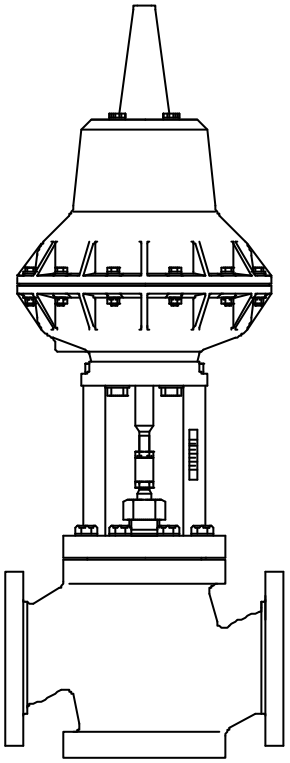
BOSSMATIC PARAGON CONTROL VALVES

600 Series – 65 - 100mm

Installation, Operation

&

Maintenance Instructions



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1.0 General Information

1.1 These instructions cover Fig. 620, Fig. 640, Fig. 660 and Fig. 680 Paragon control valves; sizes 80 and 100mm.

1.2 These instructions are intended to support unpacking, installation and maintenance of these valves. Users and maintenance personnel should read these instructions carefully before installing, operating or maintaining the valve.

1.3 These instructions do not contain information on valve ancillaries, positioner, etc. Please refer to separate instructions as necessary.

To avoid damage or injury to personnel or equipment, always heed all warnings and instructions. Unprofessional re-conditioning, the use of non-original manufacturers replacement parts or the performance of maintenance steps other than those described here, may cause the loss of efficiency or lead to personnel injury or damage to parts, and render the warranty void.

2.0 Unpacking

2.1 Check all delivered items against the despatch note.

2.2 Report any transport damage to the carrier immediately.

2.3 Larger valves may require the use of slings for lifting purposes. If slings are used they are to be attached to the valve in a manner that will not damage the valve or any ancillaries attached to it.

Important: Be aware that the centre of gravity of the valve may be above the lifting point. Ensure that the valve is properly supported prior to lifting.

3.0 Installation

Cast Iron Valves must not be exposed to shock loading (via the process fluid) or superimposed pipe loads.

3.1 Clean all pipes and tubing prior to installation.

3.2 Remove all stops and protective bungs.

3.3 Check that the valve has been supplied with the correct mode of operation.

3.4 Check the valve flow direction (as shown on the valve body) prior to installation. Ensure that the flange-seating surfaces and gaskets are free from debris before bolting the valve into line.

3.5 Whenever possible install the valve in an upright position (actuator at the top), to simplify maintenance. The valve may be installed with the actuator in the horizontal plane, in this instance the two yoke pillars must be vertically opposed.

3.6 Sufficient clearance above the valve should be allowed for future disassembly.

3.7 For modulating applications the valve is generally fitted with a NK pneumatic or electro-pneumatic positioner. Refer to separate instructions for further details.

3.8 Connect an air supply to the valve, this will usually be to a connection on the positioner. If no positioner is fitted the connection is made directly into the actuator. If an air filter regulator is fitted then the air supply is connected to it.

Max. air supply pressure 6.0 BarG. For specific application pressures refer to Northvale Korting sales department.

3.9 Connect the signal input to the positioner (pneumatic or electrical) as applicable.

4.0 Valve Operating Principles

4.1 An important factor in maintaining the control valve is an understanding of its construction and mode of operation. With this knowledge and the attached arrangement drawings maintenance is straightforward.

4.2 The control valve plug is moved to the required position by means of an applied pneumatic pressure to the diaphragm actuator assembly (or by rotation of the handjack manual override if fitted - see separate instructions for details).

4.3 The position/extent of valve travel is determined by the level of pneumatic pressure applied by the control system, which is normally 0.2 to 1 Bar (3 to 15 PSI) for modulating applications, amplified by mains air supplied from the positioner.

4.4 For on/off applications, the fully open and fully closed positions are used, usually controlled by turning the air supply ON or OFF by means of a solenoid valve in the air supply line (this can be factory fitted to the valve if required).

5.0 Performance & Functioning Checks

5.1 For satisfactory valve performance the plug must move freely in response to load changes as signalled by the control system. If it does not move freely then check for the following faults.

a) Leaking pressure tubing or connections.
b) Ruptured diaphragm.
c) Leaking diaphragm housing.
d) Binding between valve plug and seat.
e) Excessive tightness of gland packing.
f) Binding between valve spindle and guide bush.
g) Positioner incorrectly set / faulty.

6.0 Allowable Seat Leakage

6.1 Valve seat leakage's conform to the following

Metal to metal seats: EN1349 Class IV.

Soft seat inserts: EN1349 Class V.

6.2 If the valve leakage rate exceeds the limits given above, the following checks should be made before considering further action.

a) Check that the spindle is travelling the full stroke of the valve, for these valves 40mm.

b) Inspect for wear and/or damage to the valve plug and/or seat face(s).

c) Binding of the valve spindle to the guide bush or gland packing. Consult Northvale Korting sales department.

d) Insufficient spring force to close air-fail-closed valves against the line pressure. Consult Northvale Korting sales department.

7.0 General Maintenance

Prior to carrying out any maintenance tasks the following should be observed.

a) Isolate the valve from the line pressure.
b) Relieve pressure from within the valve body.
c) Disconnect the air supply to the actuator.

