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1) GENERAL FEATURES

KSB manufacture a wide range of part turn pneumatic actuators for valve remote control. The actuators are available on Double Acting “ACTAIR NG” and Spring Return “DYNACTAIR NG” versions.

- The principle of the actuator application is to open and close the connected valve, without the manual operation with lever or hand wheel, by means of an electric-pneumatic connection on remote control.

The maintenance should be done by KSB trained personnel only.

This instruction manual contains important information regarding the KSB pneumatic actuator operation, installation, maintenance and storage.

Please read carefully before installation and keep it in a safe place for further reference.

2) WORKING CONDITIONS

a) Construction.

Standard actuators are suitable for indoor and outdoor installation.

The laser marking or a printed label on the actuator body gives the actuator technical characteristics: type, size, operating pressure, output torque, operating temperature, flange connection, product code and production date. (See drawing pag.4).

b) Motive energy

The operating media should be dry and filtered compressed air not necessarily lubricated or inert gases compatible with internal actuator parts and lubricants.

The operating medium shall have a dew point equal to -20 °C or, to be at least, 10 °C below the ambient temperature (ISO 8573-1, Class 3).

The maximum particle size shall not exceed $40\text{ }\mu\text{m}$ (ISO 8573-1, Class 5).

In the case of lubrication, the amount of lubricant will not exceed 25 mg/m^3 (ISO 8573-1, Class 5).

c) Supply operating media pressure.

The maximum supply pressure is $8,4\text{ bar}$ (120 psi)

Nominal supply pressure is $5,6\text{ bar}$ (80 psi)

Working pressure range from 3 bar ($43,5\text{ psi}$) up to $8,4\text{ bar}$ (120 psi).

d) Operating temperature.

Actuator standard working temperature range: -20 °C (-4 °F) to 80 °C (176 °F)

For High temperature range: -20 °C (-4 °F) to $+150\text{ °C}$ (302 °F) please contact KSB

For low temperature range: -50 °C (-58 °F) to $+60\text{ °C}$ (140 °F) please contact KSB.

For high humidity and low temperature application are recommended to use a supplementary protection (e.g. screens, sheds or integral painting) please contact KSB.

e) Operating drive rotation.

The part turn actuator rotation angle is nominally 90 ° . KSB actuator provides a stroke of 95 ° rotations, from -4 ° to 91 ° , with standard stroke adjustment of -10 ° .

f) Cycle time.

The cycle time is dependent on different operating and installation factors such as the supply pressure, the flow capacity, the connection pipe size, the solenoid valve performance, the valve torque and characteristics, environmental temperature condition

Actuator opening, closing and open/close cycle times (sec.).

Actuator size	0°-90° cycle time	90°-0° cycle time
	SEC	SEC
NG 2	0,08	0,08
NG 5	0,1	0,09
NG 10	0,12	0,13
NG 15	0,2	0,21
NG 20	0,28	0,25
NG 30	0,38	0,36
NG 40	0,46	0,4
NG 60	0,64	0,59
NG 80	0,81	0,73
NG 120	1,36	1,21
NG 160	1,59	1,44

Actuator size	0°-90° cycle time	90°-0° cycle time
	SEC	SEC
NG 1	0,13	0,09
NG 2	0,13	0,1
NG 4	0,2	0,17
NG 6	0,31	0,33
NG 8	0,4	0,33
NG 12	0,58	0,44
NG 16	0,65	0,53
NG 25	0,96	0,72
NG 35	1,16	0,9
NG 50	1,65	1,49
NG 80	2,6	2,14

The above time table is referred to a standard actuator working cycle at the following tests conditions:

Ambient temperature: 18°C – 25°C

Motive energy operating medium: compressed air at 5,6 bar

Nominal cycle: 90° in both directions - Load:free

ACTAIR NG actuators operate with solenoid valve 5/2 ISO 1-2. While the DYNACTAIR NG actuators with solenoid valve 3/2. Time tested with Electronic Timer device.

NOTE: different working condition such as air pressure, piping connection, filters or solenoid valves, could change the timing of the operations.

g) Lubrication.

The actuators are factory lubricated for the standard working condition life.

During maintenance and reassembling KSB recommends to use:

TECNOLUBE SYNTHY POLYMER 402, or equivalents.

h) Internal wear protection

The cylinder is lapped to obtain a surface with fine roughness and is protected with 20 µm technical oxidation. The pistons slide supports are in P.T.F.E. or polyurethane only, no rubber in contact. The use of steel bearings on the Scotch-Yoke system ensures no play and low friction during operation.

i) External protection

KSB standard actuators are suitable for indoor and outdoor installation. The aluminium body is external protected for corrosion and wear with 20 µm technical oxidation. The cast aluminium end caps are polyester painted. Driving shaft and caps screws are in stainless steel.

For aggressive atmosphere and severe environmental condition select the required protection from the external finishes please contact KSB.

I) Marking and classification

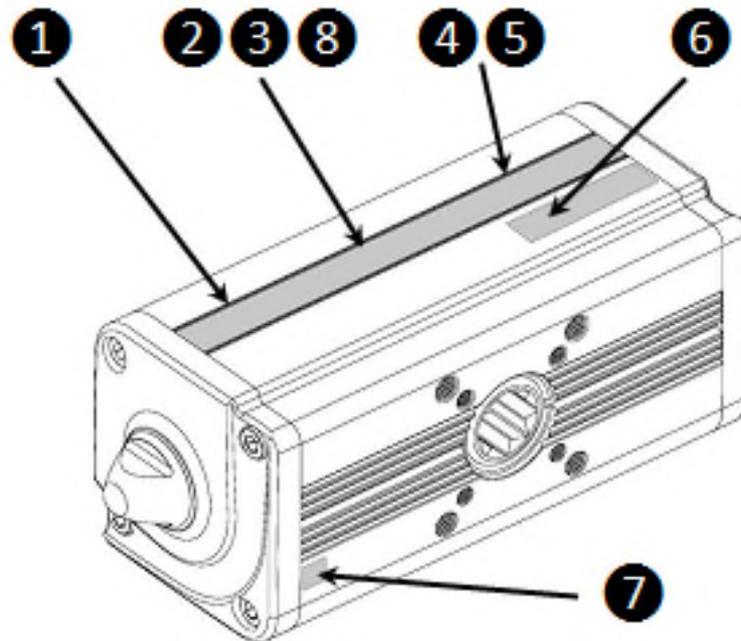
All KSB actuators bodies are marked with the Manufacturer name and address, the actuator Type code including the Series and Size, and its range of Pressure and Temperatures working conditions and limits.

Laser printings on actuators:

- ① - KSB logo
- ② - KSB actuator name and size + ISO flange dimension + Outside drive dimension
- ③ - NC or NO function (for Single acting actuator)
- ④ - Nominal air pressure: 5.6 bar or 4.2 bar (for Single acting actuator)
- ⑤ - Allowed temperature (Ex: -20°C to + 80°C) and max air pressure 8.4 bar
- ⑥ - Class of compliance with the rules and level of protection
 Name of technical File deposited with a Notified Body
- ⑦ - Production date (code marked by hand after the test)
- ⑧ - Special versions

→   II 2G Ex h IIC T6..T3 Gb X
 II 2D Ex H IIIC T85°C..T175°C Db X

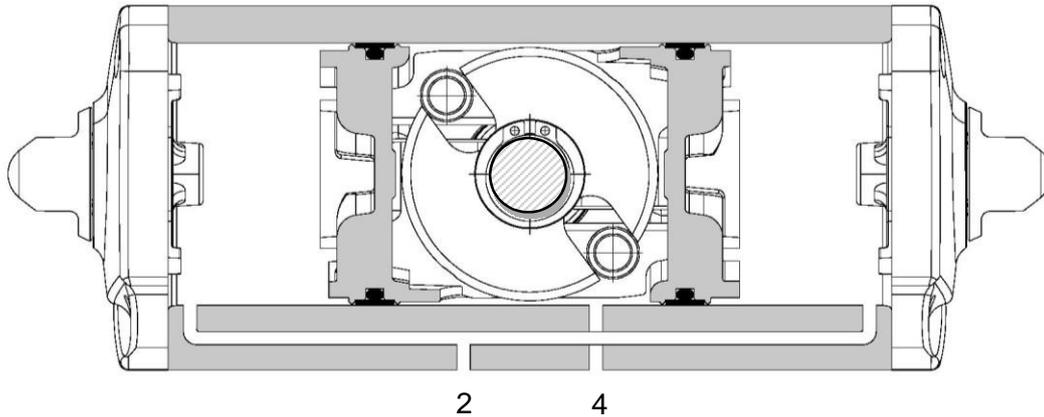
Tech File: R355-010073



3) OPERATION AND ROTATION DIRECTION

Double Acting.

The pistons of standard ACTAIR NG actuators are mounted as shown below. This provides the highest torque at the valve start opening for valve clockwise to close. The pistons are then in their outermost position and the end travel stops can be fine adjusted.

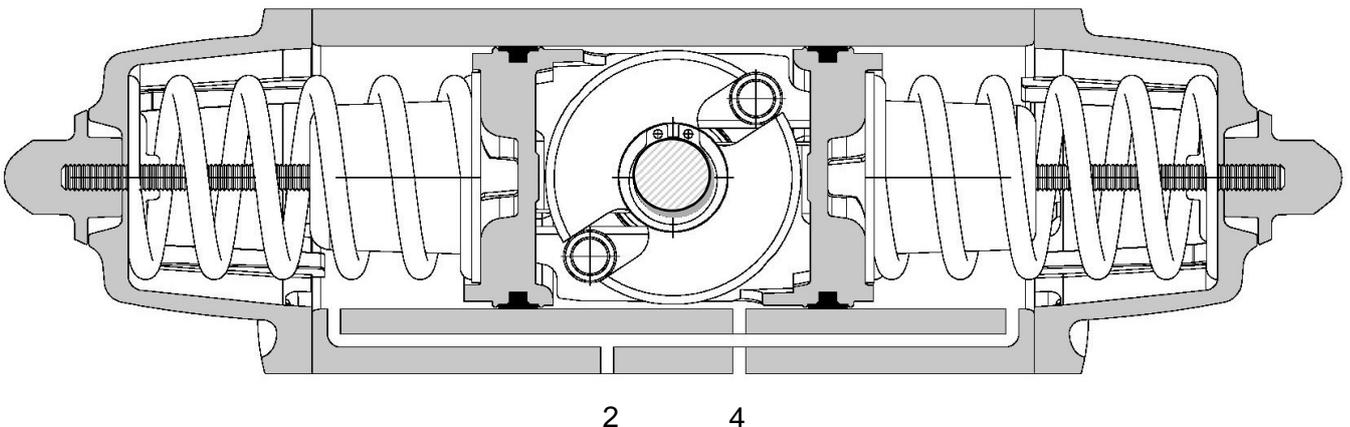


The port 2 is in connection with the cylinder side chambers, supplying the pressurized air in port 2 the standard Double Acting actuator drive shaft rotates counter clockwise to open, while the port 4 is in connection with the intermediate chamber and when pressurized the drive shaft rotates clockwise to close.

Single Acting, Spring Return fail to Close.

