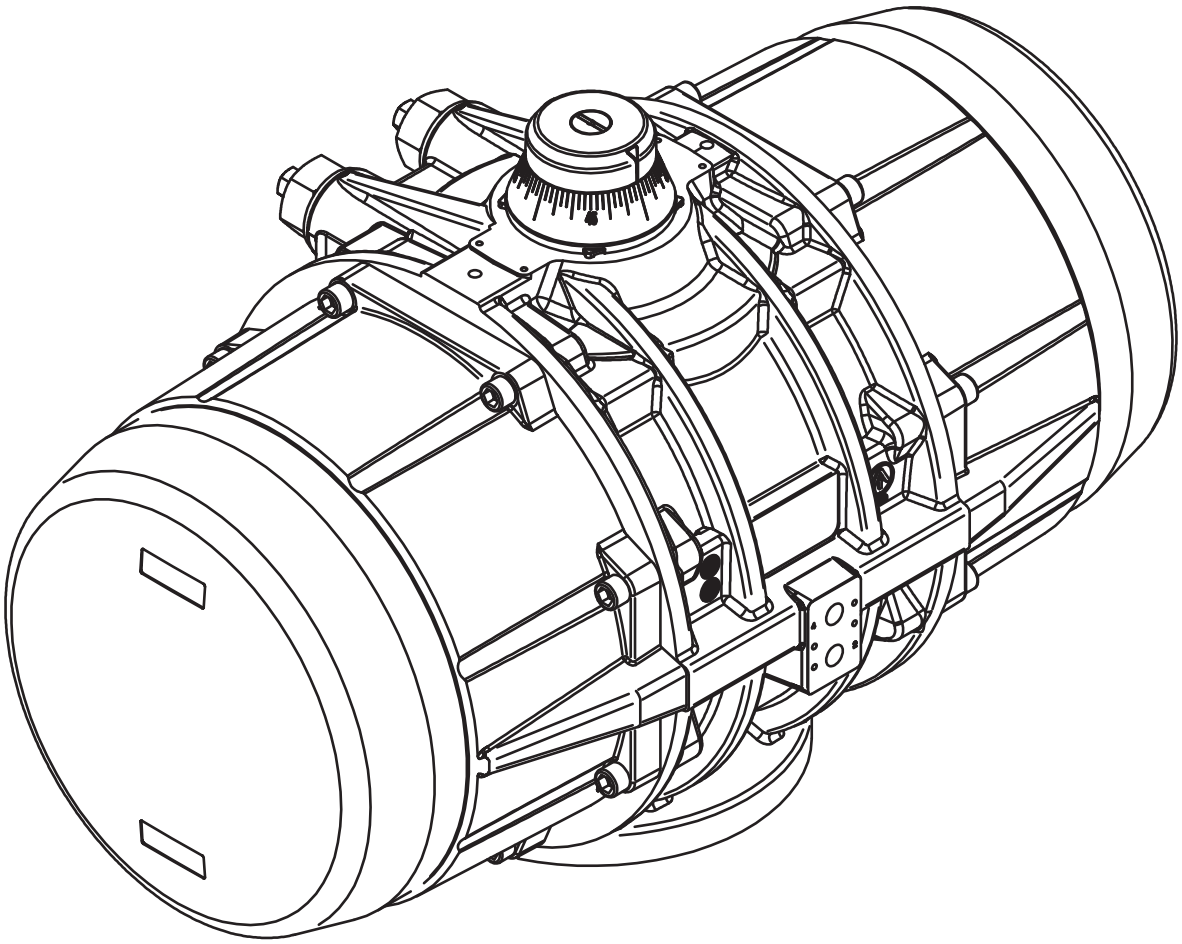
AIR TORQUE®

INSTALLATION, MAINTENANCE AND OPERATING INSTRUCTION MANUAL

For AIR TORQUE ACTUATOR Model/Type:
“AT1001U/PT1000 B” and “AT1001U R/PT1000B R”
Double acting “D” and Spring return “S”
“0°” → “90°” Stroke



CONTENTS

1) GENERAL

This instruction manual contains important information regarding the installation, operation, maintenance and storage for AIR TORQUE rack and pinion pneumatic actuators.
Please read these instructions carefully and keep them for future reference. It is important that the use and maintenance of the actuator is made only by properly trained personnel.

⚠ 2) WARNING

- **Do not operate the actuator using inflammable, o xidizing, corrosive, explosive or unstable gases or liquids (use only not dangerous fluids – group 2 according to** 2014/68/EU **directive). Moreover, for actuators installed in poten-tially explosive zones, make sure that the internal parts of the actuator do not come into contact with the external atmosphere.**
- **Referring to the Machinery Directive 2006/46/EC, the actuators can be classified as "PARTLY COMPLETED MACHINERY" (see the DECLARATION OF INCORPORATION). Therefore the actuator can not put into service until the machinery and/or the system, where the actuator is incorporated, will be declared in compliance with the requirements of the Directive 2006/42/EC.**
- **Air Torque actuators are designed, produced and classified according to the ATEX Directive** 2014/34/EU **(see actua-tor label and safety instructions).**
  The use of the actuators in potential explosive atmosphere zones has to comply with the ATEX classification indicated on the actuator label and according to the ATEX safety instructions.
- **The use, the installation and the maintenance of the Air Torque actuators must be made by adequately trained personnel. For the use, installation and maintenance of Air Torque actuators it is recommended to comply to the safety notice and to use proper equipment to protect health and prevent accidents.**
- **It is important that the actuator is used only within the working limits indicated in the technical specifications.**
- **Do not operate the actuator over temperature limits: this could damage internal and external components (disassembly of spring return actuator may become dangerous).**
- **Do not operate the actuator over pressure limits: this could damage internal parts as well as cause damage to the housing and end-caps.**
- **Do not use the actuator in corrosive environments with incorrect protection: this could damage the internal and external parts.**
- **Do not disassemble individual spring cartridges, this may result in personal injury. If maintenance to springs is necessary, send them to AIR TORQUE.**
- **Close and disconnect all air supply lines and make sure that air connections are vented during maintenance and installation on valve.**
- **Do not disassemble the actuator or remove end caps while the actuator is pressurized.**
- **The 4th GENERATION Upgrade Series actuators are designed to be used only on valves.**
- **Before installing the actuator onto the valve make sure that the rotation direction and the position indicator are in the correct position.**
- **If the actuator is incorporated in a system or used within safety devices or circuits, the customer shall ensure that the national and local safety laws and regulations are observed.**
- **In case the actuator is installed on a valve with a gearbox for emergency manual operation, make sure that the stroke of the gearbox does not exceed the stroke allowed by the actuator. Caution: make sure that the gearbox stroke, both in closed and in opened position, is properly adjusted. If you exceed the stroke allowed by the actuator with the manual operation of the gearbox, you can cause severe damage to the adjustment screws, to the pistons and to the actuator itself.**

3) WORKING CONDITIONS AND TECHNICAL DATA

- Operating media:
  Dry or lubricated air or inert gases, provided that they are compatible with the actuator internal parts and lubricant. The operating media must have a dew point equal to –20°C (-4°F) or at least 10°C below the ambient temperature. The maximum particle size contained into the operating media must not exceed 30 µm.
- Supply pressure:
  The maximum supply pressure is 8 bar (116 Psi) only for **AT1001U/PT1000 B** spring return type and **AT1001U R/ PT1000B R** double acting and spring return. While for type **AT1001U/PT1000 B** double acting the maximum supply pressure is 7 bar (101,5 Psi).
- Operating Temperature:

⇒ **"Standard"** actuators from -40°C (-40°F) to +80°C (+176°F)
⇒ Actuators for high temperature **"HT"** from -15°C (+5°F) to +150°C (+300°F)
⇒ Actuators for extreme low temperature **"LLT"** from -55°C (-67°F) to + 80°C (+176°F)

Caution: for low and high temperature service, special grease and special components are required. Please contact AIR TORQUE. Working at high or low temperature can affect the life and the output torque of the actuator.

