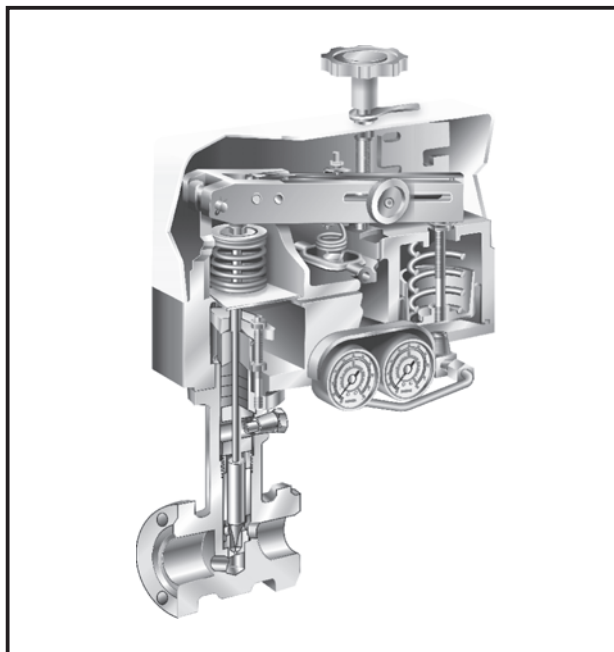


Instruction Manual

MIL 29000

Micropak Control Valves



Purchase Order No : _____



The following instructions should be thoroughly reviewed and understood prior to installing, operating or performing maintenance on this equipment. Throughout the text, safety and/or caution notes will appear and must be strictly adhered to, otherwise, serious injury or equipment malfunction could result.



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Note: Easily replaceable pressure gauges for air sets and externally mounted pressure gauges of positioners are normally dismantled, separately packed and bound to the actuator yoke as a precaution against transit damages. This may be noted while opening the boxes.

Warning: Do not lift large size valves by the actuator. Lifting lugs provided on the actuators are for lifting the actuator alone.

1. Introduction

The following instructions should be thoroughly reviewed and understood prior to installing, operating or performing maintenance on this equipment. Throughout the text, safety and/or caution notes will appear and must be strictly

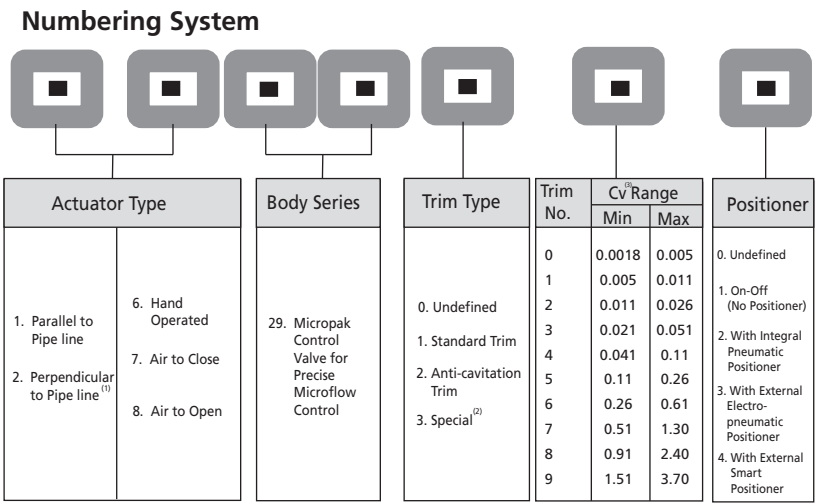
adhered to, otherwise, serious injury or equipment malfunction could result. MIL has a highly skilled Aftermarket department available for start-up, maintenance and repair of our valves and

component parts. Arrangements for availing their service can be made through your local representative or Aftermarket department. In addition, a regularly scheduled training program is conducted at our plant, to train customer service and instrumentation personnel

in the operation, maintenance and application of MIL Control valves and Accessories. Also when performing maintenance, please ensure that only original MIL replacement parts are used. When specifying parts, always include serial number of the valve.

Caution: Skilled service personnel to be engaged for start-up, maintenance and repair of the valve.

Caution: Always use original MIL replacement parts while performing maintenance.



- (1): Not Available with cast body construction
(2): Available on request- Bellows sealed, Cryogenic versions etc
(3): For discrete Cv values, please refer page 4

2. General

Designed specifically for microflow applications, MIL 29000 series Micropak provides excellent throttling control performance with a wide range of options and capabilities. Design optimization has also resulted in an extremely integrated and compact assembly. Rugged valve plug support is provided along the entire stroke length using an integrated plug guide and seat ring. This ensures excellent plug stability and control even under high pressure high drop conditions. Micropak's simple top-entry body construction includes an integrated body and bonnet design, which allows easy access and removal of quick change trim.

