment is connected to the same air supply line. • Check that air supply capacity, piping capacity, and restriction capacity are appropriate. • Supply air pressure regulator is inadequate or not operating properly.
Signal pressure is unstable	• Controller is not properly tuned. • Properly tune the controller (properly set the proportional band and other parameters). • Check that the controller output does not change abnormally.
Valve hunts even when signal pressure is stable	• Hunting output of positioner itself. • Check and repair or replace the positioner. • Being affected by pressure change of process fluid as power of the actuator is insufficient. Replace the actuator with a larger model.
Vibration of valve Valve vibrates (generates noise) at any position of valve plug.	• Piping vibrates. • Securely fasten the piping. • Check for other sources of vibration. • Worn valve plug or guides. • Check the parts and replace them as required.
Valve vibrates (generates noise) only when valve plug is set at a certain position.	• Check for change in process fluid flow conditions (Change in restriction orifice, Cv value, etc.) • Check for changes in plug configuration (change in flow control characteristics).

Table 7-1. Troubleshooting

Symptom	Cause and remedy
Sluggish valve operation or inoperative valve.	• Air leak from piping. • Air leak from actuator. • Foreign matter trapped in guide section of valve plug. • Aged and hardened gland packing, causing increased hysteresis. • Malfunctioning positioner (check the positioner by operating it directly on an air supply known to be operating normally).
Fluid leakage from gland section	• Check for loose nuts of bonnet. • Check for damaged valve shaft.
Even when valve plug is in closed position, large flow leakage from downstream side.	• Air leak at actuator section • Apply the air supply pressure or atmospheric pressure to the actuator. Check the air supply source and positioner. • Check whether the valve plug is actually in the closed position. • Check the plug seat ring for corrosion and erosion. • Check the guide sections for binding.

Chapter 8. Recommended Spare Parts

It is recommended to replace the following parts when servicing the control valve.

Valve body

Replace the following parts whenever the valve body is disassembled:

■ Gland packing
■ Gaskets

Actuator

Replace the following parts approximately every 5 years:

■ Diaphragm
■ Bushing
■ Cap
■ Seal washer. Replace whenever the actuator is disassembled.
■ Dust seal and rod seal. Replace whenever the actuator is disassembled.

Appendix-A. Parts List

1. Bonnet

1-1. Valve size: 6 inches

Parts Name	Body material	Guide bushing material	Remark	Parts name	Qty.	Note
Bonnet	SCPH2/WCB	SUS440C		82554662-111	1	Actuator type PSA3, 4
Bonnet	SCPH2/WCB	SUS316 stellite all over		82554662-131	1	Actuator type PSA3, 4
Bonnet	SCPH2/WCB	SUS316 UOP stellite		82554662-181	1	Actuator type PSA3, 4
Bonnet	SCS13A/CF8	SUS316 stellite all over		82554662-132	1	Actuator type PSA3, 4
Bonnet	SCS13A/CF8	SUS316 UOP stellite		82554662-182	1	Actuator type PSA3, 4
Bonnet	SCS14A/CF8M	SUS316 stellite all over		82554662-133	1	Actuator type PSA3, 4
Bonnet	SCS14A/CF8M	SUS316 UOP stellite		82554662-183	1	Actuator type PSA3, 4
Bonnet	SCPH2/WCB	SUS440C	Grease	82554662-211	1	Actuator type PSA3, 4
Bonnet	SCPH2/WCB	SUS316 stellite all over	Grease	82554662-231	1	Actuator type PSA3, 4
Bonnet	SCPH2/WCB	SUS316 UOP stellite	Grease	82554662-281	1	Actuator type PSA3, 4
Bonnet	SCS13A/CF8	SUS316 stellite all over	Grease	82554662-232	1	Actuator type PSA3, 4
Bonnet	SCS13A/CF8	SUS316 UOP stellite	Grease	82554662-282	1	Actuator type PSA3, 4
Bonnet	SCS14A/CF8M	SUS316 stellite all over	Grease	82554662-233	1	Actuator type PSA3, 4
Bonnet	SCS14A/CF8M	SUS316 UOP stellite	Grease	82554662-283	1	Actuator type PSA3, 4

1-2. Valve size: 8 inches

Parts Name	Body material	Guide bushing material	Remark	Parts name	Qty.	Note
Bonnet	SCPH2/WCB	SUS440C		82554662-311	1	Actuator type HA4
Bonnet	SCPH2/WCB	SUS316 stellite all over		82554662-331	1	Actuator type HA4
Bonnet	SCPH2/WCB	SUS316 UOP stellite		82554662-381	1	Actuator type HA4
Bonnet	SCS13A/CF8	SUS316 stellite all over		82554662-332	1	Actuator type HA4
Bonnet	SCS13A/CF8	SUS316 UOP stellite		82554662-382	1	Actuator type HA4
Bonnet	SCS14A/CF8M	SUS316 stellite all over		82554662-333	1	Actuator type HA4
Bonnet	SCS14A/CF8M	SUS316 UOP stellite		82554662-383	1	Actuator type HA4
Bonnet	SCPH2/WCB	SUS440C	Grease	82554662-411	1	Actuator type HA4
Bonnet	SCPH2/WCB	SUS316 stellite all over	Grease	82554662-431	1	Actuator type HA4
Bonnet	SCPH2/WCB	SUS316 UOP stellite	Grease	82554662-481	1	Actuator type HA4
Bonnet	SCS13A/CF8	SUS316 stellite all over	Grease	82554662-432	1	Actuator type HA4
Bonnet	SCS13A/CF8	SUS316 UOP stellite	Grease	82554662-482	1	Actuator type HA4
Bonnet	SCS14A/CF8M	SUS316 stellite all over	Grease	82554662-433	1	Actuator type HA4
Bonnet	SCS14A/CF8M	SUS316 UOP stellite	Grease	82554662-483	1	Actuator type HA4

1-3. Valve size: 10 inches

Parts Name	Body material	Guide bushing material	Remark	Parts name	Qty.	Note
Bonnet	SCPH2/WCB	SUS440C		82554665-111	1	Actuator type HA4
Bonnet	SCPH2/WCB	SUS316 stellite all over		82554665-131	1	Actuator type HA4
Bonnet	SCPH2/WCB	SUS316 UOP stellite		82554665-181	1	Actuator type HA4
Bonnet	SCS13A/CF8	SUS316 stellite all over		82554665-132	1	Actuator type HA4
Bonnet	SCS13A/CF8	SUS316 UOP stellite		82554665-182	1	Actuator type HA4
Bonnet	SCS14A/CF8M	SUS316 stellite all over		82554665-133	1	Actuator type HA4
Bonnet	SCS14A/CF8M	SUS316 UOP stellite		82554665-183	1	Actuator type HA4
Bonnet	SCPH2/WCB	SUS440C	Grease	82554665-211	1	Actuator type HA4
Bonnet	SCPH2/WCB	SUS316 stellite all over	Grease	82554665-231	1	Actuator type HA4
Bonnet	SCPH2/WCB	SUS316 UOP stellite	Grease	82554665-281	1	Actuator type HA4
Bonnet	SCS13A/CF8	SUS316 stellite all over	Grease	82554665-232	1	Actuator type HA4
Bonnet	SCS13A/CF8	SUS316 UOP stellite	Grease	82554665-282	1	Actuator type HA4
Bonnet	SCS14A/CF8M	SUS316 stellite all over	Grease	82554665-233	1	Actuator type HA4
Bonnet	SCS14A/CF8M	SUS316 UOP stellite	Grease	82554665-283	1	Actuator type HA4

