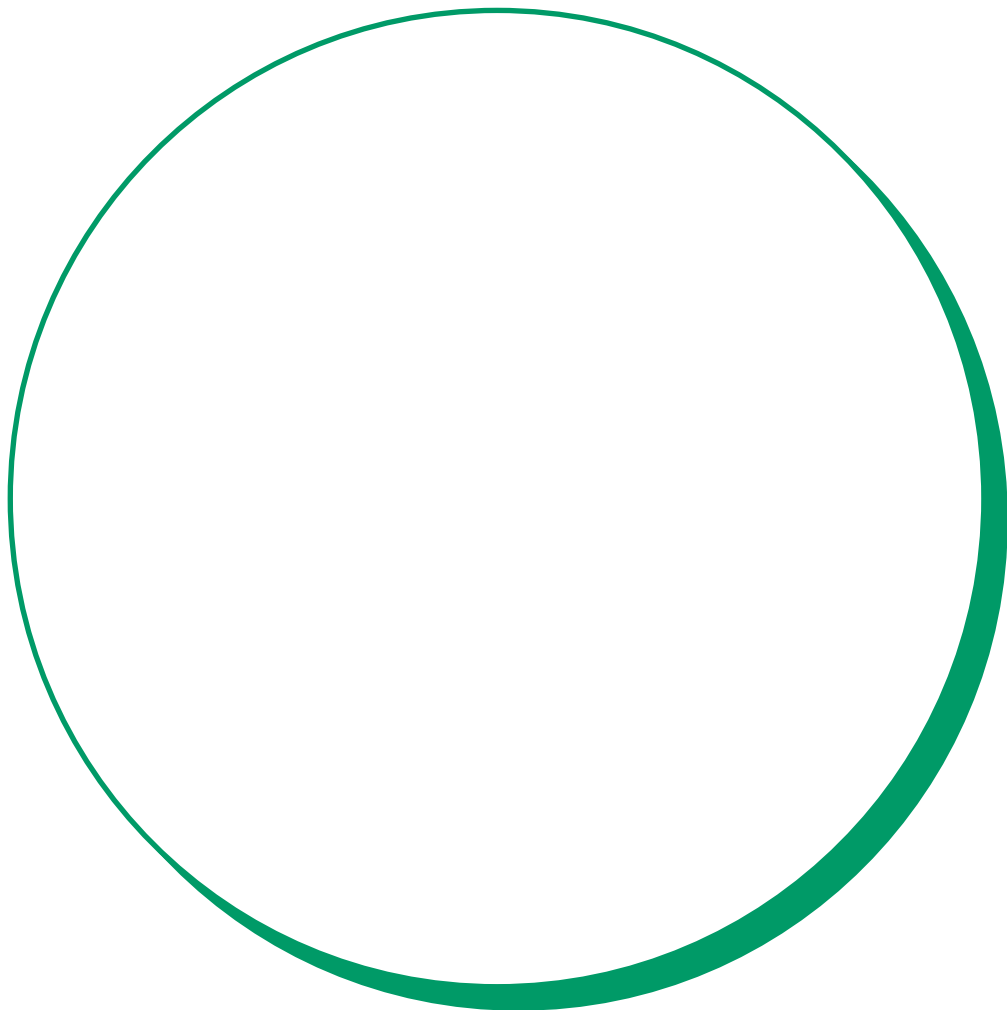


**Control Valve  
Model: ALVB, ALVM  
ANSI Class 300 or under**

**User's Manual**



Azbil Corporation

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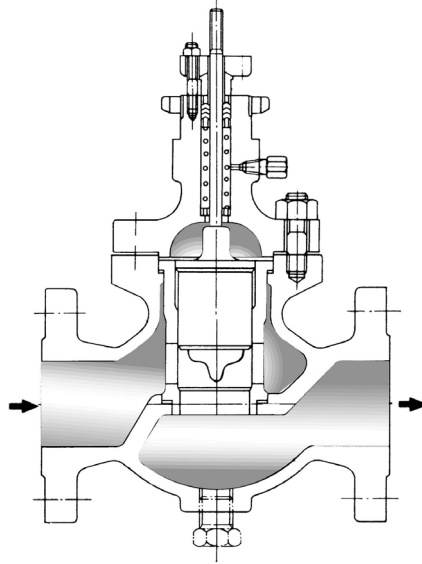
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## Chapter 1: General

This manual covers the instruction for the Pressure Balanced Cage type Double Seated Control Valves (Model ALVB, ALVM).



*Figure 1-1 Model: ALVB, ALVM*

## 1-1 : Specification of Control Valves

The basic model number, valve size, pressure rating and other related specifications of the control valve is indicated on its nameplate. (See Figure 1.) Please confirm that the process flow condensations the specifications match before installation.

The nameplate is a rectangular form with a header section containing the 'azbil' logo. Below the logo, there are several rows of text labels followed by horizontal lines for handwritten input. The labels are: TAG NO., PROD.NO., MODEL, DREASE, SIZE, LIFT, RATING, BODY, TRIM, PLUG, GASKET, PACKING, ACTUATOR, RANGE, SUPPLY, AIR TO, VALVE, and DATE. At the bottom right, there is a small 'MADE IN JAPAN' label.

Figure 1-2 Nameplate

## 1-2 : Construction

Control Valves consist of two major sections - valve body and diaphragm actuator. Different combinations of valve body and actuators, type of connections, types of materials and other specifications result in a control valve that optimally suits the requirements of process flow control.

## 1-3 : Valve Body Section

The valve body section consists of a bonnet, a valve plug, a cage and other trim parts. The bonnet is assembled to the valve body with stud bolts, nuts and with gasket, to provide a pressure - tight valve body section. The valve plug in the valve body is moved up and down by the actuator through the valve stem, thereby varying the opening formed between the plug and cage to control the amount of flow. (See Figures 1-2)

## 1-4 : Actuator

The actuator is a spring - loaded diaphragm motor. It converts a pneumatic input signal into a mechanical positioning force with its spring and diaphragm, in order to drive and hold the valve plug at a position corresponding to the pneumatic input signal. (See Figure. 1-4)