The following instructions for installation and maintenance are compiled to assist personnel in performing most of the maintenance required on the MIL 29000 series control valves. Recommended spare parts required for maintenance are listed in parts list of page 11. The model number, size, rating and serial number of valve are shown on the identification tag located on the actuator. Special supplements or addendums to this instruction manual may be required for special engineered products developed to meet specific customer requirements.

3. Operations

MIL 29000 series micropak control valves provide control of high pressure fluids with excellent throttling control and wide range of rated flow coefficients (Cv) from 0.0018 to 3.7.

3.1 Precise Adjustment of Adjustable – Cv Valve

The valve is adjusted using a simple, but robust, crossed-lever system with an adjustable fulcrum. This can be done easily by hand, either before installation or during operation.

3.2 Plug Seat Ring Combinations

Eight plugs and five seat rings are used to make up the ten available plug and seat ring combinations, identified by codes from 0 to 9 (see figure 1). The shape of each plug and the port diameter of the seat ring can be used to match parts with the table in figure 2. The difference between the four plugs in trim Nos. 0 to 3 lies in the angle of the flat machined on the tip. The same seat ring and the same spacer are used in all four cases (see figure 2). Use the table in figure 1 to select the plug and seat ring combination to obtain the Cv value or range of Cv values.

Trim No:	Flow Coefficient - Cv						
	With Adjustable Cv Function						
	Min			Risk Free			Max
0	0.0018	0.002	0.0026	0.003	0.0033	0.0037	0.005
1	0.005	0.006	0.007	0.008	0.01	0.01	0.011
2	0.011	0.014	0.017	0.02	0.022	0.024	0.026
3	0.021	0.026	0.031	0.036	0.041	0.046	0.051
4	0.041	0.06	0.05	0.065	0.085	0.1	0.11
5	0.11	0.14	0.17	0.2	0.22	0.24	0.26
6	0.26	0.31	0.36	0.41	0.46	0.56	0.61
7	0.51	0.61	0.71	0.81	0.91	1.2	1.3
8	0.91	1.11	1.31	1.51	1.71	2.2	2.4
9	1.51	1.91	2.31	2.61	2.91	3.4	3.7

Figure 1

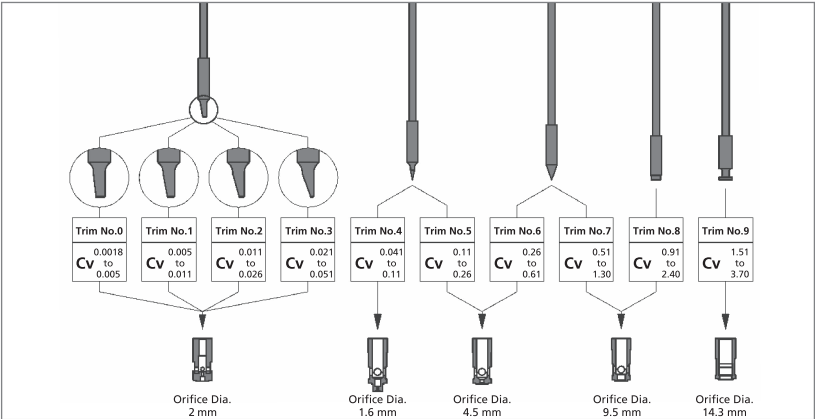


Figure 2

3.3 Changing the Plug and Seat Ring Combination

- The plug and seat ring combination can be changed very easily for trim Nos. 1 to 9 inclusive. Simply replace the following parts:
- The plug and seat ring (see figures 1 and 2 to select the combination required for the Cv).
- The Cv adjustment scale (19).
- The actuator spring (50) (see figure 3 to check the spring range corresponding to the Cv).
- Also change the serial plate (51) or correct the information on the existing plate.

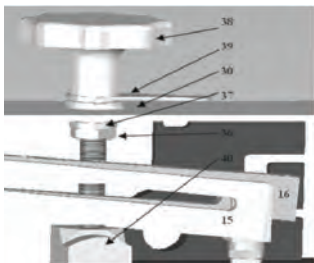
Trim No:	Rated Cv Range	Spring Ranges / Supply Pressure(Psi)	
		ATO	ATC
0	0.0018To0.005	3-15/20	3-15/30
1	0.005 To 0.011		
2	0.011 To 0.026		
3	0.021 To 0.051		
4	0.041 To 0.11		
5	0.11 To 0.26	6-24/30	
6	0.26 To 0.61		
7	0.51 To 1.3		
8	0.91 To 2.4		
9	1.51 To 3.7		