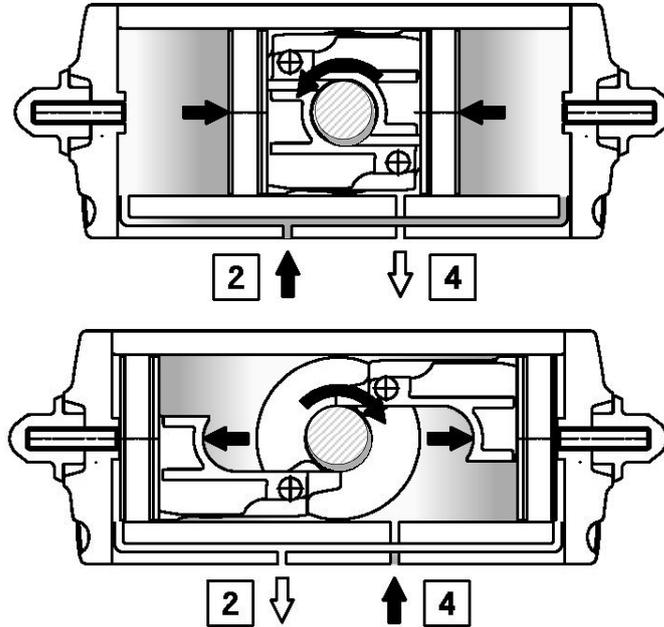
The pistons of standard DYNACTAIR NG actuators are mounted as shown below. Although spring force is diminished, the geometry of the mechanism provides a greater torque at the end of the spring stroke. When the actuator is in the valve open position, and the springs are fully compressed, the end of travel stops can be fine adjusted.

Caution. In order to avoid suction of dust or dirt inside of the actuator chambers during the spring action, install a regulator-filter on the port 2.

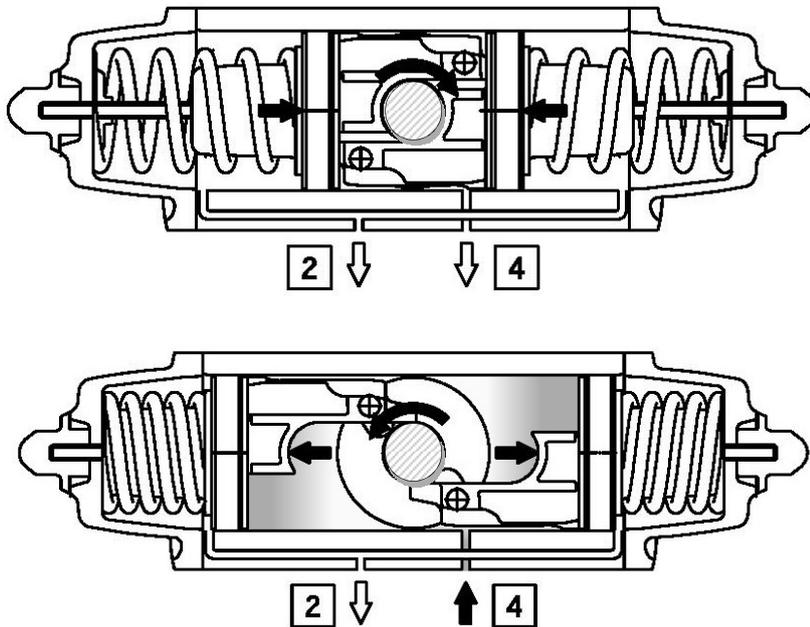


The port 4 is in connection with the intermediate chamber and when pressurized the drive shaft rotate counter clockwise to open.

Double Acting operation cycle (ACTAIR NG Type).

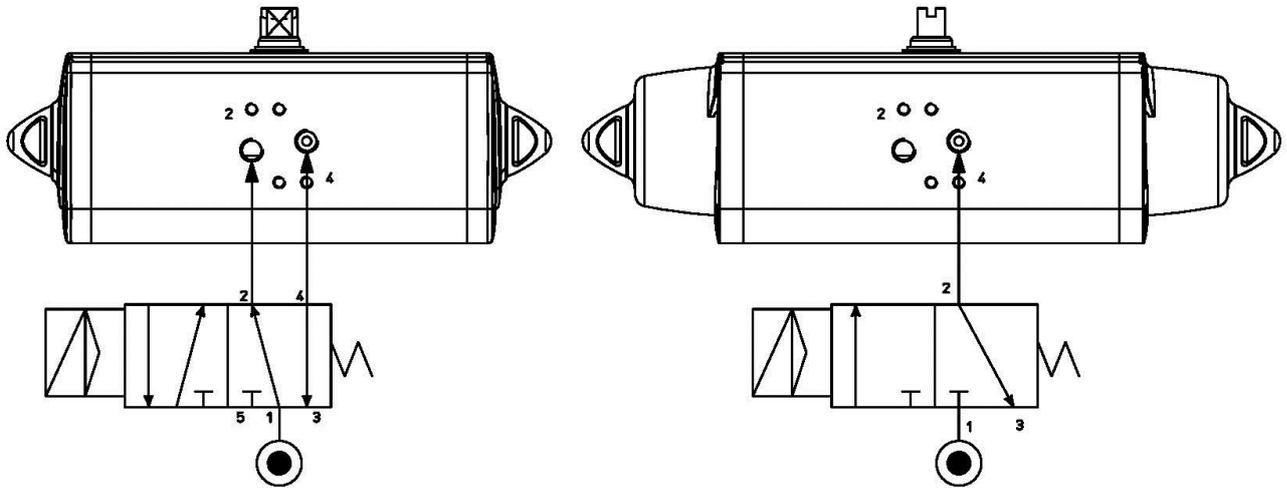


Simple Acting Spring Return fail to close operation cycle (DYNACTAIR NG Type)



Actuator operation functionality remote control should be done by means of direct solenoid valve connection to the actuator standard interface VDE/VDI 3845 NAMUR, or by means of pipes screwed on the ports marked with the numbers 2 and 4 and connected to a separate control cabinet.

Fig 3.1 – Typical air connection schema.



A) Rotation direction.

In accordance with the international standard ISO 5599-2 the actuator air ports connection position, location, orientation and form shall be clearly identified and marked with the numerate 2 and 4.

Standard Double Acting and Simple Acting Spring Return actuators shall be Clockwise (CW) direction to valve Close, and Counter

Clockwise (CCW) direction to valve Open.

4) SAFETY NOTICE

- The actuator should be used within the pressure mentioned limits only, operating the actuator over the pressure limit will damage the internal actuator parts.
- Operating the actuator over or under the temperature limits will damage the internal and external parts.
- Operating the actuator in corrosive environments without the required external protection will damage the actuator.
- Before installation, service or maintenance verify that the actuator is not pressurized, disconnect the air lines and make sure that the air ports are vented
- Do not remove the end caps while the actuator is installed in the line, or while the actuator is under pressure.
- Do not disassemble the caps end spring cartridge, this operation should be done by KSB trained personnel only, this operation could causes personal injury.
- Before mounting the actuator onto the valve make sure that the valve rotation is according with the actuator operating rotation, and the upper shaft slot orientation is also correct.
- Before installing the actuated valve do cycling test for a while to ensure the correct mechanical mounting and actuator/valve operations.
- The actuator installation shall be done according to and in observance with the local and national laws regulation.
- KSB cannot be responsible for any damage to people, animals or things due to an improper use of the product.

5) INSTALLATION INSTRUCTIONS

The principle of the actuator application is to open and close the connected part turn valve installed in a plant, without the manual operation, by remote control by means of an electric-pneumatic connection.

The normal sizing of actuators requires a 20%-30% safety margin over the valve breakaway torque to handle valves.

Plant design, chemical and physical flow characteristics and environmental condition could increase the safety factor to apply to actuator sizing. Before performing any installation operation, verify the actuator and valve conditions according to the safety notice above described.

Moreover, the utmost clearness is required during valve installation of the air supply connection to the actuator. All the connection parts such as reductions, joints, plates, brackets and equipment must be clean and dirty free.

-Before assembling the actuator onto the valve make sure that both items are correctly oriented, depending upon which direction of rotation is required.

-Before starting the actuator installation, should be done a visual actuator control to verify its physical condition after transportation and storage.

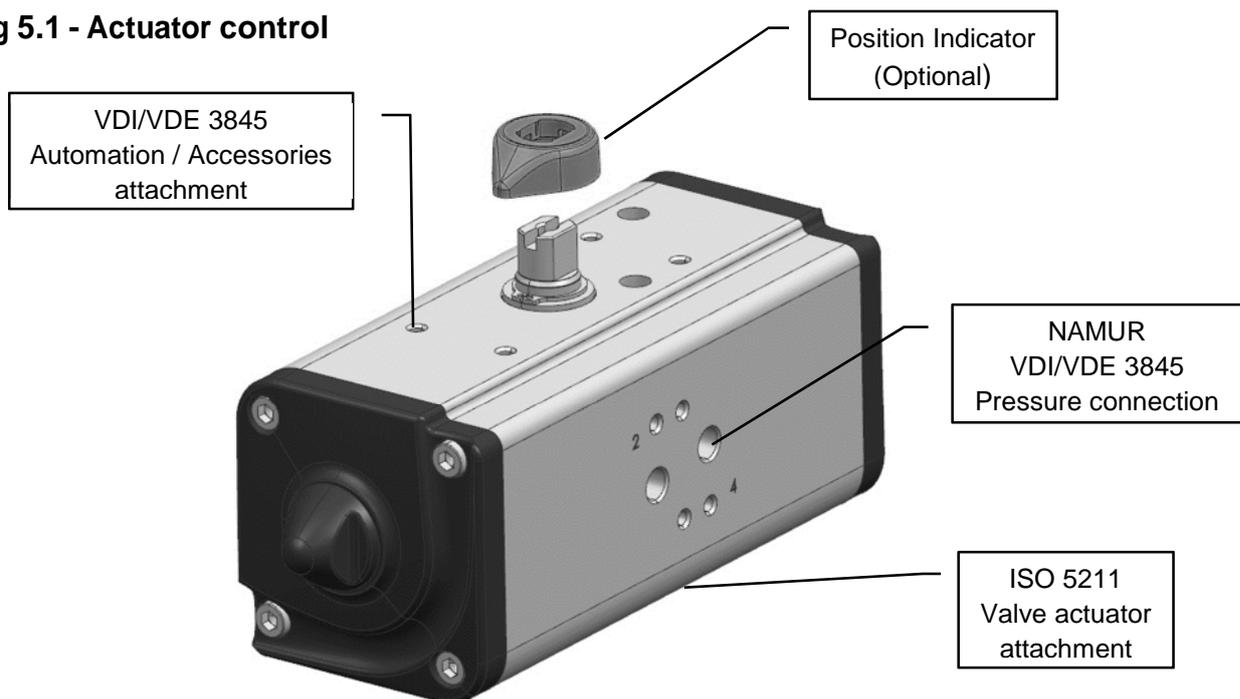
-Control through the shaft slot or caps the actuator position

-Read carefully the KSB instruction sheet included in the cardboard box

-Read the actuator limits and performances marked on the actuator body to verify its suitability

-Remove the protection label stickers from the ports

Fig 5.1 - Actuator control



-Before fitting the actuator on the valve, clean the valve and the actuator from the dust and dirt.

