

Note: the numbers in parenthesis refer to the components in the exploded view of page 3 for UT-0 thru UT-6.5 and page 4 for UT-7 and UT-8.

CAUTION:

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

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1 Warning

- **The installation and the maintenance of pneumatic actuators must be assigned to trained and qualified personnel.**
- The use of the actuators outside the allowed temperature and pressure ranges may cause damage to the internal and external components.
- Prior to any installation and maintenance of the actuator, shut-off and disconnect any kind of power or air supply.
- Disassembling the spring return type actuators may cause severe injuries due to compressed springs inside. 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 MARWIN.

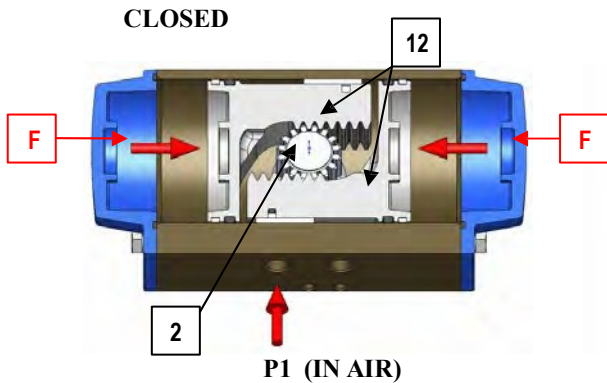
2 Service conditions

- **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).
- **WORKING PRESSURE:** 40 psi minimum to 115 psi maximum (2,7 bar minimum to 8 bar maximum)
- **TEMPERATURE:** -4°F to + 185°F (-20°C to + 85°C) - standard - NBR gaskets
-4°F to +302°F (-20°C to +150°C) - HIGH temperature option - FKM (Viton) gaskets
-40°F to +185°F (-40°C to +85°C) - LOW temperature option - silicone gaskets
Warning: in case of high or low temperature options special grease is used as lubricant and such conditions may alter the torque generated by the actuator. For further information please refer to MARWIN
- **ROTATION:** 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:** 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 and control equipment), type of valve and fluid, selected safety factor, temperature etc.

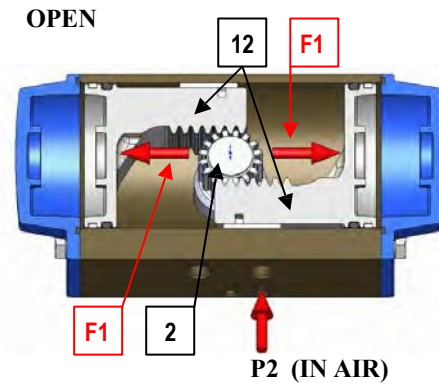
3 Function

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.

3.1 Double acting

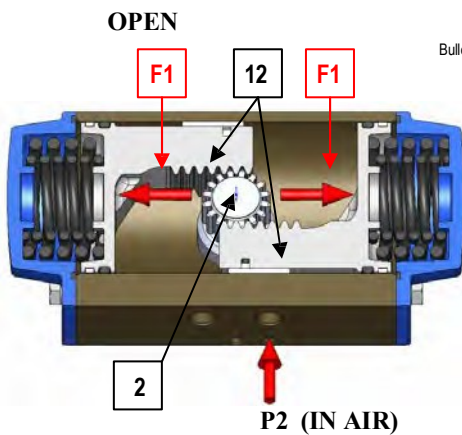


Supplying air through port **P1**, the external chambers fill up and the action of the pressure on the surface of the pistons (12) creates a force (F) pushing them toward each other, generating a torque with **CLOCKWISE** rotation.



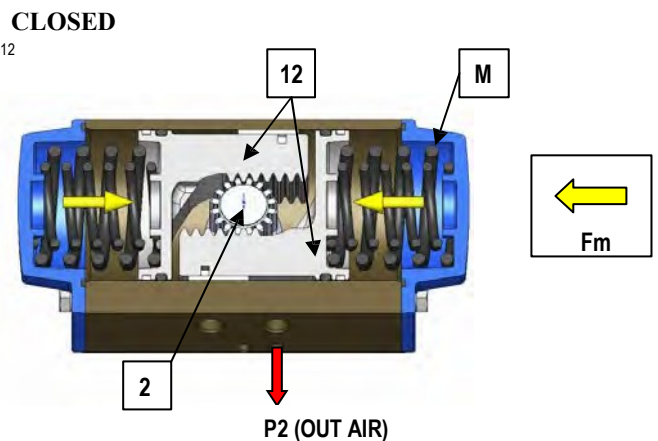
When the pistons (12) are close to the pinion, supplying air through port **P2** the internal chamber fills up and the pressure on the surface of the pistons creates a force (F1) pushing them away from each other, generating a torque with **COUNTERCLOCKWISE** rotation.

3.2 Spring return



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.

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The springs (M) are now compressed. Venting the air out of the internal chamber through port **P2** allows the springs (M) to start extending and apply a force (Fm) on the pistons (12) pushing them toward each other, generating a torque with **CLOCKWISE** rotation.

4 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 periodically stroke the actuator one complete cycle by pressurizing the chambers.