**~Note** "Air- O-Motor" is Azbil Corporation's trade name for its diaphragm motors (Model VA5).

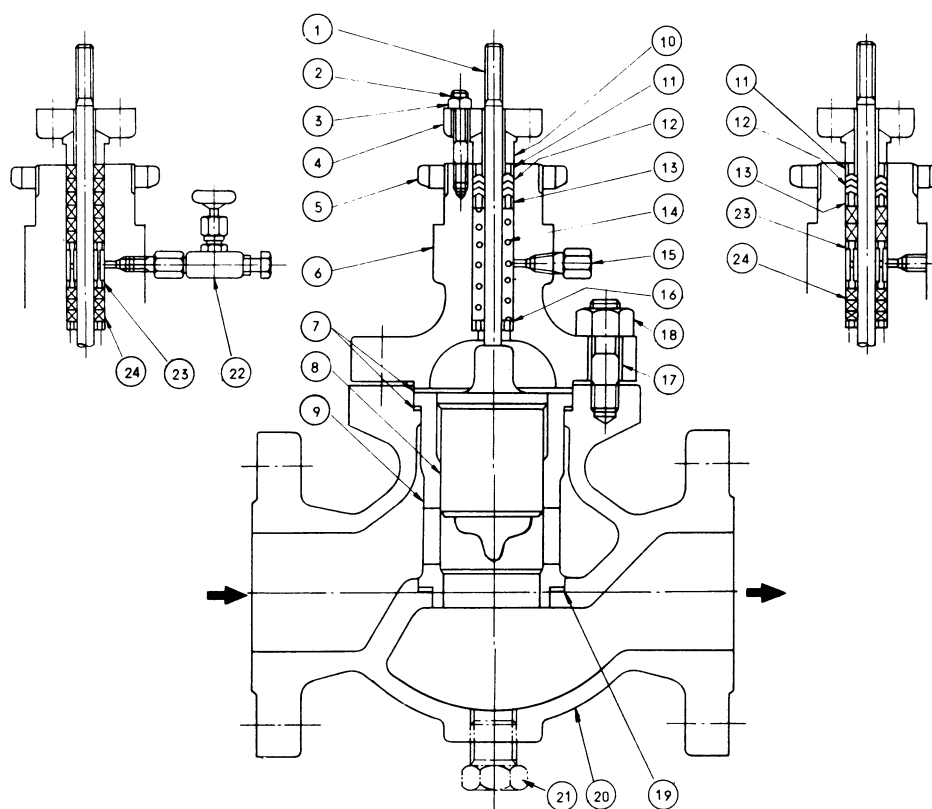
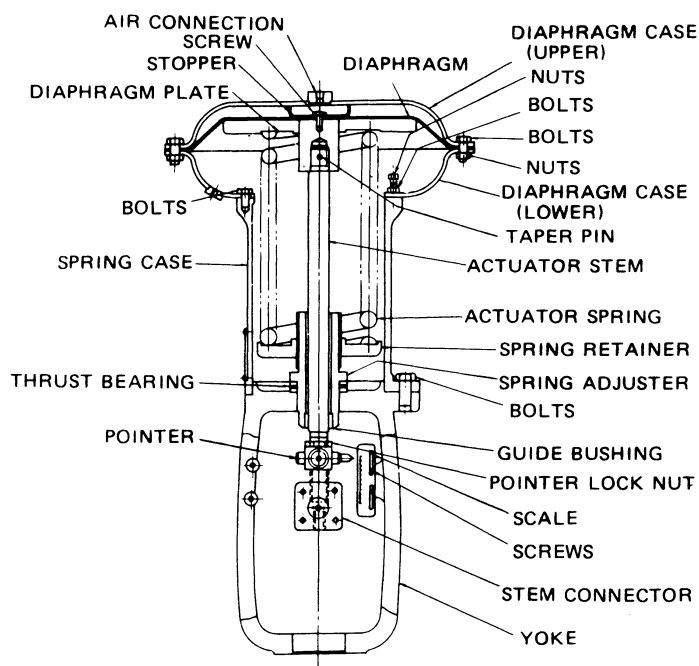
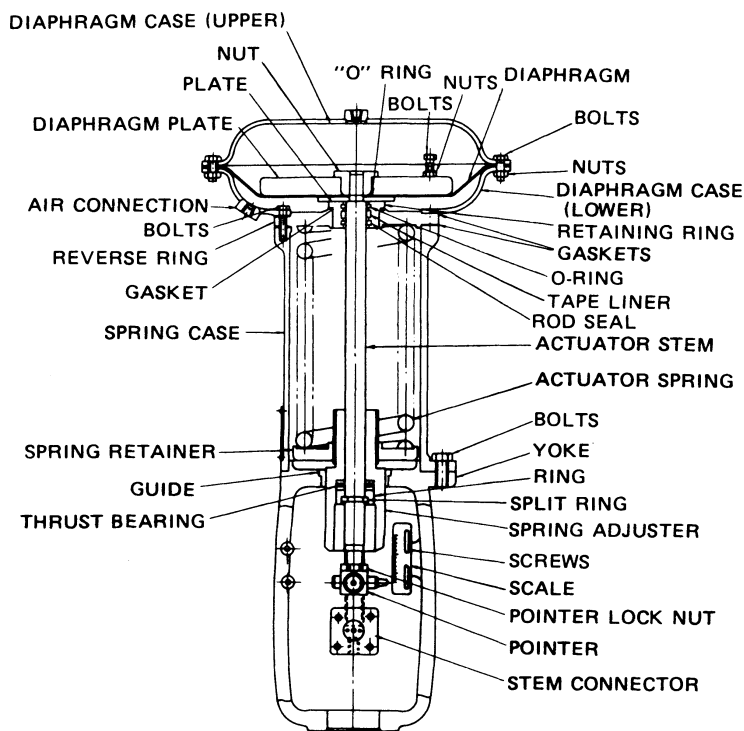


Figure 1-3 Model: ALVB, ALVM Cage type Control Valve (Rating: ANSI 300 lb. or less)

Item no.	Parts	Item no.	Parts
1	Valve stem	13	V Packing retainer
2	Stud bolt	14	V Packing spring
3	Nut	15	Blind plug
4	Packing flange	16	Packing ring
5	Yoke nut	17	Stud bolt
6	Bonnet	18	Nut
7	Gasket	19	Gasket
8	Valve plug	20	Valve body
9	Cage	21	Drain plug
10	Packing follower	22	Lubricator
11	V Packing Holder	23	Latern ring
12	V PTFE packing	24	Packing



Model VA5D  
Direct Acting Actuators



Model VA5R  
Reverse Acting Actuators.

Figure 1-4 Actuators (Air-0-Motor)



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## Chapter 2 : Installation of a Control Valve

When installing a control valve, please observe the following:

- Before installation, ensure that scales, welding chips or any other foreign materials have been cleaned out of the process pipe to which the control valve is to be connected.
- While installing the control valve ensure the process fluid flow direction matches with the flow direction indicated on the connecting flanges of the valve body.
- Install the control valve, in a position such a position that its actuator is positioned vertically.
- Exercise caution so that no edges of the gaskets connecting the pipe extrude into the process pipe. Make sure the selected gasket material is suitable for the process fluid.
- Take adequate measures to avoid applying large force to the control valve by the process piping. Take care when tightening flange bolts to avoid biased tightening which may cause undesirable mechanical stress.
- After installing the control valve and before connecting the air pipe to the actuator, below the air tube with clean compressed air to remove dust and other foreign material from inside the air pipe.
- Sufficient space shall be provided above the actuator for its removal.
- Install the control valve in a place where the ambient temperature does not exceed the specified temperature limit of the actuator.
- Check that the actuator pointer, positioner and manual handwheel (if provided) are installed in the correct direction.