1-4. Valve size: 12 inches

Parts Name	Body material	Guide bushing material	Remark	Parts name	Qty.	Note
Bonnet	SCPH2/WCB	SUS440C		82554665-511	1	Actuator type HA4
Bonnet	SCPH2/WCB	SUS316 stellite all over		82554665-531	1	Actuator type HA4
Bonnet	SCPH2/WCB	SUS316 UOP stellite		82554665-581	1	Actuator type HA4
Bonnet	SCS13A/CF8	SUS316 stellite all over		82554665-532	1	Actuator type HA4
Bonnet	SCS13A/CF8	SUS316 UOP stellite		82554665-582	1	Actuator type HA4
Bonnet	SCS14A/CF8M	SUS316 stellite all over		82554665-533	1	Actuator type HA4
Bonnet	SCS14A/CF8M	SUS316 UOP stellite		82554665-583	1	Actuator type HA4
Bonnet	SCPH2/WCB	SUS440C	Grease	82554665-611	1	Actuator type HA4
Bonnet	SCPH2/WCB	SUS316 stellite all over	Grease	82554665-631	1	Actuator type HA4
Bonnet	SCPH2/WCB	SUS316 UOP stellite	Grease	82554665-681	1	Actuator type HA4
Bonnet	SCS13A/CF8	SUS316 stellite all over	Grease	82554665-632	1	Actuator type HA4
Bonnet	SCS13A/CF8	SUS316 UOP stellite	Grease	82554665-682	1	Actuator type HA4
Bonnet	SCS14A/CF8M	SUS316 stellite all over	Grease	82554665-633	1	Actuator type HA4
Bonnet	SCS14A/CF8M	SUS316 UOP stellite	Grease	82554665-683	1	Actuator type HA4

2. Extension bonnet

2-1. Valve size: 6 inches

Parts Name	Body material	Guide bushing material	Remark	Parts name	Qty.	Note
Extension bonnet	SCPH2	SUS440C		82554663-111	1	Actuator type PSA3, 4
Extension bonnet	SCPH2	SUS316 stellite all over		82554663-131	1	Actuator type PSA3, 4
Extension bonnet	SCPH2	SUS316 UOP stellite		82554663-181	1	Actuator type PSA3, 4
Extension bonnet	SCS13A	SUS316 stellite all over		82554663-132	1	Actuator type PSA3, 4
Extension bonnet	SCS13A	SUS316 UOP stellite		82554663-182	1	Actuator type PSA3, 4
Extension bonnet	SCS14A	SUS316 stellite all over		82554663-133	1	Actuator type PSA3, 4
Extension bonnet	SCS14A	SUS316 UOP stellite		82554663-183	1	Actuator type PSA3, 4
Extension bonnet	SCPH2	SUS440C	Grease	82554663-211	1	Actuator type PSA3, 4
Extension bonnet	SCPH2	SUS316 stellite all over	Grease	82554663-231	1	Actuator type PSA3, 4
Extension bonnet	SCPH2	SUS316 UOP stellite	Grease	82554663-281	1	Actuator type PSA3, 4
Extension bonnet	SCS13A	SUS316 stellite all over	Grease	82554663-232	1	Actuator type PSA3, 4
Extension bonnet	SCS13A	SUS316 UOP stellite	Grease	82554663-282	1	Actuator type PSA3, 4
Extension bonnet	SCS14A	SUS316 stellite all over	Grease	82554663-233	1	Actuator type PSA3, 4
Extension bonnet	SCS14A	SUS316 UOP stellite	Grease	82554663-283	1	Actuator type PSA3, 4
Extension bonnet	WCB	SUS440C		82554663-114	1	Actuator type PSA3, 4
Extension bonnet	WCB	SUS316 stellite all over		82554663-134	1	Actuator type PSA3, 4
Extension bonnet	WCB	SUS316 UOP stellite		82554663-184	1	Actuator type PSA3, 4
Extension bonnet	CF8	SUS316 stellite all over		82554663-135	1	Actuator type PSA3, 4
Extension bonnet	CF8	SUS316 UOP stellite		82554663-185	1	Actuator type PSA3, 4
Extension bonnet	CF8M	SUS316 stellite all over		82554663-136	1	Actuator type PSA3, 4
Extension bonnet	CF8M	SUS316 UOP stellite		82554663-186	1	Actuator type PSA3, 4
Extension bonnet	WCB	SUS440C	Grease	82554663-214	1	Actuator type PSA3, 4
Extension bonnet	WCB	SUS316 stellite all over	Grease	82554663-234	1	Actuator type PSA3, 4
Extension bonnet	WCB	SUS316 UOP stellite	Grease	82554663-284	1	Actuator type PSA3, 4
Extension bonnet	CF8	SUS316 stellite all over	Grease	82554663-235	1	Actuator type PSA3, 4
Extension bonnet	CF8	SUS316 UOP stellite	Grease	82554663-285	1	Actuator type PSA3, 4
Extension bonnet	CF8M	SUS316 stellite all over	Grease	82554663-236	1	Actuator type PSA3, 4
Extension bonnet	CF8M	SUS316 UOP stellite	Grease	82554663-286	1	Actuator type PSA3, 4

