

Note: the numbers in parenthesis refer to the components in the exploded view of page 4.

VALBIA supplies a range of pneumatic rotary actuators, RACK and PINION TYPE, quarter turn, in double acting or spring return execution.

CAUTION:

Remove from the actuator all dust that may cause sparks; clean periodically to prevent dusting on the actuator.
Do not hit the actuators with metallic objects, as they may give off sparks.

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0 Warning

- **The installation and the maintenance of pneumatic actuators must be assigned to trained and qualified personnel.**
- The use of the actuators out of the allowed temperature and pressure ranges may cause damage to the internal and external components.
- Prior to any installation and maintenance of the actuator, close and disconnect any kind of power or air supply.
- Disassembling the spring return type actuators (springs inside) may cause severe injuries. The maintenance must be assigned to qualified expert personnel in full observance of the instruction described at paragraph 6 Otherwise the actuator has to be returned to VALBIA .

1 Service conditions

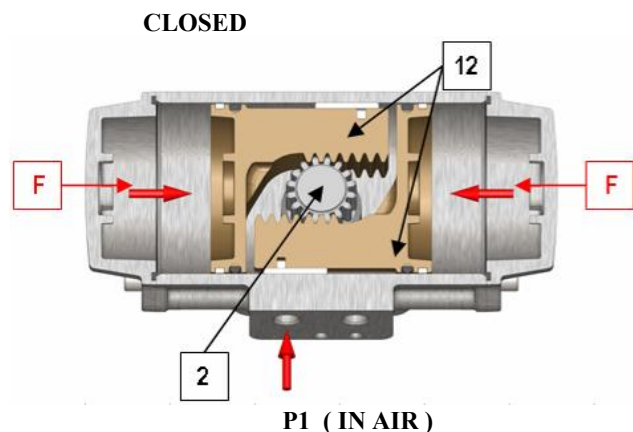
- **AIR SUPPLY:** dehumidified or lubricated air (standard). Other non corrosive gases or fluids are a possible alternative option, if compatible to the materials of the actuator components (internal parts and lubricant). The maximum particle size must not exceed 40µm (ISO 8573 Part1, Class5). In order to prevent water condensation and/or solidification (ice, when actuator work below 0°C), the operating medium must have a dew point equal to -20°C or, at least 10°C below the ambient temperature (ISO 8573 Part1, Class3).
- **WORKING PRESSURE :** min. 2,5 bar - max 8 bar
- **TEMPERATURE :** min. -20°C to max. + 85 °C - standard execution - NBR gaskets
min. -20°C to max. + 150°C - HIGH temperature execution - FKM (Viton) gaskets
min. -40°C to max. + 85 °C - LOW temperature execution - silicone gaskets
Warning: in case of high or low temp. executions a special grease is used as lubricant and such conditions may alter the torque generated by the actuator. For further information please refer to VALBIA
- **ROTATION:** half turn, 0°- 90° adjustable $\pm 5^\circ$ in both end positions (double adjustment)..
- **LUBRICATION:** The actuators are equipped with filled-for-life lubrication for normal service conditions.
- **OPERATING TIME :** please refer to the technical documentation. The operating time depends on various parameters such as air supply pressure, capacity of the air supply installation (size of piping, control equipment), type of valve and fluid, selected safety factor, temperature etc.

2 Function

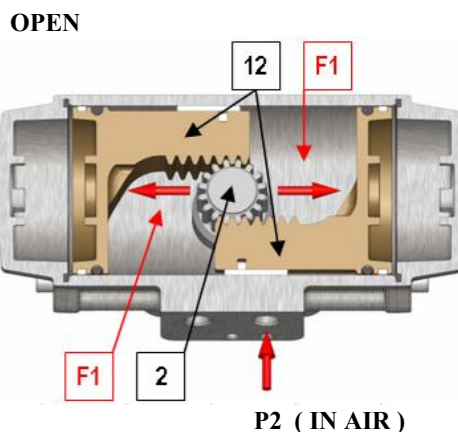
The air pressure acts on the surface of the pistons (12) causing their alternate movement, which is converted into rotation (standard 90°) of the pinion (2). As a result the pneumatic actuators can be used for remote operation of valves.

In the standard version "Normally closed" (see 2.1-2.2) the closing operation of the actuator is obtained by pressurizing the P1 entry, whereas for the "Normally open" version the closing operation is obtained by pressurizing the P2 entry (see paragraph 2.3-2.4).

2.1 Double acting (Std NC)

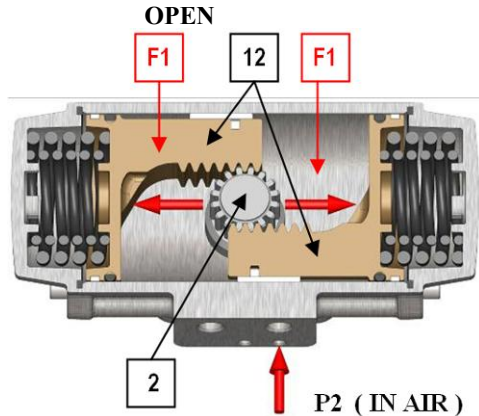


Supplying air through port P1, the external chambers fill up and the pressure on the surface of the pistons (12) creates a force (F) pushing them close to the pinion, generating a torque with **CLOCKWISE** rotation. (top view)

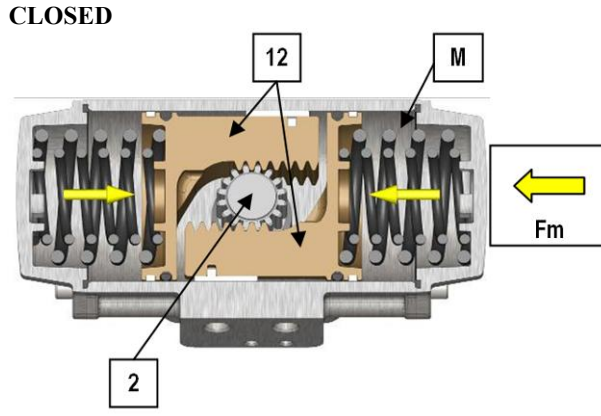


When the pistons (12) are close to the pinion, supplying air through port P2 the internal chamber fills up and the pressure on the surface of the pistons creates a force (F1) pushing them away from each other, generating a torque with **COUNTERCLOCKWISE** rotation (top view).