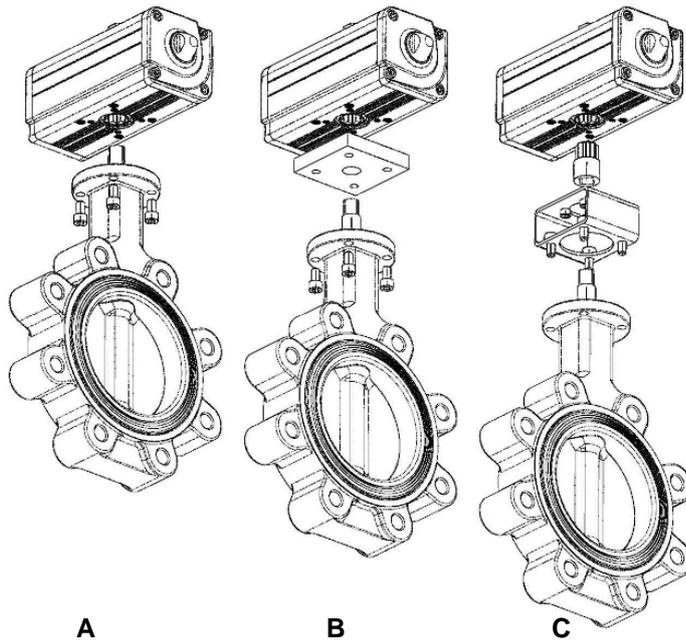
-Verify the valve position, close or open, and the rotation direction.

-Verify the actuator position and rotation according with the valve requirement and operation, especially for Spring Return installation Fail to Close or Fail to Open.

-Spring Return Fail to Close actuators are always supplied in the close position.

-While Spring Return Fail to Open are always supplied in the open position.

Fig 5.2 – Valve/Actuator assembly: (A) direct-mount (B) plate-mount (C) bracket-mount.



Screw torque wrench setting		
SIZE	TORQUE Nm	
	Steel (Cl 8-8)	Stainless steel (A4 - 70)
M5	3 to 4	3 to 4
M6	4 to 5	4 to 5
M8	10 to 15	10 to 15
M10	20 to 25	20 to 25
M12	35 to 40	35 to 40
M14	60 to 65	60 to 65
M16	90 to 95	90 to 95
M20	180 to 185	180 to 185
M30	630 to 640	630 to 640
M36	1100 to 1150	1100 to 1150

NOTA : Representation in arrangement M

A) -Direct mounting.

Valve actuator Direct mounting is the best solution to avoid plays between valve stem and actuator drive shaft. For a direct mounting you should have the same standard flange connection on valve and actuator as well as the valve stem dimensions that fit perfectly with the actuator drive. Before installation please verify that the actuator and valve flange ISO connections are the same size; verify that the valve stem size and shape is suitable for direct mounting, if necessary use a drive reduction.

Fit the valve stem into the actuator drive shaft connection, and bolt together the two ISO flanges.

B) -Mounting plate connection.

In case direct mounting is not possible cause of little differences in actuator/valve flanges or drives sizes, mounting plate's adapters with suitable flanges dimensions allows an easy connection living a sufficient space for the valve/actuator drive adapter.

C) -Bracket & Joint connection.

Wherever for technical reason the plant installation requires a distance between actuator and valve, or the valve flange and/or stem are not standard, and in any case, where the valve/actuator connection could not be possible, a bracket and joint is the right answer. The Bracket is a steel bridge that allows to connect the valve with its own flange connection in one side and with the suitable actuator connection onto the opposite side, living a space in between for a steel joint connection. The joint allows a drive connection between the actuator and the valve stem indispensable in case of stem key drive and flat head.

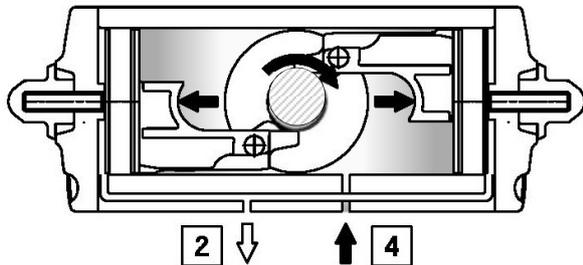
Chose the suitable flange bracket and the required joint connections to fix the actuator onto the valve very tight without any plays.

KSB actuator with its draining channels system on the flange connection pattern is especially designed for valve direct mounting. This system allows to drop away any possible flow coming from the valve stem that with valve/actuator direct mounting could damage the actuator.

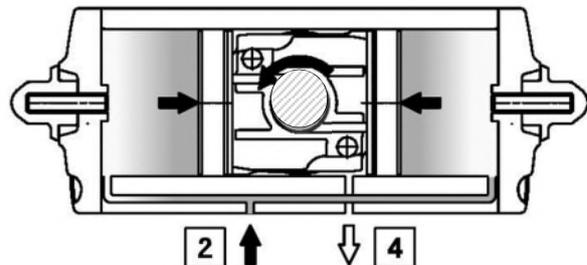
Fig 5.3 Actuator/Valve rotation control and mounting.

Type: **ACTAIR NG**

Closing position valve

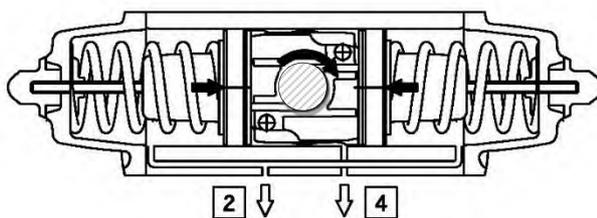


Opening position valve

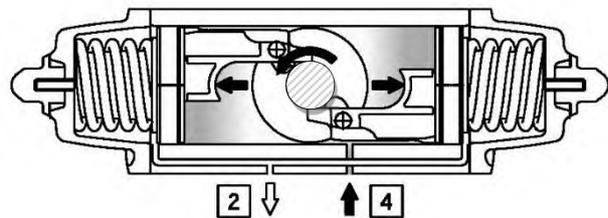


Type: **DYNACTAIR NG (Fail to close)**

Closing position valve

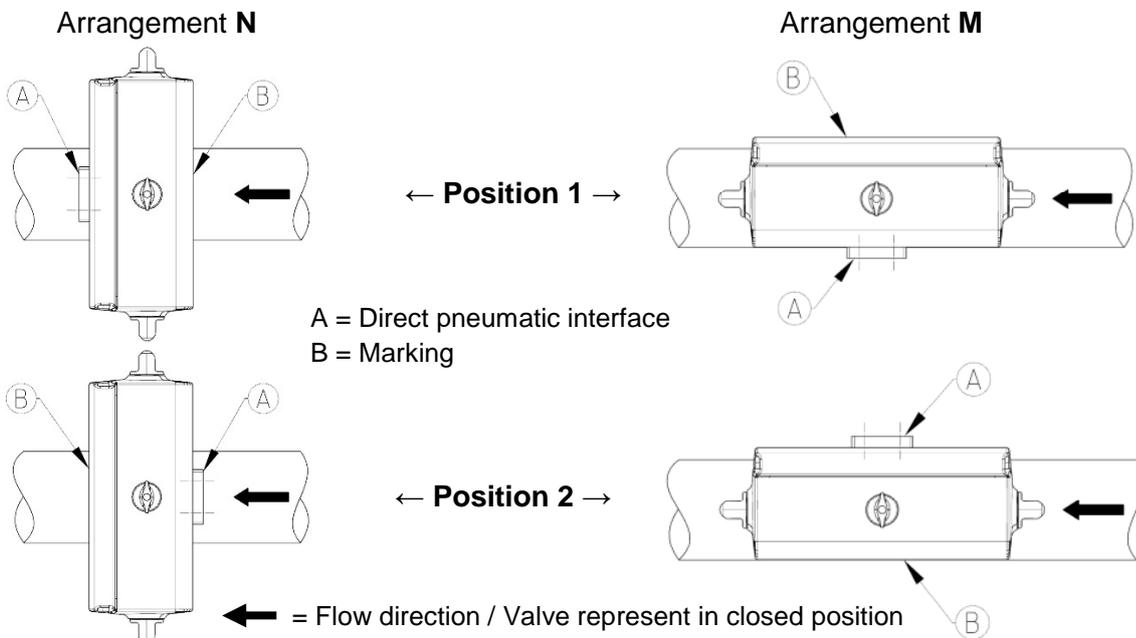


Opening position valve



Mounting on the valve

The actuator can be positioned in 4 positions at 90° intervals.
 The standard arrangement is the N position 1.



WARNING: For the actuators with flat ends (ACTAIR NG2 to NG30 and DYNACTAIR NG1 to NG12), there are two versions:

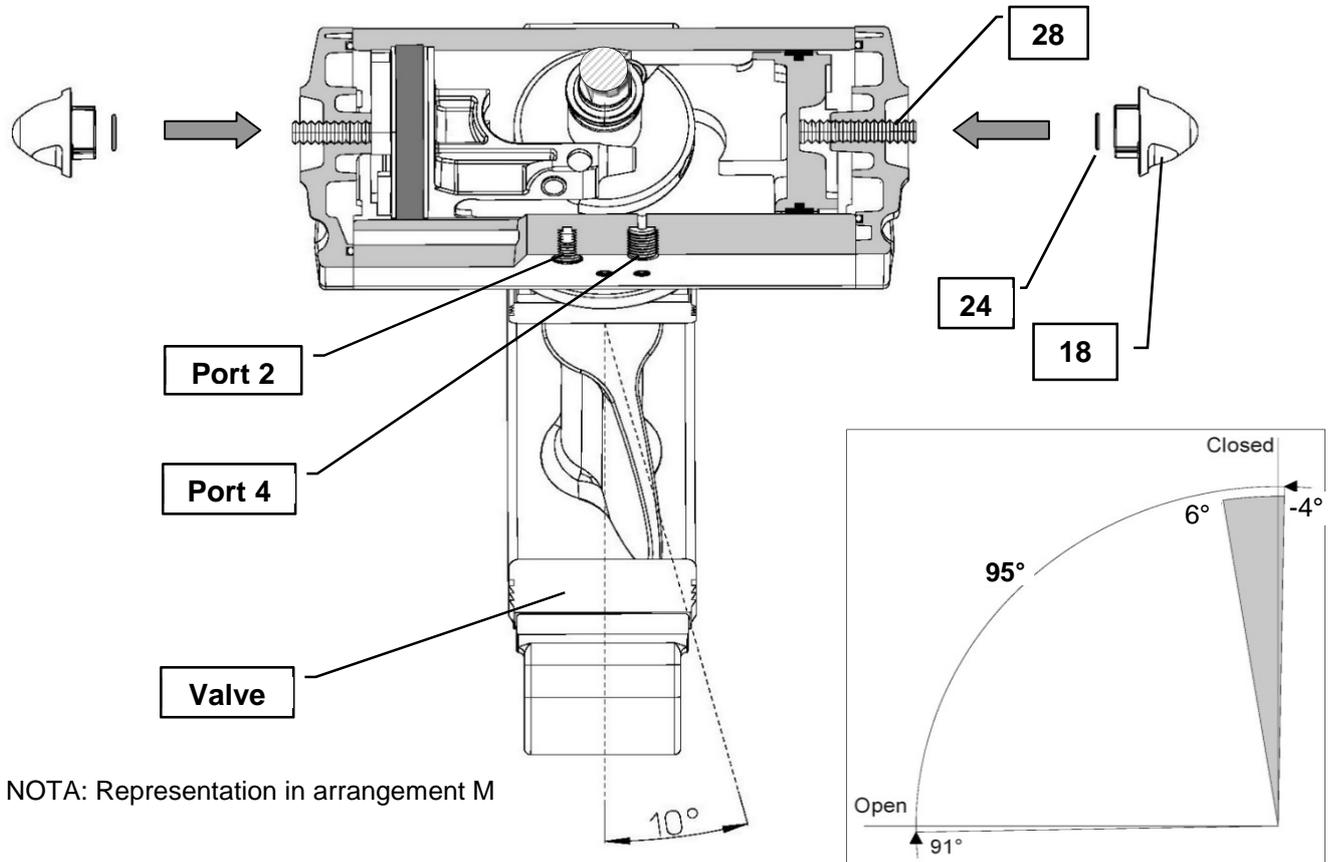
- a reference for the N position,
- a reference for the M position

It is therefore impossible to switch from N to M and vice versa without changing the actuator.