2-2. Valve size: 8 inches

Parts Name	Body material	Guide bushing material	Remark	Parts name	Qty.	Note
Extension bonnet	SCPH2	SUS440C		82554663-311	1	Actuator type HA4
Extension bonnet	SCPH2	SUS316 stellite all over		82554663-331	1	Actuator type HA4
Extension bonnet	SCPH2	SUS316 UOP stellite		82554663-381	1	Actuator type HA4
Extension bonnet	SCS13A	SUS316 stellite all over		82554663-332	1	Actuator type HA4
Extension bonnet	SCS13A	SUS316 UOP stellite		82554663-382	1	Actuator type HA4
Extension bonnet	SCS14A	SUS316 stellite all over		82554663-333	1	Actuator type HA4
Extension bonnet	SCS14A	SUS316 UOP stellite		82554663-383	1	Actuator type HA4
Extension bonnet	SCPH2	SUS440C	Grease	82554663-411	1	Actuator type HA4
Extension bonnet	SCPH2	SUS316 stellite all over	Grease	82554663-431	1	Actuator type HA4
Extension bonnet	SCPH2	SUS316 UOP stellite	Grease	82554663-481	1	Actuator type HA4
Extension bonnet	SCS13A	SUS316 stellite all over	Grease	82554663-432	1	Actuator type HA4
Extension bonnet	SCS13A	SUS316 UOP stellite	Grease	82554663-482	1	Actuator type HA4
Extension bonnet	SCS14A	SUS316 stellite all over	Grease	82554663-433	1	Actuator type HA4
Extension bonnet	SCS14A	SUS316 UOP stellite	Grease	82554663-483	1	Actuator type HA4
Extension bonnet	WCB	SUS440C		82554663-314	1	Actuator type HA4
Extension bonnet	WCB	SUS316 stellite all over		82554663-334	1	Actuator type HA4
Extension bonnet	WCB	SUS316 UOP stellite		82554663-384	1	Actuator type HA4
Extension bonnet	CF8	SUS316 stellite all over		82554663-335	1	Actuator type HA4
Extension bonnet	CF8	SUS316 UOP stellite		82554663-385	1	Actuator type HA4
Extension bonnet	CF8M	SUS316 stellite all over		82554663-336	1	Actuator type HA4
Extension bonnet	CF8M	SUS316 UOP stellite		82554663-386	1	Actuator type HA4
Extension bonnet	WCB	SUS440C	Grease	82554663-414	1	Actuator type HA4
Extension bonnet	WCB	SUS316 stellite all over	Grease	82554663-434	1	Actuator type HA4
Extension bonnet	WCB	SUS316 UOP stellite	Grease	82554663-484	1	Actuator type HA4
Extension bonnet	CF8	SUS316 stellite all over	Grease	82554663-435	1	Actuator type HA4
Extension bonnet	CF8	SUS316 UOP stellite	Grease	82554663-485	1	Actuator type HA4
Extension bonnet	CF8M	SUS316 stellite all over	Grease	82554663-436	1	Actuator type HA4
Extension bonnet	CF8M	SUS316 UOP stellite	Grease	82554663-486	1	Actuator type HA4

2-3. Valve size: 10 inches

Parts Name	Body material	Guide bushing material	Remark	Parts name	Qty.	Note
Extension bonnet	SCPH2	SUS440C		82554666-111	1	Actuator type HA4
Extension bonnet	SCPH2	SUS316 stellite all over		82554666-131	1	Actuator type HA4
Extension bonnet	SCPH2	SUS316 UOP stellite		82554666-181	1	Actuator type HA4
Extension bonnet	SCS13A	SUS316 stellite all over		82554666-132	1	Actuator type HA4
Extension bonnet	SCS13A	SUS316 UOP stellite		82554666-182	1	Actuator type HA4
Extension bonnet	SCS14A	SUS316 stellite all over		82554666-133	1	Actuator type HA4
Extension bonnet	SCS14A	SUS316 UOP stellite		82554666-183	1	Actuator type HA4
Extension bonnet	SCPH2	SUS440C	Grease	82554666-211	1	Actuator type HA4
Extension bonnet	SCPH2	SUS316 stellite all over	Grease	82554666-231	1	Actuator type HA4
Extension bonnet	SCPH2	SUS316 UOP stellite	Grease	82554666-281	1	Actuator type HA4
Extension bonnet	SCS13A	SUS316 stellite all over	Grease	82554666-232	1	Actuator type HA4
Extension bonnet	SCS13A	SUS316 UOP stellite	Grease	82554666-282	1	Actuator type HA4
Extension bonnet	SCS14A	SUS316 stellite all over	Grease	82554666-233	1	Actuator type HA4
Extension bonnet	SCS14A	SUS316 UOP stellite	Grease	82554666-283	1	Actuator type HA4
Extension bonnet	WCB	SUS440C		82554666-114	1	Actuator type HA4
Extension bonnet	WCB	SUS316 stellite all over		82554666-134	1	Actuator type HA4
Extension bonnet	WCB	SUS316 UOP stellite		82554666-184	1	Actuator type HA4
Extension bonnet	CF8	SUS316 stellite all over		82554666-135	1	Actuator type HA4
Extension bonnet	CF8	SUS316 UOP stellite		82554666-185	1	Actuator type HA4
Extension bonnet	CF8M	SUS316 stellite all over		82554666-136	1	Actuator type HA4
Extension bonnet	CF8M	SUS316 UOP stellite		82554666-186	1	Actuator type HA4
Extension bonnet	WCB	SUS440C	Grease	82554666-214	1	Actuator type HA4
Extension bonnet	WCB	SUS316 stellite all over	Grease	82554666-234	1	Actuator type HA4
Extension bonnet	WCB	SUS316 UOP stellite	Grease	82554666-284	1	Actuator type HA4
Extension bonnet	CF8	SUS316 stellite all over	Grease	82554666-235	1	Actuator type HA4
Extension bonnet	CF8	SUS316 UOP stellite	Grease	82554666-285	1	Actuator type HA4
Extension bonnet	CF8M	SUS316 stellite all over	Grease	82554666-236	1	Actuator type HA4
Extension bonnet	CF8M	SUS316 UOP stellite	Grease	82554666-286	1	Actuator type HA4

2-4. Valve size: 12 inches

Parts Name	Body material	Guide bushing material	Remark	Parts name	Qty.	Note
Extension bonnet	SCPH2	SUS440C		82554666-511	1	Actuator type HA4
Extension bonnet	SCPH2	SUS316 stellite all over		82554666-531	1	Actuator type HA4
Extension bonnet	SCPH2	SUS316 UOP stellite		82554666-581	1	Actuator type HA4
Extension bonnet	SCS13A	SUS316 stellite all over		82554666-532	1	Actuator type HA4
Extension bonnet	SCS13A	SUS316 UOP stellite		82554666-582	1	Actuator type HA4
Extension bonnet	SCS14A	SUS316 stellite all over		82554666-533	1	Actuator type HA4
Extension bonnet	SCS14A	SUS316 UOP stellite		82554666-583	1	Actuator type HA4
Extension bonnet	SCPH2	SUS440C	Grease	82554666-611	1	Actuator type HA4
Extension bonnet	SCPH2	SUS316 stellite all over	Grease	82554666-631	1	Actuator type HA4
Extension bonnet	SCPH2	SUS316 UOP stellite	Grease	82554666-681	1	Actuator type HA4
Extension bonnet	SCS13A	SUS316 stellite all over	Grease	82554666-632	1	Actuator type HA4
Extension bonnet	SCS13A	SUS316 UOP stellite	Grease	82554666-682	1	Actuator type HA4
Extension bonnet	SCS14A	SUS316 stellite all over	Grease	82554666-633	1	Actuator type HA4
Extension bonnet	SCS14A	SUS316 UOP stellite	Grease	82554666-683	1	Actuator type HA4
Extension bonnet	WCB	SUS440C		82554666-514	1	Actuator type HA4
Extension bonnet	WCB	SUS316 stellite all over		82554666-534	1	Actuator type HA4
Extension bonnet	WCB	SUS316 UOP stellite		82554666-584	1	Actuator type HA4
Extension bonnet	CF8	SUS316 stellite all over		82554666-535	1	Actuator type HA4
Extension bonnet	CF8	SUS316 UOP stellite		82554666-585	1	Actuator type HA4
Extension bonnet	CF8M	SUS316 stellite all over		82554666-536	1	Actuator type HA4
Extension bonnet	CF8M	SUS316 UOP stellite		82554666-586	1	Actuator type HA4
Extension bonnet	WCB	SUS440C	Grease	82554666-614	1	Actuator type HA4
Extension bonnet	WCB	SUS316 stellite all over	Grease	82554666-634	1	Actuator type HA4
Extension bonnet	WCB	SUS316 UOP stellite	Grease	82554666-684	1	Actuator type HA4
Extension bonnet	CF8	SUS316 stellite all over	Grease	82554666-635	1	Actuator type HA4
Extension bonnet	CF8	SUS316 UOP stellite	Grease	82554666-685	1	Actuator type HA4
Extension bonnet	CF8M	SUS316 stellite all over	Grease	82554666-636	1	Actuator type HA4
Extension bonnet	CF8M	SUS316 UOP stellite	Grease	82554666-686	1	Actuator type HA4