Figure 3 : Actuator Spring range and supply pressure

3.4 Adjusting the Cv for each Plug and Seat Ring Combination

This is done by moving adjustment knob (18) along adjustment scale (19) fastened to the top of lever No. 1 (15). For that loosen adjustment knob (18) and slide it along the lever to the required value. Tighten the adjustment knob again firmly. The adjustment scale (19) gives the range of Cv values offered by the selected plug and seat ring combination. Carry out this adjustment offer as follows:

3.6 Handwheel (Figure 5)



Handwheel



Figure 4:Adjusting Cv for each plug /seat ring combination

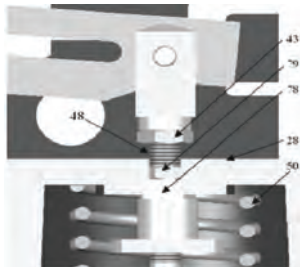
3.5 Actuator

A single actuator allows Micropak valves to act in direct Air-to-Close (ATC) or reverse Air-to-Open (ATO). Valve action can be changed by simply shifting:

- Pivot pin for lever no: 1
- Pivot pin for lever no: 2
- Replace lever arm stop (40).

Note : For ATO actuator, confirm the spring initial as 3 psi for 3-15 spring and 6 psi for 6-24 springs. Micropak actuators are equipped with a limit stop (78) and locknut (79) and are designed to prevent damage to the plug and seat ring (2) assembly and/or the plug stem in the event of handwheel or actuator over stroke in the case of ATC actuator. And it also limits the actuator stroke in the case of ATO actuator (see figure 5). See figure 3 to check spring range and supply pressure corresponding to valve action. If necessary, change the spring also.

Note : When the indicator (44) moves from bottom to top, the valve will start to open in ATO actuator and valve will start to close in ATC/handwheel operated actuator.



Limit Stop

Figure 5

The handwheel is an optional feature located on top of the cover (30) and fitted with a handwheel lock (39). Access can be gained to it directly without removing any other parts. It consists of a threaded rod; equipped with a handwheel (38) and a lever arm stop (40). The threaded rod rests freely on the actuator bracket (28) and is guided through the cover (30) by handwheel bushing (37). The stop consists of a block screwed onto the threaded rod. The block is guided by the actuator bracket (28).

When the handwheel (38) is turned clockwise, the stop (40) moves up the threaded rod, compressing the spring (50) and raising lever No. 2 (16). This closes the valve if the valve is equipped with a direct-action actuator (Air-to-Close) and opens the valve if it is equipped with a reverse-action actuator (Air-to-Open).

The valve can be returned to automatic mode (neutral position), by turning the handwheel counterclockwise until the stop (40) comes into contact with the bracket (28).

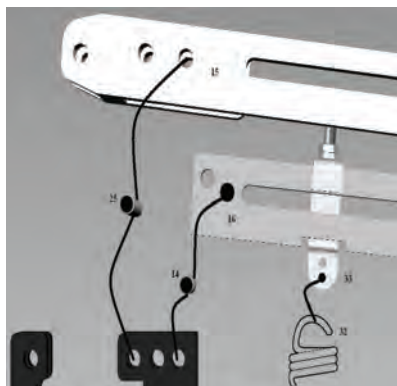
3.7 Reversing the Valve Action (Figure 5, 6, 14 And 16)

- A. Loosen and remove cover (30). On valves equipped with a handwheel, loosen cover screw (29), back off handwheel lock (39) and turn hand wheel (38) counterclockwise to release cover (30).
- B. Adjust the signal so that the valve closes. Change the signal slightly so that the plug just moves off the seat ring (2). Set the adjustment knob (18) to the minimum Cv setting.
- C. Loosen locknut (23) and using a screwdriver, turn the plug stem one and

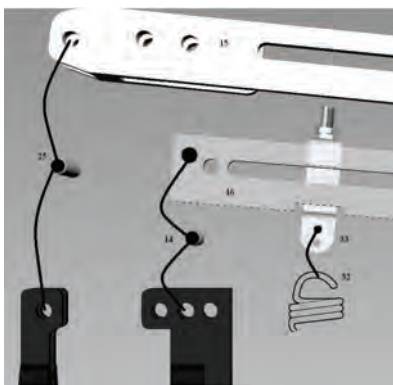
three-quarter turns counterclockwise. Shut off the signal and the supply pressure. Slightly tighten locknut (23) against the clevis.

Note: If the valve is with in-built positioner, unlock nut (35) and completely loosen take-up screw (34). Unhook balance spring (32) from spring clamp (33).

