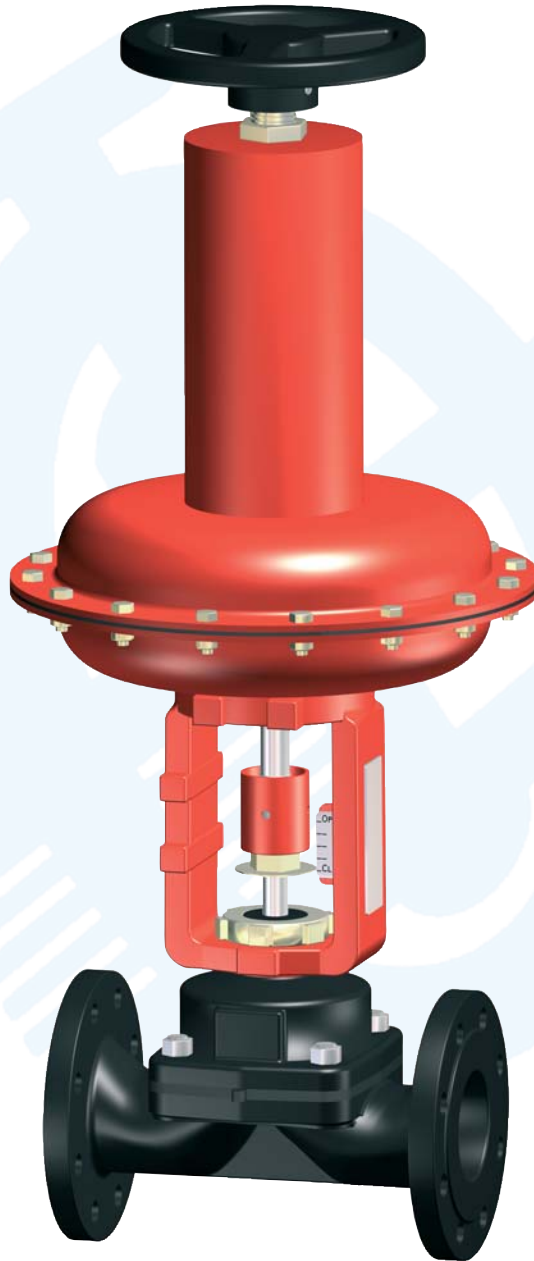


INSTALLATION, START-UP AND MAINTENANCE HANDBOOK



DIAVAL® PNEUMATIC ACTUATORS FOR DIAPHRAGM VALVES

1. – GENERAL INFORMATION. WORKING PRINCIPLE AND DOCUMENTATION.

- DIAVAL® Diaphragm Pneumatic Actuators are devised to operate diaphragm valves by means of an air supply to an enclosed cylinder which in turn expands or compresses a spring assembly. This spring assembly is connected by a spindle to the valve compressor to which the line diaphragm is attached.
- The range of Diaval® Pneumatic Actuators are manufactured and tested to conform to quality standards of DIN EN ISO 9001.
- Data Sheets are available detailing performance criteria of the full range of Diaval® Pneumatic Actuators.
- Diaval® reserves the right to modify any of all of the actuators due to development and improvement that may be deemed necessary at any time.
- Diaval® Pneumatic Actuator Data Sheets are freely available in .pdf format via the Diaval® website at www.dival.com or by contacting the Diaval® Technical Sales Team on +34 96 147 90 06.

2. – GUARANTEE.

- DIAVAL® Diaphragm Pneumatic Actuators are guaranteed for a period of one year from the date of purchase against any manufacturing defect that may have occurred in accordance to the 'Sound Engineering Practices' employed.
- DIAVAL® Diaphragm Pneumatic Actuators are guaranteed to perform in accordance with the operating criteria as stated in the available Data Sheets.
- The guaranteed becomes null and void should the actuator be subjected to mishandling, and operating parameters outside those detailed on the data sheets.
- The guarantee does not cover wear and tear of any actuator components of that have occurred and which are deemed to have been subjected to excess use.