- Operating Time (see Technical Data Sheet):
  Caution: the operating time depends on several factors such as supply pressure, supply system capacity (pipe diameter, flow capacity of pneumatic accessories), valve type, valve torque and figures, applied safety factor, cycle frequency, temperature, etc.
- Rotation and stroke adjustment (see technical data sheet):
  For standard actuator 90° rotation.
  Stroke adjustment at 0° (closed pistons): +5° / – 5°. Stroke adjustment at 90° (open pistons): +5° / – 5°.
- Lubrication:
  The actuators are factory lubricated for the life of the actuator in normal working conditions. The standard lubricant type GSTD is suitable for use from -40°C (-40°F) to +80°C (+176°F). For extreme low temperature (LLT) and high temperature (HT) service, special grease is required: please contact Air Torque.
- Construction:
  Rack and pinion actuator design suitable for both indoor or outdoor installations.
- Protection and Corrosion resistance:
  All the actuators are supplied with corrosion protection for normal environments. For corrosion resistance of the different types of protection see technical data sheet. Before installing the actuator in aggressive environment, ensure that the selected protection level is suitable.
- Actuator designation and marking (see technical data sheets):
  The actuator type, size, operating pressure, output torque, direction of rotation, spring action, operating temperature and type of connections/interfaces are determined by designation.

- All AIR TORQUE actuators are supplied with an identification l abel s howing t he s erial n umber a nd a ll n ecessary information on use, service, operation and product designation. Where applicable, the label indicates the classification according to ATEX Directive 2014/34/EU.

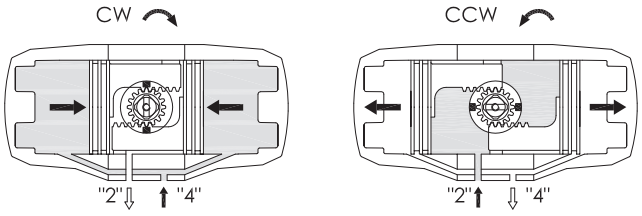
4) OPERATING FUNCTION AND DIRECTION OF ROTATION

The actuator is a pneumatic device for remote operation of industrial valves. The operation (90° rotation) may be activated by different methods:

- Direct mounting of solenoid valve (5/2 for double acting, 3/2 for spring return) to pressure connections 2 and 4, connected to supply and control lines.
- Screwed connection (to pressure connections 2 and 4) with air lines from separate control cabinet.
  The standard rotation (when port 4 is pressurized or for spring action) is clockwise to close. When port 2 is pressurized, counter-clockwise rotation is obtained.

Air Torque actuators can be supplied with different types of assembly/rotation direction depending on the type of required operation and/or installation, see technical data sheets.

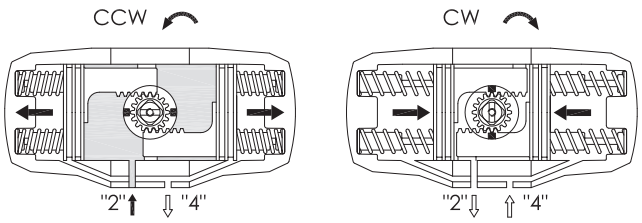
Double Acting operation function (standard rotation type “ST”) TOP View.



Air supplied to port 2 forces the pistons towards the actuator end caps. A counter-clockwise rotation is achieved. Exhaust air exits from Port 4.

Air supplied to Port 4 forces the pistons inward.
A clockwise rotation is achieved.
Exhaust air exits from Port 2.

Single Acting operation function (standard rotation type “ST”) TOP View.



Air supplied to Port “2” forces the pistons toward the actuator end caps, compressing the springs.
A counter-clockwise rotation is achieved.
Exhaust air exits from Port 4.

The loss of air pressure (air or electric failure) at Port “2” allows the springs to force the pistons inward.
A clockwise rotation is achieved.
Exhaust air exits from Port 2.

5) ACTUATOR INSTALLATION INSTRUCTIONS

The Air Torque actuator is a pneumatic device for the remote operation of industrial valves. The actuator will operate through 90° rotation permitting the opening and closing of many types of valves up to 90° rotation.
All the necessary technical information to install the actuator correctly and safely onto a valve i.e.:
Dimensions, Output torque, Supply pressure, Air volume, Stroke adjustment, Operating time, Operating temperature, Direction of rotation and Weight is stated clearly on the Actuator label, in the catalogue and technical data sheets. Please read all technical information before proceeding with the actuator installation.

⚠ 5.1) Important Safety Notice!

- For safety reasons, the actuator must not be pressurized at any time during installation as injury may result.
- The utmost cleanliness is required during air supply connection to the actuator i.e. the connecting pipe thread, fittings and seals must be clean and dirt-free.
- When fitting accessories onto the actuators, assemble them in such a way that the emergency control of the solenoid valve and the top of the drive shaft are easily accessible, should emergency manual operations be required.
- Before fitting onto the valve, make sure that the actuator/valve are correctly orientated, depending upon which direction of rotation is required.
- For spring return actuators, avoid that dangerous and/or corrosive substances in the working environment enter into the external chambers by using adequate filters and/or solenoid valves.
- Remove plugs from actuator air connections during installation and operation. Protect the air connections of actuators not being used immediately.

5.2) Interfaces for actuator controls and connections, Fig. A:

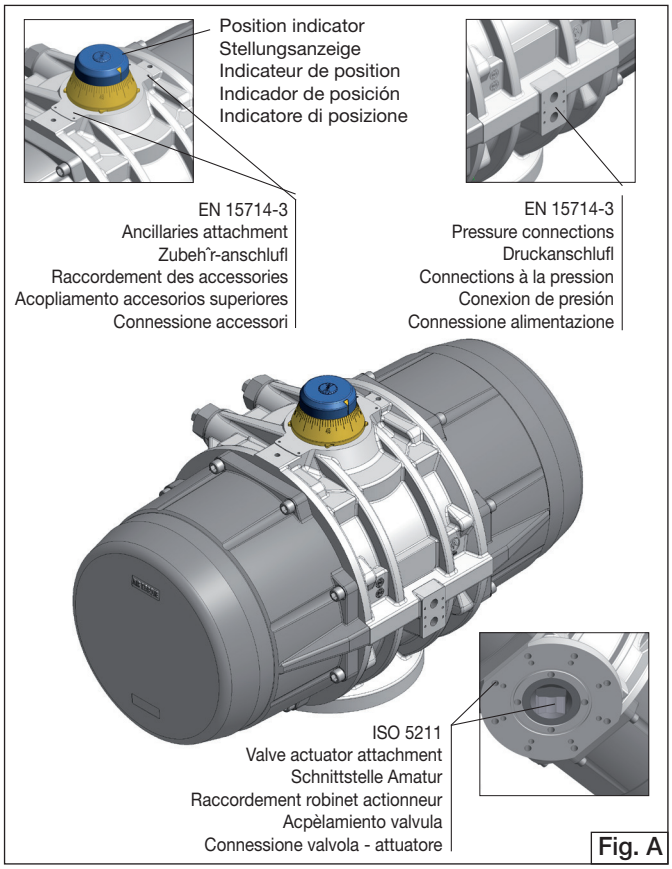


Fig. A

5.3) Assembly of accessories: Solenoid valves and Switch-boxes, Fig. B:

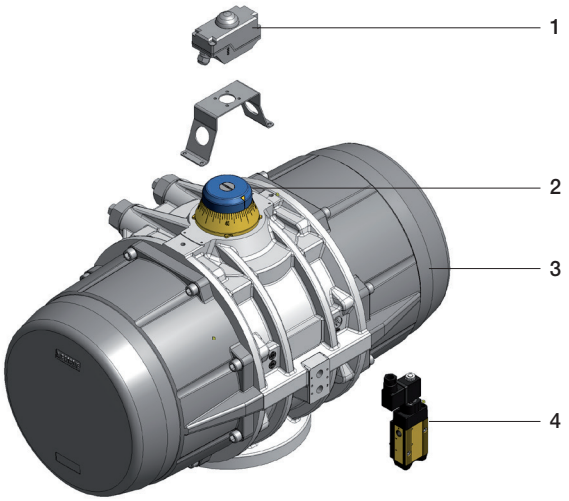


Fig. B

- **Solenoid valve mounting:**
  Before mounting a solenoid valve, ensure that the actuator is in its normal position (closed position) with pistons inwards. For standard rotation type “ST” (clockwise to close) assembly: the groove on the drive shaft or on the position indicator 2 must be horizontal to the longitudinal axis of the actuator in closed position.
  Fit the solenoid valve 4 onto the actuator 3 using the provided screws (max. tightening torque see table).

- **Switchbox mounting:**
  Fit the switchbox and bracket 1 onto the actuator 3 using four provided screws (max. tightening torque see table).

5.4) Assembly of Valve Fig. C:

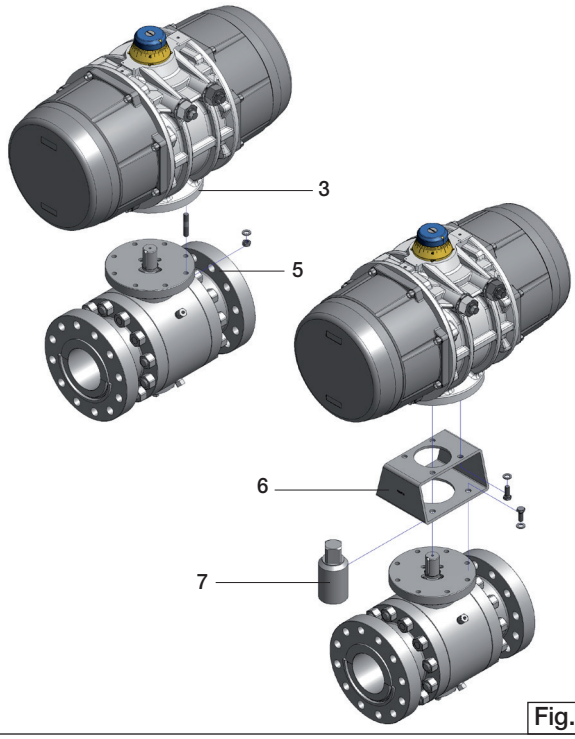


Fig. C

Before installing the actuator onto a valve, verify that the maximum transmissible torque for available ISO Flange and drive shaft connection is not exceeded according to ISO 5211 considering: the maximum actuator output torque, the maximum air supply pressure and the maximum valve torque.
Before proceeding with the assembly of the actuator onto the valve, be sure that the actuator operates in the desired direction of rotation when pressurised and both actuator / valve are in the correct position.
Important: when using a spring return actuator for a fail safe operation, ensure that when air or electricity failure occurs the direction of rotation is correct for your application.
Fit the actuator 3 onto the valve 5. It is possible to assemble the valve onto the actuator in two ways:

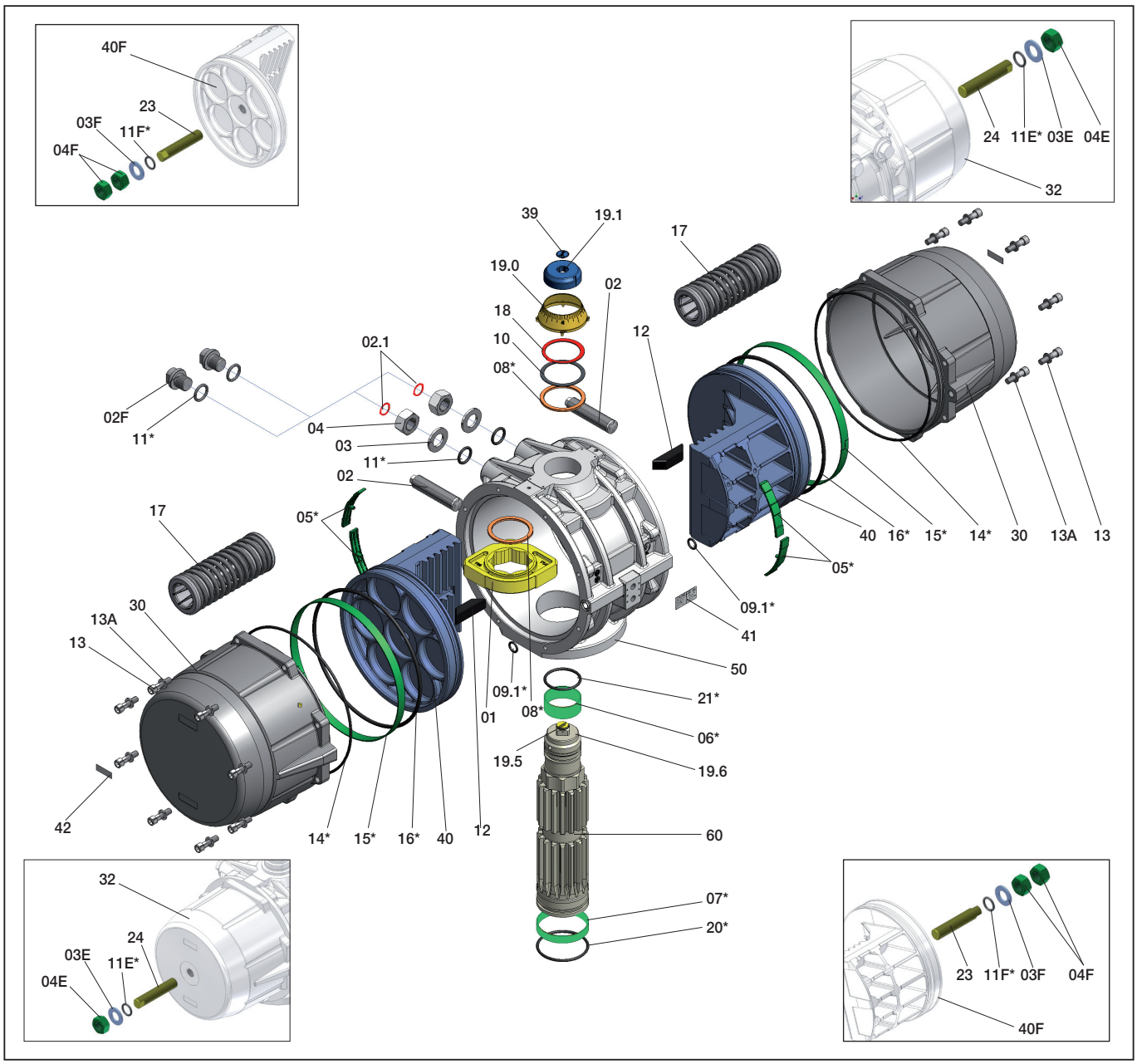
- Direct-mount: fit the stem of the valve 5 directly into the female connection of the actuator 3 and bolt together through the valve ISO pad (max. tightening torque see table).
- Bracket-mount: mounting with a bracket 6 and coupling 7, the bracket is bolted to the actuator / valve to join them together and the coupling is used to connect the actuator output drive to the valve stem (max. tightening torque see table).