Fig 5.4 Stroke adjustment.

Both actuator versions, Double Acting and Spring Return, are provided as standard with 10° stroke adjustment.

A) ACTAIR NG (Double Acting) - Close adjustment instruction



NOTA: Representation in arrangement M

The stroke adjustment on the actuator mounted on the valve should be done with the valve free of any flow pressure or friction impediments, in addition the actuator shall be disconnected from the air supply and equipment.

This operation should be done with the valve/actuator held firmly in the pipeline or in a vice.

- Supply the air pressure to port 2 to open the valve, and to position the actuator pistons inward.
- Remove the cap nuts (part N° 18) and its O-ring (part N° 24).
- Screw in clockwise direction the screw adjustment (part N° 28) in one actuator side only.
- Supply the air pressure to port 4 to close the valve and to position the pistons outward and against the adjustment screw, and check the valve close position.
- In case the valve position is not correct, repeat the operation from the beginning.
- In opposite situation, if, with the air supply in the port 4, the valve is not sufficiently closed, unscrew counter clockwise the adjustment screw (part N° 28) backward counter clockwise until the required position has been found.

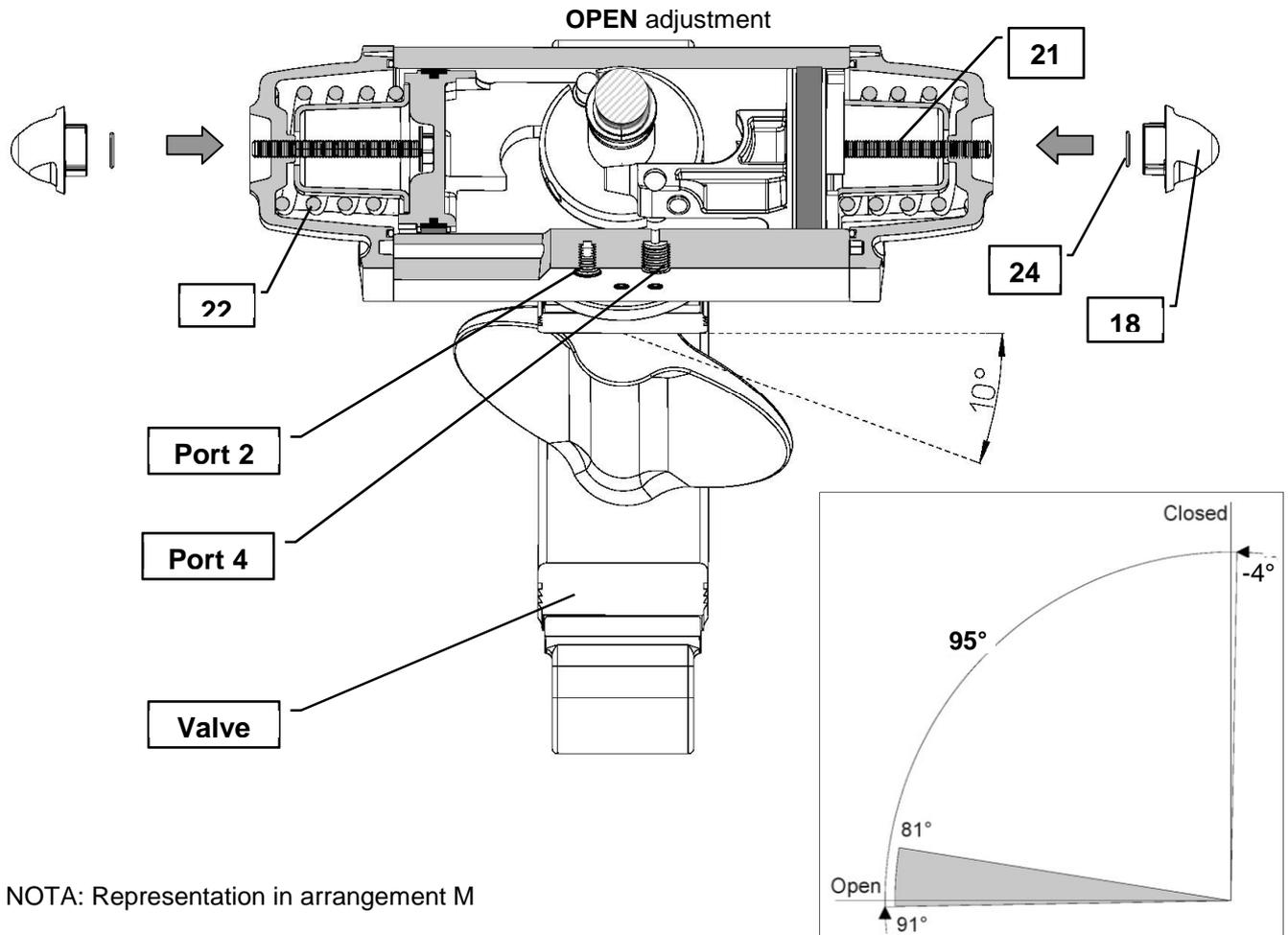
-Obtained the correct valve position, and with the air pressure to the port 4, screw the other adjustment screw up to piston pressing, in this way both adjustment screws are working to stop the pistons simultaneously.

-Tightly screw the cap nuts (part N° 18) with its sealing O-ring (part N° 24) on the end caps to hold the adjustment screws in desired position.

-The actuator is now ready to operate correctly.

KSB standard stroke adjustment is max 10°, special longer screws are available on request.

DYNACTAIR NG (Single Acting) Spring return Fail to Close - Adjustment instruction



NOTA: Representation in arrangement M

Open Adjustment:

The stroke adjustment on the actuator mounted on the valve should be done with the valve free of any flow pressure or friction impediments, in addition the actuator shall be disconnected from air supply and equipment.

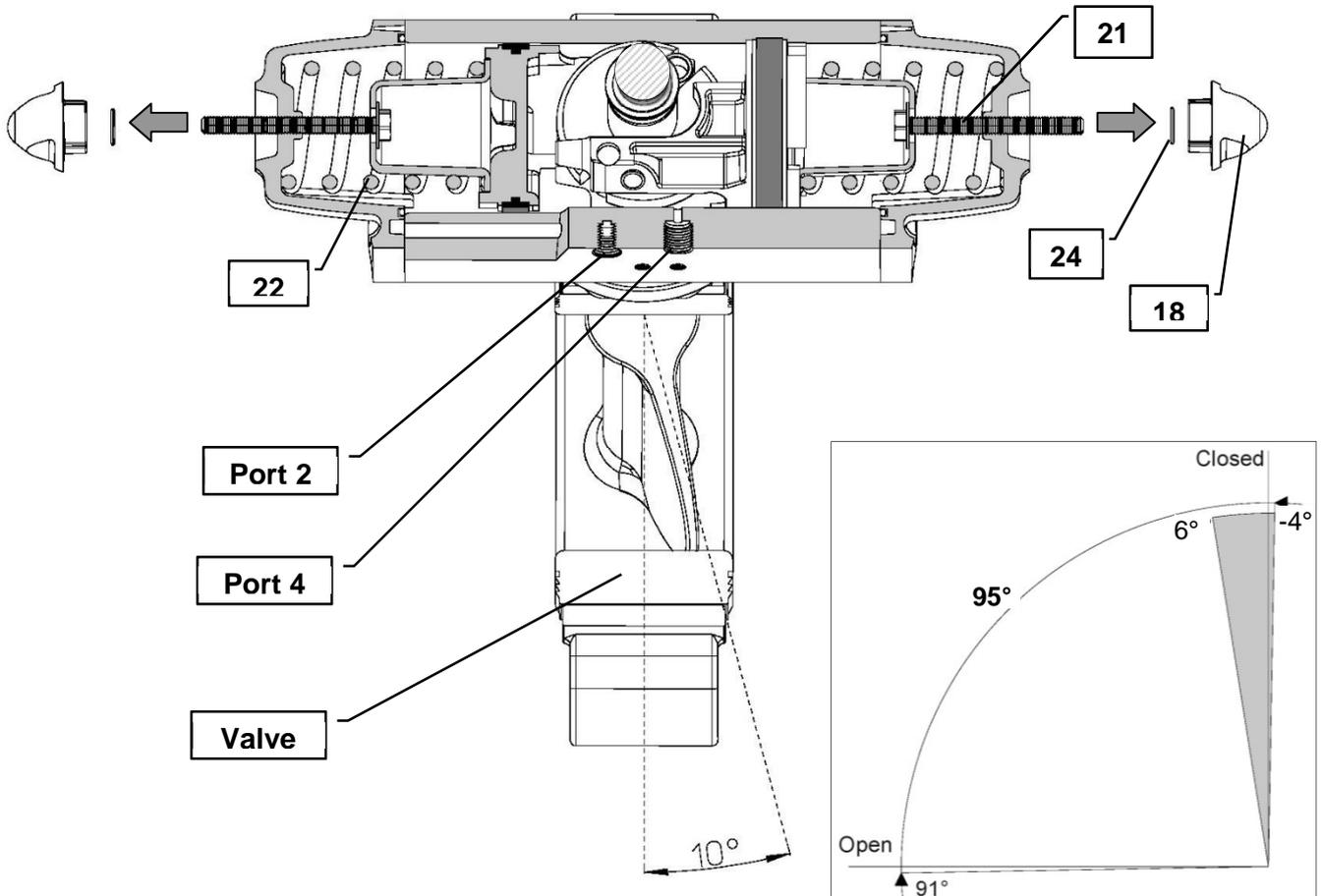
This operation should be done with the valve/actuator held firmly in the pipeline or in a vice.

- Remove the cap nuts (part N° 18) and its O-ring (part N° 24).
- Screw, clockwise direction, the screw adjustment (part N° 21) in one actuator side only.
- Supply air pressure to port 4, and due to the air pressure action the pistons move to the outward position up to the limits determined by the adjustment screw on the piston head.
- Check the valve open position, if the valve is too much open repeat the operation from the beginning.
- In opposite case, valve not sufficiently open, with the air supply to the port 4, move the adjustment screw (part N°21) backward counter clockwise until the required position has been found.

- Obtained the correct valve position, and with the air pressure to the port 4, screw the other adjustment screw up to piston pressing, in this way both adjustment screws are working to stop the pistons simultaneously.
- With pressurized air supply, tightly screw the cap nuts (part N° 18) with its sealing O-ring (part N° 24) on the end caps to hold the adjustment screws in desired position.
- In this condition the actuator is ready to operate correctly.