7.1 The following checks should be made at regular intervals to ensure valve performance.

7.2 Examine the gaskets for leaks and if necessary re-tighten the bolts.

7.3 Check the valve for damage caused by corrosive residues or corrosive vapours.

7.4 Clean the valve and re-paint if necessary.

7.5 Check the valve gland for leaks.

7.6 Stroke the valve and check for smooth spindle movement; irregular movement may indicate internal defects.

7.7 If possible, close the supply pressure and check the fail-safe position.

7.8 Prior to re-tightening any joint it is essential that all jointing faces be clean and free from any debris. It is preferable that a new gasket is used each time a seal is made.

7.9 All flange and joint bolts are to be lubricated using a suitable copper-based lubricant.

7.10 All bolts are to be tightened in a minimum of 3 stages and in a manner that allows equal force distribution. Shock loading (the hammering of spanners) should be avoided.

7.11 The following final torque's are to be used for the bolt sizes given.

Bolt Dia (mm)	Final Bolt Torque (Nm)
8	25
10	50
12	90
16	220
20	425

8.0. **Hand jack Removal**

Refer to Fig.1 for Fig 620 valves, Fig. 2 for Fig 640 valves, Fig. 3 for Fig 660 valves and Fig.4 for Fig 680 valves.

8.1 **Fig.620/660 Valves (Fig.7)**

8.2 Unscrew and remove the 4 socket head cap screws holding the handjack onto the actuator. Withdraw the handjack housing assembly over the actuator spindle. Unscrew and remove the actuator spindle locknut and remove the handjack nut complete with the bearing.

8.3 **Fig.640/680 Valves (Fig.8)**

8.4 Unscrew and remove the 4 socket head cap screws holding the cap onto the handjack shaft. Unscrew and remove the actuator spindle locknut and remove the handjack nut complete with the bearing. Unscrew and remove the 4 socket head cap screws holding the handjack onto the actuator. Withdraw the handjack assembly over the actuator spindle.

9.0 **Hand jack Re-fitting**

Refer to Fig.1 for Fig 620 valves, Fig. 2 for Fig 640 valves, Fig. 3 for Fig 660 valves and Fig.4 for Fig 680 valves.

9.1 **Fig.620/660 Valves (Fig.7)**

9.2 Screw the handjack nut complete with the bearing onto the actuator spindle, leaving approximately two threads free at the bottom on the actuator spindle. Lock in place with the actuator spindle locknut. Unwind the handjack sleeve in the housing by 3 or 4 turns (this should give clearance between the sleeve and the bearing). Fit the housing assembly over the actuator spindle locating the bearing into the sleeve. Assembly into place using socket head cap screws into actuator top.

9.3 Wind down the handjack until clearance between sleeve and bearing is taken up and then back of by half a turn.

9.4 Minimum distance between handjack cap and housing – in inactive state,
25mm for 20mm stroke valve.
35mm for 35mm stroke valve,

9.5 **Fig.640/680 Valves (Fig.8)**

9.6 Ensure handjack sleeve is protruding approximately 5mm above the handjack housing. Fit the housing assembly over the actuator spindle and secure into place using socket head cap screws into actuator top. Screw the handjack nut complete with the bearing onto the actuator spindle until it bottoms on the shoulder of the sleeve. Lock in place with the locknut. Re-fit the cap using the socket head cap screws.

9.7 Wind down the handjack until cap rests upon the housing to give the bearing clearance in the inactive state

10.0**Actuator Removal**

10.1 Refer to Fig. 1 for Fig. 620 valves, Fig. 2 for Fig. 640 valves, Fig. 3 for Fig. 660 valves and Fig. 4 for Fig. 680 valves.

10.2 Remove the positioner and its interconnecting pipework; refer to separate instructions

10.3 Loosen the spindle locking nuts and screw the spindle coupling onto the actuator spindle.

10.4 Undo the four screws holding the top cap onto the actuator and remove the cap.

10.5 Undo the four bolts holding the actuator onto the pillar yoke and lift the actuator off.

11.0 **Actuator Re-fitting**

11.1 Locate the actuator onto the yoke mounting plate and secure with the four bolts, leaving the bolts loose.

11.2 Ensure that the actuator and valve spindles are aligned and tighten the four securing bolts up gradually and evenly to a torque of 150 Nm

11.3 Re-set the actuator in accordance with Section 9.

11.4 Re-fit the actuator top cap and tighten the securing screws hand tight

11.5 Re-fit the positioner and interconnecting pipework; refer to separate instructions.

12.0**Actuator Re-setting:**

12.1 **Fig. 620/660 Valves**

12.2 Ensure that the plug is firmly pushed into its seat by applying pressure to the top of the valve spindle.

12.3 Apply compressed air to the actuator in order to bring the actuator spindle down to meet the valve spindle.

12.4 Wind down the spindle coupling to equally cover both spindles.

12.5 Reduce the air pressure on the actuator in order to bring the plug off the seat. Rotate the spindle coupling clockwise by one turn (this will preload the actuator) and tighten the spindle locking nuts.

12.6 **Fig. 640/680 Valves**

12.7 Apply compressed air to the actuator in order to raise the actuator spindle clear of the valve spindle. Ensure that the plug is firmly pushed onto its seat by applying pressure to the top of the valve spindle.