3. – ESSENTIAL SAFETY GUIDELINES.

It is essential that all Health and Safety Instructions which are in force and implemented by the purchaser and/or his/her Company are followed at all times.

These instructions may override any recommendations supplied by DIAVAL® which are considered necessary.

DO NOT INSTALL the equipment before carefully reading and understanding the DIAVAL® Operating Instruction Sheets which are attached/supplied with each valve.

DO NOT USE the valve and/or actuator outside the operating parameters for which it is intended as described in our data sheets, essential safety working regulations are to be strictly kept.

Only qualified personnel should start up and regularly follow maintenance jobs at the plant.

Any deviation from the usual installation guidelines should be notified to us for recommendation and approval.

Operating parameters of the full range of DIAVAL® Diaphragm Valves and Actuators are available from the DIAVAL® Technical Department or via the DIAVAL® website at www.dival.com

4. –STORAGE & HANDLING.

Should storage or decommissioning of the actuator be necessary, the following guidelines are recommended:

Air connections should be covered or plugged to prevent ingress of dirt and other foreign material which could affect valve/actuator operation on start-up.

Valve flanges should be protected using the end-cap protection covers supplied with the valve upon delivery.

Exposed parts such as operating spindle, should be sprayed/coated with a film of grease to prevent corrosion from the environment.

When dismantling the actuator and/or valve ensure all safety precautions relating to “the lifting of heavy objects” are followed.

5. – INSTALLATION & START-UP.

Bear in mind the following guidelines along with general installation practices:

Ensure that air supply to the actuator is within the recommendations and parameters as detailed in the Operating Data Sheets. Excess air pressure can be dangerous to the operators and easily damage the valve actuator and valve components.

Ensure that actuator is not oversized to prevent premature valve diaphragm rupture.

Check that actuator function is the correct regarding safe position at air failure (air to open, air to close or double acting).

Allow for enough space to ease maintenance operations.

Remove the protective covers if they were still fit.

The actuated valve should preferably be installed in straight pipe runs, with a minimum distance of 5 times valve diameter away from pipe bends and ‘T’ connections.

The preferred position is with actuator vertically above the valve body, at an angle of 15-20 degrees from the horizontal plane of the pipe to ensure self drainage if on the open position. It may installed in different position provided that sufficient support is given to the actuator.

For Air to Open valve, refer to drawing 1:

Valve closes upon air failure. Before installing ensure that the scale indicator (5 & 7) is in its closed position. If the scale indicator is not in its closed position, rotate the handwheel (21) until the check nut (19) comes to rest on the spring chamber.

In this position the valve attains the ‘factory set’ position for the desired line pressure, and the position indicator will show ‘the closed position’.

For Air to Close valve, refer to drawing 2:

Valve opens upon air failure. Before installing the valve ensure that the scale indicator (5 & 8) is in its open position. If the scale indicator is not in its open position, rotate the handwheel (17) anticlockwise until the indicator shows that the valve is in its open position.

Check performance of the valve and actuator assembly, by applying the correct operating air pressure to the actuator as specified on the attached label.

Ensure that 100% leak-tightness is obtained with the valve in the closed position.

When the valves are manually operated, it is essential that the air is vented/released from the valve actuator-diaphragm casing.

CAUTION: USE OF EMERGENCY HANDWHEEL (part 21(drawing 1) or 17 (drawing 2))

Handwheel is used either for adjustment of spring tension and for emergency operation. Never operate handwheel unless air is free released/vented from the actuator.

After use of handwheel for emergency operation, actuator adjustment has to be rechecked as per explained in the previous paragraphs.

6. – MAINTENANCE AND SERVICE.

Preventative maintenance schedules as defined by the ‘Codes of Practice’ issued by the purchasing Company should be followed.