KSB standard stroke adjustment is max 10°, special longer screws are available on request.

CLOSE adjustment



NOTA: Representation in arrangement M

Close adjustment:

The stroke adjustment on the actuator mounted on the valve should be done with the valve free of any flow pressure or friction impediments, in addition the actuator must be disconnected from air supply and equipment.

This operation should be done with the valve/actuator well held in the pipeline or in a vice.

- Remove the cap nuts (part N° 18) and its O-ring (part N° 24).
- Supply the air pressure to port 4 to open the valve, and position the actuator pistons outward.
- Unscrew, counter clockwise direction, both screws in same measure (part N° 21).
- Stop to supply air pressure to port 4, and due to the spring action the pistons move to the inward position up to the limits determinate to the adjustment screws on the spring caps (part N° 22).

*****Attention**

- Check the valve close position, if is over closed repeat the operation from the beginning until the desired valve closure position is achieved.
- In opposite case, with the valve to much open, with the air supply to the port 4, move both adjustment screws inward, clockwise in same measure.
- Without pressurized air supply, tighten the cap nuts (part N° 18) with its sealing O-ring (part N° 24) on the end caps to hold the adjustment screws in desired position.
- In this condition the actuator is ready to operate correctly.

6) MAINTENANCE AND MATERIALS SPECIFICATION

Life time 20 years or number of cycles as per EN15714-3 2009 (see table below).

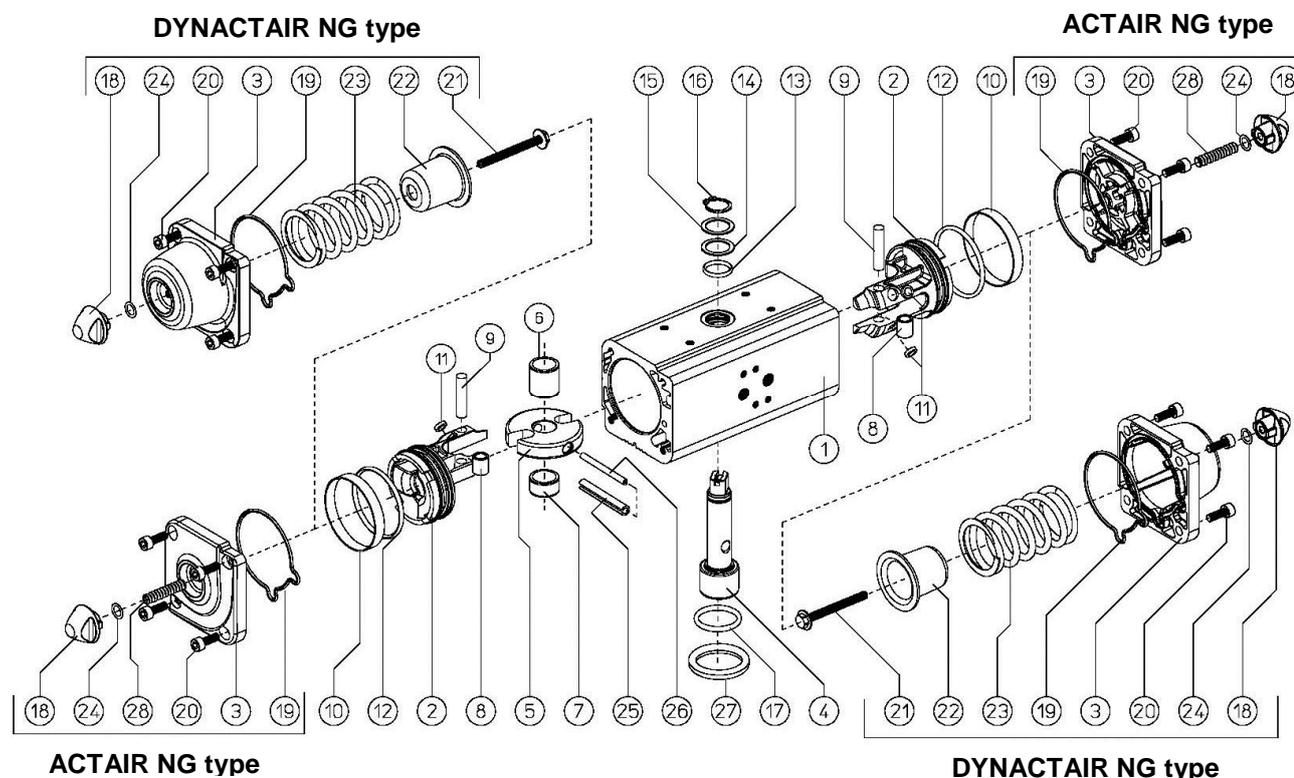
Nominal torque a Nm	Piston or vane actuator Minimum number of cycles b	Maximum stroking time for testing, based on 0-90° s
≤125	500 000 c	3
≤1 000	500 000	5
≤2 000	250 000	8
≤8 000	100 000	15
≤32 000	25 000	20
≤63 000	10 000	30
≤125 000	5 000	45
≤250 000	2 500	60

a) Based on EN ISO 5211.
b) One cycle consists of nominal 90° angular travel in both directions (i.e. 90° to open + 90° to close). For angular travel other than 90°, the endurance shall be agreed between the purchaser and the manufacturer/supplier.
c) For thermoplastic actuators the minimum number of cycles shall be 250 000.

Should it be necessary to replace its pistons sealing, this operation must be done by trained people with proper tools, we recommend to return the actuator to KSB where the actuator will be overhauled and then tested for a correct replacement. On request KSB will be willing to provide its sealing Kits.

!!! KSB declines any responsibility for the products repaired by third parties

Fig 6.1 Actuator components and material list.



POS.	DENOMINATION	Q.	MATERIALS	STANDARDS
1	Cylinder	1	Aluminium alloy	EN AW 6063 Anodized
2	Piston	2	Aluminium alloy	EN AB 46100
3	Cap	2	Aluminium alloy	EN AB46100 Painted
4	Shaft	1	Stainless steel	AISI 303 - DIN 1.4305
5	Scotch yoke	1	Steel alloy	UNI 90MnVCr8Ku - DIN 1.2842 Hardened
6	Support bush	1	Acetalic resin	
7	Shaft support	1	Acetalic resin	
8	Bush	2	Steel alloy	UNI 110w4Ku - DIN 1.2516
9	Rotative sleeve	2	Steel alloy	UNI 6364A - DIN 6325
10*	Dynamic seal (piston)	2	Polyurethane	
11*	Piston's support	4	P.T.F.E. Carbo-Graphite filled	
12*	Piston O-ring	2	Nitrilic rubber / FKM / FVMQ	
13*	O-ring (upper sealing shaft)	1	Viton	
14	External support ring	1	Aluminium alloy	
15	Washer	1	Stainless steel	UNI 3653 - DIN 471
16	Seeger	1	Stainless steel	UNI 3653 - DIN 471
17*	O-ring (low sealing shaft)	1	Viton	
18	Nut	1	Aluminium alloy	EN AB46100 Painted
19*	Cap O-ring	2	Nitrilic rubber / FKM / FVMQ	
20	Screw	8	Stainless steel	AISI 304 - DIN 1.4301
21	Spring loading screw	2	Steel	UNI 3740/65 8G Galvanized
22	Spring cap	2	Steel	DIN 1.0315 Galvanized

23	Spring	2	Steel	DIN 1.7102
24*	O-ring	2	Nitrilic rubber / FKM / FVMQ	
25	External elastic pin of the yoke	1	Steel	DIN 1481
26	Internal elastic pin of the yoke	1	Steel	DIN 1481
27	Centering ring	1	Aluminium alloy	DIN AIMgSiPb Anodized
28	Stroke adjustment screw	2	Stainless steel	AISI 304 - DIN 1.4301

* Parts included in the spare parts kit.

Fig 6.2 Spare parts kit code identification for actuator size.

A) Spare parts kit for standard version: -20°C to +80°C (NBR)

Code article	KSB Designation	Actuator
01 731 255	A59A-NG2/D32A-NG1	ACTAIR NG 2
		DYNACTAIR NG 1
01 731 256	A59A- NG5/D32A- NG2	ACTAIR NG 5
		DYNACTAIR NG 2
01 731 267	A59A- NG10/D32A- NG4	ACTAIR NG 10
		DYNACTAIR NG 4
01 731 270	A59A- NG15/D32A- NG6	ACTAIR NG 15
		DYNACTAIR NG 6
01 731 271	A59A-B NG20/D32A- NG8	ACTAIR NG 20
		DYNACTAIR NG 8
01 731 272	A59A- NG30/D32A- NG12	ACTAIR NG 30
		DYNACTAIR NG 12
01 731 273	A59A- NG40/D32A- NG16	ACTAIR NG 40
		DYNACTAIR NG 16
01 731 274	A59A- NG60/D32A- NG25	ACTAIR NG 60
		DYNACTAIR NG 25
01 731 275	A59A- NG80/D32A-NG35	ACTAIR NG 80
		DYNACTAIR NG 35
01 731 276	A59A- NG120/D32A-NG50	ACTAIR NG 120
		DYNACTAIR NG 50
01 731 278	A59A- NG160/D32A- NG80	ACTAIR NG 160
		DYNACTAIR NG 80

B) Spare parts kit for High temperature: -20°C to +150°C (FKM), Please contact KSB

C) Spare parts kit for Low temperature: -50°C to +60°C (FVMQ), Please contact KSB

Fig 6.3 Disassembly.

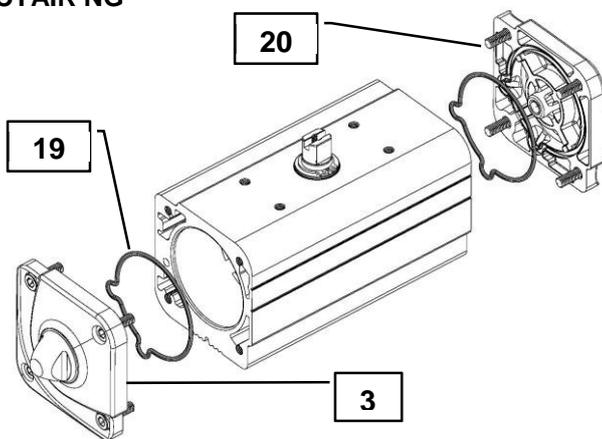
Actuator disassembly operation must have done with the actuator free from any pneumatic and electric connection and dismantled from the valve.

Verify that the actuator is air bag free, and the spring return actuator is completely in its springs rest position. Check that the airport 2 and 4 are absolutely vented.

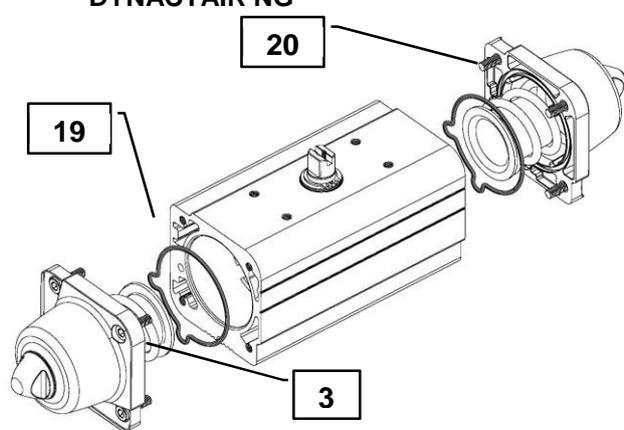
Use proper tools only.