- D. Remove retainer clips (31) from each of the two pivot pins (80) and remove pins from lever no.1 (15) and plug clevis (24).
- E. Remove the two retainer clips (31) from pivot pin No.1 (25) and disengage it to uncouple lever No.1 (15) from actuator bracket (28). Loosen adjustment knob (18) and slide it to the maximum Cv setting. Disengage the smooth end of the adjustment pin (17) from the groove in lever No.2 (16) while removing lever No.1 (15).
- F. Drive out pin No.3 (14) and remove lever No.2 (16) from the bracket (28).
- G. Remove the two screws (20) and refit Cv adjustment scale (19) after turning it round to comply with the new action.
- H. Refit levers No.1 (15) and 2 (16) in sequence, making sure that pins (25) and (28) are fitted into the correct holes in the levers and bracket (28) for the new action of the actuator (see figure 6).
- I. Reset adjustment knob (18) to the minimum Cv position.
- J. Couple plugstem clevis (24) to lever No. 1(15) following the normal reassembly procedure (step L. in the "Reassembly" section).



Air- to- close Actuator



Air- to- open Actuator

Figure 6 - Identification of lever pivot pin holes

- K. Hook spring (32) in the appropriate hole in spring clamp (33) (see figure 6).
- L. Admit supply and signal pressures and complete calibration. Refit cover (30) using the two screws (29). If the valve is equipped with a handwheel, refit the cover and turn the handwheel clockwise so that it engages in lever arm stop (40). Tighten cover screws (29).
- M. Put the valve back into service.

Note: When replacing an Air-to-Close actuator with an Air-to-Open actuator, adjust the limit stop to limit the actuator stroke.

Note: When replacing an Air-to-Open actuator with an Air-to-Close actuator, set the limit stop to prevent the plug and seat ring in the event of handwheel or actuator over stroke.

4. Unpacking

Warning: Care must be exercised when unpacking the valve to prevent damage to the accessories and component parts. Should any problem arise, contact your local representative or MIL Aftermarket department. Do not remove end protection cover before installation.

5. Installation

Caution: Before installing the valve in the line, clean piping and flush the line to remove all foreign material such as welding chips, scale, oil, grease or dirt. End flange gasket surfaces must be thoroughly cleaned to ensure leak proof joints.

To allow in-line inspection, maintenance or removal of the valve without service interruption, provide a manually operated stop valve on either side of the MIL 29000 series valve with a manually operated throttling valve mounted in the by-pass line. (See figure 2)

The recommended orientation is flow-to-open.

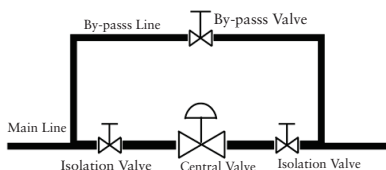


Figure 7

Caution: The valve must be installed so that the controlled substance will flow through the valve in the direction indicated by the flow arrow located on the body.

Caution: Where insulation of the valve body is required, do not insulate the valve bonnet. Take necessary protective measures for personal safety.

6. Air Piping

Air piping size shall be as per the specification of air filter regulator.

Warning : Do not exceed supply pressure indicated on tag plate.

7. Valve Disassembly

In some cases, it may be necessary to disassemble the Micropak valve, for example, to replace the plug/seat ring (2) assembly (fitting new parts or changing the maximum Cv value) or to change the packing rings.

Following are the procedures for disassembling the valve,

- A. Loosen cover screws (29) and remove cover (30). If the valve is equipped with a

handwheel, loosen cover screws (29) and handwheel lock (39), then turn handwheel (38) counterclockwise to release cover (30).

- B. Adjust the signal to close the valve. Change the signal slightly so that the plug just moves off the seat ring (2). Set adjustment knob (18) to the minimum Cv position.
- C. Loosen locknut (23) and using a screwdriver, turn the plug stem one and

three-quarter turns counterclockwise. Shut off signal and supply pressure. Slightly tighten locknut (23) against the clevis.

- D. Completely loosen locknut (35) and take-up screw (34). Remove spring clamp (33) from lever No. 2 (16) and remove balance spring (32) from the positioner.
- E. Remove the retainer clip (31) from each of the two pivot pin no.2 (80) and disengage the pins from lever No. 1(15) and clevis (24).

Note: This operation will be simplified by relieving the load exerted on the plug clevis by the conical compression spring (26). To do this, push against the plug stem end with a screwdriver, while driving out the pins.