The following guidelines are also recommended:

- Actuated valves that are left normally closed or open for long periods of time should occasionally be operated in order to ensure movement of the operating parts.
- Greasing of the actuator stem should be periodically carried out.
- Ensure complete understanding of valve and actuator workings before attempting dismantling of the valve and/or actuator.
- Ensure valve and actuator is at ambient temperature before attempting to service.
- Ensure air is released from the actuator before attempting to service.
- Ensure operating line pressure is eliminated before attempting to dismantle or remove the valve from the line.
- Ensure full ‘Health and Safety’ instructions and procedures are followed in the event that the line

fluid is classified as toxic, corrosive or flammable.

- If the valve was not assembled on the 'self-drawn' position, ensure caution is taken if valve is removed from the line due to the possibility of line fluid being present in the valve.

6.1. – Recommended Spare Parts. Replacement.

AIR TO OPEN PNEUMATIC ACTUATOR (drawing 1):

- Spring (15)
- Operating Diaphragm (13)
- Seals (set of 2) (27)
- Gasket (10)

To replace the above spare parts, please proceed as follows :

Spring (15), drawing 1

- 1) Ensure that all operating air supplies are disconnected from the actuator.
By means of rotating the handwheel (21) in an anticlockwise direction ensure that the valve is in the open position and compression on the spring is removed.
- 2) Remove the handwheel (21) by means of unscrewing the two pin retainers (22).
- 3) Unscrew lifting screw (20) fully clockwise through the bore of the handwheel spindle (18) (use a long-blade screwdriver to achieve this).
- 4) Unscrew casing fastenings (24 & 25).
- 5) Remove upper casing (17), remove retainer (16) and finally remove spring-pack (15).
- 6) Replace new spring pack (15) onto the diaphragm plate (14) and refit spring retainer (16) ensuring that spring is vertical when in place.
Replace the upper casing (17) and replace/tighten the casing fastenings (24 & 25).
Rotate the handwheel (21) clockwise until the factory set check nut (19) locates on top of the housing.
The check nut is pre-set at the factory in order to achieve correct tension on the spring-pack which in turn is dictated by the operating conditions and available operating air pressure.
Screw the lifting screw (20) anticlockwise fully through the bore of the handwheel spindle (18).
Finally carry out a leak test of the casing by connecting the air pressure to the actuator and applying correct pressure as specified on the label (4)
The actuator, if dismantled from the valve, can then be remounted on the valve and connected to the valve spindle (2) by rotating clockwise until it reaches the scale indicator (05).
Finally tighten the yoke lock-nut (6).

Actuator Diaphragm (13), drawing 1:

Follow steps 1-5 as above.

Unscrew grub screw (23a) on the nut (23).

Unscrew the retaining nut (23), remove the spring washer (30) and diaphragm plate (14) and finally the actuator diaphragm (13).

Assembly: Before re-fitting the new actuator diaphragm, it is essential to examine it to ensure it is in good condition – no cracks in the rubber surface; no cut-marks; no damage to the outer sealing edge and bolt-holes-.

Inspect the old actuator diaphragm for signs of wear due to over-closure and *too much* operating air pressure.

After replacing the new actuator diaphragm, replace the diaphragm plate (14), and spring washer (30).

Finally tighten fully the nut (23) and lock with the grub screw (23a).

Proceed from step 6 above in order to complete reassembly of the valve.

Seals (27), drawing 1

Follow steps 1-3 of spring replacement procedure. Then proceed as follows:

Unscrew the yoke lock-nut (6) to disconnect the actuator from the body. This is easily achieved by rotating the actuator anticlockwise until the valve spindle (2) disengages from the actuator stem (12).

Continue by following steps 4 and 5 of spring replacement procedure. After completion unscrew the grub screw (23a) on the lock nut (23) – used to tighten the actuator diaphragm (18), and the diaphragm plate (20) to the actuator stem (15). Unscrew the nut (23) fully to remove the spring washer (30), diaphragm plate (14) and actuator diaphragm (13).