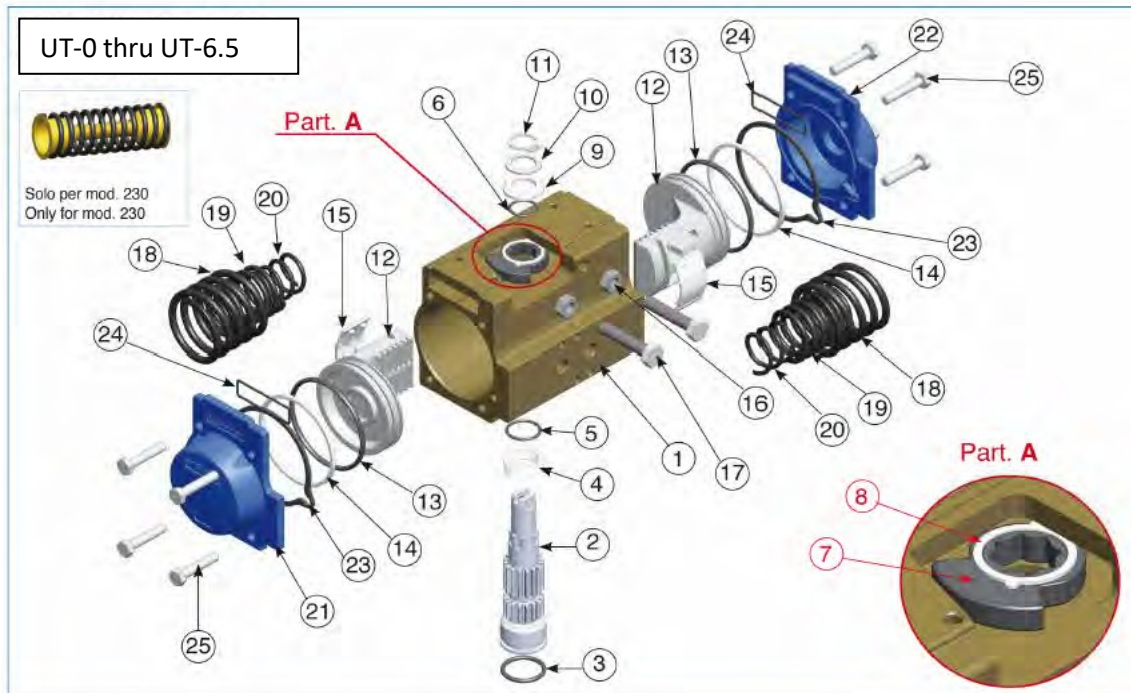
The actuators have two air ports which should be plugged during storage to avoid intrusion of contaminants.

5 Maintenance

Maintenance should be performed by Marwin or other properly trained personnel. Marwin supplies spare parts (gaskets, guide elements) in appropriate kits (except for lubricating grease). Maintenance may become necessary between 500,000 and 1,000,000 cycles, depending upon local service conditions.

6 Exploded view

6.1 Exploded view for actuators from UT-0 thru UT-6.5



Pos.	Description	Material	Treatment	Quan. DA	Quan. SR
1	Body	Extruded aluminium	Hard anodized	1	1
2	Anti-blowout pinion	Steel	Nickel plated	1	1
* 3	O-ring, pinion, lower	NBR		1	1
* 4	Spacer ring	POM		1	1
* 5	O-ring, pinion, upper	NBR		1	1
* 6	O-ring	NBR		1	1
7	Cam	Stainless steel		1	1
8	Spacer	POM		1	1
* 9	Spacer	POM		1	1
10	Washer	Stainless steel		1	1
**11	Snap ring	Steel	Nickel plated	1	1
12	Piston	Die cast aluminium		2	2
* 13	O-ring, piston	NBR		2	2
* 14	Antifriction ring, piston	POM		2	2
* 15	Thrust block	POM		2 [4]	2 [4]
16	Stop bolt retaining nut	Stainless steel		2	2
17	Bolt, Stop	Stainless steel		2	2
18	External spring	Steel	Painted	2	See Spring Set
***19	Central spring	Steel	Painted	2	
20	Internal spring	Steel	Painted	2	
21	End cap, left	Die cast aluminium	Painted	1	1
22	End cap, right	Die cast aluminium	Painted	1	1
23	Gasket, end cap	NBR		2	2
24	O-ring	NBR		2	2
25	Bolt, end cap	Stainless steel		8	8