2.2 Spring return (Std NC)



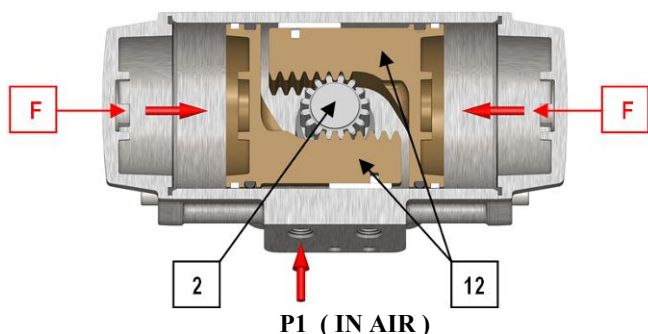
Supplying air through port P2, the internal chamber fills up and the action of the pressure on the surface of the pistons (12) creates a force (F1) pushing them away from each other, generating a torque with **COUNTERCLOCKWISE** rotation. (top view)



The springs (M) are now compressed. Terminating the supply of air through port P2 the **springs (M) start extending** and apply a force (Fm) pushing the pistons (12) close to the pinion, generating a torque with **CLOCKWISE** rotation. (top view).

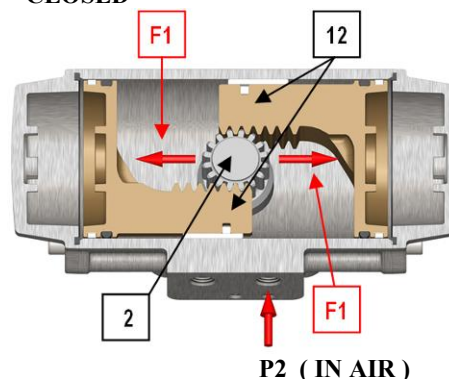
2.3 Double acting (Normally open version)

OPEN



Supplying air through port **P1**, the external chambers fill up and the pressure on the surface of the pistons (12) creates a force (F) pushing them close to the pinion, generating a torque with **COUNTERCLOCKWISE** rotation. (top view)

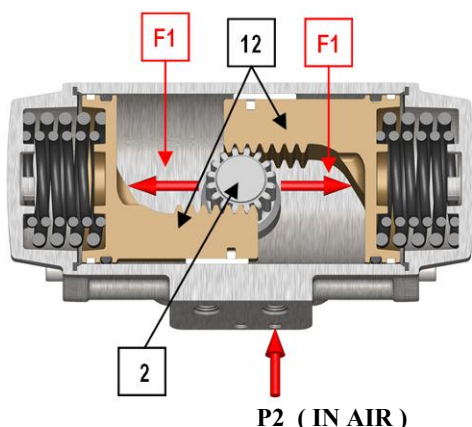
CLOSED



When the pistons (12) are close to the pinion, supplying air through port **P2** the internal chamber fills up and the pressure on the surface of the pistons creates a force (F1) pushing them away from each other, generating a torque with **CLOCKWISE** rotation (top view).

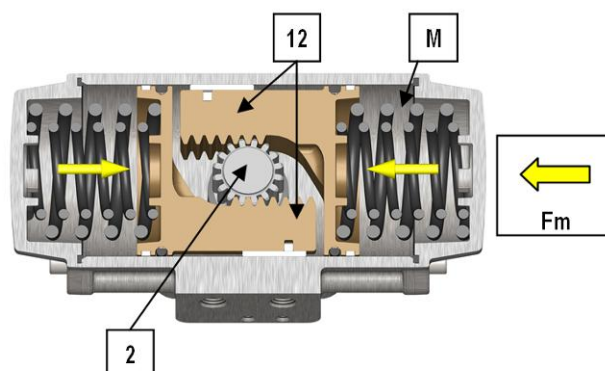
2.4 Spring return (Normally open version)

CLOSED



Supplying air through port **P2**, the internal chamber fills up and the action of the pressure on the surface of the pistons (12) creates a force (F1) pushing them away from each other, generating a torque with **CLOCKWISE** rotation. (top view)

OPEN



The springs (M) are now compressed. Terminating the supply of air through port P2 the **springs (M) start extending** and apply a force (Fm) pushing the pistons (12) close to the pinion, generating a torque with **COUNTERCLOCKWISE** rotation. (top view).

3 Storage

It is recommended that the actuator be kept in clean and dry place. The state of preservation during the storage time is improved if the actuator is preserved in the original packing box.