Tightening Torque Table	
M..	**Nm**
M5	5 <-> 6
M6	10 <-> 11
M8	23 <-> 25
M10	48 <-> 52
M12	82<-> 86
M14	132 <-> 138
M16	200 <-> 210
M20	390 <-> 410
M24	675<-> 705
M30	1340 <-> 1400
M39	2900 <-> 3000

6) MAINTENANCE INSTRUCTION

With the information given below, AIR TORQUE provides the end user with all the required information necessary for maintenance. Under normal conditions, the actuator requires only periodic observation to ensure proper operation. Maintenance (disassembly, maintenance and rebuilding) of AIR TORQUE actuators is allowed only to AIR TORQUE personnel or properly instructed personnel. In case of controversy the product guarantee will expire! Spare kits for maintenace are available to replace all seals and bearings (soft parts indicated into the table), that may be necessary between 200.000 and 1.000.000 cycles depending on operating and environmental conditions and actuator size.

6.1) Drawing with itemized components and recommended spare parts



PART N°	UNIT Q.TY	PART DESCRIPTION
01	1	OCTI-CAM (Stop arrangement)
02	2	ANTI-BLOWOUT STOP SCREW
02.1	2	SPRING CLIP (Anti-Blowout stop screw) optional
03	2	WASHER
04	2	NUT (Stop screw)
05*	4	BEARING (Piston back)
06*	1	BEARING (Pinion top)
07*	1	BEARING (Pinion bottom)
08*	2	THRUST BEARING (Pinion)
09.1*	2	O-RING (Ext. chamber air connection)
10	1	THRUST WASHER (Pinion)
11*	2	“O” RING (Stop screw)
12	2	PISTON GUIDE
13	16	CAP SCREW (End cap)
13.1	16	WASHER (Cap Screw)
14*	2	“O” RING (End cap)
15*	2	BEARING (Piston head)
16*	2	“O” RING (Piston)

PART N°	UNIT Q.TY	PART DESCRIPTION
17	min. 5 max.12	SPRING (Cartridge)
18	1	SPRING CLIP (Pinion)
19.0	1	GRADUATED RING
19.1	1	POSITION INDICATOR
19.5	1	TOP ADAPTOR
19.6	2	HEX. SOCKET SCREW (Top Adaptor)
20*	1	“O” RING (Pinion bottom)
21*	1	“O” RING (Pinion top)
30	2	RIGHT AND LEFT END CAP
39	1	CAP SCREW (Indicator)
39A	1	WASHER CAP SCREW (Indicator)
40	2	PISTON
41	1	ACTUATOR IDENTIFICATION LABEL
42	2	END CAP LABEL
43	1	SPIGOT (Only on request)
50	1	BODY
60	1	DRIVE SHAFT

ONLY FOR MODEL AT1001U R /PT1000B R and AT1001U FA /PT1000B FA		
02F	2	SCREW (Plug)
03E	2	WASHER (Plug)
03F	2	WASHER (Piston Threaded)
04E	2	NUT (End Cap Threaded)
04F	4	NUT (Piston Threaded)
11E*	2	"O" RING (End Cap Threaded)
11F*	2	"O" RING (Piston Threaded)
23	2	REW (INTERNAL Stroke Adj.)
24	2	SCREW (EXTERNAL Stroke Adj.)
32	2	RIGHT AND LEFT END CAP (Threaded)
40F	2	PISTON (Threaded)

***Suggested SPARE PARTS for maintenance**

6.2) Disassembly

When disassembly of actuator is required for maintenance, firstly remove the actuator from the valve. Before performing any disassembly operations it is important to verify that the actuator is not pressurised. Always use caution and double check that the ports 2 and 4 are vented and are free from any accessory and/or device. When the actuator is a spring return unit, make sure that the actuator is in the failed position and with pistons completely inwards before disassembling.

A) Removal of position indicator and graduated ring (Part N° 19,19.0,19.1), Fig. 01:

- Remove cap screw (39) if fitted.
- Lift position indicator (19 or 19.1) off shaft, it may be necessary to pry gently with a screwdriver.
- Lift, if necessary, the graduated ring (19.0) off the body, it may be necessary to pry gently with a screwdriver.

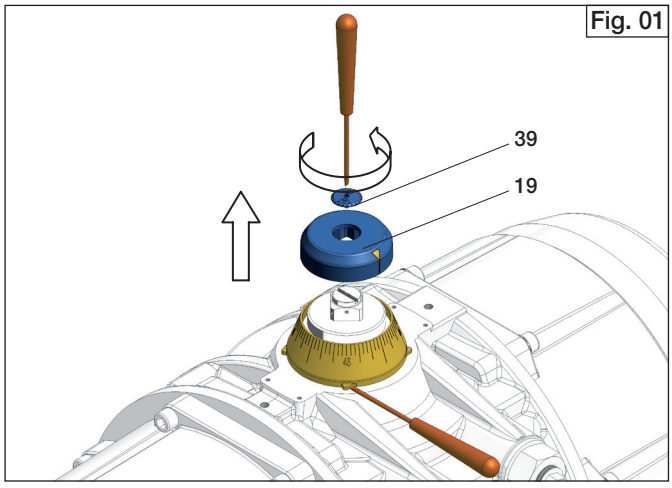


Fig. 01

B) Positioning/disassembly of stop screws (Part N° 02), Fig. 02 and 06 (N.A. for model AT1001U R/PT1000R and AT1001U FA/PT1000 B FA):

- Using snap-ring pliers remove the optional spring clip (02.1), both nuts (04) the washer (03) and the O-rings (11) and discard if replacing all soft parts.
- Unscrew the stop screws until they are at least 80 mm outside the body.
- If necessary after the drive shaft is disassembled, the stop screws may be totally removed by screwing completely into the body.
- For model AT1001U R/PT1000B R and AT1001U FA/PT1000 B FA if necessary, the screw plugs 02F may be removed only for "O" ring 11 replacement.

