



INSTALLATION, MAINTENANCE AND OPERATING INSTRUCTION MANUAL

For ACTUATORS EDITION 2010:

- **DR/SC00010U - DR/SC05000U**
- **Double acting "DR" and Spring return "SC"**
- **90°-180° Stroke**

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1. GENERAL

This instruction manual contains important information regarding the installation, operation, maintenance and storage for 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, oxidizing, corrosive, explosive or unstable gases or liquids (use only not dangerous fluids – group 2 according to 97/26/EC directive). Moreover, for actuators installed in potentially 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.
- The actuators are designed, produced and classified according to the ATEX Directive 94/9/EC (see actuator 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 actuators must be made by adequately trained personnel. For the use, installation and maintenance of the 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 the manufacture.
- 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.

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 $30\text{ }\mu\text{m}$.
- Supply pressure:
The maximum supply pressure is 8 bar (116 Psi), only for AT801U it is 7 bar (101,5 Psi).
For double acting and spring return actuators the working pressure is from 2.5 bar (36 Psi) to 8 bar (116 Psi).
- Operating temperature:
==> "Standard" actuators from -40°C (-40°F) to $+80^{\circ}\text{C}$ ($+176^{\circ}\text{F}$)
==> Actuators for high temperature "HT" from -15°C ($+5^{\circ}\text{F}$) to $+150^{\circ}\text{C}$ ($+300^{\circ}\text{F}$)
==> Actuators for extreme low temperature "LLT" from -55°C (-67°F) to $+80^{\circ}\text{C}$ ($+176^{\circ}\text{F}$)
Caution: for low and high temperature service, special grease and special components are required. Please contact the manufacture. 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 actuators (90° rotation), 120° actuators (120° rotation), 135° actuators (135° rotation) and 180° actuators (180° rotation).
Stroke adjustment at 0° (closed pistons): $+15^{\circ}\text{max}/ - 5^{\circ}$. Stroke adjustment at 90° , 120° , 135° and 180° (open pistons): $+5^{\circ}/-15^{\circ}\text{max}$. For actuator AT045U the stroke adjustment at 90° (open pistons) is available only on request.
- 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 $+80^{\circ}\text{C}$ ($+176^{\circ}\text{F}$).
For extreme low temperature (LLT) and high temperature (HT) service, special grease is required: please contact the manufacture.
- 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 actuators are supplied with an identification label showing the serial number and all necessary information on use, service, operation and product designation. Where applicable, the label indicates the classification according to ATEX Directive 94/9/EC.



4. OPERATING FUNCTION AND DIRECTION OF ROTATION

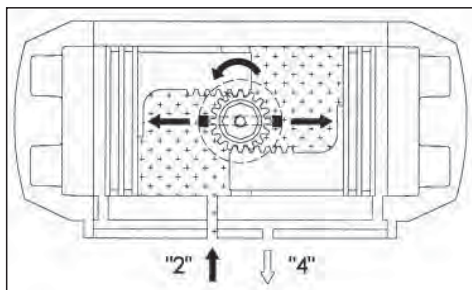
The actuator is a pneumatic device for remote operation of industrial valves. The operation (90°, 120°, 135° or 180° rotation) may be activated by different methods:

- 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.

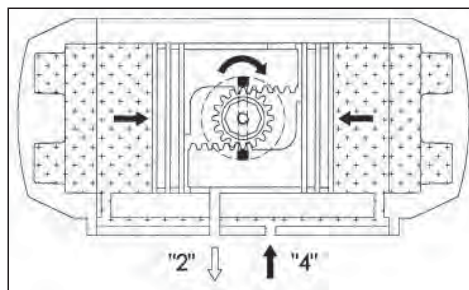
The actuators can be supplied with different types of assembly/rotation direction depending on the type of required operation and/or installation, see technical data sheets.

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.

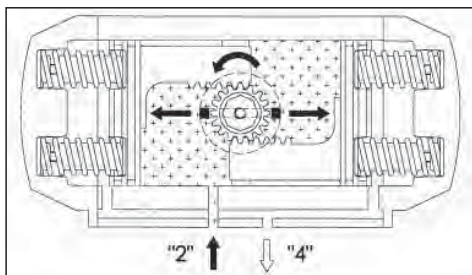


Air supplied to Port 4 forces the pistons inward. A clockwise rotation is achieved. Exhaust air exits from Port 2.

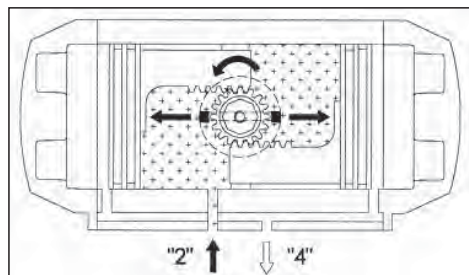


Single Acting operation function (standard rotation type "ST") TOP View

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 actuator is a pneumatic device for the remote operation of industrial valves. The actuator will operate through 90°, 120°, 135° and 180° rotation permitting the opening and closing of many types of valves up to 180° 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.

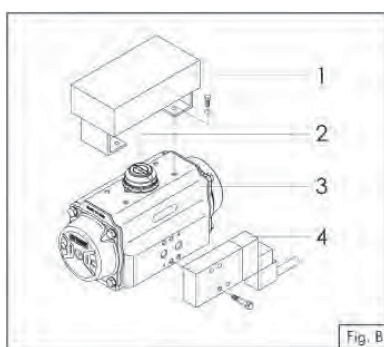
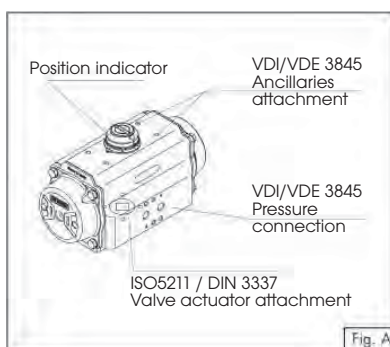


- When fitting accessories onto the actuators, assemble them in such a way that the emergency control of the solenoid valve and the top of the drive shaft are easily accessible, should emergency manual operations be required.
- Before fitting onto the valve, make sure that the actuator/valve are correctly 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 control and connections, figure A:

5.3 Assembly of accessories: Solenoid valves and switchboxes, figure 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).