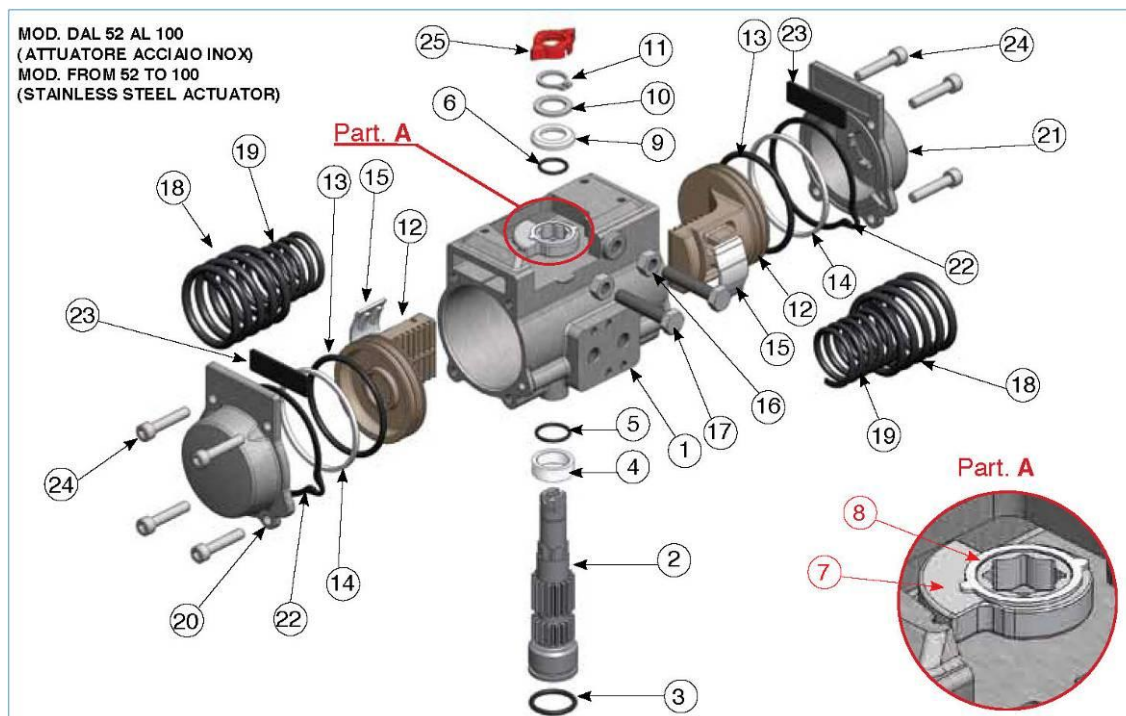
For a **long storage period** we recommend to effect periodically one complete cycling by pressurizing the chambers.

The actuators have two air ports which should be plugged during storage to avoid any intrusion

4 Maintenance

The maintenance of the actuator is permitted to Valbia personnel or to properly trained personnel. Valbia supplies the spare parts (gaskets, guide elements) in appropriate kits (except for lubricating grease). The maintenance may become necessary between 500.000 and 1.000.000 cycles, according to the local service conditions.

5 Exploded view mod.52-100



Pos.	DESCRIZIONE / Description	MATERIALE / Material	TRATTAMENTO / Treatment	Q.TA' DA	Q.TA' SR
1	Corpo - Body	Acciaio inox - Stainless steel	Ossidato duro - Hard anodized	1	1
2	Pignone antiespulsione - Anti-blowout pinion	Acciaio inox - Stainless steel		1	1
* 3	O-ring	NBR		1	1
* 4	Anello distanziale - spacer ring	POM		1	1
* 5	O-ring	NBR		1	1
* 6	O-ring	NBR		1	1
7	Camma - Cam	Acciaio inox - Stainless steel		1	1
8	Anello camma - spacer	POM		1	1
* 9	Anello sotto Seeger - spacer	POM		1	1
10	Rondella - washer	Acciaio inox - Stainless steel		1	1
11	Seeger - snap ring	Acciaio inox - Stainless steel		1	1
12	Pistone - Piston	Alluminio pressofuso - Die cast aluminium	Ossidato duro - Hard anodized	2	2
* 13	O-ring	NBR		2	2
* 14	Anello antifrizione - Antifriction ring	POM		2	2
* 15	Pattino reggispira - thrust block	POM		2	2
16	Dado di bloccaggio reg. - Stop bolt retaining nut	Acciaio inox - Stainless steel		2	2
17	Vite di regolazione - Stop bolt	Acciaio inox - Stainless steel		2	2
18	Molla esterna - External spring	Acciaio - Steel	Verniciata a polvere (bonderizzazione) Powder coating (bonderizing)	0	Vedi set molla
19	Molla interna - internal spring	Acciaio - Steel		0	
20	Tappo sinistro - Left end cap	Acciaio inox - Stainless steel		1	1
21	Tappo destro - Right end cap	Acciaio inox - Stainless steel		1	1
22	Guarnizioni Tappi - End cap seats	NBR		2	2
23	Guarnizioni Tappi - End cap seats	NBR		2	2
24	Vite di serraggio tappi - End cap fixing screw	Acciaio inox - Stainless steel		8	8
25	Indicatore di posizione -Position indicator	Gomma termoplastica TPE - Thermoplastic rubber TPE		1	1

* Part subject to wear

VALIDO DA MOD. 52 A MOD. 100
VALID FROM MOD. 52 TO MOD. 100

SET DI MOLLE
SPRING SETTING

SET STANDARD 05



SET	MOLLA ESTERNA EXTERNAL SPRING	MOLLA INTERNA INTERNAL SPRING
01	1	1
02	2	-
03	1	2
04	2	1
05	2	2

6 Disassembling mod.52-100

6.1 Disassembling mod. 52 to mod. 100 (Std NC)

CAUTION : It is recommended to use suitable safety equipment during the handling for maintenance because of heavy and/or bulky parts.