[x] UT-4.5 thru UT-6.5 only

* Part subject to wear

** Reinforced series
DIN471 - UNI 7436

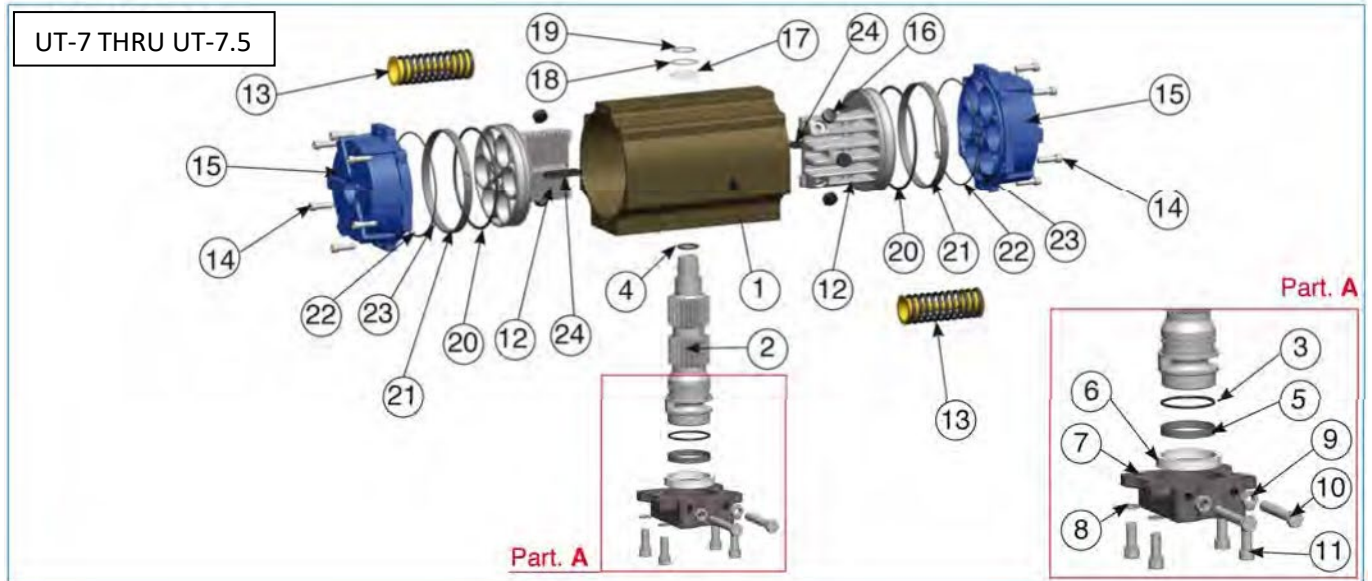
*** UT-5 thru UT-6

UT-0 THRU UT-4.5 SPRING SETS			
SPR. NO.	EXT. SPR.	INT. SPR.	
01	1	1	
02	2	-	
03	1	2	
04	2	1	
05	2	2	

UT-5 THRU UT-6 SPRING SETS			
SPR. NO.	EXT. SPR.	CNTR. SPR.	INT. SPR.
01	-	2	-
02	2	-	-
03	1	2	-
04	2	-	2
05	2	2	-
06	2	2	2

UT-6.5 SPRING SETS	
SPR. NO.	NO. SPR. EA. SIDE
01	2 / 3
02	3 / 3
03	3 / 4
04	4 / 4
05	4 / 5
06	5 / 5

6.2 Exploded view mod. UT-7 and UT-7.5



Pos.	Description	Material	Treatment	Quan. DA	Quan. SR
1	Body	Extruded aluminium	Hard anodized	1	1
2	Pinion, anti-blowout	Steel	Nickel plated	1	1
* 3	O-ring, pinion, lower	NBR		1	1
* 4	O-ring, pinion, upper	NBR		1	1
* 5	Antifriction ring, pinion	PTFE 15% graphite		1	1
* 6	Antifriction ring, pinion	PTFE		1	1
7	Housing, stop assembly	GGG40	Painted	1	1
8	Washer	Stainless steel		4	8
9	Nut, stop bolt retaining	Stainless steel		2	2
10	Bolt, stop	Steel	Zinc plated	2	2
11	Bolt, housing, stop assembly	Stainless steel		4 [8]	4 [8]
12	Piston	Die cast aluminium		2	2
13	Spring, pre-compressed	Steel	Painted	See Spring Set	
14	Bolt, end cap	Stainless steel		12 [16]	12 [16]
15	End cap	Die cast aluminium	Painted	2	2
* 16	Thrust block	POM		6 [8]	6 [8]
* 17	Spacer ring	POM		1	1
18	Washer, pinion	Stainless steel		1	1
19	Snap ring	Steel	Nickel plated	1	1
* 20	O-ring, pinion	NBR		2	2
* 21	Antifriction ring	PTFE 15% graphite		2	2
22	O-ring, end cap	NBR		2	2
23	O-ring	NBR		4 [2]	4 [2]
24	Anti-blowout key	POM		2	2

[x] UT-7 only

* Part subject to wear

UT-7 THRU 7.5 SPRING SETS	
SPR. NO.	NO. SPR. EA. SIDE
01	2 / 3
02	3 / 3
03	3 / 4
04	4 / 4
05	4 / 5
06	5 / 5
06	5 / 6
07	6 / 6

7 Disassembling

7.1 Disassembling UT-0 thru UT-6.5

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 (25) for fastening the end caps (21-22) (see Fig. 2).
For **SPRING RETURN ACTUATOR**: Unscrew **GRADUALLY** in crossed sequence the screws (25) for fastening the end caps (21-22) (see 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 snap ring (11) from the pinion (2), 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).