12.8 Reduce the air pressure on the actuator in order to bring the actuator spindle down to meet the valve spindle.

12.9 Wind down the spindle coupling to equally cover both spindles.

12.10 Increase the air pressure on the actuator in order to bring the plug off the seat. Rotate the spindle coupling clockwise by one turn (this will pre-load the actuator) and tighten the spindle locking nuts.

13.0**Change Action of Actuator**

13.1 Remove actuator; section 10.0 to 10.5.

13.2 Rotate the complete actuator through 180° and re-fit; section 11.0 to 11.5

14.0 **Actuator Refurbishment**
(Refer to Figs. 1 – 4 as appropriate)

14.1 Remove the spindle coupling and locknut from the actuator spindle.

14.2 Relieve the spring tension on the actuator by rotating the spring adjuster fully clockwise

(when viewed from above). The lower lip of the adjuster will drop slightly below the actuator spring housing when this has been achieved.

14.3 Undo the bolts holding the actuator spring and diaphragm housings together, taking care to leave the long bolts until last. Remove the actuator spring housing.

14.4 Remove the actuator spring. Then remove the spindle/diaphragm assembly by pushing it through the actuator diaphragm housing.

14.5 Undo the spacer nut and remove the diaphragm support and the diaphragm.

15.0 Diaphragm Replacement

15.1 Fit a new diaphragm over the diaphragm support.

15.2 Re-build the spindle/diaphragm assembly in reverse order; apply Loctite '242' to the threads of the spacer nut and screw firmly 'by hand' against the diaphragm support.

16.0 O-ring & Bearing Strip Replacement

16.1 Remove the old O-ring and bearing strip from the diaphragm housing using a small screwdriver and being careful not to damage the grooves.

16.2 Fit a new O-ring into the inner (narrower) groove and a bearing strip into the outer groove. The bearing strip should initially be wrapped round a small diameter (say 15mm) bar to ease installation.

17.0 Actuator Re-assembly

17.1 Remove the thrust washer from the spring adjuster and fit a new one.

17.2 The actuator is re-assembled in the reverse order of disassembly; section 14.0 to 14.5

17.3 Rotate the spring adjuster anti-clockwise until its lower edge is level with the top of the spring housing. Then apply a further 40 turns, anti-clockwise, of the spring adjuster to set the correct spring tension. (The actuator spindle should just start to move when an air pressure of 1.3 BarG is applied to the actuator).

18.0 Gland Seal Replacement (Refer to Figs 5 & 6)

18.1 Remove the actuator assembly; section 10.0 to 10.5.

18.2 Undo the bonnet to body bolting, unscrew the gland nut and remove the bonnet/pillar yoke assembly. On 2-way valves this will also remove the plug and spindle assembly which should then be pulled out of the gland.

18.3 Remove the packing follower and using an awl-type instrument remove the stem seal, taking care not to damage the gland bore in the bonnet. Remove the guide bush.

18.4 Clean the spindle, gland bore and packing follower ready for re-use.

18.5 Remove the gasket from the body/bonnet joint and clean the seating surface prior to fitting a new gasket.

18.6 For 2-way valves place the plug and spindle into the seat.

18.7 For 3-way valves push the plug and spindle into the bottom seat

18.8 Place the bonnet/pillar yoke assembly over the spindle and into the body. Fit the bolts and tighten uniformly in a diametrically staggered pattern.

18.9 Slide a new guide bush followed by a new stem seal and the lantern ring over spindle and into bonnet bore (taking care not to score the stem seal). Fit gland nut finger tight only.

18.10 Re-fit actuator assembly as 11.0 to 11.5.

18.11 Tighten gland nut down to the setting dimension shown in Fig. 5.

Important: Excessive tightening of the gland nut can cause packing wear and also hinder free movement of the valve spindle.

19.0 Bottom Cover Removal (3-way Valves)

19.1 Undo the bottom cover to body bolting and remove the bottom cover.

19.2 Remove the gasket from the body/bottom cover joint and clean the seating face prior to fitting a new gasket.

19.3 Re-fit the bottom cover and bolts. Tighten the bolts uniformly in a diametrically staggered pattern.

20.0 Plug & Spindle Replacement

20.1 Remove the gland seal; section 18.0 to 18.5.

20.2 For 3-way valves remove the bottom cover; section 19.1 to 19.2.

20.3 Replace the plug and spindle.

20.4 Re-fit the bottom cover; section19.3.

20.5 Fit a new gland seal; section 18.6 to 18.11.

21.0 Seat Replacement

21.1 Dependent upon the duty, valves may be fitted with screwed or welded-in seats. Screwed seats can (with care) be replaced on site but we recommend that valves with welded in seats be returned to our factory for replacement.

21.2 **For 3-way valves (Fig. 660/Fig. 680)** - undo the spindle coupling; section 10.3.

21.3 Undo the bonnet to body bolting and remove the top works complete. For Fig. 640 valves air should be applied to the actuator to move the plug off of the seat.

21.4 The seat can now be unscrewed using a suitable tool located in the slots/holes provided. The threads in the valve body should be cleaned using a suitable tool and/or solvent.

21.5 For 3-way valves the seat in the bottom cover should similarly be removed.

21.6 When fitting new seats, a continuous bead of thread sealant (Loctite '510' is recommended) should be placed around the seat threads. The new seat should then be screwed down tightly into place.

21.7 Remove the gasket from the body/bonnet joint and clean the seating surface prior to fitting a new gasket.

21.8 For 3-way valves remove the gasket from the body/bottom cover joint; section and clean the seating surface prior to fitting a new gasket. Re-fit the bottom cover; section 19.3.