To change the mounting direction of the actuator, proceed as follows: Apply a pneumatic pressure of approximately 60 kPa (0.6 kgf / cm<sup>2</sup>) to the diaphragm so that the valve lift is set at a mid-position of its range. Loosen the yoke clamp nut with a wrench Swivel the overall actuator to the correct position, and then securely tighten the yoke clamp nut with a wrench. Release the pneumatic pressure applied to the diaphragm. In case of a control valve that has a bellows seal, however, disconnect the actuator stem from the valve stem and then loosen the yoke clamp nut and swivel the actuator section. For details, see Chapter 5. "Disassembly and Reassembly."



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## **Chapter 3 :      Inspection and Maintenance of Control Valves**

For the inspection and maintenance of a control valve, also refer Chapter 4. "Control Valve Adjustment."

### **3-1 : Inspection Before Starting Operation.**

Before starting operating of the control valve, check & confirm the following to ensure all conditions are correct and secure.

- Confirm that the flow direction marked on the control valve conforms with the process fluid flow direction.
- Confirm that the bolts and nuts of the diaphragm are securely tightened.
- Confirm that bonnet clamp bolts are securely tightened.
- Confirm that the yoke clamp bolt is securely tightened.
- Confirm that the clamp bolts of any accessory devices (positioner, regulator valve, etc.) are securely tightened.
- Confirm that the air connection to the actuator is securely tightened and there is no air leak.
- Confirm that the bolts of the stem connector that connect the actuator stem to the valve stem are securely tightened.
- Confirm that the actuator stem and valve stem are not warped or show any other sign of defect.
- Confirm that the control valve smoothly operates within its full lift scale range.
- Confirm that the actuator spring is correctly compressed.
- Confirm that gland packing bolts are sufficiently tightened.
- If the control valve employs asbestos packing, it is recommended to lubricate it with the lubricator.
- If the control valve has a manual handwheel, check that the pointer of the operation nut is at AUTO position and the handwheel is locked.

### **3-2 : Periodical Inspection and Maintenance**

Periodically inspect and perform maintenance service to the control valve for the following:

- Check that there is no air leak from between the diaphragm case and diaphragm.
- Check that there is no process fluid leak from the bonnet and flanges.
- Check that the yoke clamp bolt is not loose.
- Check that there is no air leak from the air piping of the actuator.

- Check that there are no loose bolts on the stem connector which connects the actuator stem to the valve stem.
- Check that the actuator stem and valve stem are not warped and show no sign of damage.
- Check that valve operation is smooth and valve lift is correct
- Check that the control valve does not generate any abnormal sound or vibration.
- Check that there is no leak from the gland packing section. If the control valve has a lubricator, periodically lubricate and tighten the gland packing section.
- If the Control valve has a manual handwheel, check that the pointer of the operation nut conforms with the AUTO position and that the handwheel is locked.

### 3-3 : Lubrication of Gland Packing (for valve with asbestos packing (See Figure.3-1)

For a valve which employs asbestos packing, a lubricator is supplied being mounted on the bonnet. For lubrication, be sure to use the correct type of lubricant grease as indicated on the nameplate. (If the valve is with V-teflon or a similar type of gland packing which requires no lubrication, the column for grease on the nameplate is blank).

To lubricate gland packing, proceed as follows: Fill the lubricator with fresh grease. Loosen the lubricator handwheel and then squeeze grease into the gland packing by turning the squeezer screw. If gland packing cannot be fully lubricated even when the squeezer handle is inserted as far as it goes, tightly close the lubricator handwheel, retract and take out the squeezer screw, fill the lubricator with fresh grease once more, squeeze grease into the gland packing by setting and turning the squeezer screw, and then fully close the lubricator handwheel. Repeat this procedure until gland packing is fully lubricated with grease.

Be sure to securely tighten the lubricator handwheel when the lubrication work is finished. It is recommended to tighten slightly more the packing flange bolt slightly more after lubrication work is finished.

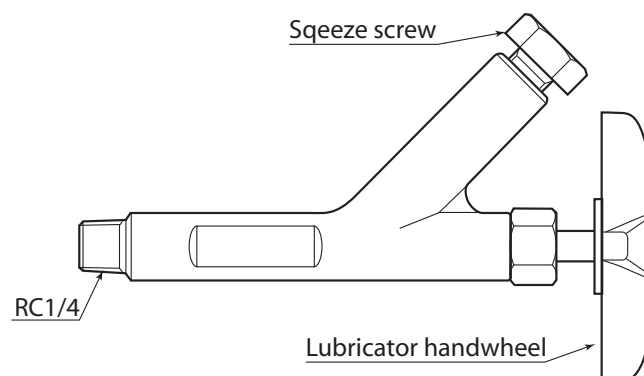


Figure 3-1 Lubricator

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## Chapter 4 : Control Valve Adjustment

Generally the diaphragm control valve does not require adjustment. However, when it is disassembled and reassembled for overhaul or parts replacement, adjustment should be made as described below:

### 4-1 : Lift Adjustment

#### **For direct acting actuators:**

Connect the air tubing to the diaphragm chamber while the stem connector is disengaged to supply compressed air to the chamber.

Push down the valve stem and make the valve plug touch on the valve seat.

Next, apply air pressure up to 5~10% (min. 1%) of the rated lift (check name plate for lift rate) from the reference position of no air in the chamber then fix the pressure at this position. The index on the scale should be set at SHUT at this point.

Connect the actuator stem to the valve stem with the stem connector.

Increase air pressure to the diaphragm chamber and verify the valve lift is more than the rated lift range and the valve seat and plug touch each other. Make sure that this contact takes place while in the SHUT position.

#### **For reverse acting actuators**

Connect the air tubing to the diaphragm chamber while the stem connector is disengaged to supply compressed air to the chamber.

Push down the valve stem and make the valve plug touch on the valve seat.

Apply air pressure to the diaphragm chamber until the actuator stem stops.

Next, reduce the pressure in the diaphragm chamber until the lift is 5~10% above the rated lift range (min. 1 mm) then fix the pressure at this position. The index on the scale should be set at SHUT at this point.

Connect the actuator stem to the valve stem with stem connector at this position.

Reduce the air pressure to the diaphragm chamber and verify if the valve lift is more than the rated lift range (min. 1 mm) and the valve seat and plug touch each other.

Make sure that this contact takes place while in the SHUT position.