- F. Remove the two retainer clips (31) from pivot pin No. 4 (42) and disengage the pin to uncouple piston clevis (24) from lever No. 2 (16).
- G. Remove the two retainer clips (31) from pivot pin No.1 (25) and disengage the pin

to uncouple lever No.1 (15) from the actuator bracket (28). Disengage the smooth end of adjustment pin (17) from the groove in lever No.2 (16) and remove adjustment knob (18) and adjustment pin (17) from lever No.1 (15).

- H. Drive out pivot pin No. 3 (14) and remove lever No. 2 (16).
- I. Hold the plug stem in place using a screwdriver and unlock nut (23). Loosen clevis (24) and locknut (23). Remove spring button (22), spring (26) and grommet support plate (21).
- J. Remove the two packing flange nuts (8), packing flange (10) and packing follower (9). Remove the two bracket mounting nuts (7) as well as the bracket (28).
- K. Using a packing hook, remove as many packing rings (6) as possible from the packing box. Remove safety pin (11) and pull the plug stem to remove the packing spacer (4), the plug and its stem and, if necessary, the rest of the packing.
- L. Using a 5/8" Allen key, unlock and pull out the seat-ring retainer (4).
- M. Remove seat ring (2) and seat ring gasket (1) using a hook made from steel wire.

8. Maintenance

8.1. Actuator Diaphragm Removal

Unscrew the two pressure connection nuts on union elbow (54) and pull tubing (56) out. Remove the four cover cap screws (55) and diaphragm cover (53). Remove the worn diaphragm. Form new diaphragm (52) and fit it on the piston as shown in figure 12. Fit the diaphragm roll into the bracket groove. Take care not to twist or bend the diaphragm during replacement. Refit diaphragm cover (53) with the four screws (55) and reconnect the tubing with the union elbow (54). Check if all connections are leak tight.



Figure 8 . Diaphragm Replacement

8.2. Adding Packing Ring

Before adding packing ring (5), the valve must be isolated and all pressure released. Remove packing flange nuts (8), lift the packing flange (10) and follower (9) and insert a new packing ring (5). Tighten nuts (8) finger tight and then tighten one full turn with the wrench.



Figure 9. Adding a Packing Ring

8.3. 7700 Positioner Maintenance

- A. Disconnect the two pressure connection nuts on union elbow (54) and pull tubing (56) out.
- B. Loosen the two cap screws (57) and remove manifold block (60), spring (71), gasket (62) and

its three O-rings, pilot valve assembly (68 to 70), shims (61), and O-ring (66).

Caution: Handle the shims carefully (61).

- C. Loosen locknut (35) and take-up screw (34); unhook the spring clamp from lever (16).

Note: Spring adjustment plate (72) is mounted upon the lever (16) by using screws (73), where take up screw (34), is positioned. This spring adjustment plate is given to adjust the span during the time of calibration

- D. Unscrew cap screws (57) from positioner block (63) and remove the positioner block from the actuator bracket (28). Remove screws (64) to separate positioner diaphragm assembly (65) and spring (67) from the positioner block. Examine all the parts and replace, if worn or damaged.
- E. Refit positioner diaphragm assembly (65) and spring (67) to positioner block (63) and tighten screws (64). Check that the small signal port O ring is in its recess in the diaphragm assembly.
- F. Reinstall the block assembly on the actuator bracket (28).

Note: When installing the positioner block (63), turn it so that when the manifold block (60) is installed, the gauges are facing the right direction.

- G. Check if gasket (62), three O-rings, and seats are not worn or damaged. Replace if necessary.
- H. Fit O-ring (66), shims (61), pilot valve assembly (68 to 70), gasket (62) and its three O-rings, spring (71) and manifold block (60). Tighten the screws (57) and refit tubing (56) with the union elbow (54).

Note: The ports in gasket (62) must be aligned with those in the positioner block (63). To ensure correct positioner performance, check if all gaskets are perfectly leak tight.

- I. Hook spring clamp (33) to lever (16). Admit the supply pressure and the signal. Set the start-up pressure following the instructions given in the 'Calibration' chapter. Put back into service.

9. Valve Reassembly

Before reassembly, thoroughly clean the inside of the valve body and parts, paying particular attention to gasket seating surfaces and contact surfaces. Make sure to use a new seat-ring gasket (1) and new packing (6) during reassembly.

- A. Insert a new seat-ring gasket (1) into valve body (13), then fit seat ring (2), making sure that the gasket is correctly centered on the seat-ring shoulder.
- B. Carefully apply Never Seez grease or equivalent (compatible with service fluid) to the threads and bottom of the seat-ring retainer (4). Using a 5/8" or 16 mm Allen key, lock the retainer upon the seat ring. (see figure 14).