3. Valve plug (with valve stem)

3-1. Valve size: 6 inches plain bonnet

Parts Name	Valve size (inches)	CV value	Trim material	Parts name	Qty.	Note
Valve plug	6	450	SUS316	82554658-111	1	Actuator type PSA3, 4
Valve plug	6	450	SUS316 stellite all over	82554658-112	1	Actuator type PSA3, 4
Valve plug	6	450	SUS316 stellite	82554658-113	1	Actuator type PSA3, 4
Valve plug	6	450	SUS316 UOP stellite	82554658-115	1	Actuator type PSA3, 4
Valve plug	6	215	SUS316	82554658-211	1	Actuator type PSA3, 4
Valve plug	6	215	SUS316 stellite	82554658-212	1	Actuator type PSA3, 4
Valve plug	6	215	SUS316 stellite all over	82554658-213	1	Actuator type PSA3, 4
Valve plug	6	215	SUS316 UOP stellite	82554658-215	1	Actuator type PSA3, 4

3-2. Valve size: 6 inches extension bonnet

Parts Name	Valve size (inches)	CV value	Trim material	Parts name	Qty.	Note
Valve plug	6	450	SUS316	82554658-121	1	Actuator type PSA3, 4
Valve plug	6	450	SUS316 stellite	82554658-122	1	Actuator type PSA3, 4
Valve plug	6	450	SUS316 stellite all over	82554658-123	1	Actuator type PSA3, 4
Valve plug	6	450	SUS316 UOP stellite	82554658-125	1	Actuator type PSA3, 4
Valve plug	6	215	SUS316	82554658-221	1	Actuator type PSA3, 4
Valve plug	6	215	SUS316 stellite	82554658-222	1	Actuator type PSA3, 4
Valve plug	6	215	SUS316 stellite all over	82554658-223	1	Actuator type PSA3, 4
Valve plug	6	215	SUS316 UOP stellite	82554658-225	1	Actuator type PSA3, 4

3-3. Valve size: 8 inches plain bonnet

Parts Name	Valve size (inches)	CV value	Trim material	Parts name	Qty.	Note
Valve plug	8	705	SUS316	82554659-111	1	Actuator type HA4
Valve plug	8	705	SUS316 stellite	82554659-112	1	Actuator type HA4
Valve plug	8	705	SUS316 stellite all over	82554659-113	1	Actuator type HA4
Valve plug	8	705	SUS316 UOP stellite	82554659-115	1	Actuator type HA4
Valve plug	8	450	SUS316	82554659-211	1	Actuator type HA4
Valve plug	8	450	SUS316 stellite	82554659-212	1	Actuator type HA4
Valve plug	8	450	SUS316 stellite all over	82554659-213	1	Actuator type HA4
Valve plug	8	450	SUS316 UOP stellite	82554659-215	1	Actuator type HA4

3-4. Valve size: 8 inches extension bonnet

Parts Name	Valve size (inches)	CV value	Trim material	Parts name	Qty.	Note
Valve plug	8	705	SUS316	82554659-121	1	Actuator type HA4
Valve plug	8	705	SUS316 stellite	82554659-122	1	Actuator type HA4
Valve plug	8	705	SUS316 stellite all over	82554659-123	1	Actuator type HA4
Valve plug	8	705	SUS316 UOP stellite	82554659-125	1	Actuator type HA4
Valve plug	8	450	SUS316	82554659-221	1	Actuator type HA4
Valve plug	8	450	SUS316 stellite	82554659-222	1	Actuator type HA4
Valve plug	8	450	SUS316 stellite all over	82554659-223	1	Actuator type HA4
Valve plug	8	450	SUS316 UOP stellite	82554659-225	1	Actuator type HA4

3-5. Valve size: 10 inches plain bonnet

Parts Name	Valve size (inches)	CV value	Trim material	Parts name	Qty.	Note
Valve plug	10	1100	SUS316	82554660-111	1	Actuator type HA4
Valve plug	10	1100	SUS316 stellite	82554660-112	1	Actuator type HA4
Valve plug	10	1100	SUS316 stellite all over	82554660-113	1	Actuator type HA4
Valve plug	10	1100	SUS316 UOP stellite	82554660-115	1	Actuator type HA4
Valve plug	10	705	SUS316	82554660-211	1	Actuator type HA4
Valve plug	10	705	SUS316 stellite	82554660-212	1	Actuator type HA4
Valve plug	10	705	SUS316 stellite all over	82554660-213	1	Actuator type HA4
Valve plug	10	705	SUS316 UOP stellite	82554660-215	1	Actuator type HA4
Valve plug	10	450	SUS316	82554660-311	1	Actuator type HA4
Valve plug	10	450	SUS316 stellite	82554660-312	1	Actuator type HA4
Valve plug	10	450	SUS316 stellite all over	82554660-313	1	Actuator type HA4
Valve plug	10	450	SUS316 UOP stellite	82554660-315	1	Actuator type HA4

3-6. Valve size: 10 inches extension bonnet

Parts Name	Valve size (inches)	CV value	Trim material	Parts name	Qty.	Note
Valve plug	10	1100	SUS316	82554660-121	1	Actuator type HA4
Valve plug	10	1100	SUS316 stellite	82554660-122	1	Actuator type HA4
Valve plug	10	1100	SUS316 stellite all over	82554660-123	1	Actuator type HA4
Valve plug	10	1100	SUS316 UOP stellite	82554660-125	1	Actuator type HA4
Valve plug	10	705	SUS316	82554660-221	1	Actuator type HA4
Valve plug	10	705	SUS316 stellite	82554660-222	1	Actuator type HA4
Valve plug	10	705	SUS316 stellite all over	82554660-223	1	Actuator type HA4
Valve plug	10	705	SUS316 UOP stellite	82554660-225	1	Actuator type HA4
Valve plug	10	450	SUS316	82554660-321	1	Actuator type HA4
Valve plug	10	450	SUS316 stellite	82554660-322	1	Actuator type HA4
Valve plug	10	450	SUS316 stellite all over	82554660-323	1	Actuator type HA4
Valve plug	10	450	SUS316 UOP stellite	82554660-325	1	Actuator type HA4