## 4-2 : Spring Compression Adjustment

This adjustment must be made after lift adjustment.

### Direct acting actuator

Connect air tubing to the diaphragm chamber to supply compressed air.

Apply low end of the pressure as specified on the name plate to the diaphragm chamber, and adjust by tightening the spring to ensure that the index on the scale starts to move below OPEN; and when the higher end pressure is applied to the diaphragm chamber, the index shows SHUT.

Tightening of spring adjuster can be made easily with no air pressure to the diaphragm chamber.

### Reverse acting actuator

Connect air tubing to the diaphragm chamber to supply compressed air

Apply low end of the pressure as specified on the name plate to the diaphragm chamber, and adjust by tightening the spring to ensure that the index on scale starts to move beyond SHUT, and when higher end pressure is applied to the diaphragm chamber, the index shows OPEN.

Tightening of spring adjuster can be made easily with no air pressure to the diaphragm chamber.

## 4-3 : Positioner Adjustment

Make this adjustment after both lift adjustment and spring tightening adjustment have been completed.

CM2-AVP300-2001

Single acting electro/pneumatic valve positioner:

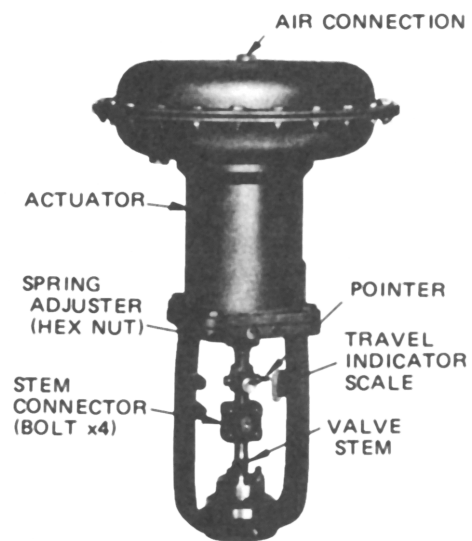
Model: AVP300, 301

OM2-8310-0200

Single acting electro/pneumatic positioner: Model HTP

OM2-8313-0100

Single acting electro/pneumatic valve positioner: Model HEP15, 16, 17



*Figure 4-1 Actuator (Reverse acting type)*





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## Chapter 5 : Disassembly and Reassembly

Before disassembling the control valve, ensure to shut off the flow from the process pipe to release pressure from inside the control valve, and wait until it cools off.

This chapter covers the disassembly and assembly procedures of the actuator for its overhaul or modification.

### 5-1 : Detaching actuator from valve body

- (1) Apply to the actuator an air pressure so that the valve position pointer is at a point of 10% - 20% above the fully closed point.
- (2) Loosen the clamping-bolts of the stem connector, remove the stem connector, and detach the actuator stem from the valve stem.
- (3) Remove the clamping-nut of the yoke.
- (4) Raise the actuator to detach it from the valve body.

Precautions: To detach the actuator from the valve body which is kept installed in the process pipe, be sure to shut down the process fluid and release the process pressure before detaching the actuator

### 5-2 : Disassembly and Reassembly of Valve Body

Procedures of disassembly and Reassembly are indicated as below. Please refer to Figure 5-1 and 5-2 for detailed structure and each part name of the control valve.

#### 5-2-1 : Dissassembly

- (1) Loosen octagonal nuts (2) fixing packing flange (1) over packing follower (9).
- (2) Remove octagonal nuts (4) fastening the valve bonnet (3) and the valve body (10) by using a wrench.
- (3) Remove the bonnet (3) from the valve body(10) with lifting by a crane. Please do not remove the plug with stem part ( 5) from valve body(10) at this time.
- (4) Put the lifting tool on the screw part of stem (5) and lift the plug with stem part(5) vertically by using a crane. Please do not remove the cage (6) from the body (10) at this time.
- (5) Remove the grooved gasket (7) located between the bonnet (3) and the body (10).
- (6) Screw the lifting eye bolts into the two holes (screwed M20) on upper side of the cage (6). And remove the cage(6) as lifting vertically from the body(10) by using crane.
- (7) Remove the seal ring (8) located between the bottom side of cage (6) and the body (10).
- (8) Remove the grooved gasket (7) located between the cage (6) and the body (10).

- (9) Disassembly of the plug with stem part (5)
- i ) Remove the scraper ring (5-1). The ring has a snip in order to remove easily.
  - ii) Expand the round stopper (5-2) and loosen and remove the octagonal nuts (5-3) with spring washer (5-4). And remove the seal ring follower (5-5).
  - iii) Remove the seal ring for plug (5-6) from the plug.

Please note that you can not disassemble the plug and stem because they are welded each other.

- (10) Remove octagonal nuts (2) and packing flange (1) from the bonnet. And take packing follower (9) and gland packings (11) out from the bonnet. You may need a special tool for taking out the gland packings.

(( Check ))

Please check following points after disassembly. If you find something damage on each part, please change the part. When you order the spare parts, please inform the control valve's "Production No. " described in the tag. plate mounting on the side of actuator's yoke.

- Please check the plug face (5) and seat part / cylindrical inside part of cage (6) as no damage.
- Please check the scraping part of the plug (5) as no damage.
- Please check that seal ring for plug (5-6) , sealing face of seal ring for cage & body (8) and out side of scraper have not any damage. And also please check the grooves for installed these parts in have no damage.
- The flat faces for gasket of body (10), bonnet (3) and cage (6) should be checked as no damage.

## 5-2-2 : Reassembly

Please refer to Figure 5-3 and Table 5-1 for grease as subordinate material of reassembly. And please refer to Figure 5-1, 5-2 and Table 5-2 for tightening torque of each bolt and nut.

Please check that each part, especially gasket mounting part and scraping part, is clean without any dusts.

Please use new parts for gland packings (11), grooved gasket (7) and round stopper and never use its old parts.

- (1) Install the seal ring for cage & body (8) in the valve body (10).
- (2) Install the grooved gasket (7) in the valve body (10).
- (3) Screw the lifting eye bolts into the two holes (screwed M20) on upper side of the cage (6). And install the cage (6) into the body (10) as lifting by using crane. At this time, please take care the seal ring (8) for keeping from damage against the cage (6).
- (4) Installation of the plug with stem (5)
  - i ) Attach the seal ring (5-6) on the plug (5). Please take care that the outside and inside of seal ring faces have not any damage during the installation on the plug.