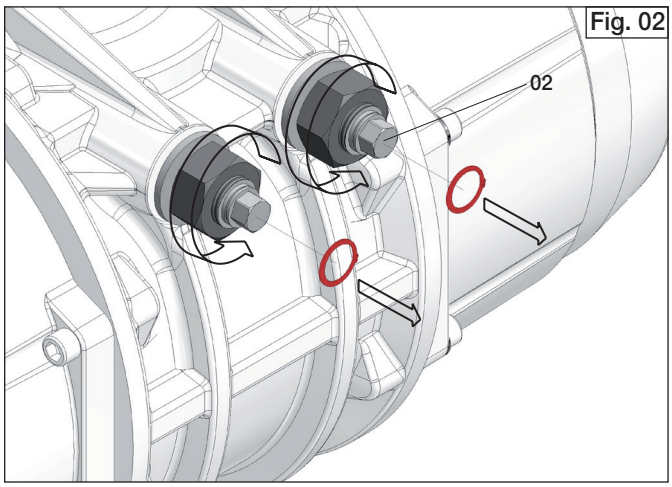


Fig. 02

C) End Caps disassembly (Part N° 30 for model AT1001U/ PT1000B, Part N° 32 for model AT1001U R/PT1000B R and AT1001U FA/PT1000 B FA), Fig. 03:

- End caps disassembly for spring return actuators (disassemble one end cap at a time).
  Unscrew the end cap bolts (End cap 13) in the sequence shown in the figure 03. Caution: when disassembling a spring return actuator, the end caps (30 or 32) should be loose after unscrewing end cap bolts (13) 4-5 turns. Unscrew the ands caps bolts by a step of one turn sequence for all the screw. If there is still force on the end caps after 4-5 turns of the end cap bolts, this may indicate a damaged spring cartridge and any further disassembly should be discontinued. Further disassembly of the end caps may result in injury.
- End caps disassembly for double acting actuators (disassemble one end cap at a time). Unscrew the end cap bolts (13) in the sequence shown in figure 03, until the screws are completely unscrewed and the end caps are free.
- For spring return actuators, always remove spring cartridge.
- Remove the o-rings (14) using a screwdriver. Discard soft parts if replacing.
- Remove O-rings external chamber connections (09.1) and discard if replacing all soft components.
- Only for Model AT1001U/PT1000B R and AT1001U FA/ PT1000 B FA remove the nuts 04E, washers 03E, "O" rings 11E and screws 24E. Discard bearings when replacing all soft components.
- Only for actuators with adjustment 50% or 100%, remove the nut 04R, the washers 03R and o-rings 11R and discard soft parts if replacing.

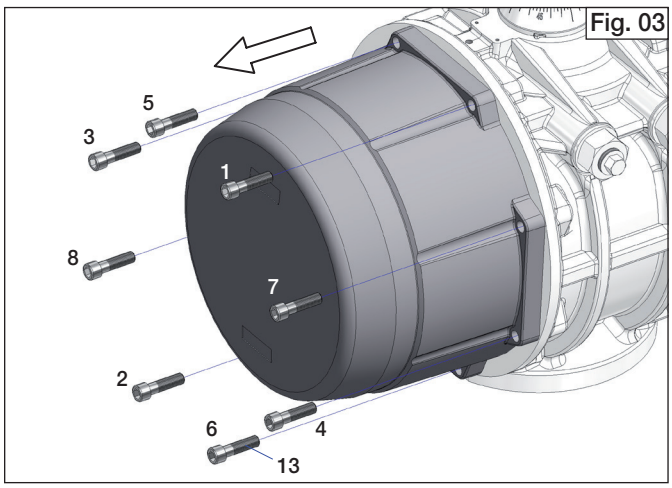
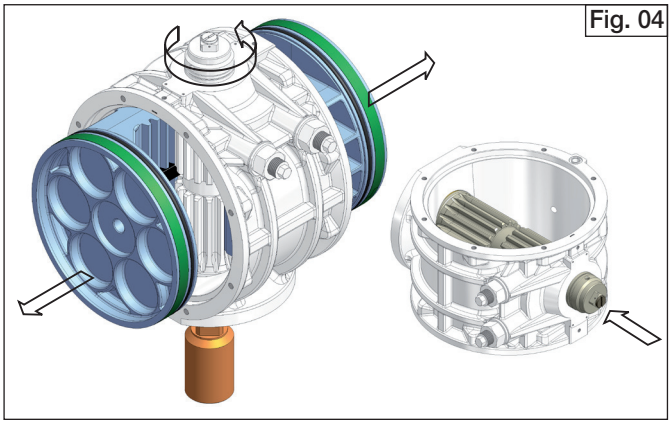


Fig. 03

D) Pistons disassembly (Part N° 40 or 40F), Fig. 04:

- Fixing the drive shaft (60) in a troper hub or similar device, rotate the body (50) until the pistons (40 or 40F) are released. Caution: Air pressure should not be used to remove the pistons from the body.
- Remove piston 'O' rings (16) using a small screwdriver; remove the piston back (05) and piston head (15) bearings.
- Discard bearings when replacing all soft components.
- Only for Model AT1001U R/PT1000B R and AT1001U FA/PT1000 B FA remove the nuts 04F, washers 03F, "O" rings 11F and screws 23. Discard bearings when replacing all soft components.

Fig. 04



E) Pinion shaft disassembling (Part N° 60), Fig. 05:

- If necessary, remove the graduated ring (19.0) with a screwdriver, remove the spring clip (18) using snap-ring pliers or screwdriver for spiral rings, remove the thrust washer (10) and the external thrust bearing (08). Apply downward force to top of drive shaft (60), until it is partially out of the bottom of the body when it is possible to remove the internal thrust bearing (08) and the octi-cam (01 only for model AT1001U/PT1000 B), then rotate the body by 90° till the drive shaft is in an horizontal position, than push the pinion (60) completely out of the body. If pinion is not easily removed, gently tap the top of the shaft with a plastic hammer.
- Remove top and bottom pinion bearings (06) and (07) and top and bottom pinion O-rings (21) and (22).
- Discard bearings (06) and (07), internal and external thrust washer (08) and O-rings (21) and (22) if replacing all soft components.

All the components disassembled and not replaced will have to be cleaned and inspected for wear and before reassembly, if necessary, also replace the plugs (09.1).

Fig. 05

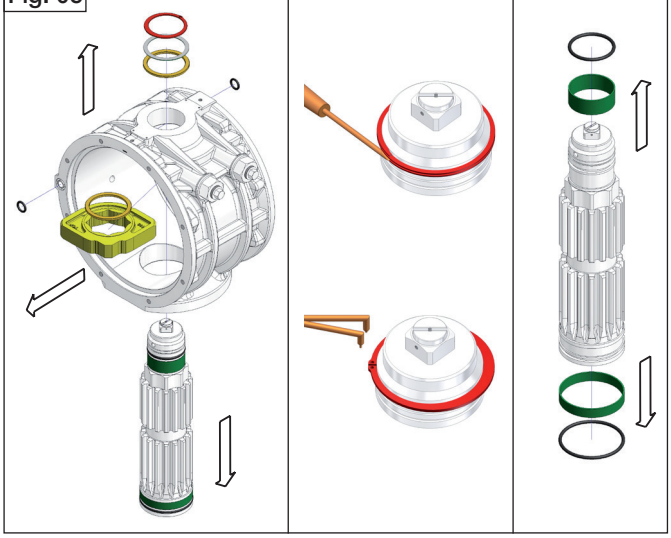
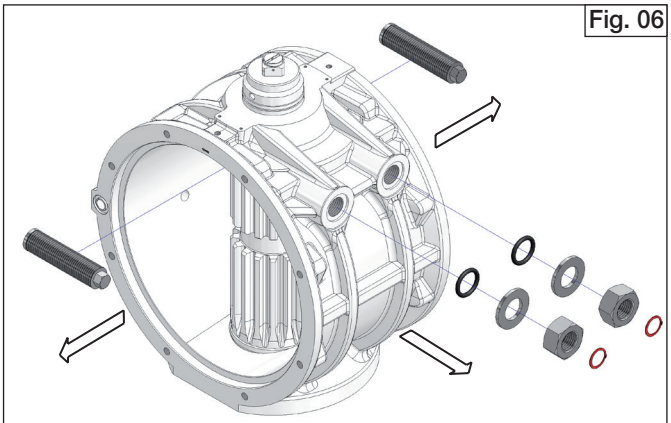