A) Loosen the end cap screws (part N° 20) in cross sequence to remove the end caps (part n° 3), in case of force on the screws that means that the actuator is still under air or spring action and the operation should be discontinued until the action is removed. The end caps contain a sealing O-ring (part N° 19) on its seat that should be checked before replacement.

ACTAIR NG



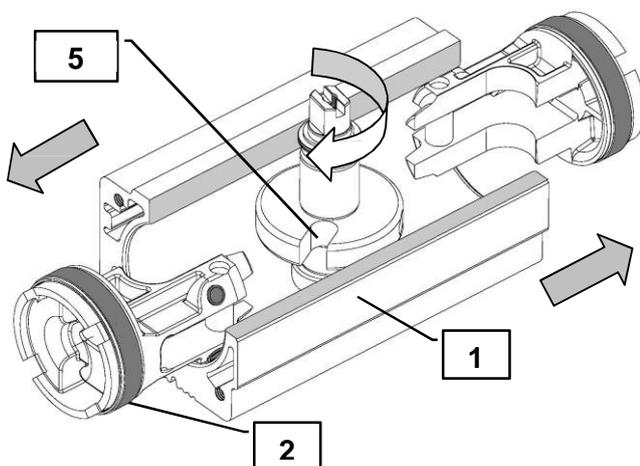
DYNACTAIR NG



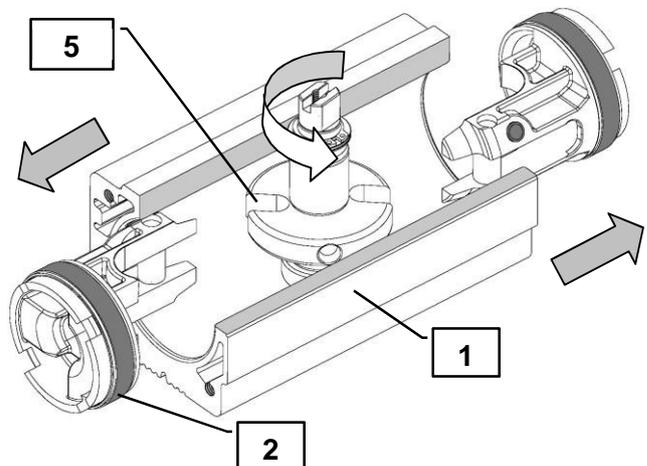
Caution. The Spring Return end caps cartridges (Parts N° 3 + 18+24+19+23+22+21) are a safety device, where the preloaded spring is set to avoid the dangerous spring jumping. Do not release the screw (part N° 21) to remove the spring from its seat, this operation must be done by KSB technician only.

B) Hold the actuator in the vice and rotate the drive shaft until the pistons (part N°2) are released form the scotch-yoke groves (part N° 5), then slip off the pistons from the cylinder (part N° 1). Do not use compressed air to remove the pistons from the body, this operation could cause personal injuries.

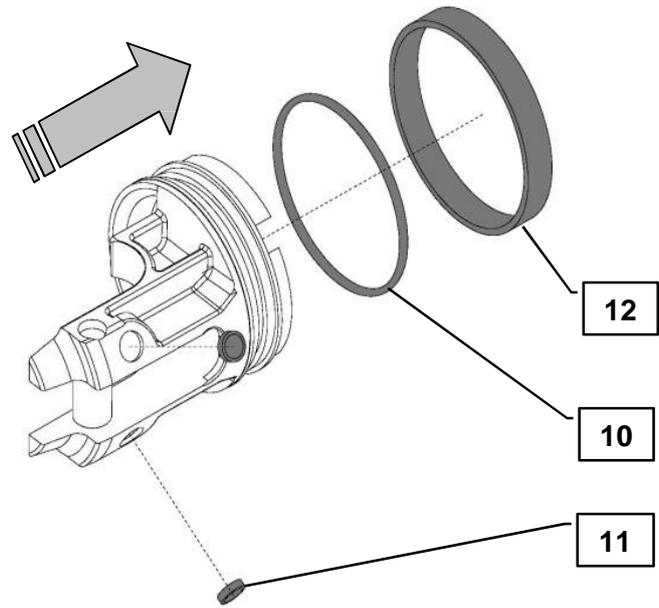
ACTAIR NG



DYNACTAIR NG



C) The dynamic seal (part N° 10), O-ring (part N° 12) and supports (part N° 11) should be checked before replacement. Do not use sharp tools to cut the dynamic seal and O-ring or remove the supports from the piston as this may cause furrows or marks.

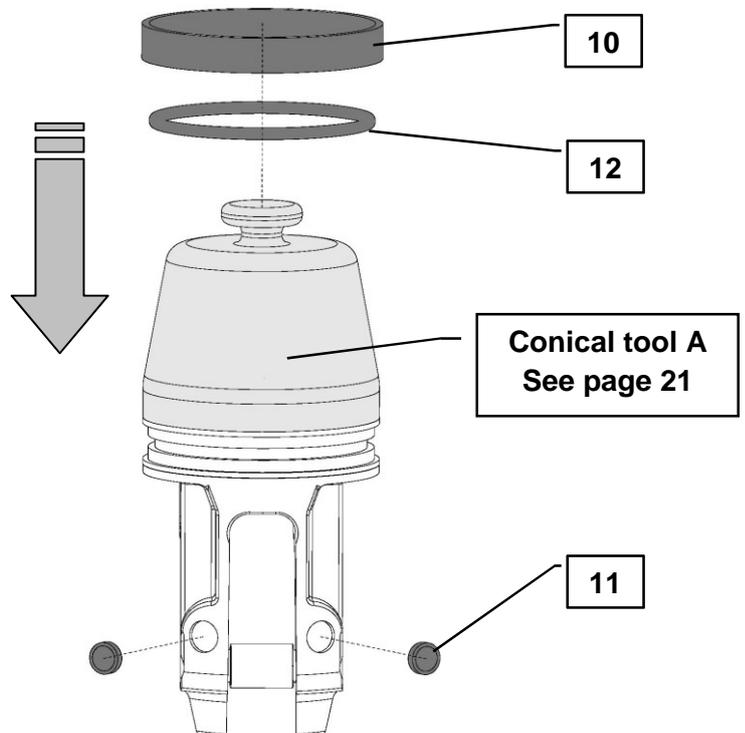


D) When the components are disassembled, they should be properly cleaned and wear checked prior to being greased and reassembled. In case the sealing parts are too much worn out use new parts from the spare parts kit.

Attention. Due to KSB scotch-yoke shaft blow-out security system the shaft disassembly operation must be carried out by KSB technician only.

Fig 6.3 Assembly.

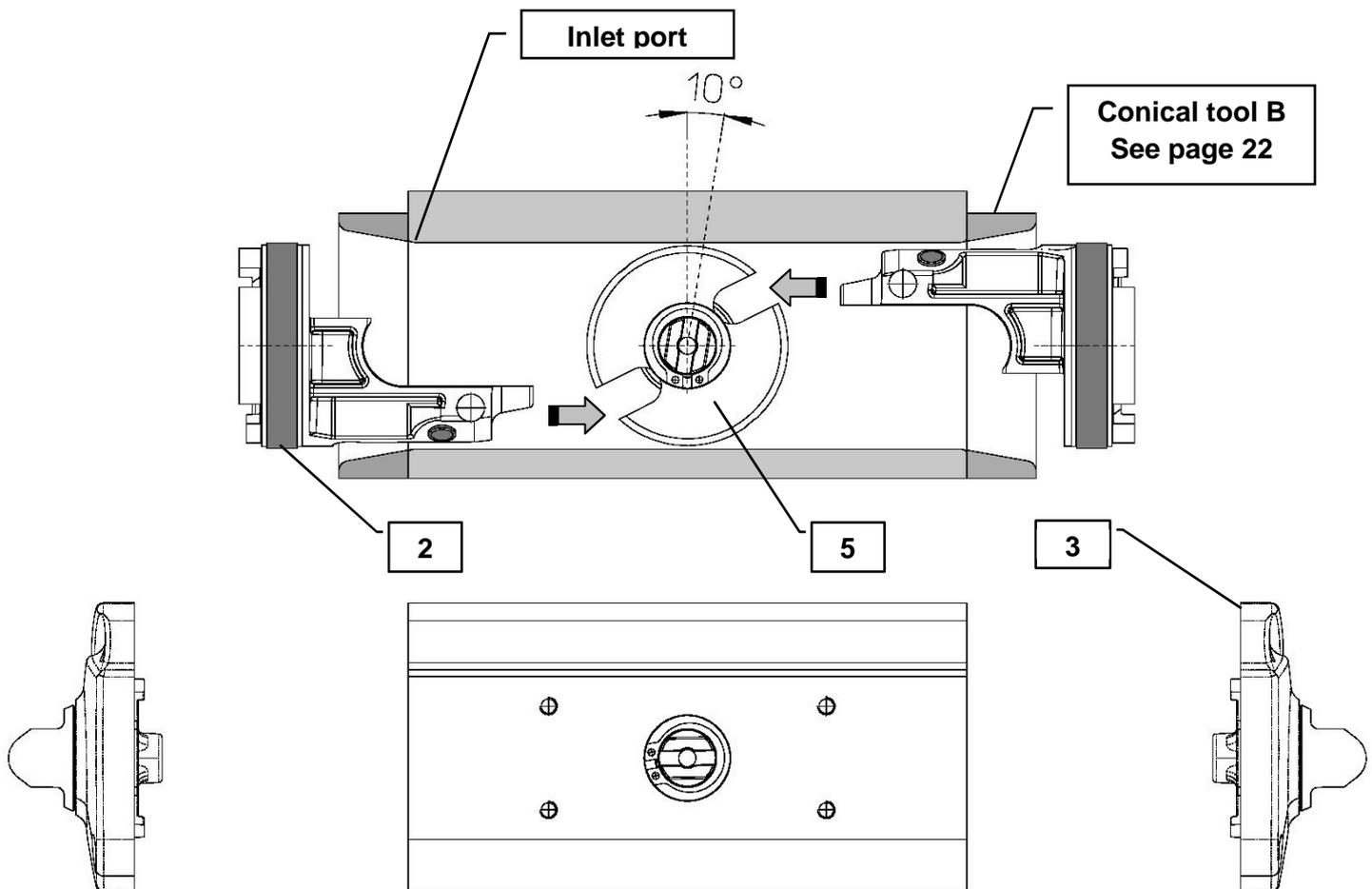
A) O-ring (part N° 12) and dynamic seal (part N° 10) shall be greased and mounted onto the piston seat using a proper conical tool (see the drawing) that allows an easy and perfect slip-in of the items without any damages.



- B)** Push into its piston seats the P.T.F.E. supports (part N° 11).
- C)** Grease the pistons (part N° 2) on the replaced parts (parts N° 10+11+12), and the piston bearings (part N° 8).
- D)** Grease the internal cylinder surface (part N° 1).
- E)** Position the scotch-yoke shaft (part N° 5) in order to have the grooves in position for the pistons insertion and the right shaft required direction of rotation.
- F)** Insert the pistons (part N°2), using a proper conical tool (see the drawing), in the scotch-yoke grooves (part N° 5) and press simultaneously the two pistons inside of the cylinder (part N° 1). The KSB scotch-yoke system will avoid pistons misalignment. Holding the actuator on a vice rotate the shaft to verify the shaft rotation direction and the easy movement.
- G)** Replace the sealing O-ring (part N° 19) on its caps seat (part N° 3) and grease it. Fit the end caps to the body screwing the screws in cross (part N° 20).