Rotate anticlockwise the mechanical stop (9) with the nut (8) and then proceed to rotate and remove the bushing (29).

The seals (27) can now be easily removed.

Assembly: To assemble a new set, examine them to ensure they are not damaged in any way.

As with the fitting of any rubber seals/'o' rings, it is advisable to smear the item with grease.

When fitting ensure that the seal is fitted the correct way with the 'cup-side' facing down and flat side upper most. Refit the back bushing (29) and adjustable mechanical stop (9) and nut (8). Reassemble the actuator by following the instructions given for assembly of actuator diaphragm above.

Gasket (10), drawing 1

Follow instructions for removal of seals (27) to the point that they have been removed.

Next remove the actuator stem (12) from the actuator assembly.

Remove the yoke studs (26) and separate the yoke from the lower casing assembly (11).

The gasket (10) can now be easily replaced.

Assembly: Assemble the lower casing (11) with the yoke (3) by tightening yoke studs (26) properly/fully and then proceed as per assembly instructions given above for seals.

IMPORTANT.AIR TO OPEN ACTUATOR SETTING :

Once maintenance service has been completed, adjustment of travel and tightness of the valve must be checked.

In case of need proceed as follows:

1. Unscrew the Locking Grub screw (19a) on the check nut (19).
2. Rotate the check nut (19) in anticlockwise direction.
3. Rotate the Handwheel (21) in clockwise direction till the valve seat tightness is achieved and travel indicator (5 & 7) is in its closed position.
4. Tighten the check nut (19) over upper casing (17).
5. Lock the grub screw (19a) fully.

AIR TO CLOSE PNEUMATIC ACTUATOR (drawing 2):

- Diaphragm (13)
- Spring (10)
- U-Seals, set of 2 (25)

Replacement of the above parts can be achieved as follows:

Diaphragm (13) Drawing 2

1) Ensure that the valve is in the fully open position - this is achieved when operating air is disconnected - if necessary further rotate the handwheel (21) anticlockwise with the air connection free in order to ensure valve is in its fully open position.

2) Unscrew fastenings of the actuator housing (22 & 21).

3) Remove the upper casing (15). Now the diaphragm (13) can be replaced.

4) After diaphragm replaced, reassemble the upper casing (15) by tightening fastenings of the actuator housing (22 & 21).

In case of need turn the handwheel fully anticlockwise to allow fastenings to be tightened.

Carry out leak test using an operating air pressure as specified on the label.

Spring (10) Drawing 2

Follow steps 1-3 above.

Remove the diaphragm (13), remove the cross pin (23) and then remove the plate (12).

Now the spring can be replaced.

Refix the plate (12) by means of cross pin (23), then place the diaphragm (13) (check it in order to make sure it is not damaged) and then follow step 4 above.

U-Seals (25) Drawing 2

Follow steps 1-3 above. (in this case it is not necessary to remove the diaphragm (13)).

Unscrew and remove the stem (14).

Now the U-Seals (25) can be reached inside the upper casing (15), and can be replaced.

To reassemble again, reinsert and fully screw the stem (14), and then follow step 4 above.