1. Disconnect pneumatic and electric supplies from the actuator;
2. After having disconnected their power supply, remove carefully any accessory attached to the actuator, preventing any damage during the handling;
3. Detach the actuator from the valve taking carefully note of all references that may be helpful for the attachment after maintenance;
4. Place the actuator on a support with a square of the same size of the pinion (2) so as to easily execute the below listed operation (see Fig. 1):
5. Before disassembling the actuator **check** from the label on the body whether it is a double acting (DA) or spring return (SR) type;
6. For **DOUBLE ACTING ACTUATOR** : Unscrew in crossed sequence the screws (24) for fastening the end caps (20-21), see Fig. 2 ;
For **SPRING RETURN ACTUATOR** : Unscrew **GRADUALLY** in crossed sequence the screws (24) for fastening the end caps (20-21), s. fig. 2;
Note: the screws are long enough to hold the springs even if extended;
7. Loosen nuts (16) and unscrew completely screws (17) see Fig. 3 ;
8. Rotate the cylinder (1) in **CLOCKWISE** direction (top view) holding the pinion (2) so as to release the rack of the pistons (12) from the pinion (2) and to push the pistons towards to the cylinder ends. Now both pistons (12) can be removed see Fig. 4.
NOTE: Do not use compressed air to remove the pistons (12) from the cylinder (1);
9. Remove the position indicator (25) from the pinion (2), snap ring (11), the washer (10), the spacer (9) and the O-ring (6) see Fig. 5 ;
10. Extract the pinion (2) from the cylinder (1) by pushing it down, with special caution for all seatings, see Fig. 5 (if necessary use a rubber hammer);
11. Tilt the cylinder (1) and let the cam (7) slide out, see Fig. 5.

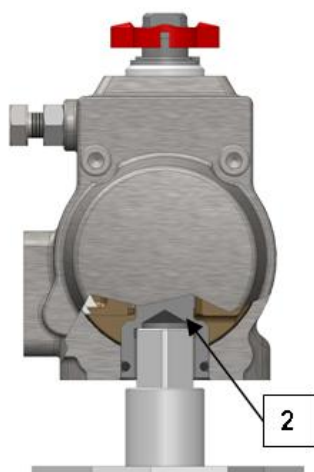


Fig.1

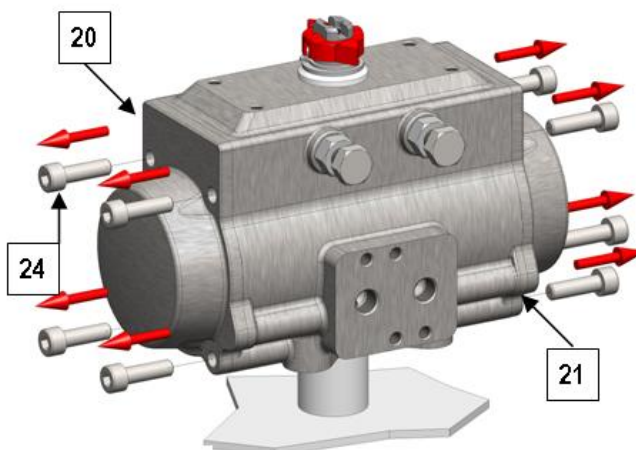


Fig.2

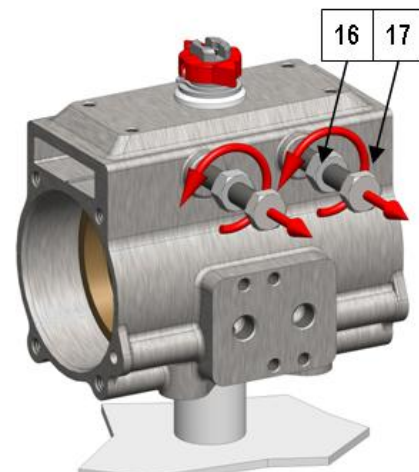


Fig.3

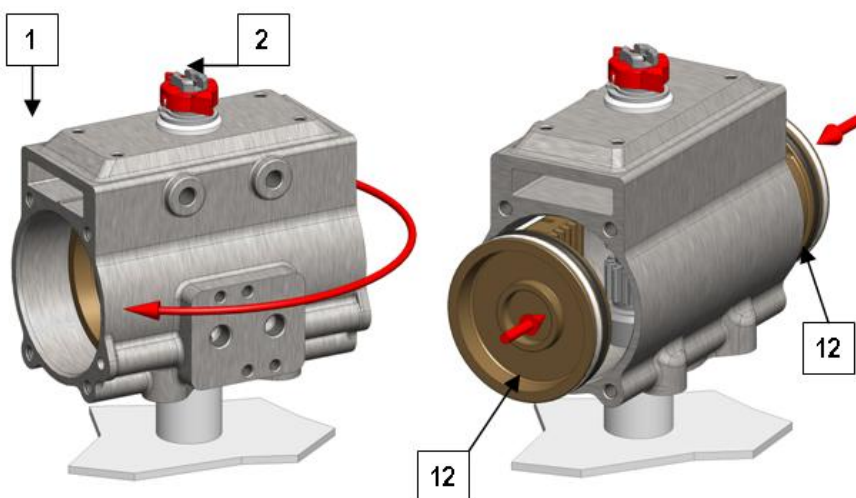


Fig.4

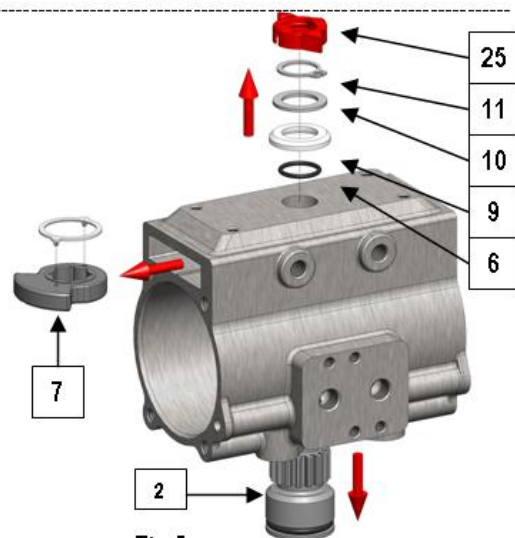


Fig.5

6.2 Disassembling mod. 52 to mod. 100 (Normally open version)

CAUTION : It is recommended to use suitable safety equipment during the handling for maintenance because of heavy and/or bulky parts.