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

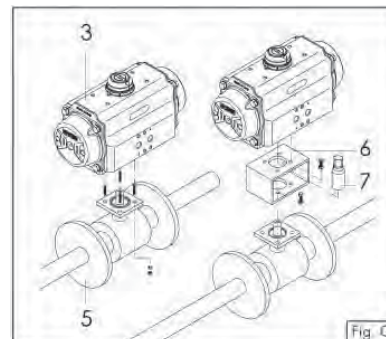
5.4 Assembly of valve figure C:

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).



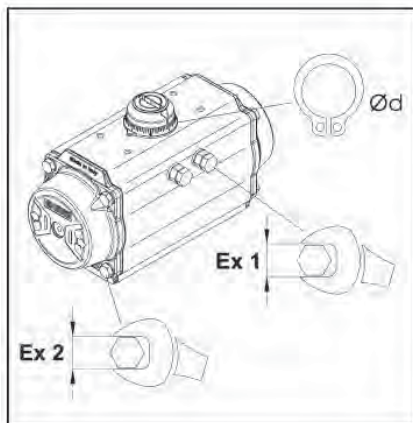
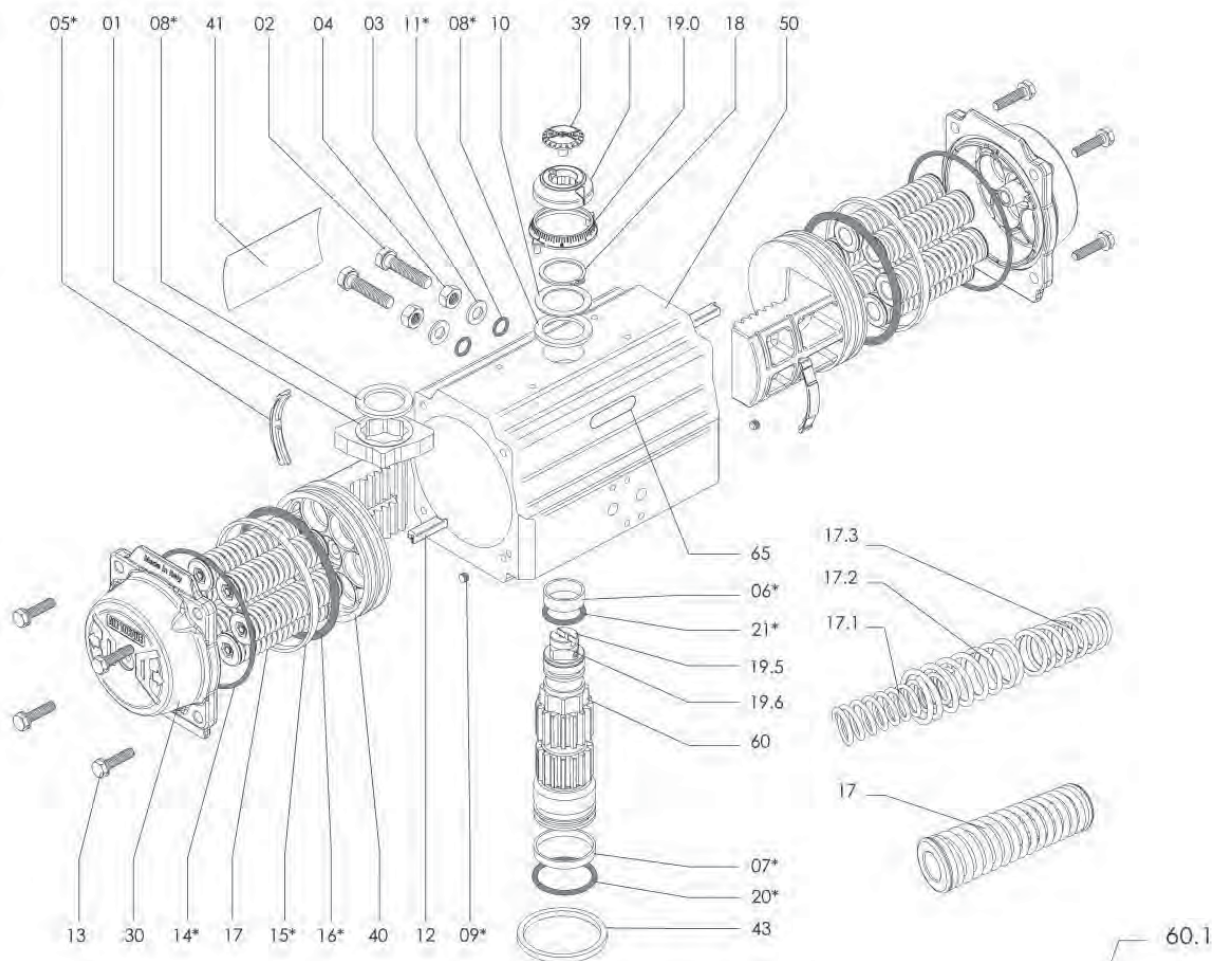


6. MAINTENANCE INSTRUCTION

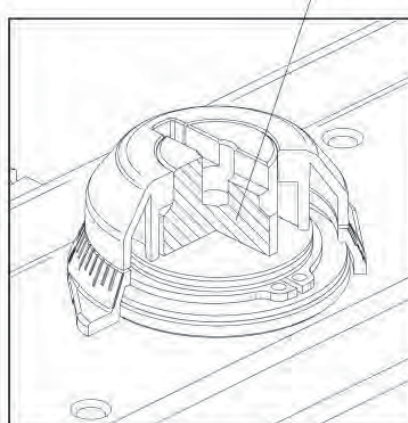
With the information given below, we provide the end user with all the required information necessary for maintenance. Under normal conditions, the actuator requires only periodic observation to ensure proper operation.