- ii) Attach the round stopper (5-2) to the seal ring follower (5-5) and fix them by fastening spring washers(5-4) and octagonal bolts (5-3).
  - iii) In order not to loosen the octagonal bolts (5-3), semicircle part of round stopper (5-2) should be bent to octagonal bolts side and the other part of round stopper should be bent to the seal ring follower side as 90 degree.
  - iv) Install scraper ring (5-1) into groove of the seal ring follower (5-1).
- (5) Put the lifting tool on the screw part of stem (5) and install it into the cage (6) as lifting by using crane. Please take care that the seal ring (5-6) and the scraper (5-1) have not any damage during the installation.
- (6) Install the grooved gasket (7) on the upper side of cage (6).
- (7) Put the bonnet (3) on the valve body (10). After checking that the male part of bonnet fits the female part of the body, please fasten alternately each octagonal nut located as diagonal line in order not to fasten only one side .
- (8) Please apply grease on gland packings (11) and install the gland packings into the bonnet. If you use yarn packings, please do not pile up their cutting part as same side.
- (9) Install packing follower (9) and packing flange (1) on the bonnet and fasten them by octagonal nuts (2).

Please fasten the two octagonal nuts equally in order to keep the packing flange as horizontal level.

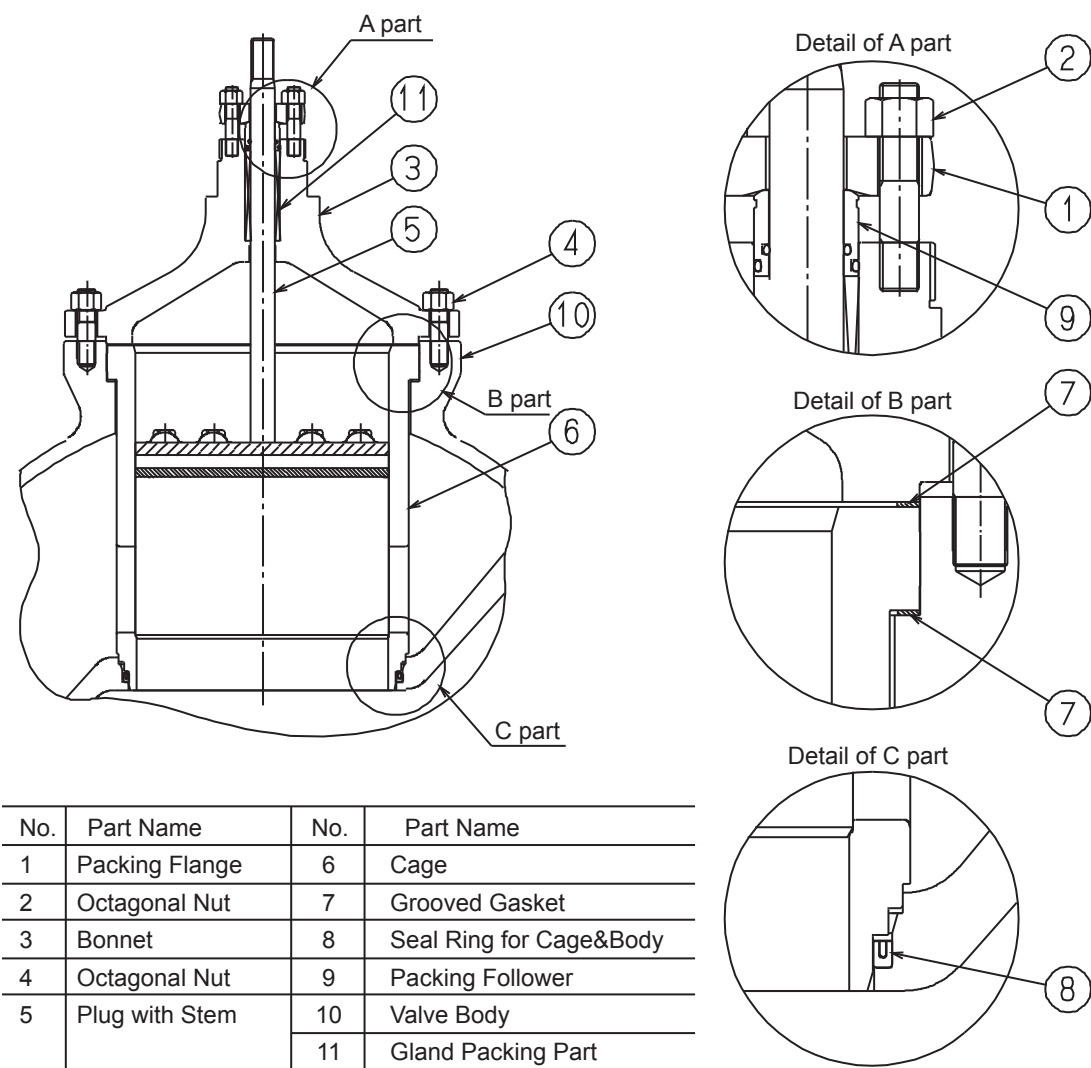


Figure 5-1 Cross section of ALVB, ALVM Body

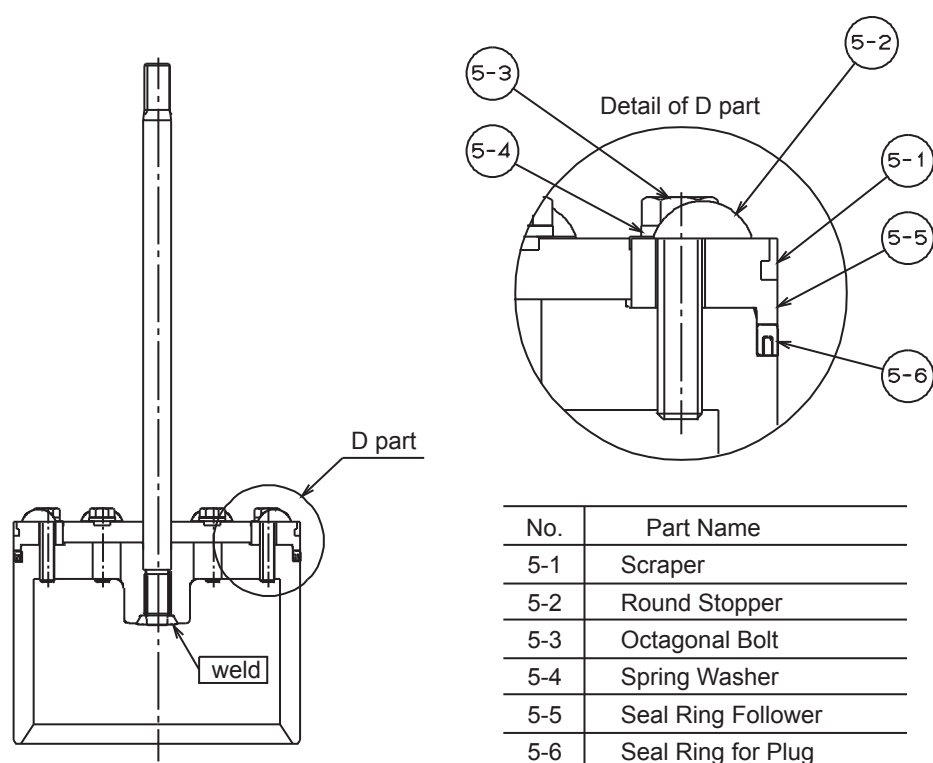


Figure 5-2 Cross Section of ALVB, ALVM Plug & Stem Part

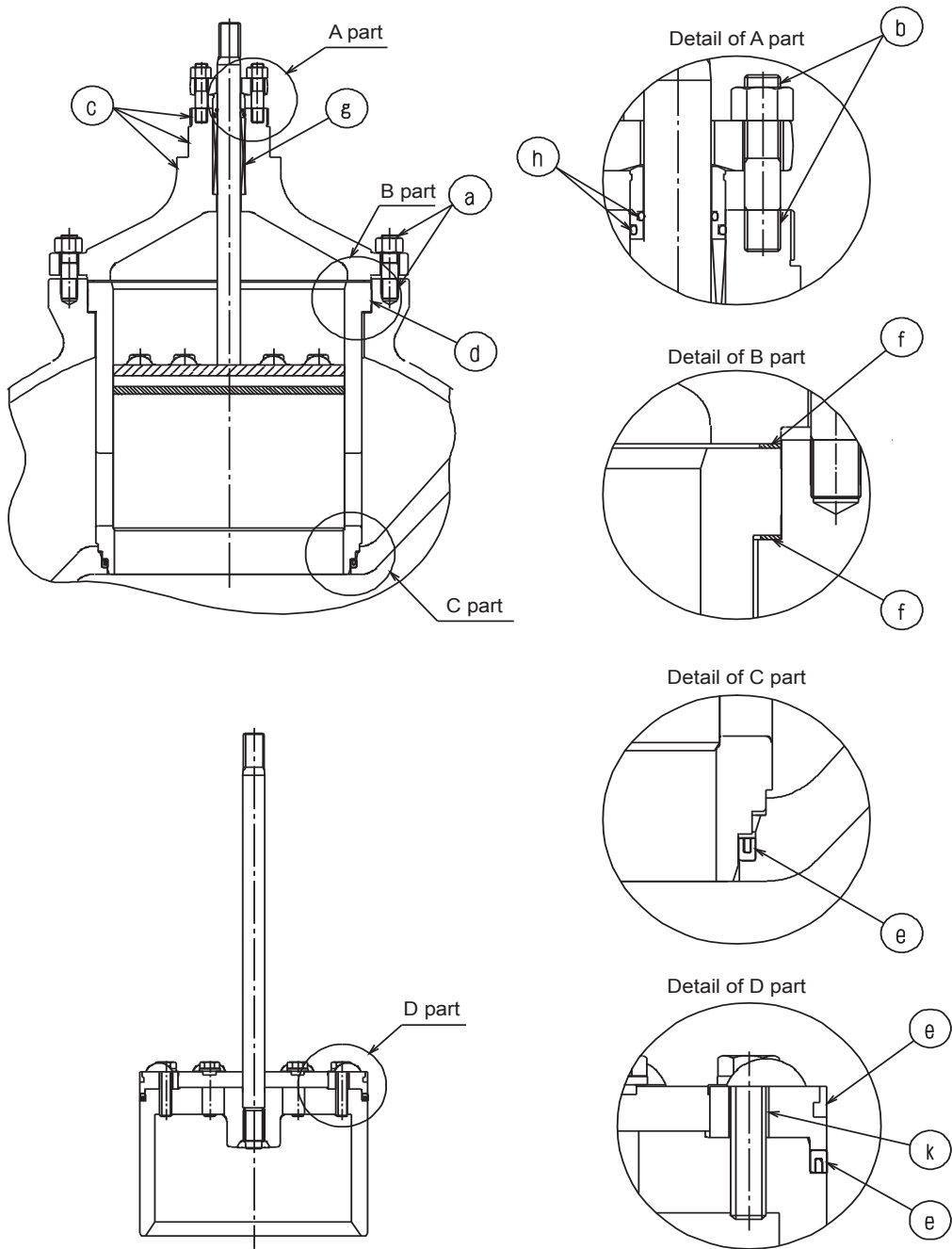


Figure 5-3 Grease Applying Part for ALVB, ALVM

No.	Part Name	Type of Grease
a	Screw of stud bolts/octagonal nuts of body / bonnet	Never Seeds Nickel Special Grade
b	Screw of stud bolts/octagonal nuts of gland part	Never Seeds Nickel Special Grade
c	Screw, socket and plane part of bonnet connecting to yoke	Never Seeds Nickel Special Grade