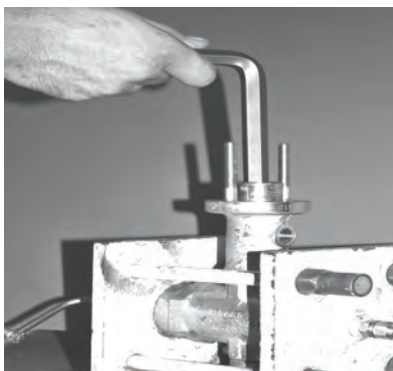


Figure 10

Tightening the Seat Ring Retainer

- C. Insert the plug and stem assembly into the seat ring. For all valves especially anti-cavitation type, check that there is no friction point in the plug stroke. If a friction point is detected, loosen retainer (4) and reposition seat ring until the stem slides smoothly. Fit spacer (4), turning it so that one of its holes is aligned with safety pin (11) hole in the valve body.
- D. Wind two layers of PTFE tape around the safety pin (11). Screw the pin into the bonnet five and a half to six turns from the thread engagement point.
- E. Fit the packing (5), making sure that the skive cut of each packing ring is located 45° away from that of the adjacent ring. Push the rings down slightly using a tube. Fit the packing follower (9) onto the plug stem (12).
- F. Fit actuator bracket (28) and secure it with two nuts (7). Slip packing flange (10) onto plug stem. Hand tighten the two packing flange nuts (8) and add one full turn with the wrench.
- G. Fit in the following order, grommet plate (21), conical compression spring (26) and its spring button (22) (see position in figure 16 and 17). Screw nut (23) and clevis (24) on the plug stem. Adjust the nut and clevis without locking them together until the clevis holes are positioned approximately 1.5 mm above the alignment of the pin holes in the actuator bracket.

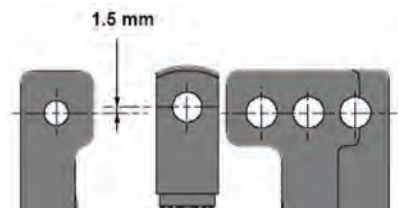


Figure 11. Plug Stem Pre-adjustment

- H. Couple lever No. 2 (16) to the actuator bracket (28) using pin (14). Ensure that the hole in lever No. 2 (16) where the

spring clamp (33) is fitted is located above and in line with balance spring (32).

- I. Fit adjustment pin (17) in the slide of lever No. 1 and screw adjustment knob (18) on its threaded end. Insert the smooth end of pin (17) into the groove in lever No.2 (16) and place lever No. 1(15) on actuator bracket (28). Couple lever No. 1 to actuator bracket (28) using pin (25) and two retainer clips (31).
- J. Set adjustment knob (18) to the minimum Cv position.
- K. If piston rod clevis (24) has not been disturbed during disassembly; couple it to the end of lever No. 2 using pin (42) and two retainer clips (31).
- L. Couple clevis (24) to lever No. 1. To do this, press the end of the plug stem with a screwdriver until the holes in the clevis (24) and lever No. 1 (15) are aligned. Couple using the two pins (80) and retainer clips (31).
- M. Fully unscrew take-up screw (34) from spring clamp (33), then fit clamp, after hooking balance spring (32) first to the positioner spring bracket of the diaphragm S/A (65) and then to spring clamp (33).

Note: The spring clamp (33) has two holes. If an Air-to-open actuator is used, the spring must be hooked to the top hole. If an Air-to-close actuator is used, the spring must be hooked to the bottom hole (see figure 6).

- N. Admit the signal and supply pressure and complete calibration. Refit cover (30) using the two screws (29). If the valve is equipped with a handwheel, refit the cover, then turn the hand wheel clockwise until it is engaged in lever arm stop (40). Tighten cover screws (29).
- O. Put the valve back into service.

10. Calibration

Micropak valves are factory-calibrated according to the components specified in the customer order. If for any reason this calibration has been disturbed [(eg. After changing from direct to reverse valve action,

or replacing the plug(18) and seat ring (2)], all or some of the adjustments below must be carried out in the following order:

- Piston rod clevis (24) adjustment.
- Plug stem adjustment.

- Limit stop adjustment.
- Cv adjustment.
- Positioner start-up pressure adjustment.

10.1 Piston Rod Clevis Adjustment

With the piston resting against diaphragm cover (53), turn clevis (24) at its full thread. This is for getting the maximum initial thrust of spring. For ATO actuator confirm the spring initial as 3 psi for 3-15 psi spring or 6 psi for 6-24 psi spring. Couple lever No.2 (16) in this clevis position. Admit enough air pressure to disengage locknut (43) and tighten it against the indicator (44). Release air pressure.