Maintenance (disassembly, maintenance and rebuilding) of these actuators is allowed only to the manufacturer personnel or properly instructed personnel. In case of controversy the product guarantee will expire! Spare kits for maintenance are available to replace all seals and bearings (soft parts indicated into the table), that may be necessary between 300.000 and 1.000.000 cycles depending on operating and environmental conditions and actuator size.

6.1 DRAWING WITH ITEMIZED COMPONENTS AND RECOMMENDED SPARE PARTS



Type	Ex1 mm	Ex2 mm	Ø d mm
DRSC00010U	/	8	13
DRSC00015U	10	8	14
DRSC00030U	10	10	16
DRSC00060U	13	10	22
DRSC00100U	13	10	25
DRSC00150U	17	13	26
DRSC00220U	19	13	36
DRSC00300U	19	17	38
DRSC00450U	22	17	45
DRSC00600U	22	19	48
DRSC00900U	24	19	52
DRSC01200U	30	22	58
DRSC02000U	30	24	68
DRSC03000U	36	22	80
DRSC04000U	46	24	85
DRSC05000U	46	24	90





Part No.	Quantity	Note	Part Description
1	1	not for DRSC00010U	OCTI-CAM (Stop arrangement)
2	2	not for DRSC00010U	Stop cap screw
3	2	not for DRSC00010U	Washer
4	2	not for DRSC00010U	Nut (Stop screw)
05*	2		Bearing (Piston back)
06*	1		Bearing (Pinion top)
07*	1		Bearing (Pinion bottom)
08*	2	1 piece for DRSC00010U	Thrust bearing (Pinion)
09*	2	not for DRSC05000U	Plug
09.1*	2		O-Ring for DRSC05000U
10	1		Thrust washer (Pinion)
11*	2	not for DRSC00010U	O-Ring (Stop screw)
12	2	not for DRSC00010U	Piston guide
13	8/12/16	(A)	Cap screw (End cap)
14*	2		O-Ring (End cap)
15*	2		Bearing (Piston head)
16*	2		O-Ring (Piston)
17	min.5/max.12	for DRSC00030U-DRSC05000U	Spring (Cartridge)
17.1	max.2	not for DRSC00030U-DRSC05000U	Spring for DRSC00010U and DRSC00015U
17.2	max.2	not for DRSC00030U-DRSC05000U	Spring for DRSC00010U and DRSC00015U
17.3	max.2	not for DRSC00030U-DRSC05000U	Spring for DRSC00010U and DRSC00015U
18	1		Spring clip (Pinion)
19	1	not for DRSC00010U	Position indicator for DRSC00015U and DRSC00030U
19.0	1		Graduated ring
19.1	1	not for DRSC00015U-DRSC00030U	Position indicator
19.5	1	not for DRSC00010U-DRSC00030U	Top adaptor
19.6	2	not for DRSC00010U-DRSC00030U	Hex. socket screw (Top adaptor)
20*	1		O-Ring (Pinion bottom)
21*	1		O-Ring (Pinion top)
30	2		End cap
39	1		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
60.1	1	only for type „E“ and „EC“	Integral drive shaft
65	1		Plastic insert

*Suggested SPARE PARTS for maintenance; Notes: (A) 12 pieces for type DRSC03000U/DRSC04000U, 16 pieces for type DRSC05000U

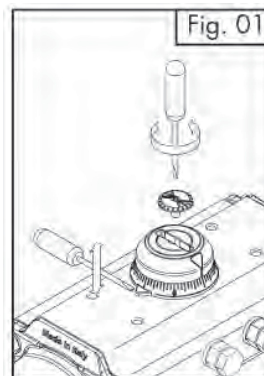
6.2 DISASSEMBLY

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.



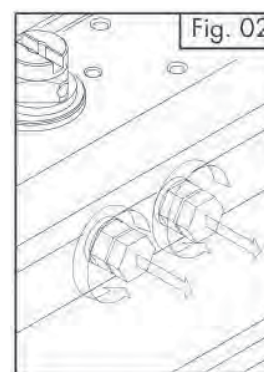
A. Removal of position indicator and graduated ring (Part N° 19,19.0,19.1), figure 01:

- 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.



B. Removal of stop cap screws (Part N° 02), figure 02:

- Remove both stop cap screws together with nut (04) and washer (03).
- Remove stop screw o-rings (11) and discard if replacing all soft parts.



C. End caps disassembly (Part N° 30), figure 03:

- End caps disassembly for spring return actuators (disassemble one end cap at a time).

Unscrew the end cap bolts (13) in the sequence shown in figure 03, until the end-caps are free from springs force (for AT045U and AT051U 20-23 turns of the screws, for AT101U to AT801U 4-5 turns of the screws).

Then completely unscrew the screws and remove the end-cap and the springs.

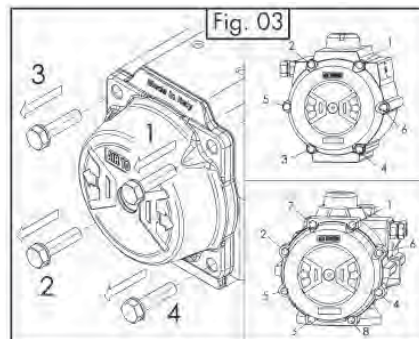
If there is still force on the end-caps after unscrewing as indicated above, this may indicate that spring cartridge is damaged or that the pistons are not completely closed, so any further disassembly should be discontinued.

Further disassembly of the end caps may result in injury.

- End caps disassembly for double acting actuators (disassemble one end cap at a time)

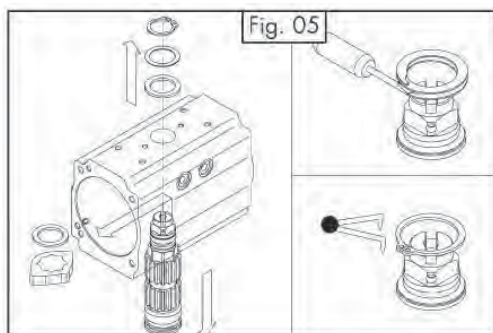
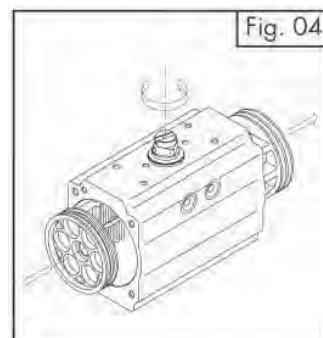
Unscrew the end cap bolts (13) in the sequence shown in figure 03, until the screws are completely unscrewed and the end caps are free.