d	Body and socket part of cage	Never Seeds Nickel Special Grade
e	Seal ring for plug / Bottom of cage, Scraper ring	Shin-etsu Silicon G40M
f	Seal face of gasket	Never Seeds Nickel Special Grade
g	Gland Packing (V-PTFE, PTFE Yarn Packing)	Shin-etsu Silicone G40M
h	Inside and outside O-ring installed in the packing follower	No dropping Grease, Plasterubu No.3
j	Octagonal bolts of plug	Never Seeds Nickel Special Grade

Table 5-1: Grease list

No.	Part	Size	Fastening Torque(N·m)	
4	Octagonal Nut	M22	360 to 400	
		M30	500 to 550	
5	Octagonal Nut	M16	32 to 37	PTFE Yarn
5-3	Octagonal Bolt	M16	70 to 80	

Table 5-2: Fastening Torque for Screw Part





---

## Chapter 6 :     **Parts Replacement**

### **6-1 : Replacement of Gland Packing**

Before servicing the control valve, ensure to shut the flow in the process pipe, to release pressure from inside the control valve, and wait until it cools off.

#### **6-1-1: Replacement of Yarn packing**

Remove the actuator from the valve body. Disassemble the valve by following the procedures explained in Chapter 4. "Disassembly and Reassembly," Item (a) Disassembly, Steps (1) through (4).

Undo the packing flange nuts. Remove the packing flange and packing follower. Use the packing hook to remove a packing.

To remove packing lower than the lantern ring, unscrew the clamp nuts of bonnet, remove the bonnet valve body, and then take out the lantern ring and packing.

Mount the bonnet on the valve body. Insert fresh packing, piece by piece, the cut ends of piece shifted by 90 to 180 degrees of angle from that of the adjoining one.

Each time as you insert a piece of packing, securely press it with the packing retainer.

Determine the number of pieces of Yarn Packing that is necessary so that the lubrication hole is positioned lower than the lantern ring.

After inserting a sufficient amount of the packing, place packing follower and the packing flange, and secure packing flange nuts.