1. Disconnect pneumatic and electric supplies from the actuator;
2. After having disconnected their power supply, remove carefully any accessory attached to the actuator, preventing any damage during the handling;
3. Detach the actuator from the valve taking carefully note of all references that may be helpful for the attachment after maintenance;
4. Place the actuator on a support with a square of the same size of the pinion (2) so as to easily execute the below listed operation (see Fig. 6);
5. Before disassembling the actuator **check** from the label on the body whether it is a double acting (DA) or spring return (SR) type;
6. For **DOUBLE ACTING ACTUATOR** : Unscrew in crossed sequence the screws (24) for fastening the end caps (20-21), see Fig. 7 ;
For **SPRING RETURN ACTUATOR** : Unscrew **GRADUALLY** in crossed sequence the screws (24) for fastening the end caps (20-21), s. fig. 7 ;
Note: the screws are long enough to hold the springs even if extended;
7. Loosen nuts (16) and unscrew completely screws (17) see Fig. 8 ;
8. Rotate the cylinder (1) in counterclockwise direction (top view) holding the pinion (2) so as to release the rack of the pistons (12) from the pinion (2) and to push the pistons towards to the cylinder ends. Now both pistons (12) can be removed see Fig. 9.
NOTE: Do not use compressed air to remove the pistons (12) from the cylinder (1);
9. Remove the position indicator (25) from the pinion (2), snap ring (11), the washer (10), the spacer (9) and the O-ring (6) see Fig. 10 ;
10. Extract the pinion (2) from the cylinder (1) by pushing it down, with special caution for all seatings, see Fig. 10 (if necessary use a rubber hammer);
11. Tilt the cylinder (1) and let the cam (7) slide out, see Fig. 10.

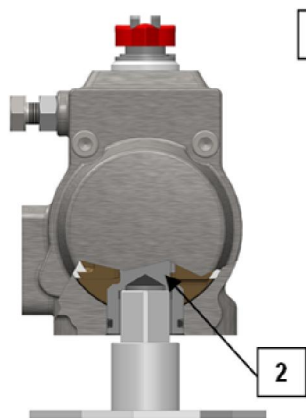


Fig.6

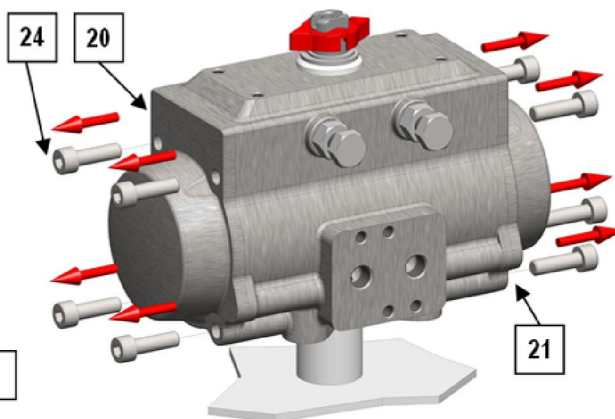


Fig.7

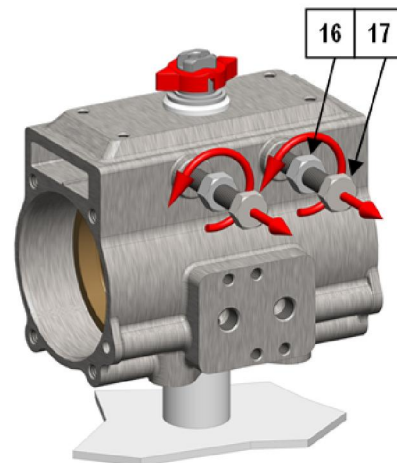


Fig.8

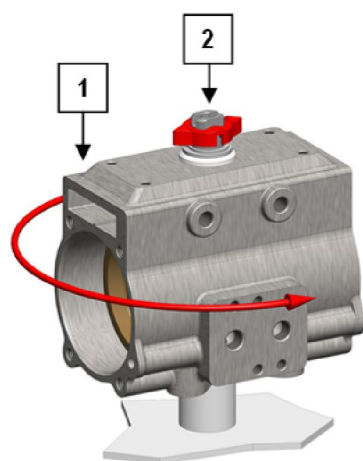


Fig.9

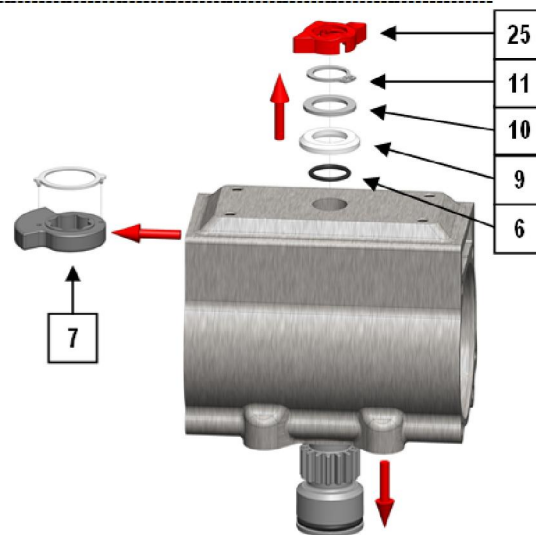
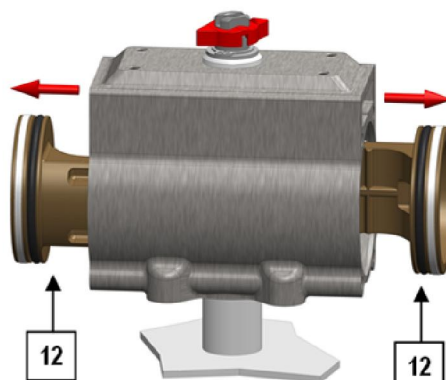


Fig.10

7 Assembling

7.1 Assembling mod.52 to mod.100 (Std NC)

CAUTION : It is recommended to use suitable safety equipment during the handling for maintenance because of heavy and/or bulky parts.