21.9 **For Fig 640 valves** - Apply compressed air to the actuator in order to raise the plug while re-fitting.

21.10 Place the bonnet/pillar/actuator/spindle assembly into the body. Tighten the body to bonnet bolts uniformly and in a diametrically staggered pattern.

21.11 **For 3-way valves (Fig. 660/ Fig. 680)** – reconnect the valve and actuator spindles with the spindle coupling and re-set the actuator; section 12.0 to 12.10.

21.12 Remove compressed air from actuator.

22.0 Spare Parts / Valve Refurbishment

22.1 Northvale offer a full spare parts service and factory valve refurbishing service. Please contact our sales department for full details. When ordering spare parts please quote the valve serial number.

Fig. 1 - General Arrangement for Figure 620 Fail Open Valve

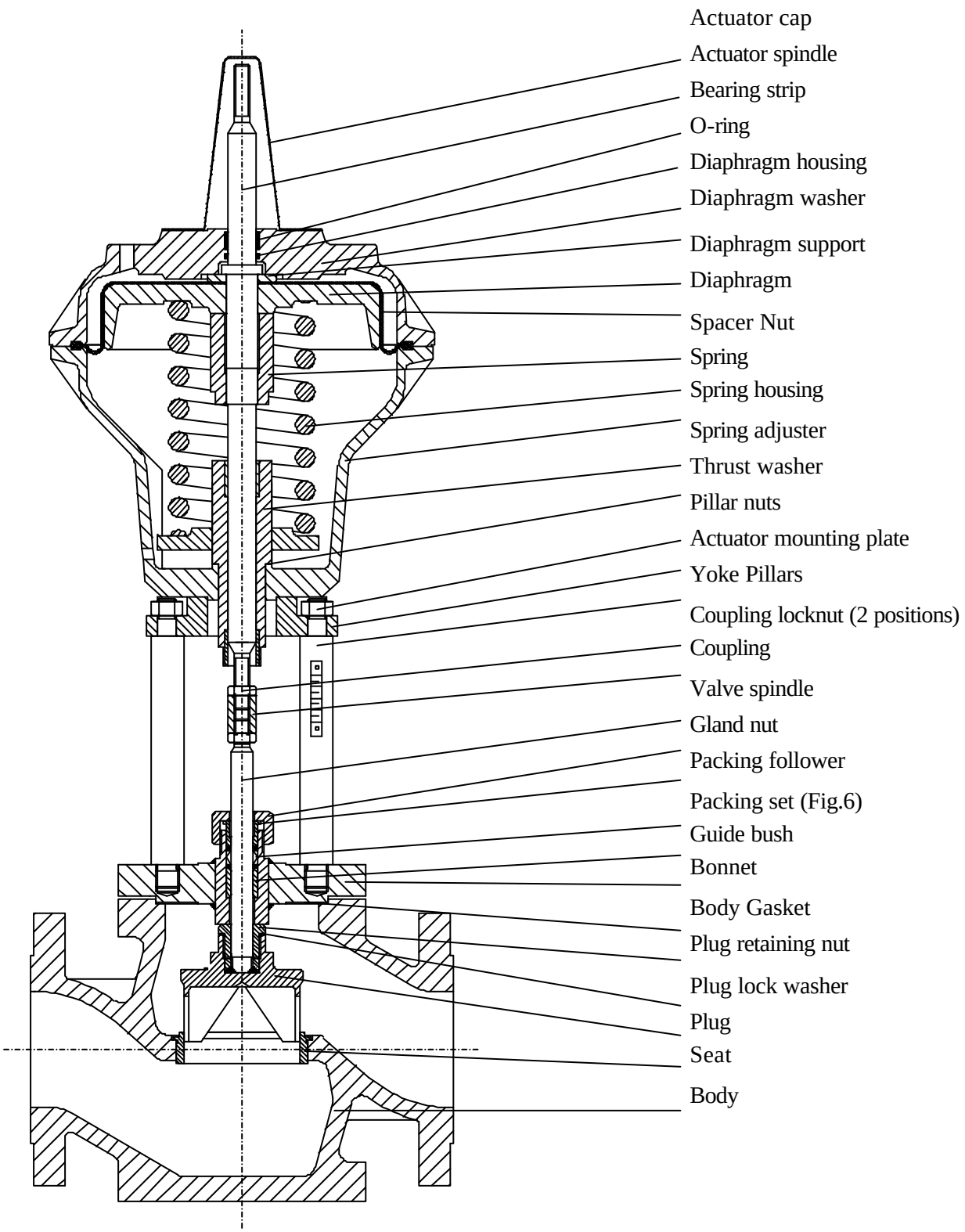