- Remove the o-rings (14) using a screwdriver. Discard soft parts if replacing.
- 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.



D. Pistons disassembly (Part N° 40), figure 04:

- Holding the body (50) in a vice or similar device, rotate the drive shaft (60) until the pistons (40) are released.
- Caution: air pressure should not be used to remove the pistons from the body.
- Remove o-rings (16) using a screwdriver. Remove the piston back (05) and piston head (15) bearings.
- Discard bearings when replacing all soft components.



E. Drive shaft disassembly (Part N° 60), figure 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),



then 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.

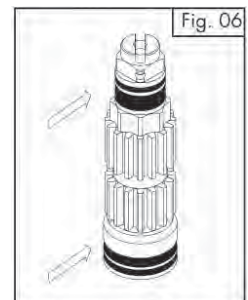
- Remove top (06) and bottom (07) pinion bearings and top (20) and bottom (21) pinion o-rings.
- Discard bearings (06) and (07), internal and external thrust washer (08) and o-rings (20) and (21) if replacing the soft components.

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).

6.3 ASSEMBLY:

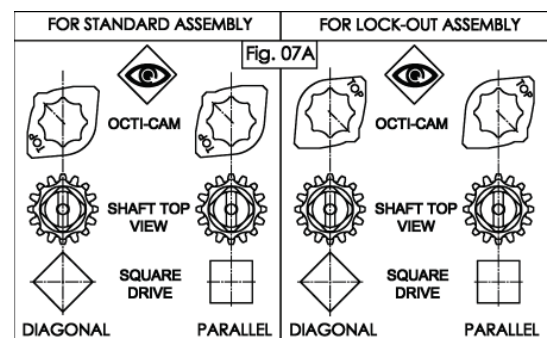
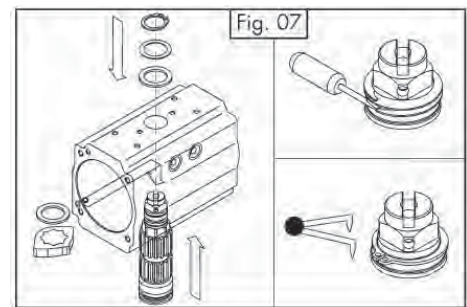
Prior to assembly, ensure that:

- 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 technical data sheets).
- Note: The lubricants suitable for the various operating temperatures (Standard, HT and LLT actuators) are available by the manufacturer.
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.



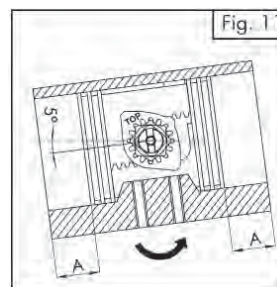
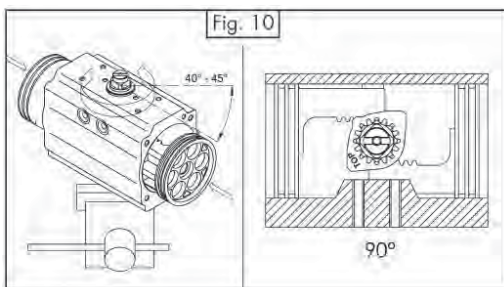
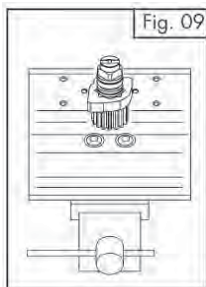
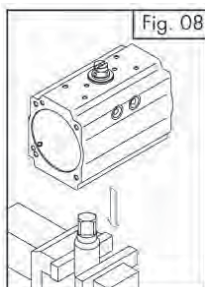
A. Drive shaft assembly (Part N° 60), figures 06, 07 and 07A:

- Install top (06) and bottom (07) bearings, grease and insert the bottom (20) and top (21) pinion o-rings onto the shaft.
- Grease the outside surface of the drive shaft as shown in figure 06.
- Insert partially the drive shaft (60) in the body (50), install octi-cam (01) in the correct position (for standard assembly or for lock-out) as shown in figures 07 and 07A, related to the bottom and top of the drive shaft and the rotation of the actuator when energised. Install the 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.



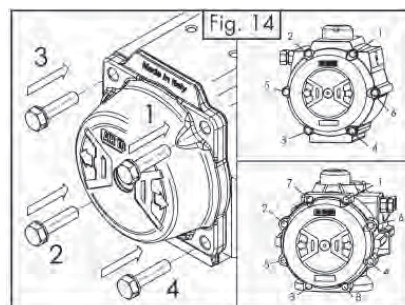
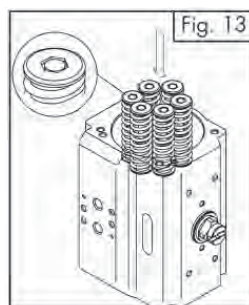
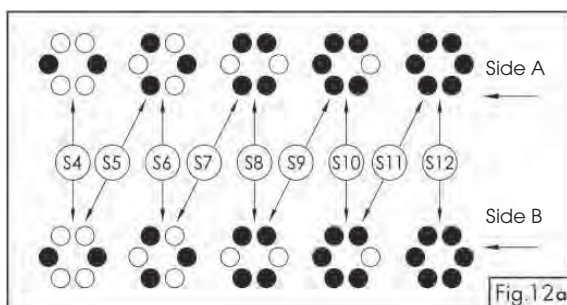
B. Pistons assembly (Part N° 40), figures 08, 09, 10 and 11:

- Grease and install o-rings (16), piston back (05) and piston head (15) bearings.
- Grease the internal surface of the body (50) and the piston (40) rack teeth.
- Insert the female connection of the drive shaft (60) in a properly fixed coupling.
- Ensure that the octi-cam is in the right position as shown in figure 09.
- For standard rotation assembly type "ST" (clockwise to close), rotate the body (50) about 40-45° clockwise from top view, as shown in figure 10.
- Insert and press the two pistons (40) simultaneously inside the body (50) until the pistons are engaged, then rotate the body anticlockwise from top view until the stroke is completed.
- Ensure that with pistons completely closed, the rotation obtained referred to the axis of the body is about over 0° for models AT051U - AT801U (0,5° over 0° for AT045U) and that the dimension "A" on both sides is the same as shown in figure 11.