1. Before assembling clean all components preferably with degreaser.
2. Place the pinion (2) on a support with a square of the same size of the female attachment. Make sure that the pinion is provided with lower O-ring (3), spacer (4) and upper O-ring (5). Lubricate the O-rings (see arrows fig. 6) ;
The recommended lubricating grease is " **HELIOS SYNTH 1EP**"
3. Screw down one adjustment screw (17) with nut (16) in the right adjustment hole of the cylinder (1) and let the cam (7) with ring (8) slide down on the guiding rail on the cylinder (1) (see detail. A Fig.7) until it stops against the screw;
4. Lay the cylinder (1) down on the pinion (2) holding it with the NAMUR surface rotated by approx. 50° to the upper slot of the pinion, see fig. 8;
5. Fit on the pinion (2) the O-ring (6), the spacer (9), the washer (10), the snap ring (11) and the position indicator (25), see Fig. 9 ;
6. Grease the internal chamber of the cylinder (1) and both pistons (12) provided with O-ring (13) antifriction ring (14) and thrust block (15) -
The recommended lubricating grease is " **HELIOS SYNTH 1EP**".
7. For the standard execution (clockwise rotation closed) press the pistons (12) into the cylinder (1) while turning the cylinder (1) in counterclockwise direction (top view) until the pistons come into contact, see fig. 10 ;
8. Screw down the second adjustment screw (17) with nut (16) in the cylinder (1) and adjust the travel stop , s. paragraph 8;
9. For **DOUBLE ACTING ACTUATOR**: Mount the end cap (20-21) with gasket (22-23) on the cylinder and screw down in crossed sequence the screws (24), see fig. 11. Repeat the operation on the opposite side.
For **SPRING RETURN ACTUATOR**: Introduce the spring set (18-19) into the cylinder (1) and center them on the piston (12), then mount the caps (20-21) with gaskets (22-23) centred on the springs (18-19). **Note: the pistons have to be in CLOSED position.** Screw partially down the screws (24) in crossed sequence compressing the springs uniformly until the cap is completely closed, see fig. 11. Repeat the operation on the opposite side;
10. Execute some test cycles to check the correct functioning of the actuator before installing it.