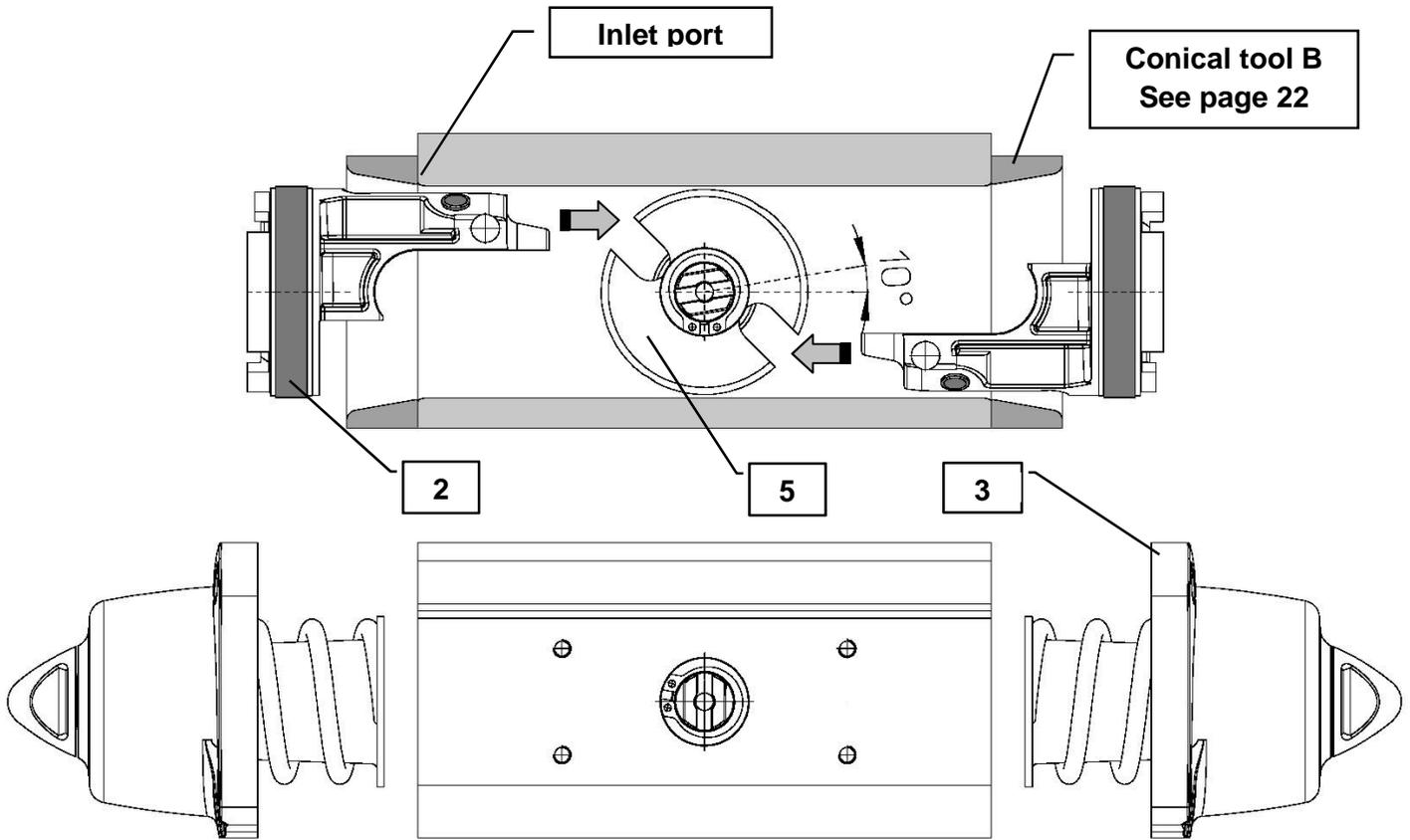
N.B. For the screw torque wrench setting see page 9.

ACTAIR NG



NOTA: Representation in arrangement M

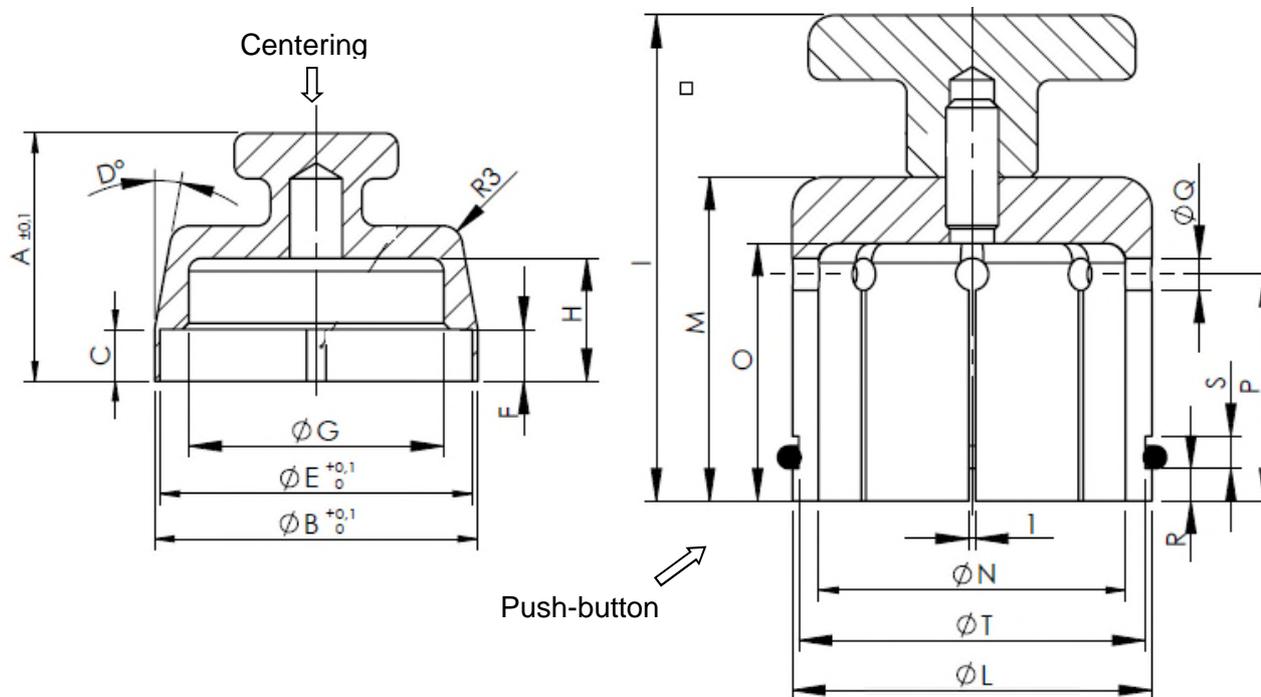
DYNACTAIR NG



NOTA: Representation in arrangement M

Conical tools A

Tools for mounting the O-ring (No.12) and the dynamic seal (No.10) on the piston



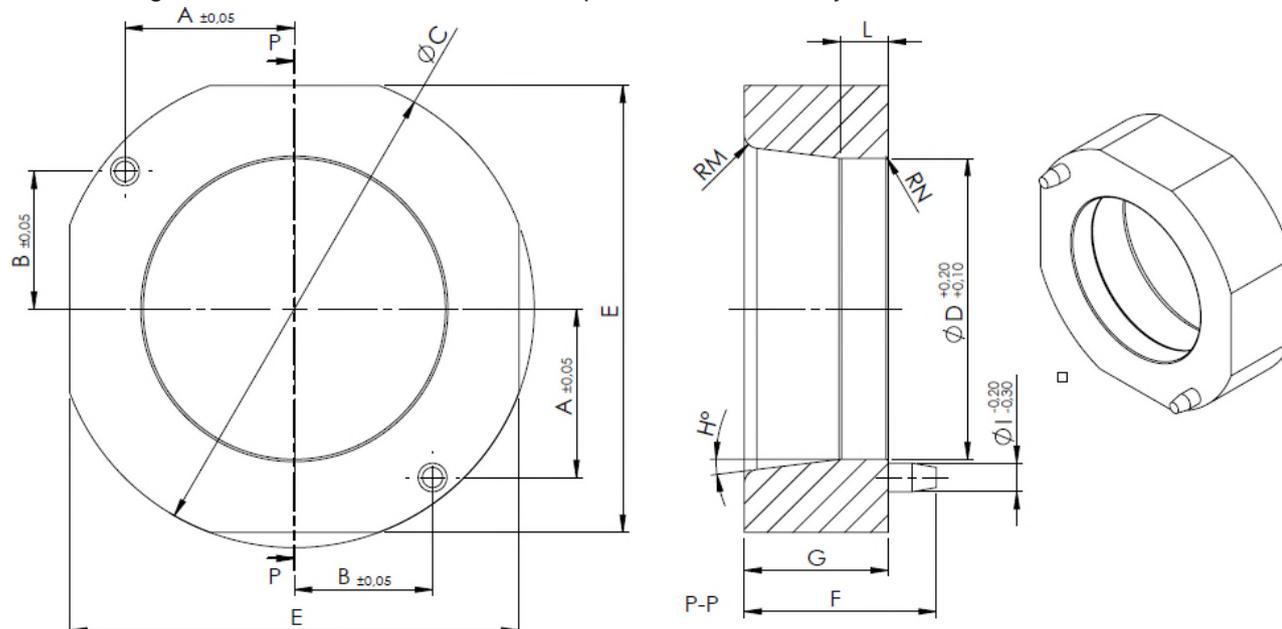
Model	A	B	C	D	E	F	G	H	I	L	M	N	O	P	Q	R	S	T
NG2	38.5	39.4	8	10	36.9	6.5	24.1	18	75	44	50	37	40.5	35	5	5	5	42
DYN NG1																		
NG5	38.3	49.4	8	10	47.8	8	39	19	75	55	50	47	39.8	35	5	5	5	53
DYN NG2																		
NG10	53	59.4	6	5	56.9	7.8	50	28.4	89.5	65	64	55.5	54.2	44	5	5	10	63
DYN NG4																		
NG15	46.8	72.2	1	5	63.3	10	55	20.8	83	79	63	67.5	48	44.5	3	5	10	77
DYN NG6																		
NG20	51.8	80	2	5	74.4	11	55	25.8	88	82	68	76	53	49.5	3	5	10	80
DYN NG8																		
NG30	57	89.4	2	5	80.4	13	75	24	99	100	74	86	59	55	4	5	10	98
DYN NG12																		
NG40	59	99.4	2	5	87.9	17	75	28	101	106	76	92	61	55	4	5	10	102
DYN NG26																		
NG60	69	114.4	2	5	110	3	102.9	26	121	126	86	111.8	71	65.5	5	5	10	125
DYN NG25																		
NG80	78.7	124.4	2	5	113.4	3	108.4	31	130	134	95	120	80	71	5	5	10	133
DYN NG35																		
NG120	69	144.3	2	5	131.5	0	125.5	26	121	156	86	140.9	71	65.5	5	5	10	155
DYN NG50																		
NG160	80.7	159.3	2	5	139.4	0	134.4	37	132	170	97	155	82	73	5	5	10	169
DYN NG80																		

!!! KSB declines any responsibility for an assembly carried without these tools

Conical tools B

Tools for mounting pistons (N ° 2) in cylinder actuator (N ° 1)

NOTE: Obligation to have two conical tools B to perform this assembly.