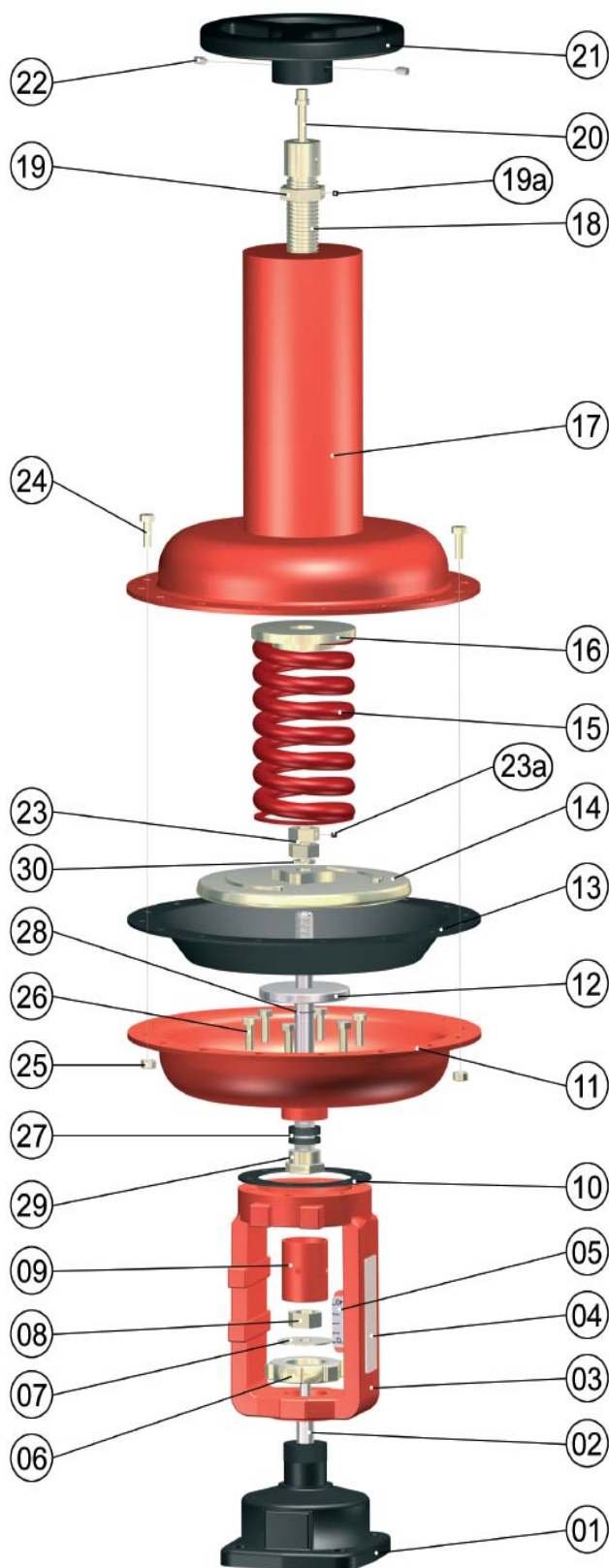
IMPORTANT.AIR TO CLOSE ACTUATOR SETTING:

Once maintenance service has been completed, adjustment of travel and tightness of the valve must be checked.

If the indicator (5 & 8) is not in the open position, rotate the handwheel (17) anticlockwise until the indicator shows that the valve is in its open position. Check performance of the valve and actuator assembly, by applying the correct operating air pressure to the actuator as specified on the label of the actuator. Ensure that 100% leak-tightness is obtained with the valve in the closed position. Opening of the valve can be limited by adjusting the Mechanical Stoppers (18) provided at the top of the handwheel (17).