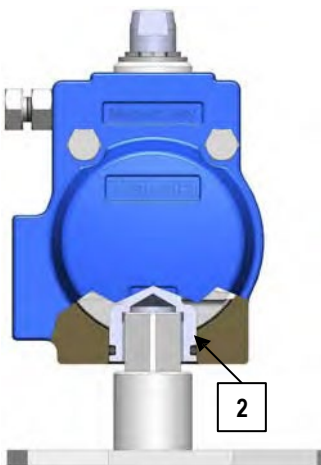


Fig. 1

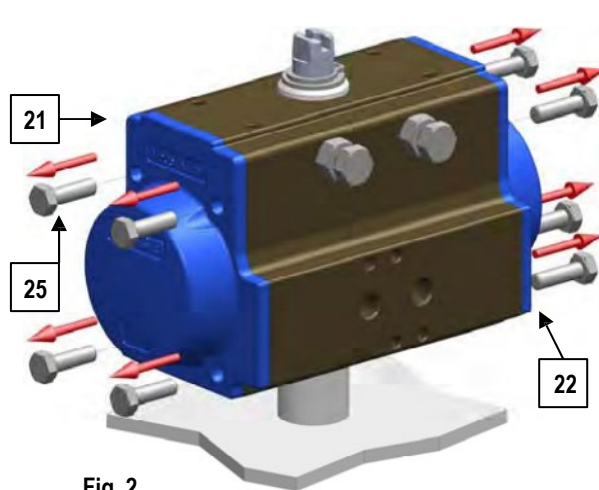


Fig. 2

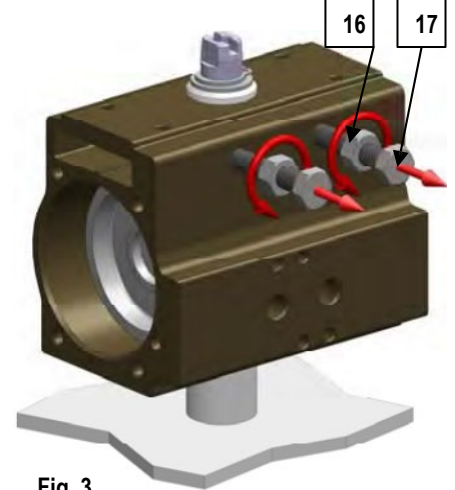


Fig. 3

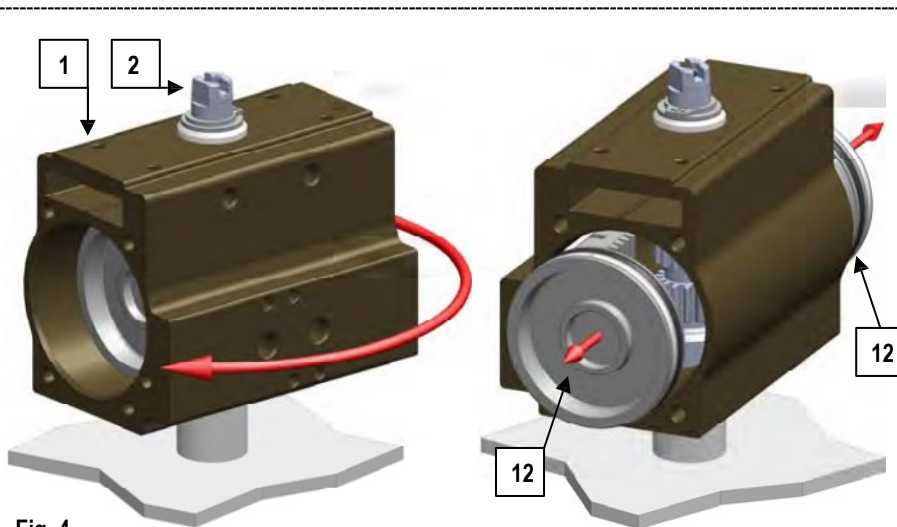


Fig. 4

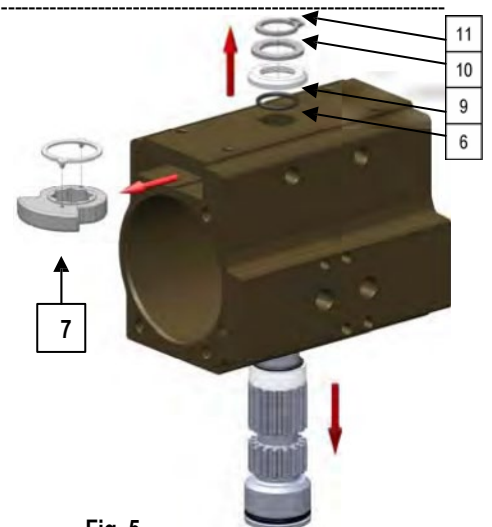


Fig. 5

7.2 Disassembling mod. UT-7 and UT-7.5

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 (14) for fastening the end caps (15) (see Fig. 7).
For **SPRING RETURN ACTUATOR**: Unscrew **GRADUALLY** in crossed sequence the screws (14) for fastening the end caps (15) (see Fig. 7).
NOTE: the screws are long enough to hold the pre-compressed springs (13) even if extended.
7. Loosen nuts (9) and unscrew completely screws (10) (see Fig. 8).
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 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. Lay the actuator on one base of its cylinder (1) and unscrew the screws (11) in crossed sequence to remove the plate (7) (see Fig. 10).
10. Place the actuator on the support again.
11. Remove the snap ring (19) from the pinion (2), the washer (18), the spacer (17) (see Fig. 11).
12. Gradually raise the cylinder (1), make sure that the pinion (2) gets extracted with special caution for all seatings (if necessary, use a rubber hammer) (see Fig. 12).