For the reassembly of a valve after packing replacement, follow the procedures in chapter 5. "Disassembly and Reassembly," Item (b) "Assembly," from Step (5) and further.

#### **Replacement of V PTFE Packing.**

Remove the actuator from the valve body. Disassemble the valve by following the procedures explained in Chapter 4. "Disassembly and Reassembly," Item (a) Disassembly, Steps (1) through (4).

Unscrew the packing flange nuts. Remove the packing flange and packing follower, and V packing holder use a packing hook to take out the V PTFE packing.

Insert fresh packing, with its V-shape groove positioned downward. (Insert this in the reverse attitude for a control valve used for vacuum service.) Place the packing follower and the packing flange, and secure packing flange nuts.

For reassembly of valve after packing replacement, follow the procedure explained in Chapter 4. "Disassembly and Reassembly", Item (b) "Assembly," Steps (5) and further.

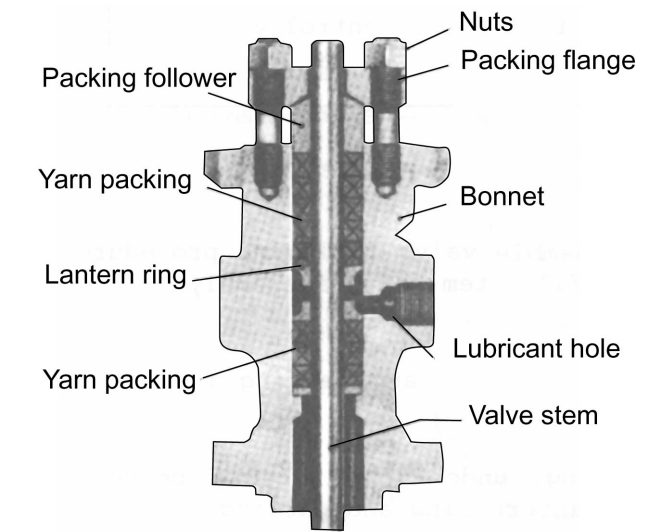


Figure 6-1 Yarn Packing

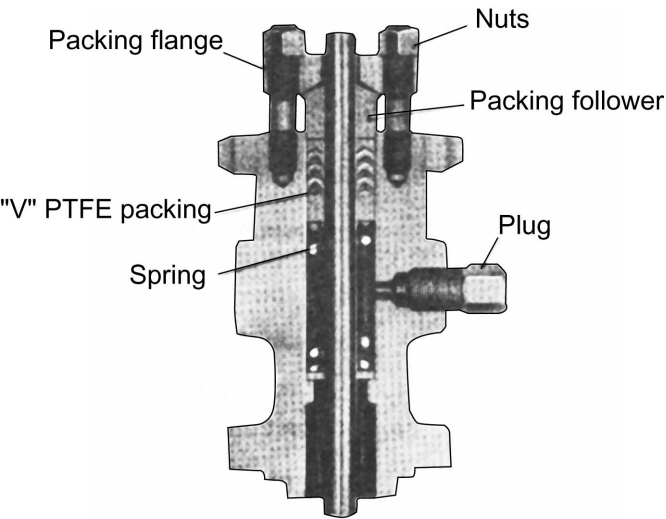


Figure 6-2 "V" PTFE Packing

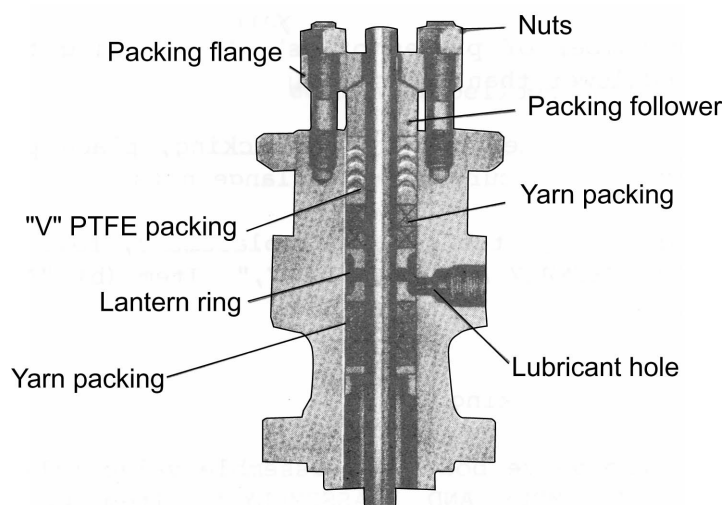


Figure 6-3 Yarn and "V" PTFE, Combined Packing

## 6-2 : Diaphragm Replacement of Diaphragm Motor (See Figure 1-3.)

Always after removing the stem connector and disconnecting the actuator stem from the valve stem, turn the spring adjuster counterclockwise to fully slacken the spring.

### 6-2-1: Direct- acting Type

#### (a) For VA5D

Disconnect air connection. Turn the spring adjuster clockwise until the spring is fully slackened. Remove hex clamp bolts of the diaphragm case assembly and then remove diaphragm case (upper).

Pull out cotter pin and remove slotted nut. If the actuator stem also rotates while doing this, hold it by applying a wrench to the pointer lock nut. Remove the stopper and diaphragm plate. Replace diaphragm.

After replacing diaphragm, assemble the actuator following the above procedure in the reverse order.

After reassembling the valve, compress the spring. For this, follow the procedure explained in Chapter 6. "Control Valve Adjustment", Items (b) "Spring Compression Adjustment".

**6-2-2: Reverse - acting type.****(a) For VA5D**

Disconnect air connection. Remove hex clamp bolts of the diaphragm case assembly and then remove diaphragm case (upper).

Remove clamp nut of the diaphragm plate. If actuator stem also rotates while doing this, hold it by applying a wrench to the pointer lock nut. Remove diaphragm plate and replace diaphragm

To reassemble, follow the above procedure in the reverse order. After reassembling, apply a sufficient amount of adhesive agent (semi-dry adhesive agent for metals) to prevent air leak.

**6-3 : O-ring Replacement of Diaphragm Motor (See Figure 1-3.)****6-3-1: For VA5R**

Disconnect air connection. Turn spring adjuster clockwise until spring is fully slackened. Remove hex clamp bolts of the diaphragm case assembly and then remove diaphragm case (upper).

Remove clamp nut of diaphragm plate. If actuator stem also rotates while doing this, hold it by applying a wrench to the pointer lock nut. Remove the diaphragm plate and replace diaphragm

Remove the bolt on which O - ring is positioned. Remove O - ring from the bolt using a scrubber or other tool.

Position the new O- ring. Before doing this, thoroughly clean the groove for the O-ring and sparingly apply silicone grease to groove.

To reassemble, follow the above procedure in the reverse order. After reassembly, adjust the spring compression. For adjustment, follow the procedure explained in Chapter 6. "Control Valve Adjustment", Item (b) "Spring Compression Adjustment".