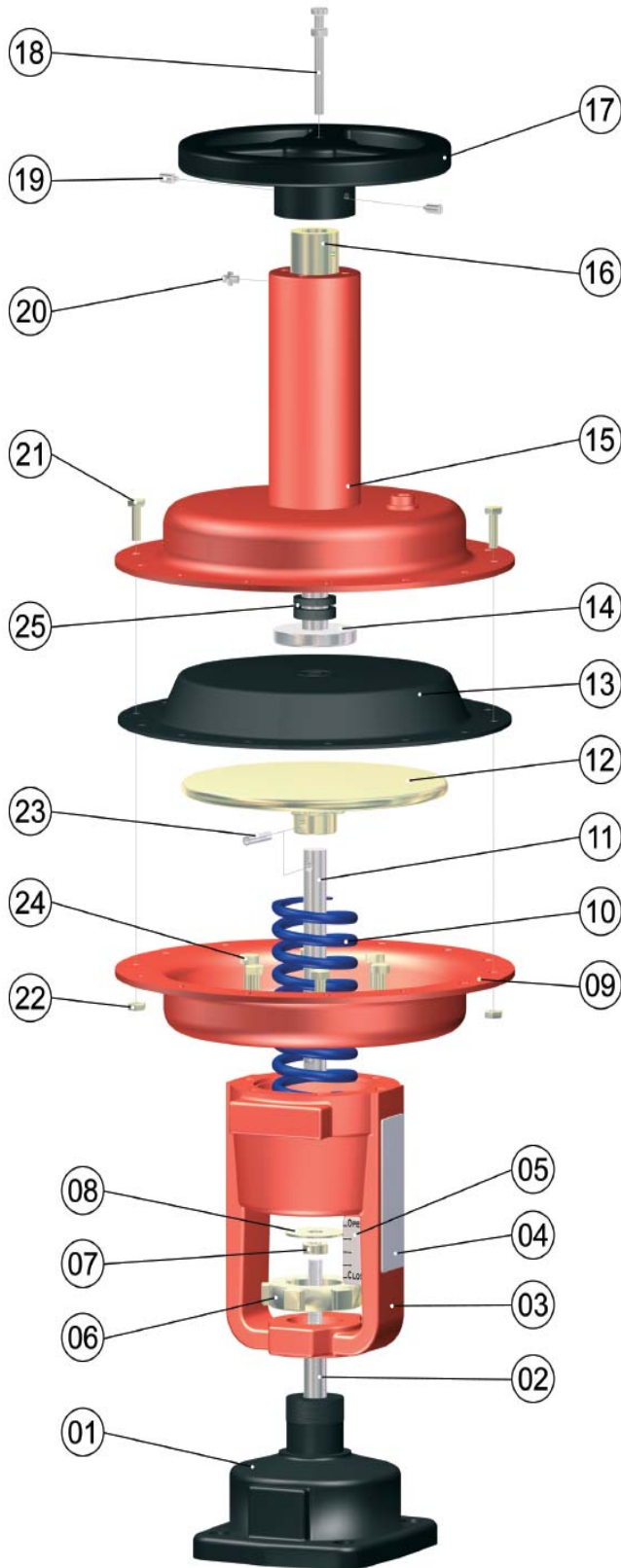
Full Technical Support is always available from the Main Office in Valencia or from any of the International Offices.

DRAWING 1 - AIR TO OPEN



PART LIST	
01	Valve Bonnet
02	Valve spindle
03	Yoke
04	Label
05	Scale indicator
06	Lock nut-yoke
07	Travel indicator
08	Lock nut valve spindle
09	Adjustable mech. Stop
10	Gasket
11	Lower casing assembly
12	Actuator stem
13	Actuator Diaphragm
14	Diaphragm Plate
15	Spring
16	Spring retainer
17	Upper casing assly
18	Handwheel spindle
19	Check nut
19a	Grub screw
20	Lifting screw
21	Handwheel
22	Retainers (2 Nos)
23	Nut plate (2 Nos)
23a	Grub screw
24	Studs
25	Nuts
26	Studs
27	U-seals (2 uds)
28	O ring
29	U-seals bush
30	Washer

DRAWING 2 - AIR TO CLOSE



PART LIST	
01	Valve Bonnet
02	Valve Spindle
03	Yoke
04	Label
05	Scale indicator
06	Lock nut-yoke
07	Lock nut valve spindle
08	Travel indicator
09	Lower casing assembly
10	Spring
11	Actuator stem
12	Diaphragm plate
13	Actuator Diaphragm
14	Handwheel spindle
15	Upper casing
16	Handwheel bush
17	Handwheel
18	Adjustable mech. stopper
19	Pin retainer (2 Nos)
20	Grease nipple
21	Studs
22	Nuts
23	Cross pin
24	Studs
25	U-seals