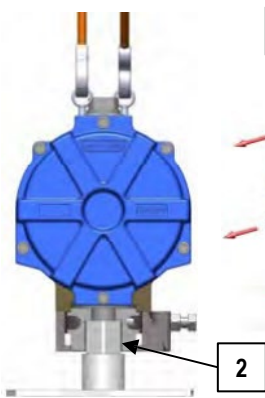


Fig. 6

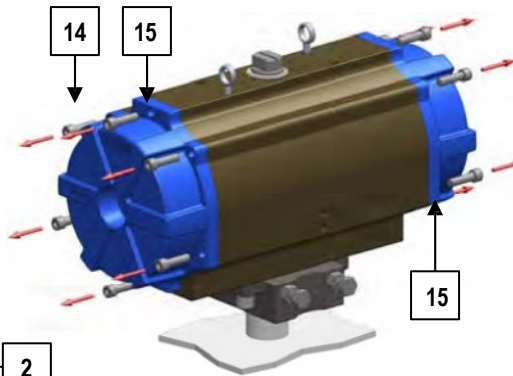


Fig. 7

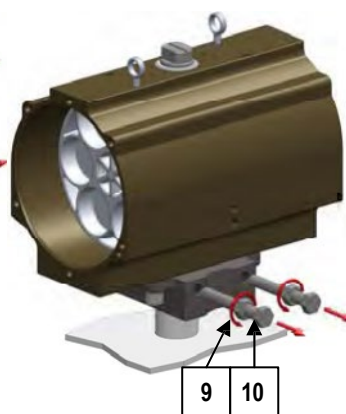


Fig. 8

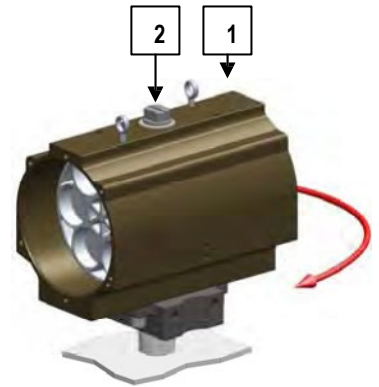


Fig. 9

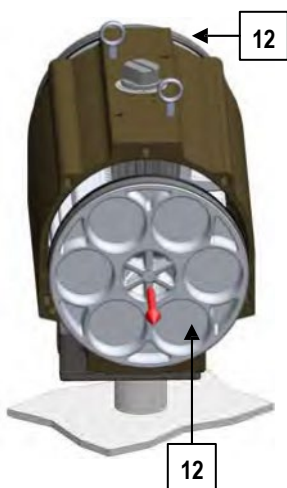


Fig. 9

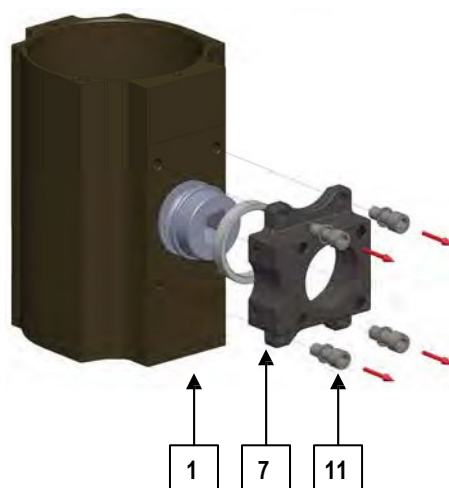


Fig. 10

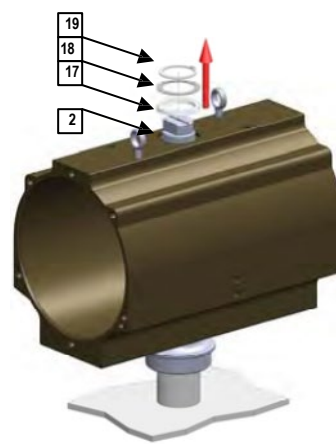


Fig. 11

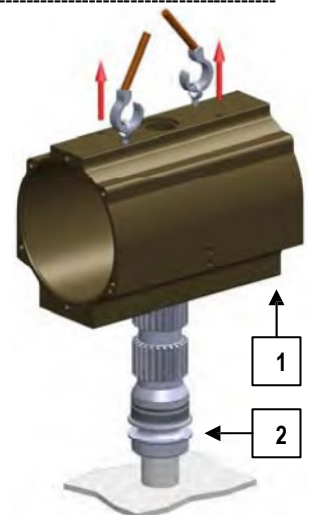


Fig. 12

8 Assembling

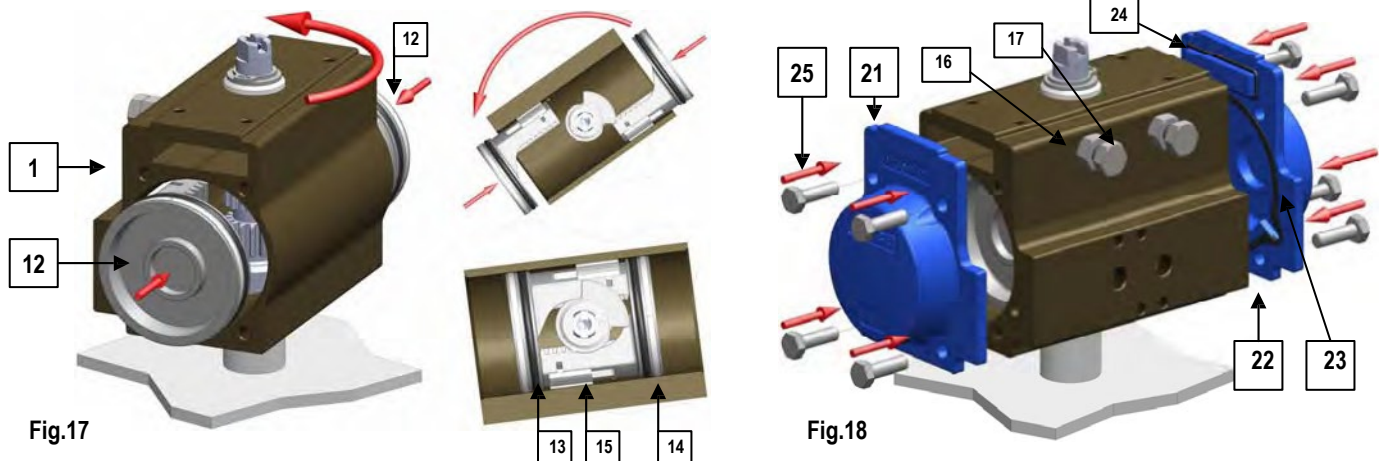
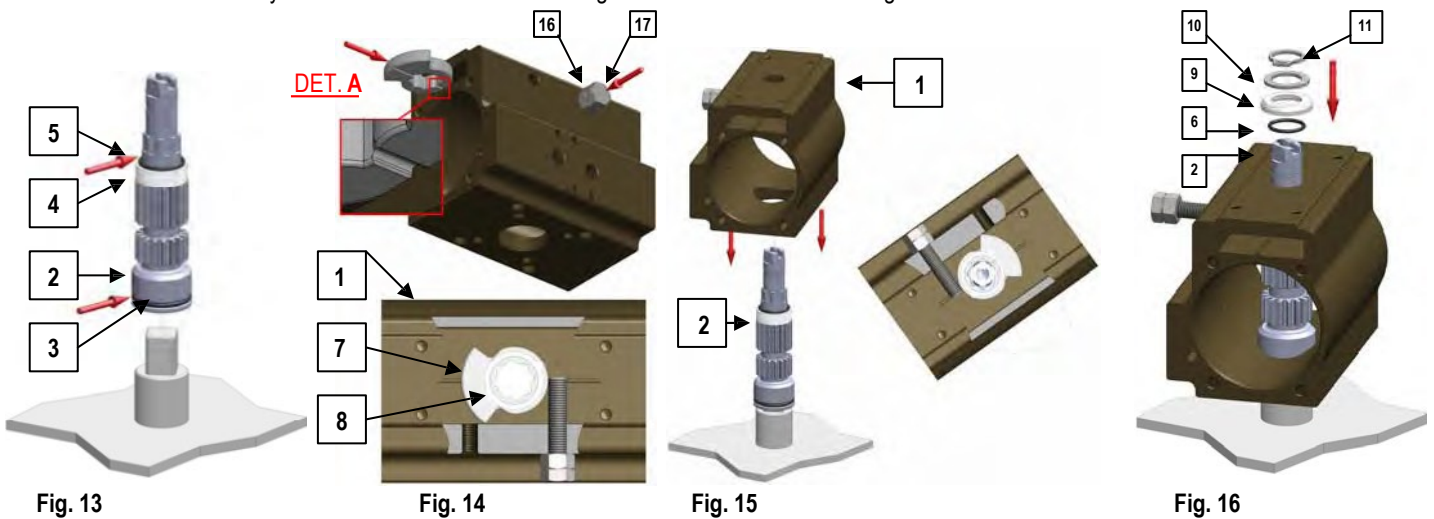
8.1 Assembling UT-0 thru UT-6.5

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. 13).
The recommended lubricating grease is "KLUBER" TRIBO STAR 1EP"
- 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) until it stops against the screw (see Fig. 14 detail A).
- Lay the cylinder (1) down on the pinion (2) holding it with the NAMUR surface rotated by approximately 50° to the upper slot of the pinion, (see Fig. 15).
- Fit on the pinion (2) the O-ring (6), the spacer (9), the washer (10), the snap ring (11) (see Fig. 16).
- 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 "KLUBER" TRIBO STAR 1EP".
- For the standard execution (clockwise rotation o pens) 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. 17).
- Screw down the second adjustment screw (17) with nut (16) in the cylinder (1) and adjust the travel stop (see paragraph 9).
- For **DOUBLE ACTING ACTUATOR**: Mount the end cap (21-22) with O-ring (24) and gasket (23) on the cylinder and screw down in crossed sequence the screws (25) (see Fig. 18). Repeat the operation on the opposite side.

For **SPRING RETURN ACTUATOR**: Introduce the spring set (18-19-20) into the cylinder (1) and center them on the piston (12), then mount the caps (21-22) with O-ring (24) and gaskets (23) centered on the springs (18-19-20). **Note: the pistons have to be in CLOSED position.** Screw partially down the screws (25) in crossed sequence compressing the springs uniformly until the cap is completely closed (see Fig. 18). Repeat the operation on the opposite side.

- Execute some test cycles to check the correct functioning of the actuator before installing it.