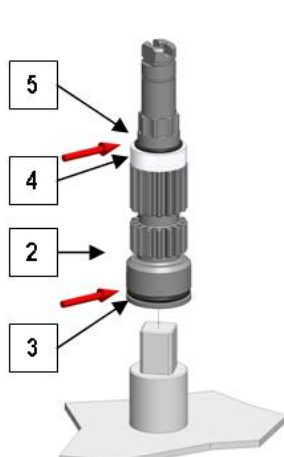


Fig.6

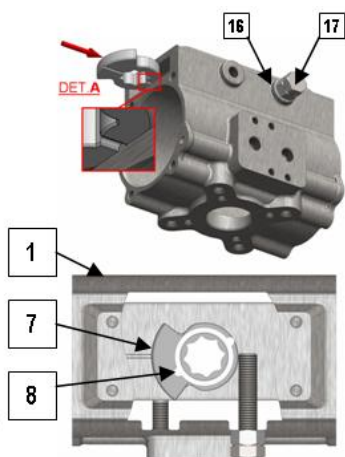


Fig.7

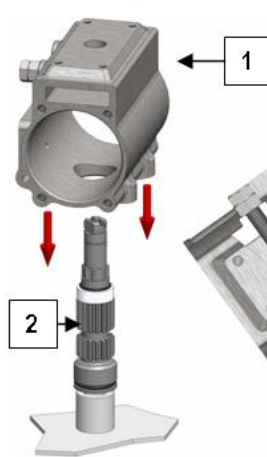


Fig.8

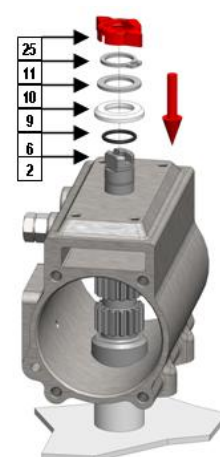


Fig.9

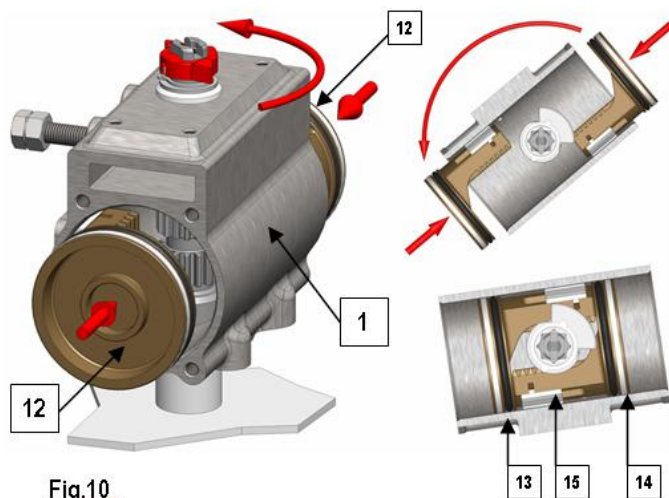


Fig.10

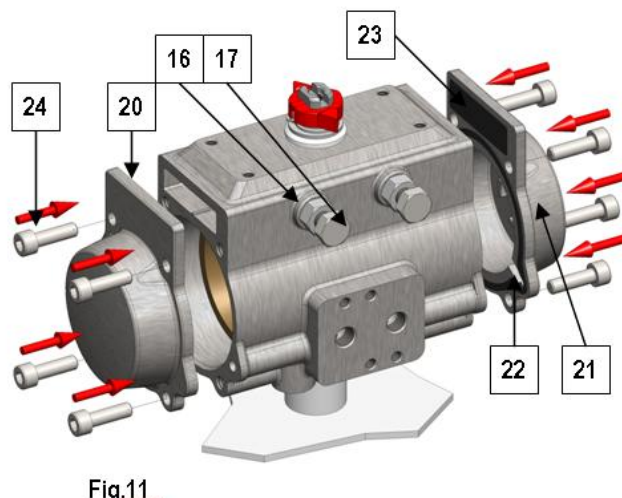
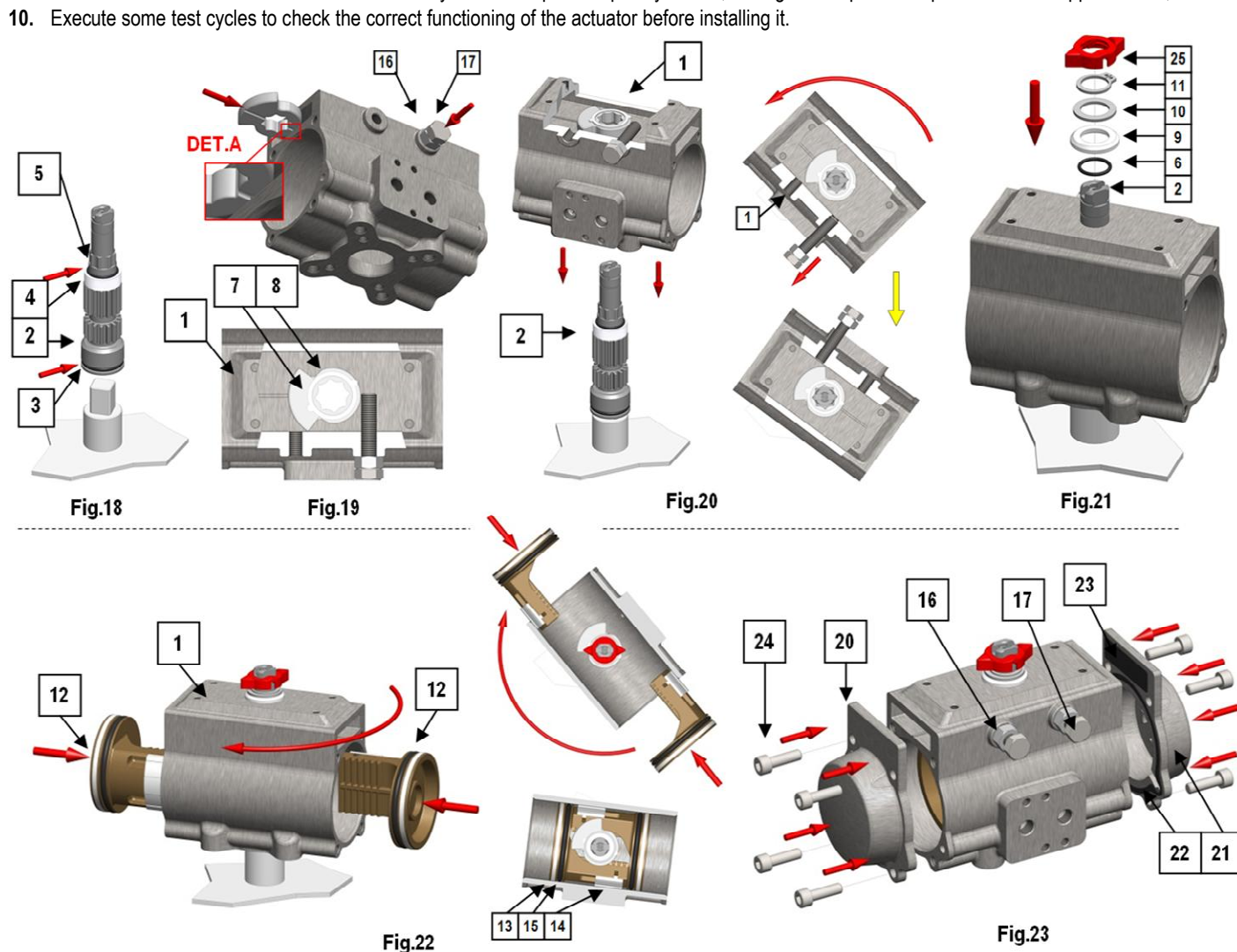


Fig.11

7.2 Assembling mod.52 to mod.100 (Normally open version)

CAUTION : It is recommended to use suitable safety equipment during the handling for maintenance because of heavy and/or bulky parts.