Fig. 2 - General Arrangement for Figure 640 Fail Closed Valve

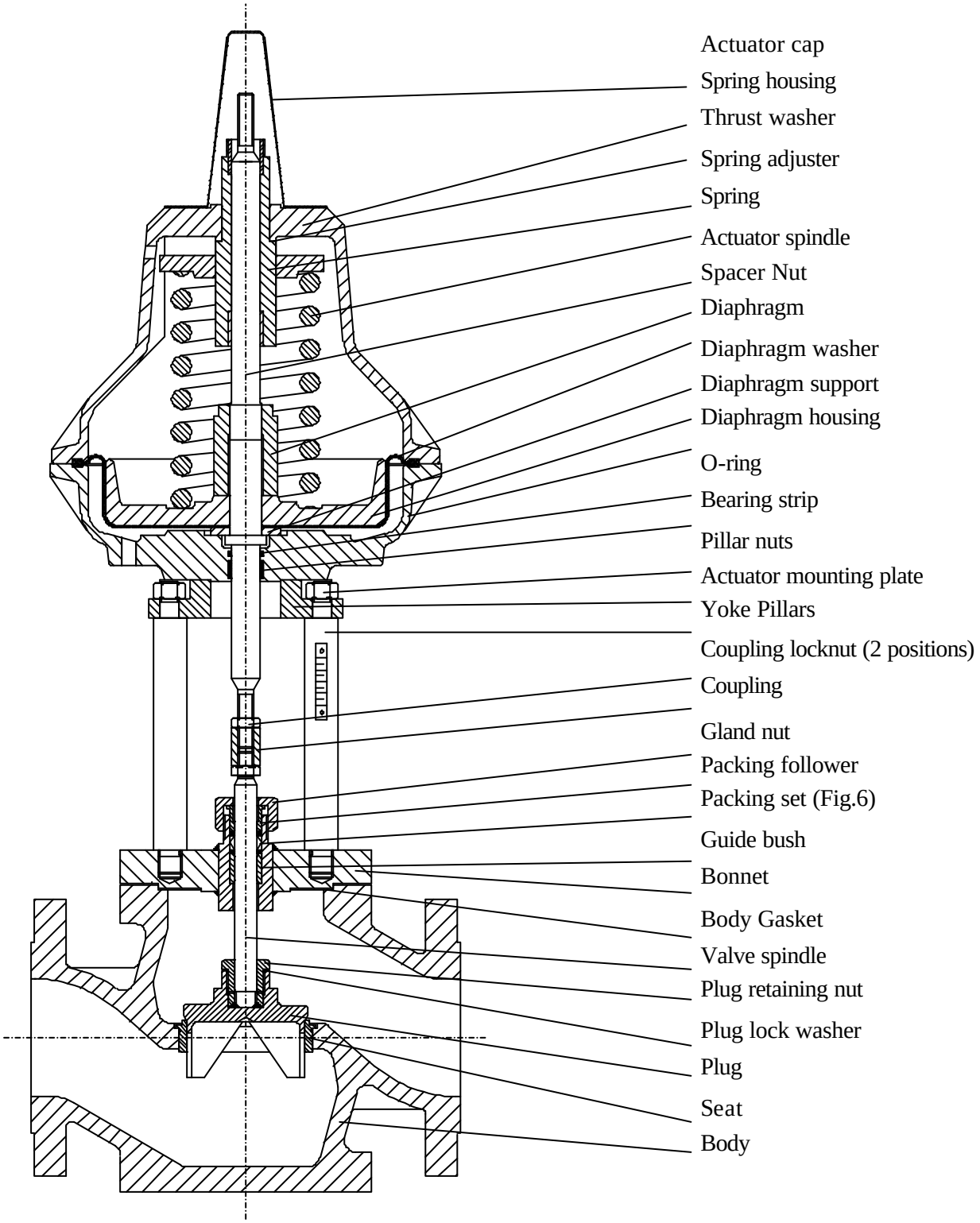

Fig. 3 - General Arrangement for Figure 660 Fail Top Seat Valve

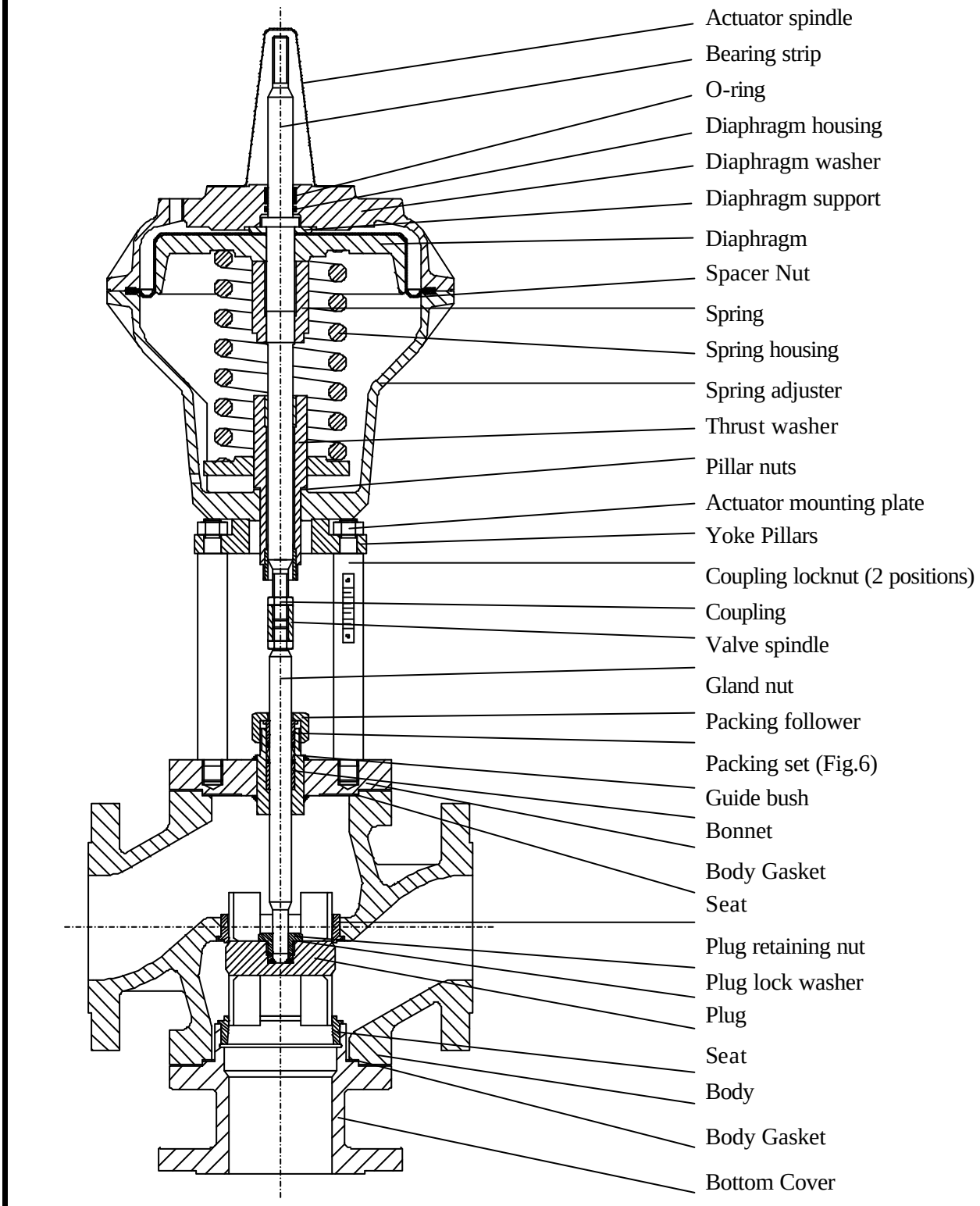

Fig. 4 - General Arrangement for Figure 680 Fail Bottom Seat Valve

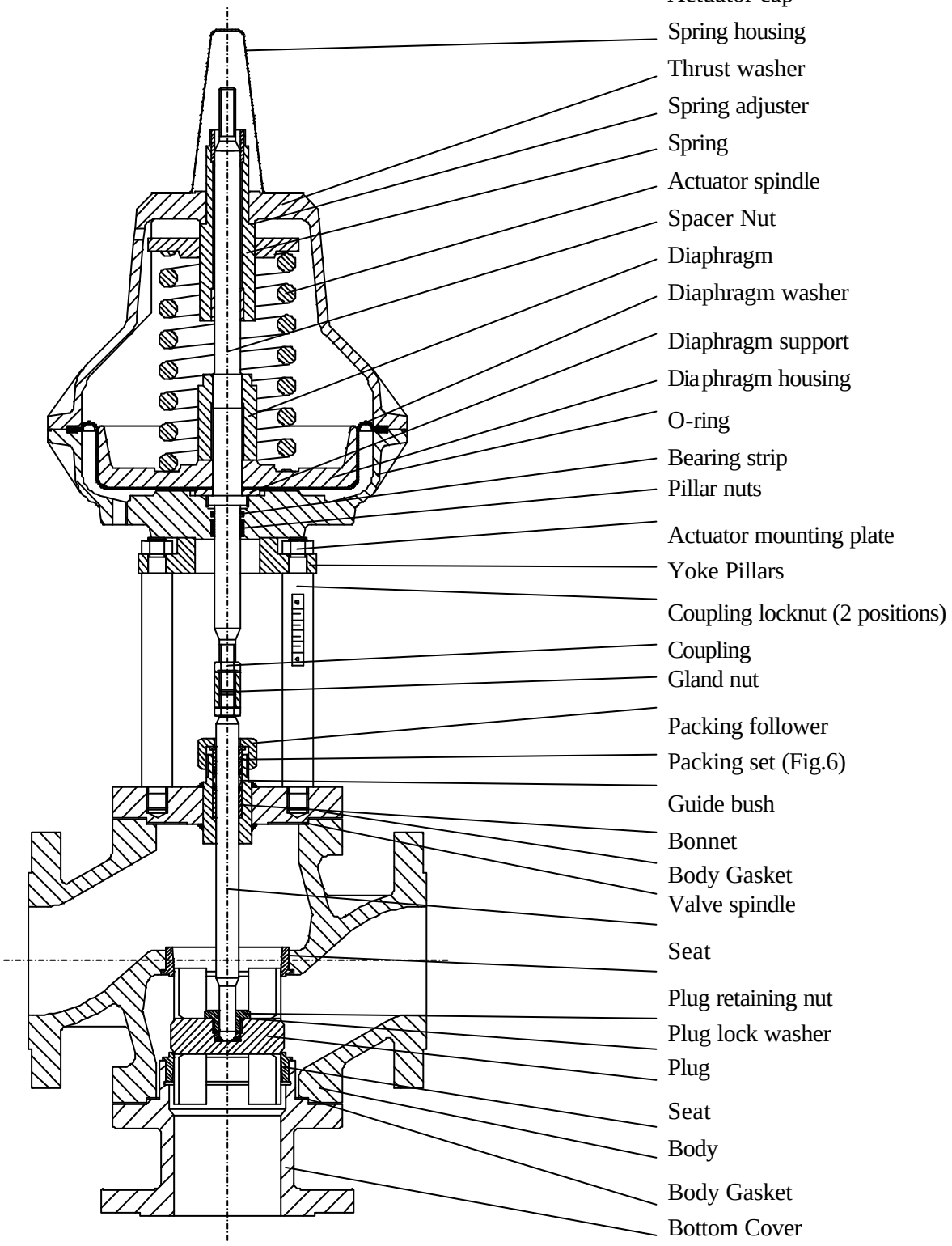