8.2 Assembling UT-7 and UT-7.5

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 (5) and upper O-ring (4). Lubricate the O-rings (see arrows Fig. 19). The recommended lubricating grease is "KLUBER" TRIBO STAR 1EP"
3. Lay the cylinder (1) down on the pinion (2) (see Fig. 20).
4. Fit on the pinion (2) the spacer (17), the washer (18), the snap ring (19) (see Fig. 21).
5. Remove the cylinder with pinion from the support and lay it on one base to mount the plate (7) with antifriction ring (6), (holes for adjusting screws on the same side as the NAMUR attachments) then screw down the fastening screws (11) with washer (8) in crossed sequence (see Fig. 22), and place the cylinder on the support again.
6. Grease the internal chamber of the cylinder (1) and both pistons (12) provided with O-ring (20) antifriction ring (21) anti blowout key (24) and thrust block (16) - The recommended lubricating grease is "KLUBER" TRIBO STAR 1EP".
7. Rotate the cylinder (1) by approximately 50° to the upper slot of the pinion (see Fig. 23).
8. For the standard execution (clockwise rotation opens) 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. 23, 24).
9. Introduce the adjustment screws (10) with nut (9) into the plate (7) to adjust the travel stop (see Fig. 25 and paragraph 9).
10. For **DOUBLE ACTING ACTUATOR**: Mount the end cap (15) with O-ring (22-23) and gasket (23) on the cylinder and screw down in crossed sequence the screws (25), see Fig. 18. Repeat the operation on the opposite side.
For **SPRING RETURN ACTUATOR**: Introduce the spring set (13) into the cylinder (1) and center them on the piston (12), then mount the caps (15) with O-ring (22-2) centered on the springs (13). **Note: the pistons have to be in CLOSED position.** Screw partially down the screws (14) in crossed sequence compressing the springs uniformly until the cap (15) is completely closed (see Fig. 26). Repeat the operation on the opposite side.
11. Execute some test cycles to check the correct functioning of the actuator before installing it.