Model	A	B	C	D	E	F	G	H	I	L	M	N
NG2	24.8	18.85	70	40	63	22	15	8	4.3	5	3	0.5
DYN NG1												
NG5	28.4	22.9	80	50	75.4	30	20	8	5	8	3	0.5
DYN NG2												
NG10	33.4	27.7	95	60	89.6	40	30	7	5	10	3	0.5
DYN NG4												
NG15	41	36	120	72	113	40	30	7	7	10	3	0.5
DYN NG6												
NG20	44.2	36	125	80	120.2	40	30	7	7	10	3	0.5
DYN NG8												
NG30	47	39.5	135	90	124	42	30	7	8	10	3	0.5
DYN NG12												
NG40	55.3	45	155	100	145.8	52	40	7	8	10	5	0.5
DYN NG26												
NG60	60.9	51.9	175	115	157	52	40	7	8	10	5	0.5
DYN NG25												
NG80	70.6	55	198	125	187	52	40	7	9	15	5	0.5
DYN NG35												
NG120	78.6	64	220	145	203	52	40	7	9	10	5	0.5
DYN NG50												
NG160	88	69.5	248	160	229.4	70	50	7	12	5	5	0.5
DYN NG80												

!!! KSB declines any responsibility for an assembly carried without these tools

7) ATEX 2014/34/EU

In conformance with the European Directive ATEX 2014/34/EU for the suitability of the equipment intended for the use in Potentially Explosive Atmosphere, KSB declare the conformity of the scotch-yoke actuator of the above mentioned ATEX directive in the limits of its Classification and Zone Classification.

Classification:

Product Classification: Equipment Group II Category 2

Zone Classification : Suitable for Gas Zone 1, and Dust Zone 21.

Protection Class: "c" constructional safety

Gas group IIC / IIB

Temperature Class TX, determined by Environmental Temperature and Operating Media Temperature.

Whenever the actuator may be installed in the Potentially Explosive Atmosphere the operator before start the installation must observe the suitability of the equipment classification and special installation instruction included that follow the actuator. In case of instruction missing or any doubts please call the KSB technical department.

Attention.

Keep the actuator in its original box until the installation, and store it in dry and clean environment at temperatures between -10°C and +60°C.

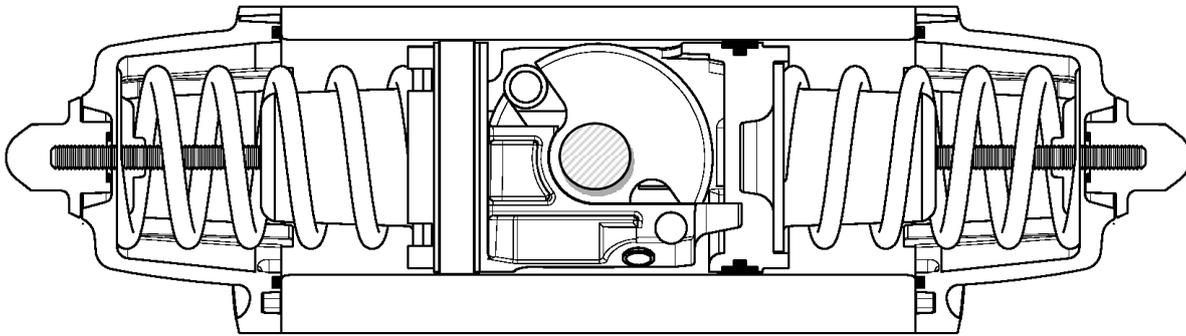
8) ACTUATOR SPECIAL VERSION

KSB manufactures and supplies special actuators versions for specific actuator use and environmental.

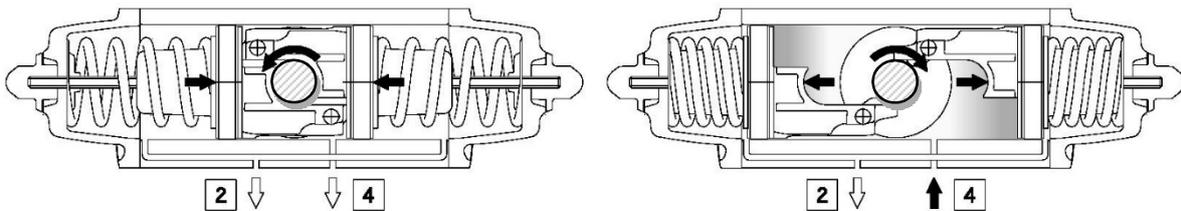
A) Simple Acting spring return Fail to Open.

Spring Return Fail to Open actuators are required when in case of the pressurized air or electrical power supply are off the valve should be automatically opened.

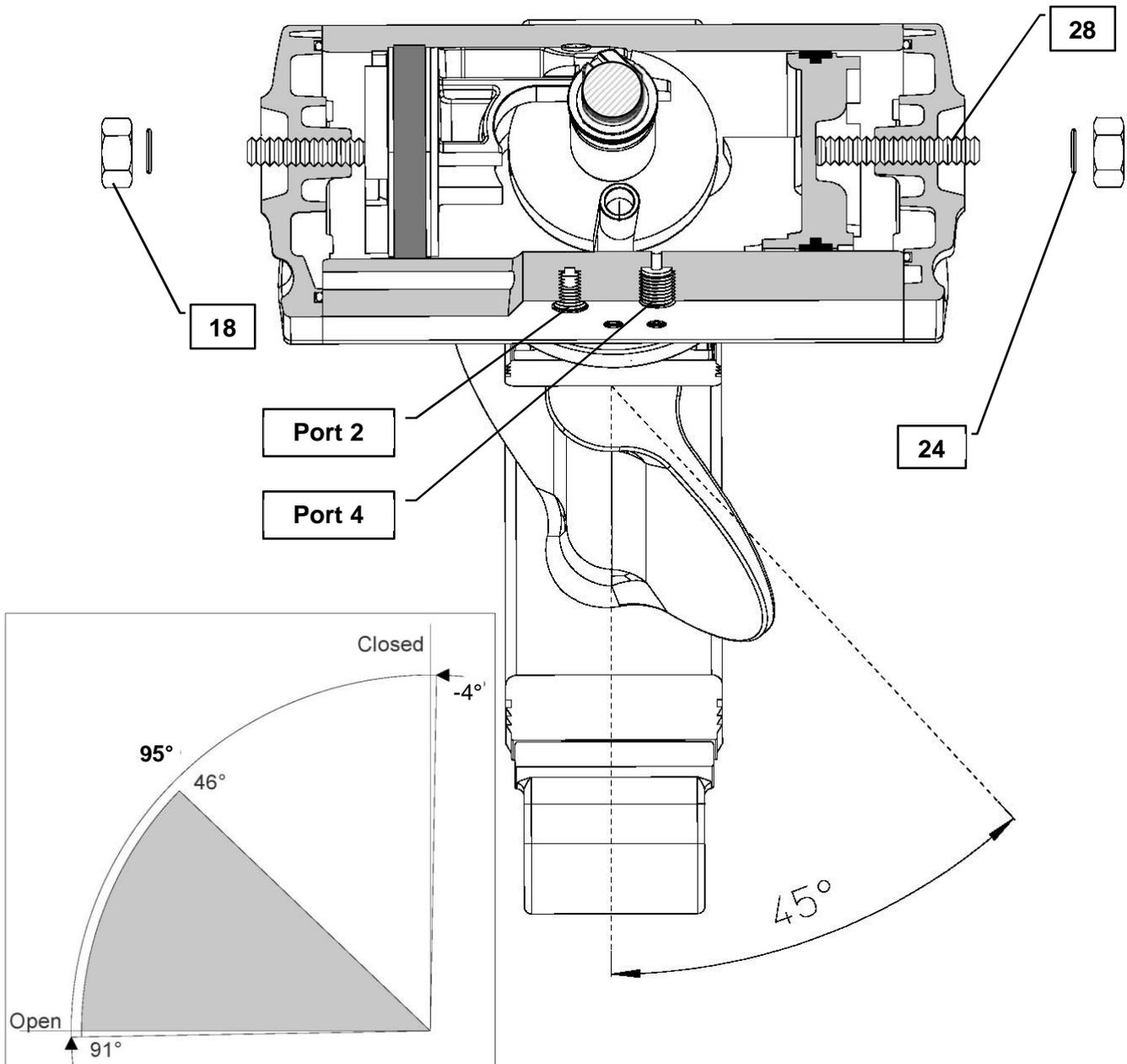
In the fail to open actuators the pistons are inserted into the cylinder like the Double Acting version, and due to the spring force the actuator is Normally Open.



Simple Acting Spring Return fail to open operation cycle.



- B) This double acting ACTAIR NG special version, with the pistons rotated and extra-long adjustment screws, limits the actuator/valve travel in the open position and is used when the valve should never be totally open, but limited up to 45% of its capacity.



NOTA: Representation in arrangement M

Attention. Double Acting ACTAIR NG and Spring Return DYNACTAIR NG special version develop different torque forces and before installation and maintenance please consult KSB technical department for their technical data and torque diagrams.

9) STORAGE

The KSB actuator has been packaged to provide protection during shipment, however, it can be damaged in transport. Prior to storage, inspect the actuator for shipping damage. Keep the actuators in their original packing box during storage. It is recommended to keep the actuators in a clean and dry environment at temperatures between -10°C and +60°C until ready for use.

The actuator has two air ports, which are closed by labels for prevent liquids or others material to entering in the actuator during storage.

If the actuators are to be stored for a long period of time before installation, it is recommended to stroke them periodically to prevent setting of the seals.

Store the actuators indoors to protect them from humidity and dust.

10) TROUBLESHOOTING GUIDE

SYMPTOM	POSSIBLE CAUSE	SOLUTION
Loss or reduction of output torque	No air supply	Connect air supply
	Insufficient air supply to produce required torque	Increase air supply
	Loss of air due to seal leakage	Replace worn seal
Air leak at top or bottom shaft	Damage O-ring seal	Contact KSB
	Damage to body bore	Contact KSB
	Damage to pinion shaft	Contact KSB
Air leak at end cap and body seal	Damage end cap seal	Replace end cap seal
	Dust in the home of cap seal	Clean the cap
Air leaking from either port after operation	Damage piston seal	Replace piston seal
	Damage body cylinder	Contact KSB
Insufficient valve rotation	Actuator has failed	Repairs or replace
	Insufficient air supply to produce required valve torque	Increase air supply
	Actuator mechanical stop (if present) not properly adjusted	Adjust actuator stops allow more travel
	Incorrect fit between actuator output bore and valve stem	Check actuator to valve adapter for proper size and fit

11) DISPOSAL

Observe all regulations and laws governing the disposal of hazardous substances to the environment.



ACTAIR - NG2 to NG160
INSTRUCTION MANUAL
DYNACTAIR – NG1 to NG80





ACTAIR - NG2 to NG160
INSTRUCTION MANUAL
DYNACTAIR – NG1 to NG80



This leaflet is not contractual
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