10.2 Plug - Stem Adjustment

Once all the coupling operations are completed, proceed as follows:

- Loosen adjustment knob (18) and slide it along lever No. 1(15) to the maximum Cv position on adjustment scale (19). Fully tighten adjustment knob (18).
- Loosen locknut (23) and, using a screwdriver, turn the plug stem (12) until the plug is just touching the seat ring (2).
- Admit supply pressure to the actuator and measure the actuator stroke.
- Loosen adjustment knob (18) and slide it along lever No. 1(15) to the minimum Cv position on adjustment scale (19). Fully tighten adjustment knob (18). Measure the actuator stroke.
- If the stroke at minimum Cv position is less than that at maximum Cv position, loosen locknut (23) and using a screwdriver, lift the plug. And if the condition is reverse, down the plug.
- By trial and error method, get the same stroke on each side.(Now the slots in lever 1 & 2 are parallel). Using the screwdriver to hold the plug stem in position, tighten locknut (23) against clevis (24).
- Then by adjusting the limit stop set the actuator stroke 22mm for ATO and 25 mm for ATC. Confirm the stroke of plug as 2.5mm.

10.3 Limit Stop Adjustment

Micropak valves include a limit stop to prevent damage to the plug and seat ring (2) and/or plug stem in the event of actuator or handwheel overstroke and also to limit the stroke. This device consists of a limit stop (78) acting as a stop, screwed onto the piston rod inside the spring chamber and a lock nut (79). This device

should be adjusted immediately, after plug stem adjustment.

For ATC Actuator

- Admit sufficient supply pressure to close the valve. Turn locknut (79) on the piston rod until it touches locknut (43). Turn limit stop (78) until it just touches the inside of actuator bracket (28).
- Hold the limit stop with a wrench and tighten locknut (79). Release the air pressure.

For ATO Actuator

- Admit sufficient supply pressure to open the valve. Turn locknut (79) on the piston rod until it touches locknut (43). Turn limit stop (78) until get the actuator stroke of 22 mm.
- Hold the limit stop with a wrench and tighten locknut (79). Release the air pressure.

10.4 Cv Adjustment

This adjustment is carried out by moving adjustment knob (18) along adjustment scale (19) fastened to the top of lever No. 1 (15). See section “Adjusting the Cv for each plug and seat ring (2) combination”

10.5 Positioner Start-up Pressure Adjustment

- Connect the air supply and signal lines to the positioner
- Set the supply pressure according to the valve Cv value (see the table in figure 3).
- Set the signal to the minimum value for an Air-to- Open actuator and to the maximum value for an Air-to-Close actuator. Turn take-up screw (34) until the piston rod just begins to move. Tighten locknut (35).

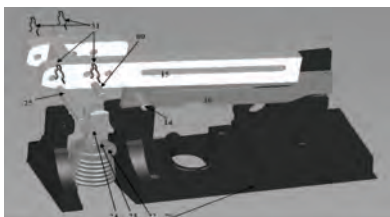
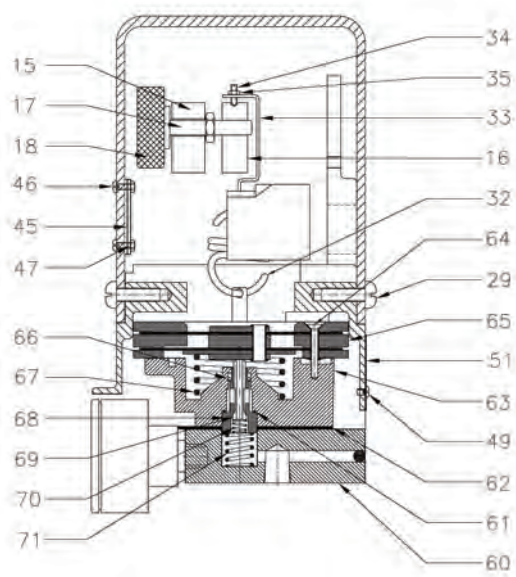
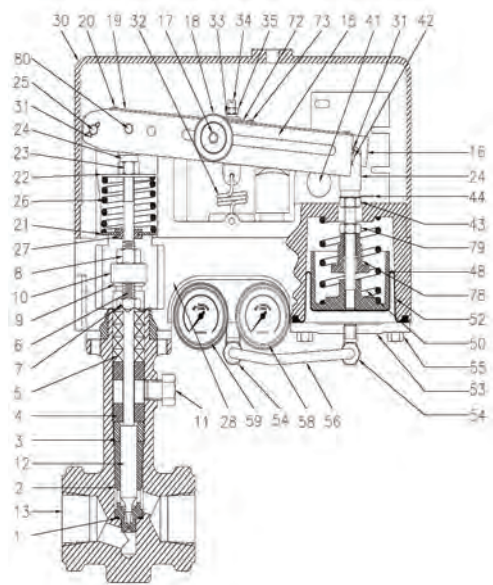