C. End cap (Part N° 30) assembly, figures 12, 13 and 14:

- Assemble one end cap at a time.
- Lubricate the body.
- For spring return actuators, insert the springs in each end cap according to the desired configuration, as shown in figure 12 and related tables. For models DRSC00030U -> DRSC5000U insert spring cartridges as shown in figure 13.
- Fit end cap o-ring seal (14) into the groove on both end caps.
- 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 tighten each only partially. Complete tightening by making 1-2 turns for each screw in the sequence shown in figure 14 until tightening is completed. See the table for screw tightening torque.



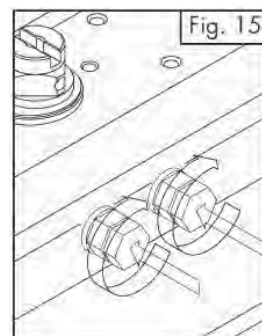
D. Assembly of stop cap screws (Part 02) and stroke adjustment for models DRSC00015U -> DRSC5000U, figures 15 and 16:

- Fit the stop cap screws (02) in the body.
- Stroke adjustment for actuators with standard type "ST" rotation / assembly (clockwise to close).

Stroke adjustment in close position: with the actuator in close position 0°, screw or unscrew the right (from top view) stop cap screw until the desired stop position is achieved. Then tighten the stop adjustment nut (04) to lock it in place.

Stroke adjustment in open position: with the actuator in open position 90°, screw or unscrew the left (from top view) stop cap screw until the desired stop position is achieved. Then tighten the stop adjustment nut (04) 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.

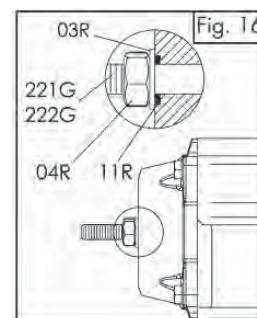




- Only for actuators with adjustment 50% or 100%, fit on end-cap adjustment screws 221G/222G the o-rings 11R, the washers 03R and the nuts 04R.

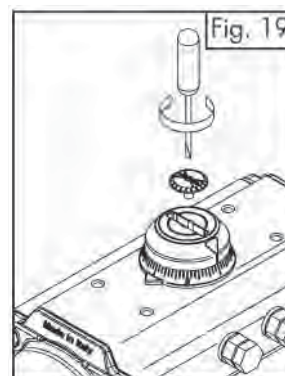
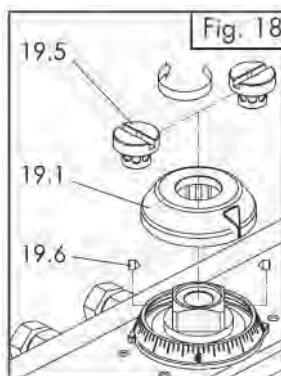
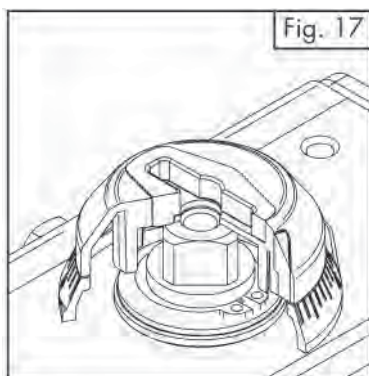
To adjust the stroke in open position: with the actuator in partially or totally open position, screw or unscrew the end-cap adjustment screw 221G/222G until the desired position is achieved.

It is important that the two end-cap adjustment screws are both in contact with the pistons. Then lock the nuts 04R.



E. Assembly of graduated ring and position indicator (Part N° 19,19.0,19.1), figures 17,18 and 19:

- 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 or 19.1) making sure that it indicates the correct actuator position.
- Screw the indicator screw (39) if assembled.



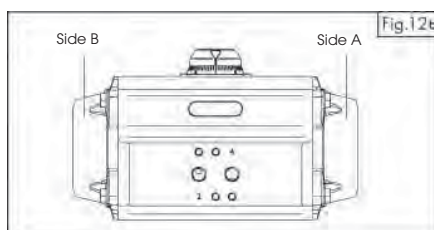
Spring set configuration of SC/SO00010U and SC/SC00015U:

Tab.01 Spring set configuration DRSC00010U

Spring Set	Side B	Side A
	DRSC00010U Spring type	DRSC00010U Spring type
S1-1	1 (green)	1 (green)
S1-2	1 (green)	2 (red)
S2-2	2 (red)	2 (red)
S2-3	2 (red)	3 (black)
S3-3	3 (black)	3 (black)

Tab.02 Spring set configuration DRSC00015U

Spring Set	Side B		Side A	
	DRSC00015U Internal spring type	DRSC00015U External spring type	DRSC00015U Internal spring type	DRSC00015U External spring type
S1	1 (green)	—	—	2 (black)
S2	—	2 (black)	—	2 (black)
S3	—	2 (black)	—	3 (red)
S4	—	3 (red)	—	3 (red)
S5	—	3 (red)	1 (green)	2 (black)
S6	1 (green)	2 (black)	1 (green)	2 (black)
S7	1 (green)	2 (black)	1 (green)	3 (red)
S8	1 (green)	3 (red)	1 (green)	3 (red)





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 $+40^{\circ}\text{C}$ ($+104^{\circ}\text{F}$).
- 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 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 the manufacturer for any information and technical data-sheets.