---

## **Chapter 7 :     Manual Handwheel**

### **(Side Handwheel of Actuator)**

#### **7-1 : Operation Method**

##### **(a) Manual Operation**

Undo the handwheel lock (the chain lock for VA5). Turn the handwheel in the direction indicated the arrow. As you turn the handwheel clockwise, the valve moves in the closing direction regardless of whether it is a direct - acting or reverse - acting type. The arrows on the handwheel indicates the direction for valve SHUT and OPEN function.

##### **(b) Automatic Operation**

For the automatic operation, turn the handwheel such that the pointer of the operation bolt indicates the AUTO position. Then, lock the handwheel.

#### **7-2 : Installation**

- (1) A side mounted handwheel can be installed even when the valve is set for automatic operation. To install the handwheel, proceed as follows:
- (2) Turn the handwheel of the manual operation assembly so that the pointer of the operation bolt indicates the AUTO position.
- (3) Remove the bolt (s) (three bolts in case of VA5) which clamp the two levers. Widen the gap between the two levers.
- (4) Install the manual drive assembly on the mounting pad at the back of the Air-O-Motor, with the mounting bolts.
- (5) Hang the smaller holes at the end of the levers on to the pointer base and the other larger holes at the other end on to the base of the operation nut. Secure the lever clamp bolt.
- (6) When in automatic operation, set the pointer of the operation nut to the AUTO position and lock the handwheel.

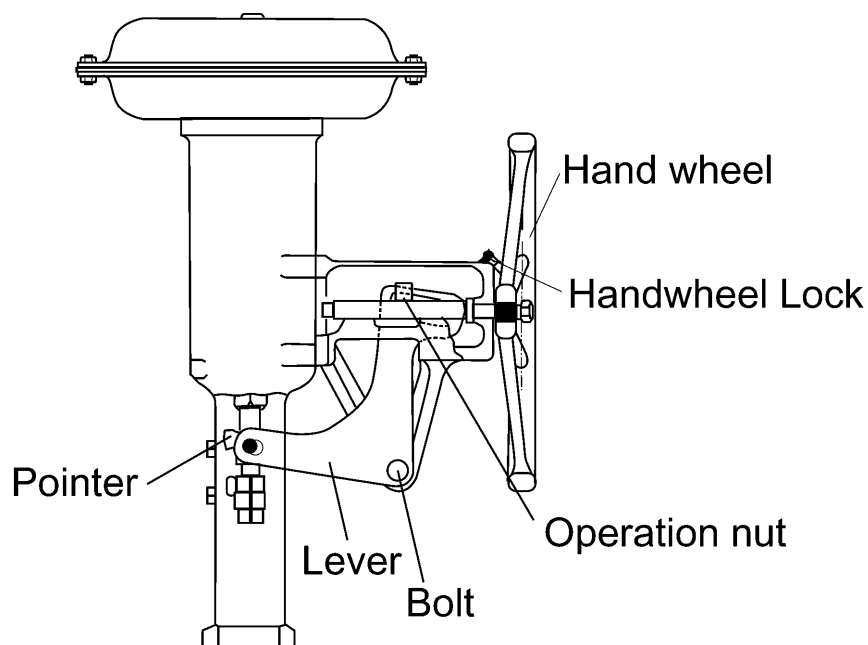
#### **7-3 : Disassembly and Reassembly**

Before disassembling the manual drive assembly, ensure that the handwheel is set at the AUTO position.

- (1) Undo the bolt (s) (three bolts in case of VA5) which clamp the two levers. Remove the levers from the pointer base.
- (2) Remove the mounting bolts of the manual drive assembly and detach it from the Air-O-Motor.
- (3) Remove the handle lock nut and then remove the handwheel.

- (4) Remove the handwheel from the manual drive assembly by evenly striking the drive shaft in the handwheel direction.
- (5) Remove the stop ring (using a special tool) and the bearing.

To assemble the manual drive assembly, follow the above disassembly procedure in the reverse order.



*Figure 7-1 Side Handwheel*

## Chapter 8 : Troubleshooting

Symptom	Cause / Verification / remedial measures
Valve Operation unstable	Valve capacity is too large (Reduce Cv)
Hunting at fully closed	For single valve, direction of flow is wrong
Supply air pressure fluctuates	Check if other line is using excessively large volume of air. (Pipe capacity, restriction, air supply source capacity)
Supply air pressure fluctuates	Check if other line is using excessively large volume of air. (Pipe capacity, restriction, air supply source capacity)
Signal pressure fluctuates	Check for abnormal controller output
Hunting continues even on	Hunting by positioner itself (Check, repair or replace positioner)
	Impact by process fluid pressure (Insufficient torque of actuator. Replace actuator with larger size one)
Valve vibrates	Check and see if the pipe on which the valve mounted is vibrating (Enhance support)
Vibration at any opening	Search for other source of vibration
Intermittent vibration	Erosion of plug and guide (Replace parts)
	Change in Process fluid condition (Modify orifice or Cv coefficient)
	Change plug type (Change of characteristics)
Valve operation sluggish	Leakage on pneumatic pipe
Valve fails to operate	Air leakage from actuator
	Foreign matter adhering on plug's guide
	Hardening of gland packing (Increased hysteresis)
	Faulty positioner (Try on other line's positioner)

Symptom	Cause / Verification / remedial measures
Fluid leaks out of gland	<p>Check for loose packing flange</p> <p>Is grease volume sufficient ?</p> <p>Are there any scarson valve stem ?</p>
Fluid leaks out of gasket	<p>Has bonnet nut been properly tightened</p> <p>Faulty gasket (Scar, deformation)</p>
Regardless of valve opening, excessive fluid leaks out to downstream of valve	<p>Air Leakage in actuator</p> <p>Apply supply air or atmospheric pressure to actuator. (Check air source and positioner)</p> <p>Is valve opening at true zero ? (Check lift)</p> <p>Corrosion or erosion on plug or seat ring</p> <p>Jamming on guide</p>

Replace parts as required.



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## Chapter 9 : Recommended Spare parts

### Major replacement parts

Although control valve parts have been designed and manufactured for prolonged usage, the following parts will have to be replaced as a part of maintenance work:

#### **Body**

- |                 |                                      |
|-----------------|--------------------------------------|
| * Gland packing | To be replaced with each disassembly |
| * Gasket        | To be replaced with each disassembly |

#### **Actuator**

- |               |                          |
|---------------|--------------------------|
| * Bushing     | Once every five years    |
| * Seal Washer | “ (or when disassembled) |
| * Dust Seal   | “ (or when disassembled) |
| * Rod Seal    | “ (or when disassembled) |
| * O- ring     | “ (or when disassembled) |



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