Fig. 06



6.3) Assembly:

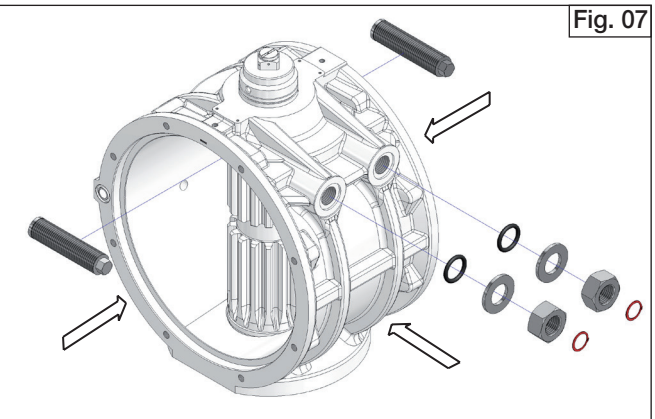
Prior to assembly, ensure that:

- all the components are perfectly clean and in good condition.
- the spare parts and the lubricant used are suitable for the operating temperature of the actuator (see Air Torque technical data sheets).
- Note: The lubricants suitable for the various operating temperatures (Standard, HT and LLT actuators) are available in Air Torque. Only for "standard" actuators, for temperature from -40°C (-40°F) to +80°C (+176°F), it is possible to use lubricant Dow Corning type Molykote® G-2003.

A) Positioning/assembly of stop screws (Part N° 02), Fig. 07 (N.A. for model AT1001U R/PT1000B R):

- Screw the stop screws from inside the body until they are at least 80 mm outside the body.
- Insert on both the stop cap screw (02), the nut (04), the washer (03), the O-ring (11) and the spring clip (02.1).

Fig. 07



B) Drive shaft assembly (Part N° 60), Fig. 08, 09 and 09A:

- Install top and bottom pinion bearings (06) and (07) and top and bottom pinion O-rings (20) and (21) onto the shaft.
- Grease the outside surface of the drive shaft on top and bottom as shown in figure 08.
- Insert partially the drive shaft (60) in the body (50), install octi–cam (01 only for model AT1001U/PT1000 B) in the correct position as shown in figures 09 and 09A related to the bottom and top of the drive shaft and the rotation of the actuator when energised and install internal thrust bearing (08). Insert completely the drive shaft in the body.
- Fit external thrust bearing (08), thrust washer (10) and then external spring clip (18) using snap ring pliers or screwdriver for spiral rings.

Fig. 08

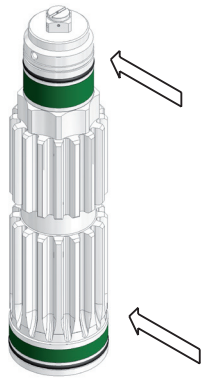
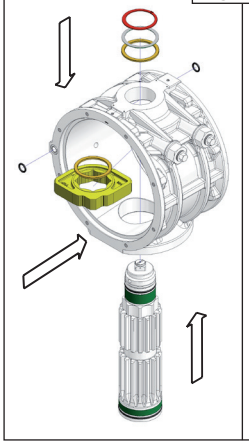


Fig. 09



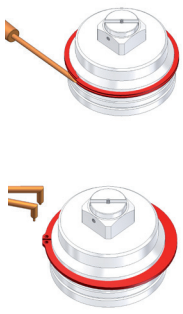
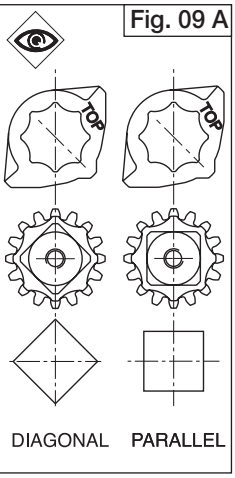


Fig. 09 A



C) Pistons assembly (Part N° 40 or 40F), Fig. 10,11,12,13 14 and 15:

- Only for Model AT1001U R/PT1000B R and AT1001U FA/PT1000 B FA install screws 23, O-rings 11F, washers 03F and nuts 04F.
- Grease and install piston O-rings (16), the Piston skirt (05) and piston head (15) bearings.
- Grease the internal surface of the body (50) and the piston (40) rack teeth.
- Hold the body (50) in a horizontal position by inserting the top of the shaft into a vice or the bottom of the shaft connection into a male drive fitted in a vice as shown in figure 11.
- Ensure that the octi-cam is in the right position as shown in figure 12.
- For standard rotation assembly (clockwise to close) rotate the body (50) about 40-45° counter-clockwise from bottom view or clockwise from top view depending on which way the shaft has been linked as shown in figure 13.
- Press the two pistons (40) simultaneously inside the body (50) until the pistons are engaged and rotate the body clockwise from bottom view or counter clockwise from top view until the stroke is completed as shown in figure 14.
- Ensure that with pistons completely closed, the rotation obtained referred to the axis of the body is about over 0° and that the dimension “A” on both sides is the same as shown in figure 15.
- Only for Model AT1001U R/PT1000B R and AT1001U FA/PT1000 B FA, adjust screws 23, until the desired stop.
  position at 0° is achieved. Then tighten the stop adjustment nuts (04F) to lock it in place.