9. NOTES regarding the FLANGE CONNECTION

Extract from the standard DIN ISO 5211:

The torque values in the following table show the maximum torques which are allowed to be transmitted by the flange connection:

Flange	Md max.all. (Nm)	Flange	Md max.all. (Nm)	Flange	Md max.all. (Nm)
F03	32	F10	500	F25	8 000
F04	63	F12	1 000	F30	16 000
F05	125	F14	2 000		
F07	250	F16	4 000		



Protection and Serviceability

Version		Part and Protection				suitable for
		Body	End Caps	Drive Shaft	Pistons	
	A	ALODUR	anodized plus polyester coating	Carbon Steel ENP	normal anodized	General Service
	Coating Colour	30 - 35 µm bright S.S.	80 - 90 µm S.S. Ral 9007	25 - 30 µm	15 - 20 µm black	
	B	ALODUR + PTFE coating	anodized plus polyester coating	Carbon Steel ENP	normal anodized	General Service, acid or basic solutions in low concentration
	Coating Colour	30-35/25-30 µm light grey	80 - 90 µm S.S. Ral 9007	25 - 30 µm	15 - 20 µm black	
	D	ALODUR +PTFE coating	anodized plus PTFE coating	Carbon Steel ENP	normal anodized	acid or basic solutions
	Coating Colour	30-35/25-30 µm light grey	80 - 90 µm light grey	25 - 30 µm	15 - 20 µm black	
	E	ALODUR +PTFE coating	anodized plus PTFE coating	Stainless Steel	normal anodized	resistant against numerous chemical atmosphere
	Coating Colour	30-35/25-30 µm light grey	80 - 90 µm light grey		15 - 20 µm black	
	P	ALODUR	resin impregnated + hard anodized	carbon steel ENP	normal anodized	Chemical Industry, solvents
	Coating Colour	30-35 µm bright S.S.	30 - 35 µm bright S.S.	25 - 30 µm	15 - 20 µm black	
	EC	ALODUR+ EPOXY	anodized + EPOXY	Stainless Steel	normal anodized	Marine environment (On and Off Shore)
	Coating Colour	80-95 µm blue grey	80 - 95 µm blue grey		15 - 20 µm black	

Conditions of Usage

Air Supply	Temperature Range according to Design		max. pressure	Turning Range 20° adjustable
Filtered, lubricated or dry air, non corrosive media, Dp -20°C (Dew Point) (Dp min. 10°C < T _{area}), particle size < 30 µm	Standard	-40°C to +80°C	8 bar	90° 120°-135°-145°-180°
	Low Temperature	-60°C to +80°C		
	High Temperature	-15°C to +150°C		

DR	Output Torque for Double Acting Actuators in Nm												
	2,5bar	3bar	3,5bar	4bar	4,2 bar	4,5bar	5bar	5,5bar	6bar	6,5bar	7bar	7,5bar	8bar
00010	6,0	7,2	8,4	9,6	10,1	10,8	12,0	13,2	14,4	15,6	16,8	18,0	19,1
00015	8,3	10	11,6	13,3	14	15	16,6	18,3	19,9	21,6	23,3	24,9	26,6
00030	14,7	17,6	20,5	23,5	24,6	26,4	29,3	32	35,2	38,1	41	44	46,9
00060	29,1	34,9	40,7	46,5	48,9	52,4	58,2	64	69,8	75,6	81,4	87,3	93,1
00100	45,8	54,9	64,1	73,2	76,9	82,4	91,5	101	110	120	128	138	146
00150	66,5	79,8	93,1	106	112	120	133	146	160	173	186	199	213
00220	107	129	150	172	181	193	215	236	258	279	301	322	344
00300	138	166	194	222	233	249	277	305	332	360	388	415	443
00450	217	261	304	348	365	391	435	478	522	565	609	652	696
00600	284	340	397	454	477	511	567	624	681	737	794	851	908
00900	383	459	536	613	643	689	766	842	919	996	1072	1149	1225
01200	532	638	745	851	893	957	1064	1170	1276	1383	1489	1595	1702
02000	893	1072	1251	1430	1501	1608	1787	1966	2144	2318	2502	2684	2859
03000	1297	1556	1815	2075	2179	2334	2594	2853	3112	3372	3631	3890	4150
04000	1795	2154	2513	2872	3015	3231	3590	3949	4308	4667	5026	5400	5744
05000	2252	2703	3153	3604	3784	4054	4504	4955	5405	5855	6306	6756	7207
10000	4169	5003	5837	6671	7005	7505	8339	9173	10007	10841	11674		