3-7. Valve size: 12 inches plain bonnet

Parts Name	Valve size (inches)	CV value	Trim material	Parts name	Qty.	Note
Valve plug	12	1580	SUS316	82554661-111	1	Actuator type HA4
Valve plug	12	1580	SUS316 stellite	82554661-112	1	Actuator type HA4
Valve plug	12	1580	SUS316 stellite all over	82554661-113	1	Actuator type HA4
Valve plug	12	1580	SUS316 UOP stellite	82554661-115	1	Actuator type HA4
Valve plug	12	1100	SUS316	82554661-211	1	Actuator type HA4
Valve plug	12	1100	SUS316 stellite	82554661-212	1	Actuator type HA4
Valve plug	12	1100	SUS316 stellite all over	82554661-213	1	Actuator type HA4
Valve plug	12	1100	SUS316 UOP stellite	82554661-215	1	Actuator type HA4
Valve plug	12	705	SUS316	82554661-311	1	Actuator type HA4
Valve plug	12	705	SUS316 stellite	82554661-312	1	Actuator type HA4
Valve plug	12	705	SUS316 stellite all over	82554661-313	1	Actuator type HA4
Valve plug	12	705	SUS316 UOP stellite	82554661-315	1	Actuator type HA4

3-8. Valve size: 12 inches extension bonnet

Parts Name	Valve size (inches)	CV value	Trim material	Parts name	Qty.	Note
Valve plug	12	1580	SUS316	82554661-121	1	Actuator type HA4
Valve plug	12	1580	SUS316 stellite	82554661-122	1	Actuator type HA4
Valve plug	12	1580	SUS316 stellite all over	82554661-123	1	Actuator type HA4
Valve plug	12	1580	SUS316 UOP stellite	82554661-125	1	Actuator type HA4
Valve plug	12	1100	SUS316	82554661-221	1	Actuator type HA4
Valve plug	12	1100	SUS316 stellite	82554661-222	1	Actuator type HA4
Valve plug	12	1100	SUS316 stellite all over	82554661-223	1	Actuator type HA4
Valve plug	12	1100	SUS316 UOP stellite	82554661-225	1	Actuator type HA4
Valve plug	12	705	SUS316	82554661-321	1	Actuator type HA4
Valve plug	12	705	SUS316 stellite	82554661-322	1	Actuator type HA4
Valve plug	12	705	SUS316 stellite all over	82554661-323	1	Actuator type HA4
Valve plug	12	705	SUS316 UOP stellite	82554661-325	1	Actuator type HA4

4. Seat ring

4-1. Valve size: 6 inches

Parts Name	Valve size (inches)	CV value	Trim material	Parts name	Qty.	Note
Seat ring	6	450, 215	SUS316	82554357-101	1	
Seat ring	6	450, 215	SUS316 stellite	82554357-102	1	
Seat ring	6	450, 215	SUS316 stellite all over	82554357-103	1	
Seat ring	6	450, 215	SUS316 UOP-B, G stellite	82554357-104	1	

4-2. Valve size: 8 inches

Parts Name	Valve size (inches)	CV value	Trim material	Parts name	Qty.	Note
Seat ring	8	705, 450	SUS316	82554162-101	1	
Seat ring	8	705, 450	SUS316 stellite	82554162-102	1	
Seat ring	8	705, 450	SUS316 stellite all over	82554162-103	1	
Seat ring	8	705, 450	SUS316 UOP-B, G stellite	82554162-104	1	

4-3. Valve size: 10 inches

Parts Name	Valve size (inches)	CV value	Trim material	Parts name	Qty.	Note
Seat ring	10	1100, 705, 450	SUS316	82554163-101	1	
Seat ring	10	1100, 705, 450	SUS316 stellite	82554163-102	1	
Seat ring	10	1100, 705, 450	SUS316 stellite all over	82554163-103	1	
Seat ring	10	1100, 705, 450	SUS316 UOP-B, G stellite	82554163-104	1	

4-4. Valve size: 12 inches

Parts Name	Valve size (inches)	CV value	Trim material	Parts name	Qty.	Note
Seat ring	12	1580, 1100, 705	SUS316	82554164-101	1	
Seat ring	12	1580, 1100, 705	SUS316 stellite	82554164-102	1	
Seat ring	12	1580, 1100, 705	SUS316 stellite all over	82554164-103	1	
Seat ring	12	1580, 1100, 705	SUS316 UOP-B, G stellite	82554164-104	1	

5. Gasket

5-1. Gasket for bonnet

Parts Name	Valve size (inches)	Material	Remark	Parts name	Qty.	Note
Gasket	6	V543 PTFE	For bonnet	82554484-101	1	Plain
Gasket	8	V543 PTFE	For bonnet	82554484-201	1	Plain
Gasket	10	V543 PTFE	For bonnet	82554484-301	1	Plain
Gasket	12	V543 PTFE	For bonnet	82554484-401	1	Plain
Gasket	6	V543 graphite	For bonnet	82554626-101	1	High temperature
Gasket	8	V543 graphite	For bonnet	82554626-201	1	High temperature
Gasket	10	V543 graphite	For bonnet	82554626-301	1	High temperature
Gasket	12	V543 graphite	For bonnet	82554626-401	1	High temperature

5-2. Gasket for seat ring (upper part)

Parts Name	Valve size (inches)	Material	Remark	Parts name	Qty.	Note
Gasket	6	V563 PTFE	For seat ring	82535503-601	1	Plain
Gasket	8	V563 PTFE	For seat ring	82535503-701	1	Plain
Gasket	10	V563 PTFE	For seat ring	82554537-101	1	Plain
Gasket	12	V563 PTFE	For seat ring	82554537-201	1	Plain
Gasket	6	V563 graphite	For seat ring	82554628-101	1	High temperature
Gasket	8	V563 graphite	For seat ring	82554628-201	1	High temperature
Gasket	10	V563 graphite	For seat ring	82554667-101	1	High temperature
Gasket	12	V563 graphite	For seat ring	82554667-201	1	High temperature

5-3. Gasket for seat ring (bottom)

Parts Name	Valve size (inches)	Material	Remark	Parts name	Qty.	Note
Gasket	6	V6590, SUS316	For seat ring	82554487-101	1	
Gasket	8	V6590, SUS316	For seat ring	82554487-102	1	
Gasket	10	V6590, SUS316	For seat ring	82554487-103	1	
Gasket	12	V6590, SUS316	For seat ring	82554487-104	1	

5-4. Gasket for bottom plate

Parts Name	Valve size (inches)	Material	Remark	Parts name	Qty.	Note
Gasket	6	V543 PTFE	For bottom plate	82554385-301	1	Plain
Gasket	8	V543 PTFE	For bottom plate	82554385-101	1	Plain
Gasket	10, 12	V543 PTFE	For bottom plate	82554385-201	1	Plain
Gasket	6	V543 graphite	For bottom plate	82554627-301	1	High temperature
Gasket	8	V543 graphite	For bottom plate	82554627-101	1	High temperature
Gasket	10, 12	V543 graphite	For bottom plate	82554627-201	1	High temperature