Fig. 5 - Packing Set Arrangement

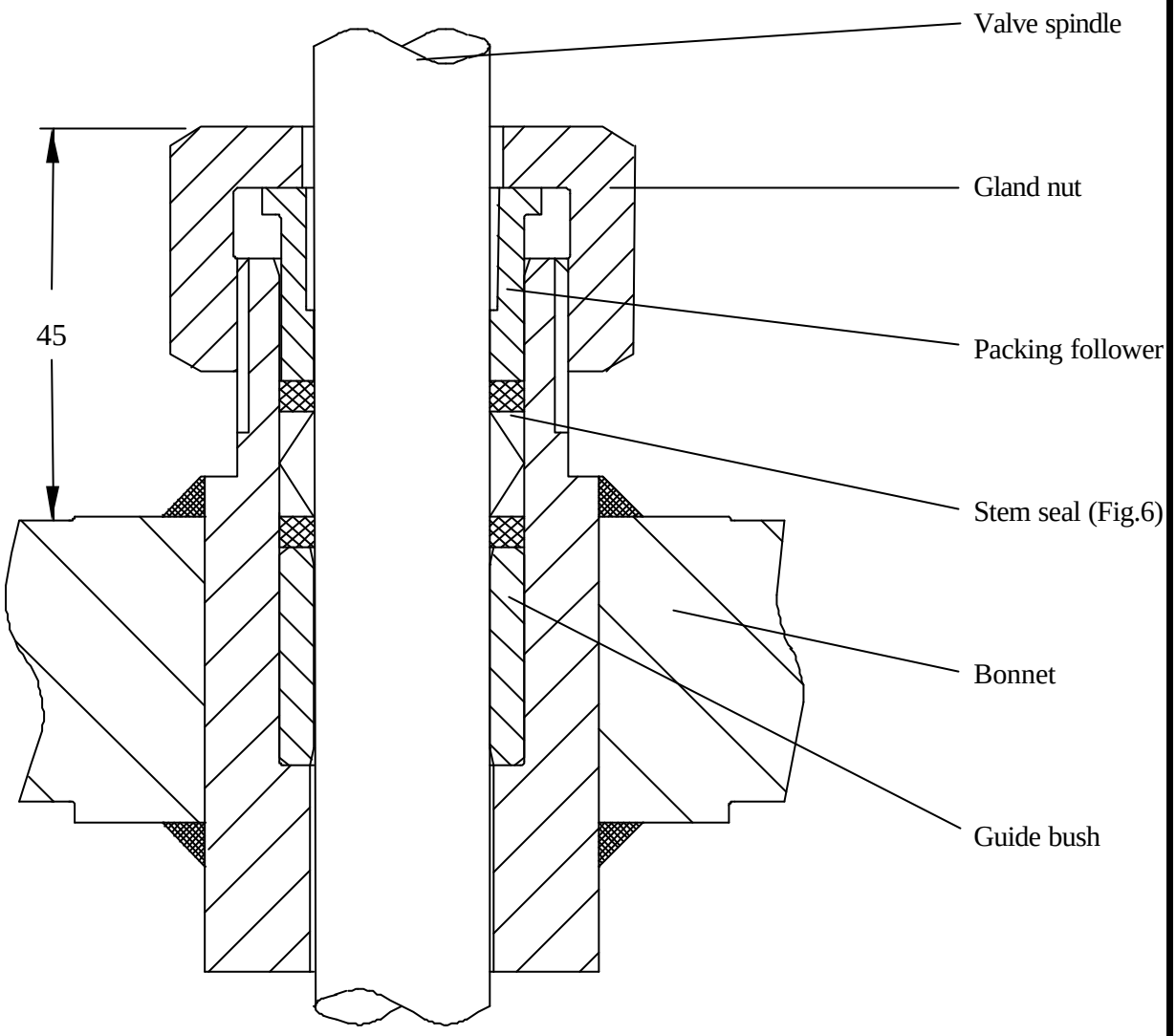

Fig. 6 - Seal Arrangement

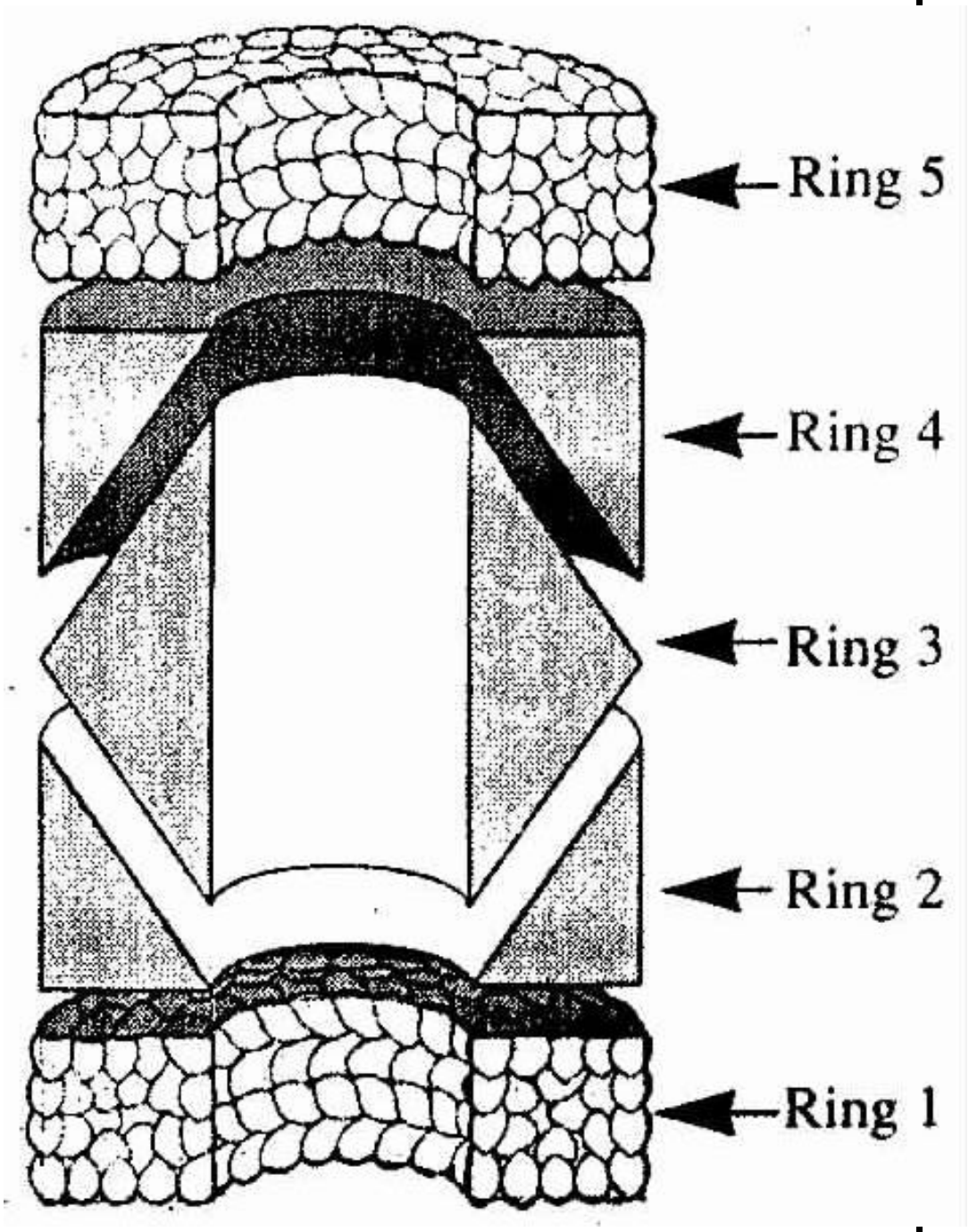

Fig.7 Handjack Assembly – Air Fail Open

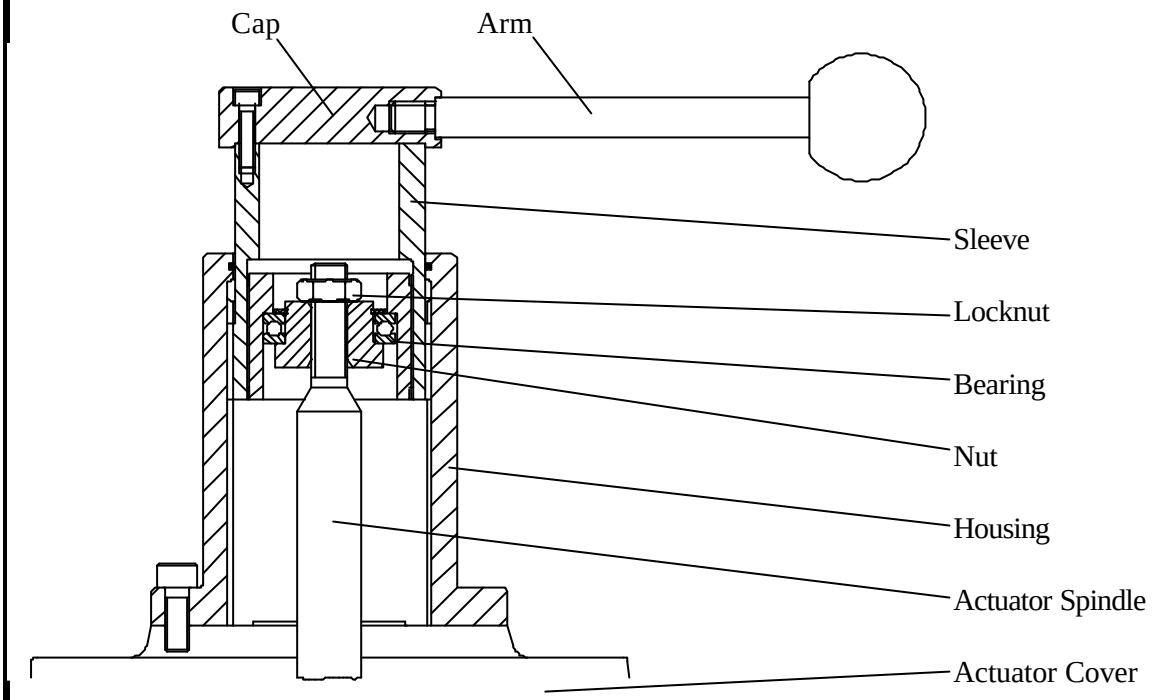

Fig.8 Handjack Assembly – Air Fail Closed