Figure 12. Coupling Details of Lever No.1 and 2

Cross Sectional View - Micropak Positioner



Cross Sectional view - Micropak S/A



Parts List

Ref. No	Qty	Part name	Ref. No	Qty	Part name
1	1	Seat ring gasket	41	1	Cover plug
2	1	Seat ring	42	1	Pivot pin No. 4
3	1	Seat-ring retainer	43	1	Locknut
4	1	Packing spacer	44	1	Indicator
5	4	Packing ring	45	1	Indicator plate
6	2	Packing flange stud	46	2	Indicator plate screw
7	2	Mounting nut	47	2	Speed nut
8	2	Packing flange nut	48	1	Piston SA
9	1	Packing follower	49	2	Serial plate screw
10	1	Packing flange	50	1	Actuator spring
11	1	Safety pin	51	1	Serial plate
12	1	Plug stem	52	1	Diaphragm
13	1	Body	53	1	Diaphragm cover
14	1	Pivot pin No. 3 (16/28)	54	1	Union elbow
15	1	Lever No. 1	55	4	Cover cap screw
16	1	Lever No. 2	56	1	Tubing
17	1	Adjustment pin	57	4	Screw
18	1	Ov adjustment knob	58	1	Output gauge
19	1	Ov adjustment scale	59	1	Instrument gauge
20	2	Adjustment plate screw	60	1	Manifold block
21	1	Grommet support plate	61	1 to 5	Shim
22	1	Spring button	62	1	Gasket
23	1	Locknut	63	1	Positioner block
24	2	Olevis	64	2	Slotted flat. c screw
25	1	Pivot pin No. 1	65	1	Positioner diaphragm SA
26	1	Conical compression spring	66	1	O-ring
27	1	Grommet	67	1	Spring
28	1	Actuator bracket	68	1	Sleeve
29	2	Cover screw	69	1	Spool
30	1	Cover	70	1	Spring
31	6	Retainer dip	71	1	Spring
32	1	Balance spring	72	1	Spring adjustment plate
33	1	Spring damp	73	2	Screw
34	1	Take-up screw	74	4	Washer
35	1	Locknut	75	4	Nut
36	1	Hand wheel locknut	76	2	Cover washer
37	1	Hand wheel bushing	77	1	Signal decal
38	1	Hand wheel	78	1	Limit stop
39	1	Hand wheel lock	79	1	Locknut
40	1	Lever arm stop	80	2	Pivot pin No. 2

Do's & Don'ts For Valves

Do's

1. Instruction manual should be read thoroughly and understood prior to installing, operating or performing maintenance on the equipment.
2. Highly skilled Aftermarket department personnel to be engaged for start up, maintenance and repair of our valves.
3. Use the right tool for the job.
4. Care must be exercised when unpacking the valve to prevent damage to the accessories and compact parts.
5. Be careful not to score the stem, plug and guiding surface.
6. Before installing the valve in the line clean the piping and valve for all foreign materials like weld chips, scale, oil, grease, etc.
7. Ensure all lubricants, sealing compound, O-ring and packing are compatible with process fluid.
8. New packing and gaskets should be on hand before reassembly
9. Gasket surfaces should be thoroughly cleaned to ensure leak proof joints.
10. Ensure the correct direction of flow on the valve as indicated in the flow direction located on the body.
11. Before performing maintenance on the valve, isolate the valve and vent the process pressure, shut-off supply line and pneumatic and electrical supply line.
12. Valve must be isolated and pressure vented before performing packing box maintenance.

Don'ts

1. Do not exceed supply pressure/electrical signals from specification of actuator or accessories.
2. Do not expose the valve to dust, sand, building material , etc. , during storage.
3. Do not remove end protective cover before installation.
4. Do not over tighten seat ring resulting in unwarranted seat leakage.
5. Do not over tighten packing box.
6. Do not use unauthorized spares.
7. Do not try to change packing when valves are in service.

IMPORTANT

In normal process control applications, expected life cycle of a control valve is 25 years with periodic maintenance and replacement of wear parts. We recommend inspection of valves in critical loops during all plant shutdowns.

Soft parts like gland packing, gaskets, seal rings etc are recommended to be replaced with OEM parts every time valve is opened for maintenance. Metallic Wear parts like plug, seat ring, cages etc are to be inspected in the event of performance deterioration and should be replaced if found necessary. Damage, if any, noticed to valve body and bonnet also should be replaced or repaired.

After the life-cycle, we recommend to dispose the parts as per your established procedures, through approved agencies only.



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