6. Bottom plate

Parts Name	Valve size (inches)	Body material	Material	Parts name	Qty.	Note
Bottom plate	6	SCPH2, SCS13A, SCS14A	SUS304	82554258-201	1	
Bottom plate	8	SCPH2, SCS13A, SCS14A	SUS304	82554258-202	1	
Bottom plate	10, 12	SCPH2, SCS13A, SCS14A	SUS304	82554258-203	1	

7. Plug guide

Parts Name	Valve size (inches)	Body material	Parts name	Qty.	Note
Plug guide	6	SUS440C	82554262-101	1	
Plug guide	6	SUS316 stellite	82554409-101	1	
Plug guide	6	SUS316 UOP stellite	82554409-102	1	
Plug guide	8	SUS440C	82554260-101	1	
Plug guide	8	SUS316 stellite	82554485-101	1	
Plug guide	8	SUS316 UOP stellite	82554485-102	1	
Plug guide	10	SUS440C	82554261-101	1	
Plug guide	10	SUS316 stellite	82554486-101	1	
Plug guide	10	SUS316 UOP stellite	82554486-201	1	
Plug guide	12	SUS440C	82554261-102	1	
Plug guide	12	SUS316 stellite	82554486-102	1	
Plug guide	12	SUS316 UOP stellite	82554486-202	1	

8. Grand packing

8-1. PTFE yarn (for regular service)

Parts Name	Valve size (inches)	Packing	Remark	Stem dia	Parts name	Qty.	Note
Grand packing	6	P4519		16	82553328-101	5	Actuator type PSA3, 4
Grand packing	8-12	P4519		20	82553944-101	5	Actuator type HA4

8-2. V type PTFE (for regular and oil free service)

Parts Name	Valve size (inches)	Packing	Remark	Stem dia	Parts name	Qty.	Note
Grand packing	6	V-PTFE	Regular and oil free	16	82509693-001	4	Actuator type PSA3, 4
Grand packing	8-12	V-PTFE	Regular and oil free	20	82509694-001	4	Actuator type HA4

8-3. V type PTFE direct + reverse (for vacuum service)

Parts Name	Valve size (inches)	Packing	Remark	Stem dia	Parts name	Qty.	Note
Grand packing	6	V-PTFE	Vacuum	16	82509693-001	6	Actuator type PSA3, 4
Grand packing	8-12	V-PTFE	Vacuum	20	82509694-001	6	Actuator type HA4

8-4. Expanded graphite (for high temperature)

Parts Name	Valve size (inches)	Packing	Remark	Stem dia	Parts name	Qty.	Note
Grand packing	6	P6610CL	High temperature	16	82554274-102	4	Actuator type PSA3, 4
Grand packing	6	P6720	High temperature	16	82554744-102	4	Actuator type PSA3, 4
Carbon ring	6		High temperature	16	82554749-102	2	Actuator type PSA3, 4
Grand packing	8-12	P6610CL	High temperature	20	82554274-104	4	Actuator type HA4
Grand packing	8-12	P6720	High temperature	20	82554744-104	4	Actuator type HA4
Carbon ring	8-12		High temperature	20	82554749-104	2	Actuator type HA4

9. Grand parts

9-1. PTFE yarn (for regular service), Valve stem dia. 16 mm

Parts Name	Valve size (inches)	Packing	Remark	Stem dia	Parts name	Qty.	Note
Packing follower	6	SUS316		16	82553027-101	1	Actuator type PSA3, 4
O-ring (P22.4)	6	Fluorine rubber		16	82592222-401	1	Actuator type PSA3, 4
O-ring (P16)	6	Fluorine rubber		16	82592221-701	1	Actuator type PSA3, 4
Spacer	6	SUS316		20	82553331-254	1	Actuator type PSA3, 4

9-2. PTFE yarn (for regular service), Valve stem dia. 20 mm

Parts Name	Valve size (inches)	Packing	Remark	Stem dia	Parts name	Qty.	Note
Packing follower	8-12	SUS316		20	82553945-101	1	Actuator type HA4
O-ring (P26)	8-12	Fluorine rubber		20	82592222-801	1	Actuator type HA4
O-ring (P20)	8-12	Fluorine rubber		20	82592221-901	1	Actuator type HA4
Spacer	8-12	SUS316		20	82553331-557	1	Actuator type HA4

9-3. V type PTFE (for regular and oil free service), Valve stem dia. 16 mm

Parts Name	Valve size (inches)	Packing	Remark	Stem dia	Parts name	Qty.	Note
Packing follower	6	SUS316		16	82553027-101	1	Actuator type PSA3, 4
O-ring (P22.4)	6	Fluorine rubber		16	82592222-401	1	Actuator type PSA3, 4
O-ring (P16)	6	Fluorine rubber		16	82592221-701	1	Actuator type PSA3, 4
Retaining ring upper	6	SUS316		16	82509683-166	1	Actuator type PSA3, 4
Retaining ring lower	6	SUS316		16	82509703-166	1	Actuator type PSA3, 4
Spring	6	SUS316		16	82553329-102	1	Actuator type PSA3, 4
Packing ring	6	SUS316		16	82509653-166	1	Actuator type PSA3, 4

9-4. V type PTFE (for regular and oil free service), Valve stem dia. 20 mm

Parts Name	Valve size (inches)	Packing	Remark	Stem dia	Parts name	Qty.	Note
Packing follower	8-12	SUS316		20	82553945-101	1	Actuator type HA4
O-ring (P26)	8-12	Fluorine rubber		20	82592222-801	1	Actuator type HA4
O-ring (P20)	8-12	Fluorine rubber		20	82592221-901	1	Actuator type HA4
Retaining ring upper	8-12	SUS316		20	82509684-166	1	Actuator type HA4
Retaining ring lower	8-12	SUS316		20	82509704-166	1	Actuator type HA4
Spring	8-12	SUS316		20	82553329-103	1	Actuator type HA4

9-5. V type PTFE direct+reverse (for vacuum service), Valve stem dia. 16 mm

Parts Name	Valve size (inches)	Packing	Remark	Stem dia	Parts name	Qty.	Note
Packing follower	6	SUS316		16	82553027-101	1	Actuator type PSA3, 4
O-ring (P22.4)	6	Fluorine rubber		16	82592222-401	1	Actuator type PSA3, 4
O-ring (P16)	6	Fluorine rubber		16	82592221-701	1	Actuator type PSA3, 4
Retaining ring upper	6	SUS316		16	82509683-166	2	Actuator type PSA3, 4
Retaining ring lower	6	SUS316		16	82509703-166	2	Actuator type PSA3, 4
Spacer	6	SUS316		16	82553331-228	1	Actuator type PSA3, 4