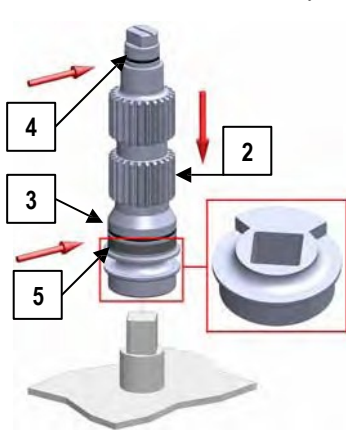


Fig. 19

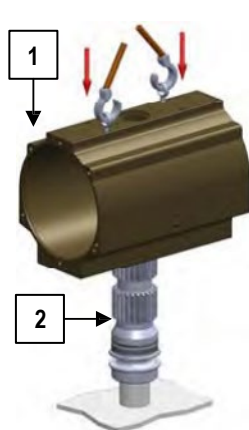


Fig. 20

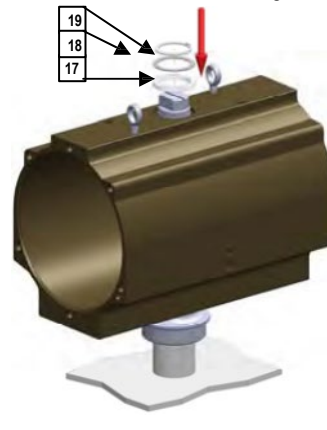


Fig. 21

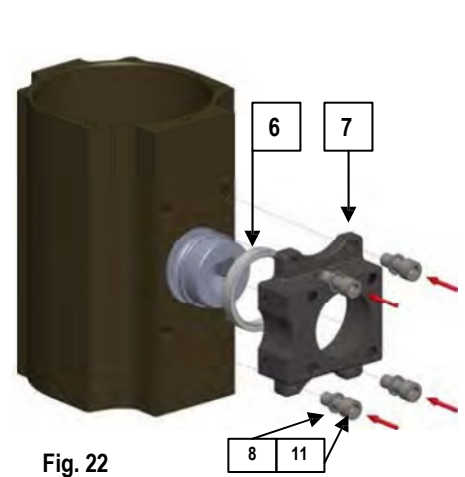


Fig. 22

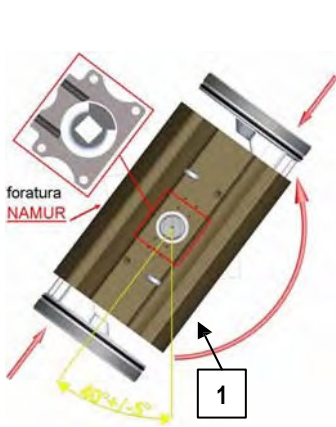


Fig. 23

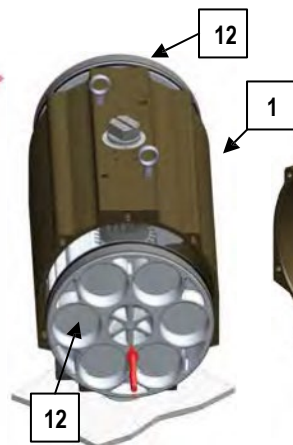


Fig. 24

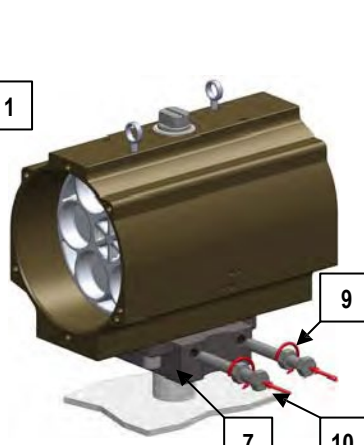


Fig. 25

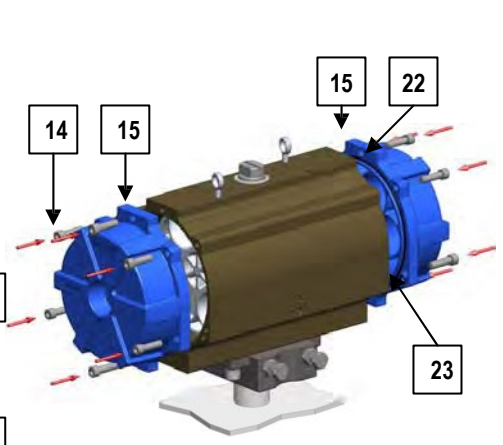


Fig. 26

9 Adjustment

The 90° position (open) can be adjusted with the left screw (see Fig. 27). The 0° position (closed) can be adjusted with the right screw (see Fig. 28).

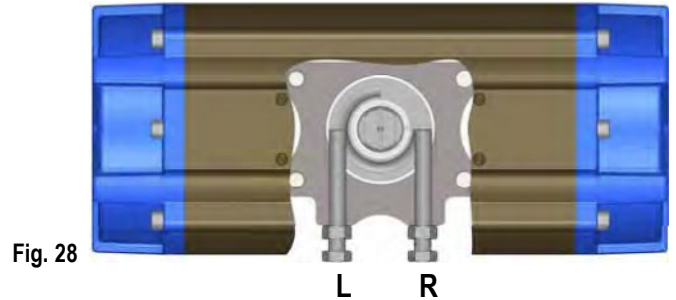
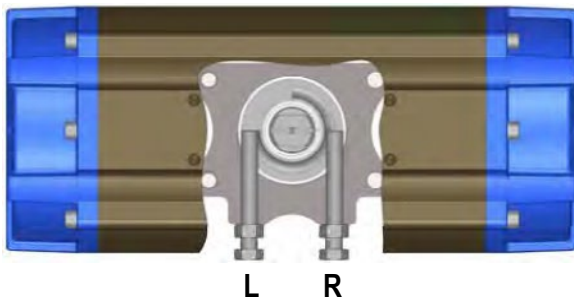
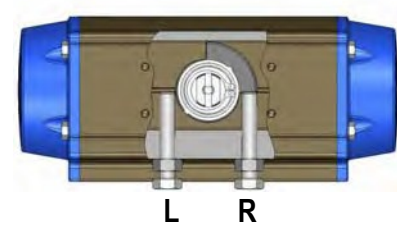
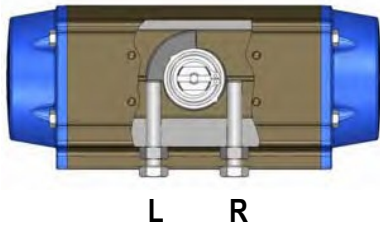


Fig. 27

Fig. 28

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

9.1 Adjustment procedure, actuator in open position

- 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.

9.2 Adjustment procedure, actuator in closed position

- Put the actuator in open position (supply compressed air for spring return actuators).
- Adjust by means of the right adjustment screw (**R**).
- Put the actuator in closed position and check the adjustment (vent the air supply for spring return actuators).
- Repeat until the desired adjustment is achieved.
- Hold the screw in the correct position and tighten the nut.

2011 Design (UT-1 Shown)

Representative of:

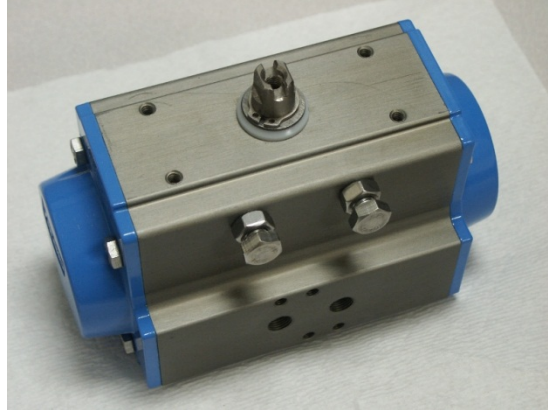
UT actuators 0A thru 7.5 after about 2011

Distinguishing features:

Adjusting screws on side, no hub on top,
“squared” ends

I&M

Bulletin IM-UT Dsgn2011_1112



2003 Design (UT-0 and UT-0A Shown)

Representative of:

UT actuators 0 thru 4 after about 2003

Distinguishing features (UT-0 thru UT-4.5):

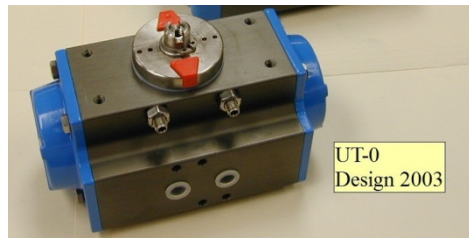
Adjusting screws on side, hub on top,
“squared” ends

Distinguishing features (UT-0A)

Shorter shaft extension on top

I&M

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Pre 2003 Design (UT-0 and UT-0A Shown)

Representative of:

All UT actuators 0A thru 7 prior to 2003

UT-0A, and UT-5 thru 7 only after 2003

Distinguishing features:

No adjusting screws on side, no hub on top,
Rounded ends with adjusting screws

I&M

Bulletin IM-UT(Pre2003Design)-1209