Fig. 10

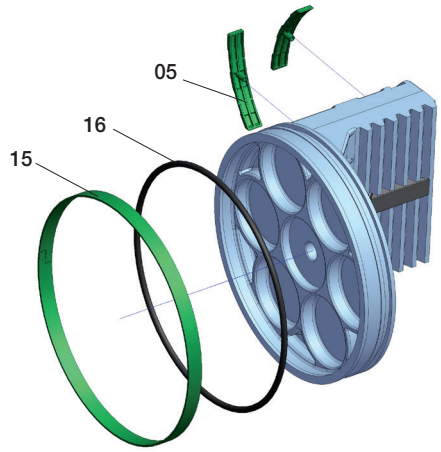


Fig. 11

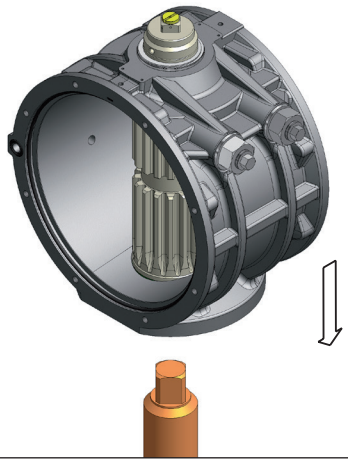


Fig. 12

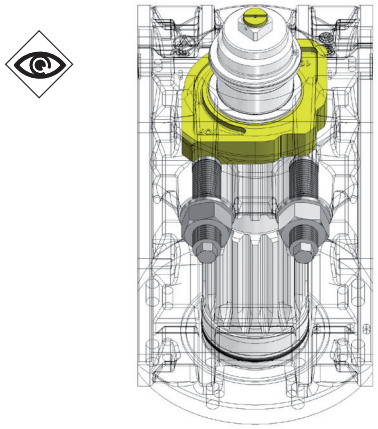


Fig. 13

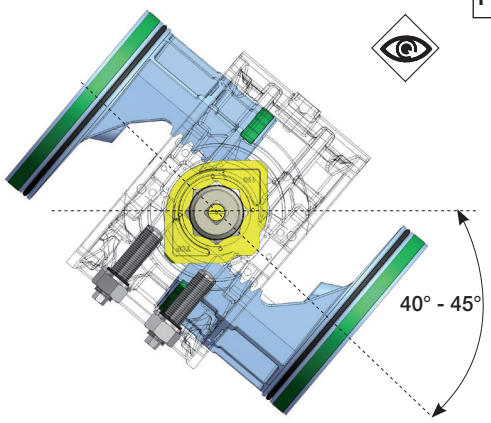


Fig. 14

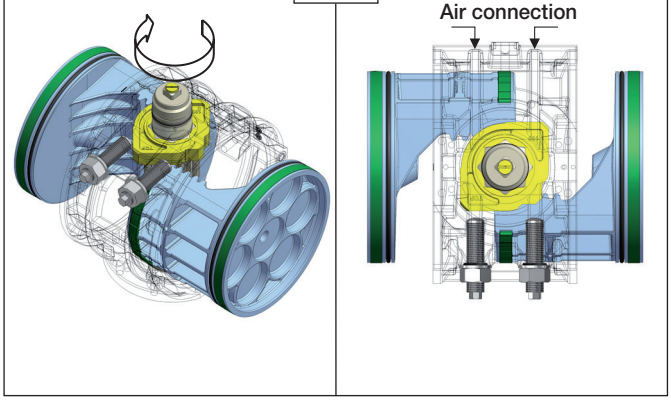


Fig. 16

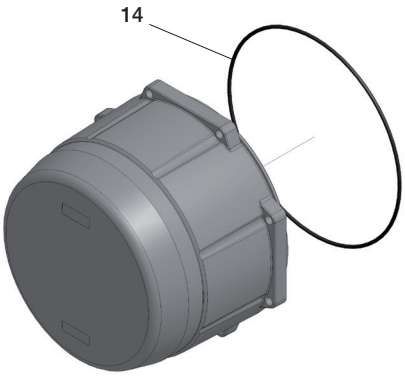


Fig. 15

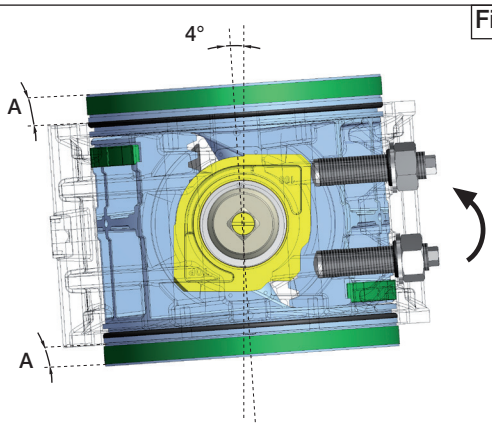
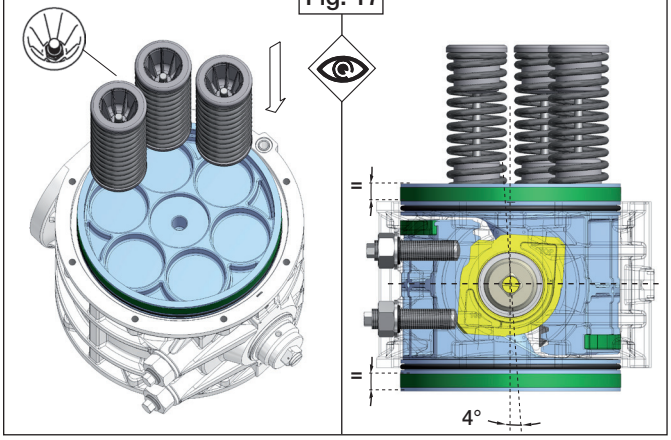


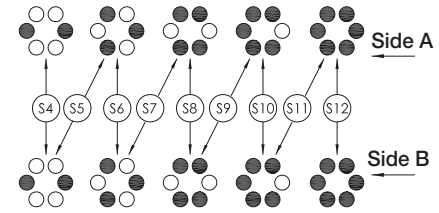
Fig. 17



D) End cap (Part N° 30 for model AT1001U/PT1000 B, Part N° 32 for model AT1001U R/PT1000B R) and spring cartridge (17) assembly, Fig. 16, 17,18 and 19:

- Assemble one end cap at a time.
- Lubricate the inside surface of end caps and piston "O" rings 16.
- Lubricate the body.
- For spring return actuators, insert the springs in each end cap according to the desired configuration, as shown in figure 18 and related tables (referring to the total number of springs). Insert spring cartridge (17) as shown in figure 17. Springs housing of pistons should be oriented as shown on figure 17.
- Fit end cap O-ring seal (14) into the groove in the end cap, on both end caps.
- Fit O-rings external chamber connections (09.1) on both sides.
- Ensure that the body is perpendicular to the pistons, than fit end caps onto the body (50), verifying that the O-ring remains in the groove.
- Only for actuators with 50% or 100% stroke adjustment, ensure that the adjustment screws 221G/222G are completely screwed into the end-cap.
- Insert the cap screws (13) and the washer cap screw (13A) and tighten each only partially. Complete tightening by making 1-2 turns for each screw in the sequence shown in figure 19 until tightening is completed. See the table for screw tightening torque.