9-6. V type PTFE direct+reverse (for vacuum service), Valve stem dia. 20 mm

Parts Name	Valve size (inches)	Packing	Remark	Stem dia	Parts name	Qty.	Note
Packing follower	8-12	SUS316		20	82553945-101	1	Actuator type HA4
O-ring (P26)	8-12	Fluorine rubber		20	82592222-801	1	Actuator type HA4
O-ring (P20)	8-12	Fluorine rubber		20	82592221-901	1	Actuator type HA4
Retaining ring upper	8-12	SUS316		20	82509684-166	2	Actuator type HA4
Retaining ring lower	8-12	SUS316		20	82509704-166	2	Actuator type HA4
Spacer	8-12	SUS316		20	82553331-537	1	Actuator type HA4

9-7. Expanded graphite (for high temperature service), Valve stem dia. 16 mm

Parts Name	Valve size (inches)	Packing	Remark	Stem dia	Parts name	Qty.	Note
Packing follower	6	SUS316		16	82553027-101	1	Actuator type PSA3, 4
Retaining carbon ring	6	SUS316		16	82554748-101	2	Actuator type PSA3, 4
O-ring (P22.4)	6	Viton		16	82592222-497	1	Actuator type PSA3, 4
O-ring (P16)	6	Viton		16	82592221-797	1	Actuator type PSA3, 4
Lantern ring	6	SUS316		16	82554747-101	1	Actuator type PSA3, 4
Packing ring	6	SUS316		16	82509653-166	1	Actuator type PSA3, 4

9-8. Expanded graphite (for high temperature service), Valve stem dia. 20 mm

Parts Name	Valve size (inches)	Packing	Remark	Stem dia	Parts name	Qty.	Note
Packing follower	8-12	SUS316		20	82553945-101	1	Actuator type HA4
Retaining carbon ring	8-12	SUS316		20	82555098-101	2	Actuator type HA4
O-ring (P26)	8-12	Viton		20	82592222-897	1	Actuator type HA4
O-ring (P20)	8-12	Viton		20	82592221-997	1	Actuator type HA4
Lantern ring	8-12	SUS316		20	82555100-101	1	Actuator type HA4
Packing ring	8-12	SUS316		20	82509654-166	1	Actuator type HA4

10. Other parts

10-1. Packing flange

Parts Name	Valve size (inches)	Packing	Remark	Stem dia	Parts name	Qty.	Note
Packing flange	6	SCS13		16	82509513-264	1	Actuator type PSA3, 4
Packing flange	8-12	SCS13		20	82509514-201	1	Actuator type HA4

10-2. Stud bolt, nut (for grand parts)

Parts Name	Valve size (inches)	Packing	Remark	Stem dia	Parts name	Qty.	Note
Stud bolt	6	SUS304		16	82592004-264	2	Actuator type PSA3, 4
Nut	6	SUS304		16	82592448-013	2	Actuator type PSA3, 4
Stud bolt	8-12	SUS304		20	82592005-364	2	Actuator type HA4
Nut	8-12	SUS304		20	82592448-023	2	Actuator type HA4

10-3. York nut

Parts Name	Valve size (inches)	Packing	Remark	Stem dia	Parts name	Qty.	Note
Yoke nut	6	S25C		16	82509503-126	1	Actuator type PSA3, 4
Yoke nut	8-12	S25C		20	82509504-126	1	Actuator type HA4

11. SECURE-SEAL certified ISO 15848-1 – Compliant low emission gland packing system

11-1. For PTFE yarn (actuator: PSA3 or PAS4)

Part name	Actuator	Material	Part No.	Qty.
Main packing	PSA3 PAS4	P4519	82553328- 101	3
Adapter packing		P6720	82573475- 202	2
Carbon ring		P6210C2FS	82573484- 007	2
Belleville spring		SUS304	82573462- 103	6
O-ring (small)		AFLAS	82592221- 701	1
O-ring (large)		AFLAS	82592222- 401	1
Gland stud		A193 GrB8CL2	82559312- 012	2
Gland nut		SUS304	82592448- 013	2
Packing flange		SCS13	82573458- 101	1
Packing follower		SUS304	82573480- 101	1
Packing follower for O-ring use		SUS304	82573481- 101	1
Spacer		SUS304	82553331- 249	1

11-2. For PTFE yarn (actuator: HA4)

Part name	Actuator	Material	Part No.	Qty.
Main packing	HA4	P4519	82553944- 101	3
Adapter packing		P6720	82573475- 203	2
Carbon ring		P6210C2FS	82573484- 008	2
Belleville spring		SUS304	82573462- 104	6
O-ring (small)		AFLAS	82592221- 901	1
O-ring (large)		AFLAS	82592222- 801	1
Gland stud		A193 GrB8CL2	82571707- 012	2
Gland nut		SUS304	82592448- 023	2
Packing flange		SCS13	82573459- 101	1
Packing follower		SUS304	82573482- 101	1
Packing follower for O-ring use		SUS304	82573483- 101	1
Spacer		SUS304	82553331- 556	1

11-3. For expanded graphite (actuator: PSA3 or PSA4)

Part name	Actuator	Material	Part No.	Qty.
Main packing	PSA3 PSA4	P6617CL	82573489- 007	3
Adapter packing		P6720	82573475- 202	2
Carbon ring		P6210	82573488- 007	2
Belleville spring		SUS304	82559308- 102	6
O-ring (small)		Viton	82592221- 797	1
O-ring (large)		Viton	82592222- 497	1
Gland stud		A193 GrB8CL2	82559312- 012	2
Gland nut		SUS304	82592448- 013	2
Packing flange		SCS13	82573458- 101	1
Packing follower		SUS304	82573480- 201	1
Packing follower for O-ring use		SUS304	82573481- 201	1
Spacer		SUS304	82553331- 247	1

11-4. For expanded graphite (actuator: HA4)

Part name	Actuator	Material	Part No.	Qty.
Main packing	HA4	P6617CL	82573489- 008	3
Adapter packing		P6720	82573475- 203	2
Carbon ring		P6210	82573488- 008	2
Belleville spring		SUS304	82573462- 108	6
O-ring (small)		Viton	82592221- 997	1
O-ring (large)		Viton	82592222- 897	1
Gland stud		A193 GrB8CL2	82571707- 012	2
Gland nut		SUS304	82592448- 023	2
Packing flange		SCS13	82573459- 101	1
Packing follower		SUS304	82573482- 201	1
Packing follower for O-ring use		SUS304	82573483- 201	1
Spacer		SUS304	82553331- 554	1

Terms and Conditions

We would like to express our appreciation for your purchase and use of Azbil Corporation's products. You are required to acknowledge and agree upon the following terms and conditions for your purchase of Azbil Corporation's products (system products, field instruments, control valves, and control products), unless otherwise stated in any separate document, including, without limitation, estimation sheets, written agreements, catalogs, specifications and instruction manuals.

1. Warranty period and warranty scope

1.1 Warranty period

Azbil Corporation's products shall be warranted for one (1) year from the date of your purchase of the said products or the delivery of the said products to a place designated by you.