example of layout DR900 at 5,5bar air supply -> 842Nm output torque



Absperrklappen
Industriearmaturen
Schüttguttechnologie

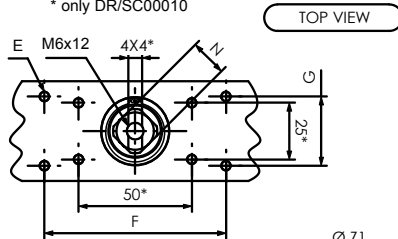
EDITION 2010
Torque
DR/SC00010U-10000U

WAREX®
Powder and Bulk Technology
VALVE

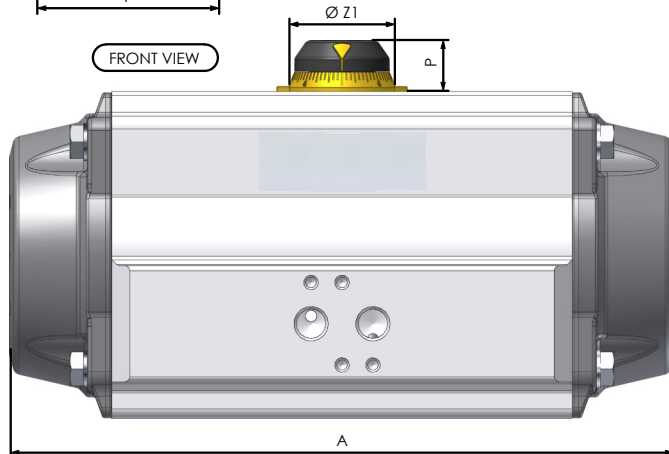
SC	F/S	2,5bar		3bar		3,5bar		4bar		4,2bar		Spring		F/S	4,2bar		4,5bar		5bar		5,5bar		6bar		8bar		Spring	
		0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	90°	0°		0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	90°	0°
00015	S1	5,0	3,0	7,0	4,7	8,0	6,3	10,0	8,0	10,7	8,7	5,3	3,3	S4	8,7	5,5	9,7	6,4	11,3	8,1	13,0	9,8	14,7	11,4	20,6	17,0	8,5	5,3
	S2	4,0	1,9	6,0	3,6	7,7	5,3	9,3	6,9	10,0	7,6	6,4	4,0	S5	8,1	4,4	9,0	5,4	10,7	7,0	12,3	8,7	14,0	10,0	35,8	30,0	9,6	5,9
	S3			5,3	2,5	7,0	4,2	8,7	5,8	9,4	6,6	7,4	4,6	S6			8,4	4,3	10,0	6,0	11,7	7,6	13,3	9,3	20,0	16,0	10,6	6,6
	S4					6,3	3,0	8,0	5,0	8,7	5,5	8,5	5,3	S7					9,4	4,9	11,0	6,6	13,0	8,2	19,3	14,9	11,7	7,3
	S5					7,3	3,7	7,3	3,7	8,1	4,4	9,6	5,9	S8							11,0	6,6	12,0	7,2	18,7	13,8	12,8	7,9
00030	2/3	9,1	6,2	12,0	9,2	15,0	12,1	17,9	15,0	19,1	16,2	8,4	6,0	4	15,7	11,1	17,5	12,9	20,4	15,8	23,4	18,7	26,3	21,7	36,9	31,7	13,5	9,0
	3	8,0	4,5	10,9	7,5	13,9	10,4	16,8	13,3	18	14,5	10,1	7,0	4/5	14,6	9,4	16,4	11,2	19,3	14,1	22,3	17,1	25,2	20,0	36,9	31,7	15,2	10,0
	3/4			9,8	5,8	12,8	8,7	15,7	11,6	16,9	12,8	11,8	7,8	5			15,3	9,5	18,2	12,4	21,1	15,4	24,1	18,3	35,8	30,0	16,9	11,1
	4					11,6	7,0	14,6	10,0	15,7	11,1	13,5	9,0	5/6					17,1	10,8	20,0	13,7	23,0	16,6	34,7	28,3	18,6	12,0
	4/5					13,5	8,3	14,6	9,4	15,2	10,0			6							18,9	12,0	21,9	14,9	33,6	26,7	20,2	13,3
00060	2/3	18,0	11,8	23,8	17,6	29,7	23,4	35,5	29,9	37,8	31,6	17,3	11,1	4	31,2	21,2	34,7	24,7	40,5	30,5	46,3	36,8	52,1	42,1	73,2	61,9	31,2	19,9
	3	15,8	8,3	21,6	14,1	27,5	19,9	33,3	25,8	35,6	28,1	20,8	13,3	4/5	29,0	17,7	32,5	21,2	38,3	27,0	44,1	32,8	49,9	38,6	71,0	58,5	34,6	22,1
	3/4			19,4	10,7	25,2	16,5	31,1	22,3	33,4	24,6	24,2	15,5	5			30,2	17,7	36,1	23,6	41,9	29,4	47,7	35,2	68,7	55,0	38,1	24,3
	4					23,0	13,0	28,8	18,8	31,2	21,2	27,7	17,7	5/6					33,8	20,1	39,7	25,9	45,5	31,7	68,7	55,0	38,1	24,3
	4/5					26,2	15,4	29,0	17,7	31,2	19,9			6							37,5	22,4	43,3	28,3	66,5	51,5	41,5	26,5
00100	2/3	27,4	16,9	36,6	26,0	45,7	35,2	54,9	44,3	58,5	48,0	28,9	18,3	4	47,5	30,7	53,0	36,2	62,2	45,3	71,3	54,5	80,5	63,6			46,2	29,3
	3	23,8	11,1	32,9	20,3	42,1	29,4	51,2	38,6	54,9	42,2	34,7	22,0	4/5	43,9	24,9	49,4	30,4	58,5	39,5	67,7	48,7	76,8	57,8	113	94,5	57,0	33,0
	3/4			29,2	14,5	38,4	23,6	47,5	32,8	51,2	36,4	40,4	25,7	5			45,7	24,6	54,8	33,8	64,0	42,9	73,1	52,1	110	88,7	52,8	36,7
	4					34,7	17,9	43,9	27,0	47,5	30,7	46,2	29,3	5/6					51,2	28,0	60,3	37,1	69,5	46,3	106	82,9	63,5	40,3
	4/5					40,2	21,2	43,9	24,9	43,9	24,9	52,0	33,0	6							56,7	31,4	65,8	40,5	102	77,1	69,3	44,0
00150	2/3	41,1	27,1	54,4	40,4	67,7	53,7	81,0	67,0	86,3	72,3	39,4	25,3	4	71,1	48,7	79,1	56,6	92,4	69,9	106	83,2	119	96,5			63,0	40,5
	3	36,1	19,2	49,4	32,5	62,7	45,8	76,0	59,1	81,3	64,4	47,3	30,4	4/5	66,0	40,8	74,0	48,8	87,3	62,1	101	75,3	114	88,6	167	142	70,9	45,6
	3/4			44,3	24,6	57,6	37,9	70,9	51,2	76,2	56,5	55,1	35,5	5			69,0	40,9	82,3	54,2	95,6	67,5	109	80,8	162	134	78,8	50,7
	4					52,5	30,0	65,8	43,3	71,1	48,7	63,0	45,5	5/6					77,2	46,3	90,5	59,6	104	72,9	157	126	86,7	55,7
	4/5					60,8	35,5	66,1	40,8	70,9	45,6			6							85,4	51,7	99,0	65,0	152	118	94,5	60,8
00220	2/3	66,5	41,9	87,9	63,4	109	84,9	131	106	140	115	65,5	41,0	4	115	75,7	128	88,6	149	110	171	132	192	153			105	65,6
	3	58,3	28,8	79,7	50,3	101	71,8	123	93,3	131	102	78,6	49,2	4/5	107	62,6	120	75,5	163	118	184	140	213	167	270	226	118	73,8
	3/4			71,5	37,2	93,0	59,0	115	80,2	123	88,8	91,7	57,4	5			111	62,0	133	83,9	154	105	176	127	262	213	131	82,0
	4					84,8	45,6	106	67,1	115	75,7	105	65,6	5/6					125	71,0	146	92,3	168	114	254	200	144	90,2
	4/5					98,1	54,0	107	62,6	118	73,8			6					138	79,0	159	101	181	131	245	198	157	98,4
00300	2/3	86,0	56,1	114	83,8	141	111	169	139	180	150	82,4	52,5	4	149	101	165	117	193	145	221	173	248	201			132	84,0
	3	75,5	39,6	103	67,3	131	95,0	159	123	170	134	99	63,0	4/5	138	84,3	155	101	182	129	210	156	238	184	349	295	148	94,5
	3/4			93,0	50,8	120	78,5	148	106	159	117	115	73,5	5			144	84	172	112	200	140	227	168	338	278	165	105
	4					110	62,0	138	89,7	149	101	132	84,0	5/6					161	96,0	189	123	217	151	328	262	181	116
	4/5					127	73,3	138	84,3	148	94,5			6					179	107	206	135	245	181	317	245	198	126
00450	2/3	135	88,6	179	132	222	176	265	219	283	236	129	82,4	4	233	159	260	185	303	229	347	272	390	316			206	132
	3	119	63,0	162	106	206	150	249	193	266	211	155	99	4/5	217	133	243	159	287	203	330	246	374	290	547	464	232	148
	3/4			146	80,0	189	124	233	167	250	185	180	115	5			227	134	270	177	314	221	357	264	531	438	258	165
	4					173	98,0	216	142	233	159	206	132	5/6					254	151	297	195	341	238	515	412	283	181
	4/5					200	116	217	133	232	148			6							281	169	324	213	498	386	309	198
00600	2/3	171	118	228	174	285	231	342	288	364	310	166	112	4	297	211	331	245	388	302	444	358	501	415			266	180
	3	149	84,0	206	141	262	198	319	255	342	277	199	135	4/5	275	178	309	212	365	268	422	325	479	382	531	438	299	202
	3/4			183	108	240	165	297	221	319	244	233	157	5			286	178	343	235	400	292	456	349	683	575	332	224
	4					218	131	274	188	297	211	266	180	5/6					320	202	377	259	434	315	661	542	365	247
	4/5					252	155	275	178	299	202			6							355	225	411	282	638	509	399	269
00900	2/3	225	146	301	223	378	299	455	376	485	406	237	158	4	390	264	436	310	513	387	589	464	666	540			379	253
	3	193	99,0	270	175	346	252	423	329	454	359	284	190	4/5														