Fig. 18



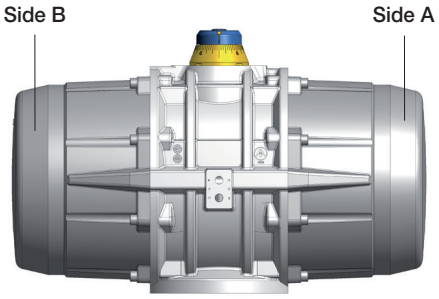
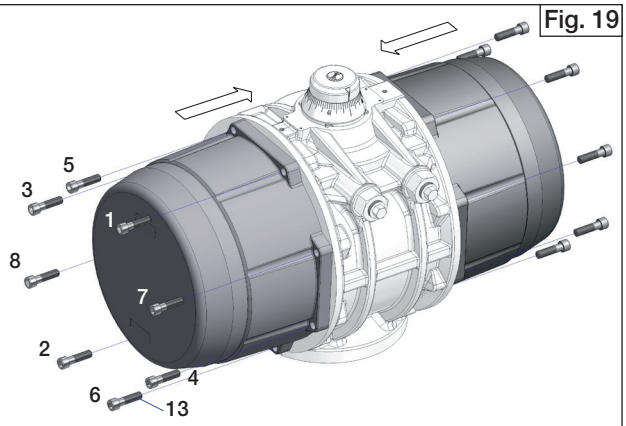


Fig. 19



E) Stroke adjustment for standard rotation actuator (Clockwise to close) Fig. 20:

- Stroke adjustment for actuators with standard type “ST” rotation / assembly (clockwise to close):
  Stroke adjustment in close position: 0° (Close) position stroke adjustment with actuator in close position, screw or unscrew the right (from top view) stop cap screw (02) until the desired stop position is achieved. Then tighten the stop adjustment nut (04) to lock it in place. **Stroke adjustment in open position:** 90° (open) position stroke adjustment with actuator in open position, screw or unscrew the left (from top view) stop cap screw (02) until the desired stop position is achieved, then tighten the stop adjustment nut (04) and lock it in place. For spring return actuators, it could be necessary to make rotation tests to verify the correct stroke adjustment in open position.
- Only for Model AT1001U R/PT1000B R, with actuator in open position adjust screws 24, until the desired stop position at 90° is achieved. Then tighten the stop adjustment nuts (04E) to lock it in place. For spring return actuators, it could be necessary to make rotation tests to verify the correct stroke adjustment in open position.
- Only for actuators with adjustment 50% or 100%, fit on end-cap adjustment screws 221G/222G the o-rings 11R, the washers 03R and the nuts 04R. To adjust the stroke in open position: with the actuator in partially or totally open position, screw or unscrew the end-cap adjustment screw 221G/222G until the desired position is achieved. It is important that the two end-cap adjustment screws are both in contact with the pistons. Then lock the nuts 04R.

Fig. 20

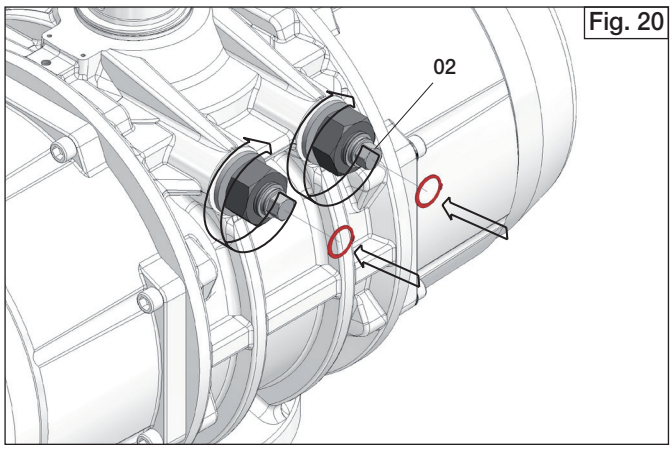
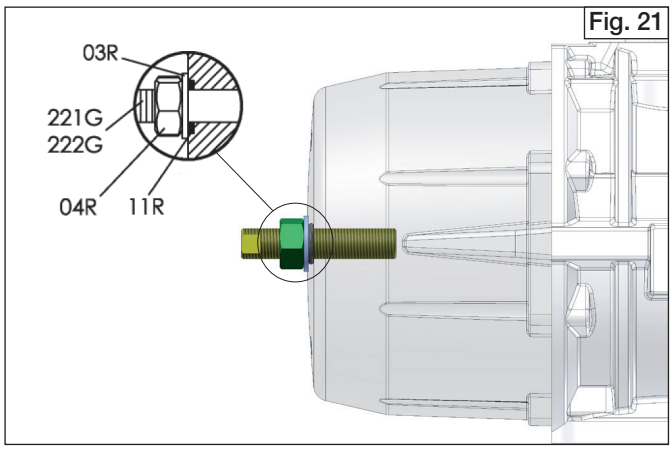


Fig. 21



F) Assembly of graduated ring and position indicator (Part N° 19.0 and 19.1), Fig. 22 and 23:

- Fix the graduated ring (19.0) to the body.
- If necessary, correctly position the “Top Adaptor” (19.5) and lock it with the proper screws (19.6).
- Insert the indicator (19.1) making sure that it indicates the correct actuator position.
- Screw the indicator screw (39) if assembled.

Fig. 22

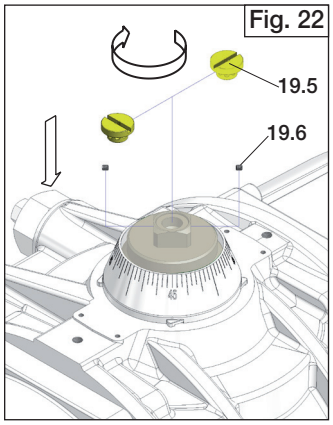
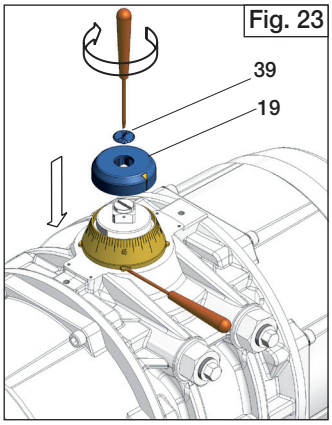
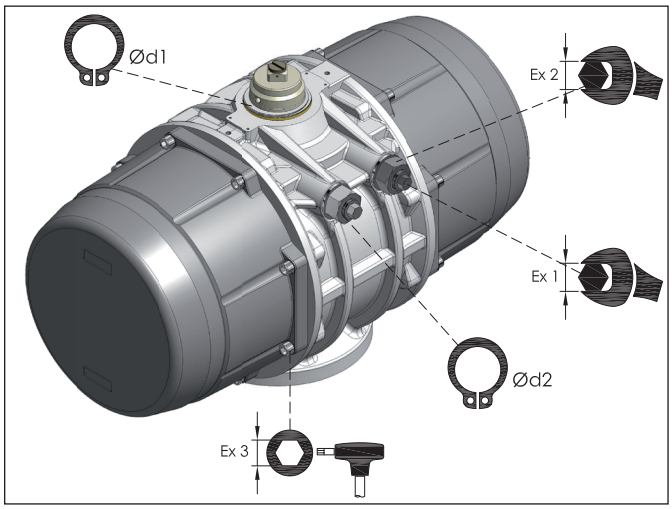


Fig. 23





EX1 mm	EX2 mm	EX3 mm	Ø d1 mm	Ø d2 mm
24	60	14	100	32

7) STORAGE INSTRUCTIONS

If the actuator is not for immediate use, the following precaution must be taken for storage:

- Store the actuator in a clean and dry environment and at temperature between –20°C (-4°F) and +40°C (+104°F).
- It is recommended that the actuator be stored in its original box.
- Do not remove the plastic plugs on air supply ports.

8) LIFTING and HANDLING

It is recommended to lift the actuators with proper, adequate and permitted systems in relation to the actuator weight and by following the ruling laws in terms of safety and health protection. The weight of the actuators is indicated on the Air Torque catalogue and on the related technical data-sheets.
During the lifting and the handling of the actuators, it is recommended to avoid clashes and/or accidental falls in order to avoid irreparable damages to the actuators and to compromise the functionality.
Contact Air Torque for any information and technical data-sheets.

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