1.2 Warranty scope

In the event that Azbil Corporation's product has any failure attributable to azbil during the aforementioned warranty period, Azbil Corporation shall, without charge, deliver a replacement for the said product to the place where you purchased, or repair the said product and deliver it to the aforementioned place. Notwithstanding the foregoing, any failure falling under one of the following shall not be covered under this warranty:

(1) Failure caused by your improper use of azbil product
(noncompliance with conditions, environment of use, precautions, etc. set forth in catalogs, specifications, instruction manuals, etc.);
(2) Failure caused for other reasons than Azbil Corporation's product;
(3) Failure caused by any modification or repair made by any person other than Azbil Corporation or Azbil Corporation's subcontractors;
(4) Failure caused by your use of Azbil Corporation's product in a manner not conforming to the intended usage of that product;
(5) Failure that the state-of-the-art at the time of Azbil Corporation's shipment did not allow Azbil Corporation to predict; or
(6) Failure that arose from any reason not attributable to Azbil Corporation, including, without limitation, acts of God, disasters, and actions taken by a third party.

Please note that the term "warranty" as used herein refers to equipment-only-warranty, and Azbil Corporation shall not be liable for any damages, including direct, indirect, special, incidental or consequential damages in connection with or arising out of Azbil Corporation's products.

2. Ascertainment of suitability

You are required to ascertain the suitability of Azbil Corporation's product in case of your use of the same with your machinery, equipment, etc. (hereinafter referred to as "Equipment") on your own responsibility, taking the following matters into consideration:

(1) Regulations and standards or laws that your Equipment is to comply with.
(2) Examples of application described in any documents provided by Azbil Corporation are for your reference purpose only, and you are required to check the functions and safety of your Equipment prior to your use.
(3) Measures to be taken to secure the required level of the reliability and safety of your Equipment in your use
Although azbil is constantly making efforts to improve the quality and reliability of Azbil Corporation's products, there exists a possibility that parts and machinery may break down.
You are required to provide your Equipment with safety design such as fool-proof design, *1 and fail-safe design*2 (anti-flame propagation design, etc.), whereby preventing any occurrence of physical injuries, fires, significant damage, and so forth. Furthermore, fault avoidance, *3 fault tolerance,*4 or the like should be incorporated so that the said Equipment can satisfy the level of reliability and safety required for your use.

*1. A design that is safe even if the user makes an error.
*2. A design that is safe even if the device fails.
*3. Avoidance of device failure by using highly reliable components, etc.
*4. The use of redundancy.

3. Precautions and restrictions on application

Azbil Corporation's products other than those explicitly specified as applicable (e.g. azbil Limit Switch For Nuclear Energy) shall not be used in a nuclear energy controlled area (radiation controlled area).
Any Azbil Corporation's products shall not be used for/with medical equipment.
The products are for industrial use. Do not allow general consumers to install or use any Azbil Corporation's product. However, azbil products can be incorporated into products used by general consumers. If you intend to use a product for that purpose, please contact one of our sales representatives.
In addition,
you are required to conduct a consultation with our sales representative and understand detail specifications, cautions for operation, and so forth by reference to catalogs, specifications, instruction manual, etc. in case that you intend to use azbil product for any purposes specified in (1) through (6) below.
Moreover, you are required to provide your Equipment with fool-proof design, fail-safe design, anti-flame propagation design, fault avoidance, fault tolerance, and other kinds of protection/safety circuit design on your own responsibility to ensure reliability and safety, whereby preventing problems caused by failure or nonconformity.

(1) For use under such conditions or in such environments as not stated in technical documents, including catalogs, specification, and instruction manuals

(2) For use of specific purposes, such as:
* Nuclear energy/radiation related facilities
[For use outside nuclear energy controlled areas] [For use of Azbil Corporation's Limit Switch For Nuclear Energy]
* Machinery or equipment for space/sea bottom
* Transportation equipment
[Railway, aircraft, vessels, vehicle equipment, etc.]
* Antidisaster/crime-prevention equipment
* Burning appliances
* Electrothermal equipment
* Amusement facilities
* Facilities/applications associated directly with billing

(3) Supply systems such as electricity/gas/water supply systems, large-scale communication systems, and traffic/air traffic control systems requiring high reliability
(4) Facilities that are to comply with regulations of governmental/public agencies or specific industries
(5) Machinery or equipment that may affect human lives, human bodies or properties
(6) Other machinery or equipment equivalent to those set forth in items (1) to (5) above which require high reliability and safety

4. Precautions against long-term use

Use of Azbil Corporation's products, including switches, which contain electronic components, over a prolonged period may degrade insulation or increase contact-resistance and may result in heat generation or any other similar problem causing such product or switch to develop safety hazards such as smoking, ignition, and electrification.
Although acceleration of the above situation varies depending on the conditions or environment of use of the products, you are required not to use any Azbil Corporation's products for a period exceeding ten (10) years unless otherwise stated in specifications or instruction manuals.

5. Recommendation for renewal

Mechanical components, such as relays and switches, used for Azbil Corporation's products will reach the end of their life due to wear by repetitious open/close operations.
In addition, electronic components such as electrolytic capacitors will reach the end of their life due to aged deterioration based on the conditions or environment in which such electronic components are used.
Although acceleration of the above situation varies depending on the conditions or environment of use, the number of open/close operations of relays, etc.
as prescribed in specifications or instruction manuals, or depending on the design margin of your machine or equipment, you are required to renew any Azbil Corporation's products every 5 to 10 years unless otherwise specified in specifications or instruction manuals.
System products, field instruments (sensors such as pressure/flow/level sensors, regulating valves, etc.) will reach the end of their life due to aged deterioration of parts.
For those parts that will reach the end of their life due to aged deterioration, recommended replacement cycles are prescribed. You are required to replace parts based on such recommended replacement cycles.

6. Other precautions

Prior to your use of Azbil Corporation's products, you are required to understand and comply with specifications (e.g., conditions and environment of use), precautions, warnings/cautions/notices as set forth in the technical documents prepared for individual Azbil Corporation's products, such as catalogs, specifications, and instruction manuals to ensure the quality, reliability, and safety of those products.

7. Changes to specifications

Please note that the descriptions contained in any documents provided by azbil are subject to change without notice for improvement or for any other reason.
For inquires or information on specifications as you may need to check, please contact our branch offices or sales offices, or your local sales agents.

8. Discontinuance of the supply of products/parts

Please note that the production of any Azbil Corporation's product may be discontinued without notice.
For repairable products, we will, in principle, undertake repairs for five (5) years after the discontinuance of those products. In some cases, however, we cannot undertake such repairs for reasons, such as the absence of repair parts.
For system products, field instruments, we may not be able to undertake parts replacement for similar reasons.

9. Scope of services

Prices of Azbil Corporation's products do not include any charges for services such as engineer dispatch service.
Accordingly, a separate fee will be charged in any of the following cases:
(1) Installation, adjustment, guidance, and attendance at a test run
(2) Maintenance, inspection, adjustment, and repair
(3) Technical guidance and technical education
(4) Special test or special inspection of a product under the conditions specified by you

Please note that we cannot provide any services as set forth above in a nuclear energy controlled area (radiation controlled area) or at a place where the level of exposure to radiation is equivalent to that in a nuclear energy controlled area.

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