- Before assembling clean all components preferably with degreaser.
 - Place the pinion (2) on a support with a square of the same size of the female attachment. Make sure that the pinion is provided with lower O-ring (3), spacer (4) and upper O-ring (5). Lubricate the O-rings (see arrows fig. 18) ;
The recommended lubricating grease is " " **HELIOS SYNTH 1 EP** " "
 - Screw down one adjustment screw (17) with nut (16) in the right adjustment hole of the cylinder (1) and let the cam (7) with ring (8) slide down on the guiding rail on the cylinder (1) (see detail. A Fig.19) until it stops against the screw;
 - Lay the cylinder (1) down on the pinion (2) holding it with the NAMUR surface rotated by approx. 50° to the upper slot of the pinion, see fig.20 then rotate the cylinder in CCW rotation (top view) until the contact with the cam (7) ;
 - Fit on the pinion (2) the O-ring (6), the spacer (9), the washer (10), the snap ring (11) and the position indicator (25), see Fig. 21 ;
 - Grease the internal chamber of the cylinder (1) and both pistons (12) provided with O-ring (13) antifriction ring (14) and thrust block (15) -
The recommended lubricating grease is " " **HELIOS SYNTH 1 EP** " "
 - For the Normally open assembly insert the pistons press the pistons (12) into the cylinder (1) while turning the cylinder (1) in clockwise direction (top view) until the pistons come into contact, see fig. 22 ;
 - Screw down the second adjustment screw (17) with nut (16) in the cylinder (1) and adjust the travel stop , s. paragraph 8;
 - For **DOUBLE ACTING ACTUATOR**: Mount the end cap (20-21) with gasket (22-23) on the cylinder and screw down in crossed sequence the screws (24), see fig. 23. Repeat the operation on the opposite side.
- For **SPRING RETURN ACTUATOR**: Introduce the spring set (18-19) into the cylinder (1) and center them on the piston (12), then mount the caps (20-21) with gaskets (22-23) centred on the springs (18-19). **Note: the pistons have to be in OPEN position.** Screw partially down the screws (24) in crossed sequence compressing the springs uniformly until the cap is completely closed, see fig. 23. Repeat the operation on the opposite side;



8 Adjustment

By means of the left screw the 90° end position (open) can be adjusted, see Fig. 24, of the right screw the 0° end position (closed), see Fig. 25.

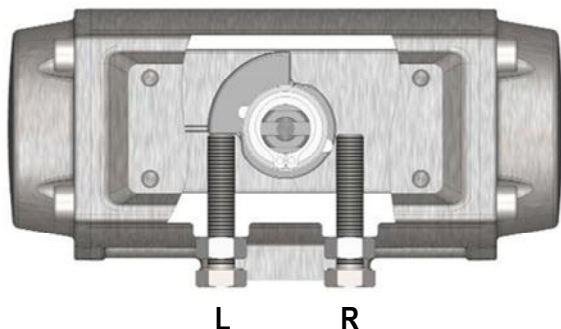


Fig.24

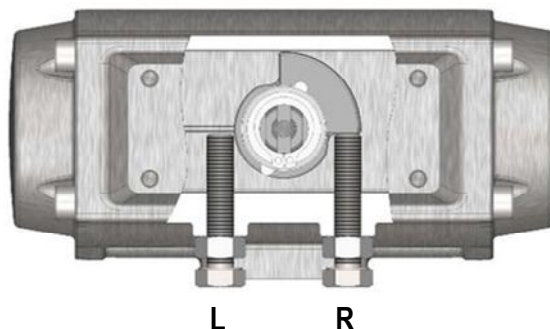


Fig.25

NOTE : During the adjustment the pinion must not be blocked on the support.

8.1 Adjustment procedure, actuator in open position (Std version)

- Put the actuator in closed position;
- Adjust by means of the left adjustment screw (L);
- Put the actuator in open position and check the adjustment
- Repeat until the desired adjustment is achieved;
- Hold the screw in the correct position and tighten the nut.

8.2 Adjustment procedure, actuator in closed position (Std version)

- Put the actuator in open position (supply compressed air for mod SR);
- Adjust by means of the right adjustment screw (R);
- Put the actuator in closed position and check the adjustment (interrupt the air supply for mod.SR);
- Repeat until the desired adjustment is achieved;
- Hold the screw in the correct position and tighten the nut.

8.3 Adjustment procedure, actuator in open position (Normally open version)

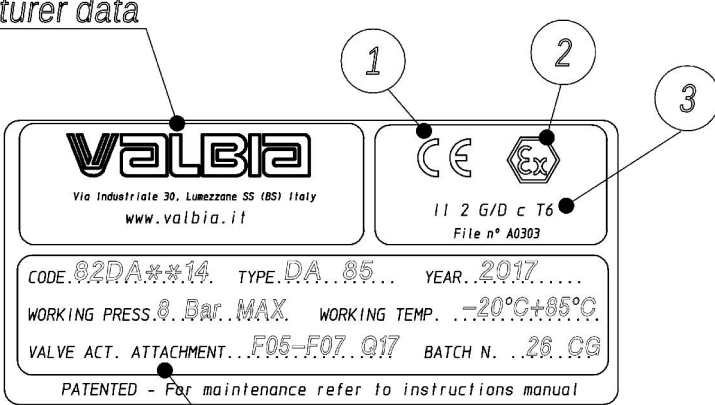
- Put the actuator in closed position (supply compressed air for mod SR);
- Adjust by means of the left adjustment screw (L);
- Put the actuator in open position and check the adjustment (interrupt the air supply for mod.SR)
- Repeat until the desired adjustment is achieved;
- Hold the screw in the correct position and tighten the nut.

8.4 Adjustment procedure, actuator in closed position (Normally open version)

- Put the actuator in open position;
- Adjust by means of the right adjustment screw (R);
- Put the actuator in closed position and check the adjustment;
- Repeat until the desired adjustment is achieved;
- Hold the screw in the correct position and tighten the nut.


9 Actuator plate (label)


Manufacturer data



Actuator identification data


CODE. 82DA**14 TYPE. DA...85... YEAR. 2017....
WORKING PRESS. 8.5 bar MAX. WORKING TEMP. -20°C+85°C
VALVE ACT. ATTACHMENT...F05-F07.Q17 BATCH N. ..26.CG
PATENTED - For maintenance refer to instructions manual

①  indicates the compliance with european regulations applicable to the product

②  indicates the compliance with european regulation 2014/34/UE

Conformity with category 2:
products manufactured for use in areas
in which explosive atmospheres are likely to occur.
G= gas D= dust

PROTECTION METHOD:
In our case the constructional safety is type "c"

③  TEMPERATURE CLASS:
surface temperature
of the device in T6 = 85°C

Conformity with GROUP II: equipment intended for use
on the surface and other locations