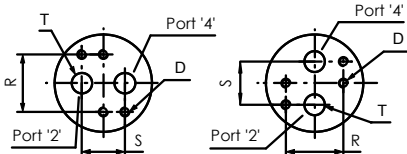
DR/SC00010 - DR/SC00030
* only DR/SC00010



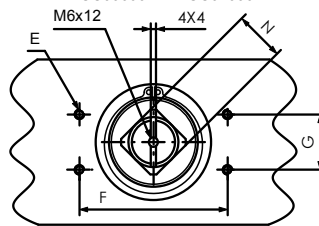
FRONT VIEW



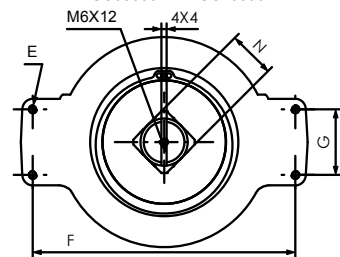
AIR CONNECTION VDI/VDE 3845



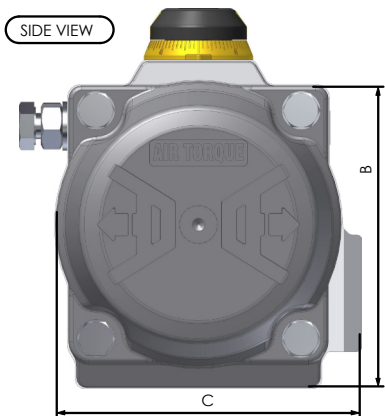
DR/SC00060 - DR/SC04000



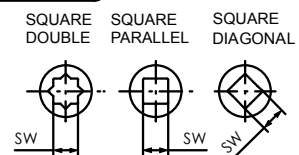
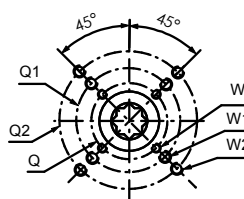
DR/SC05000 - DR/SC10000



SIDE VIEW



BOTTOM VIEW ISO 5211



Type	00010	00015	00030	00060	00100	00150	00220	00300	00450	00600	00900	01200	02000	03000	04000	05000	10000
DR Nm*	15	20	35	70	110	160	258	332	522	681	919	1276	2144	3112	4308	5405	10007
SC Nm*	5	8	13	27	44	61	99	126	198	269	379	510	865	1309	1688	2207	4067
ISO Range	F04	F04	F05-07	F05-07	F05-07	F07-10	F07-10	F07-10	F10-12	F10-12	(F12)F14	(F12)F14	(F14)F16	(F14)F16	F16(F25)	F16-25	F16-25-30
SW x I min	11 x 12	11 x 12	14 x 16	14 x 18	17 x 19	17 x 24	22 x 30	22 x 34	27 x 39	27 x 40	36 x 39	36 x 40	46 x 63	46 x 51	46 x 51	55 x 60	75 x 80
T-ISO228	1/8"	1/8"	1/8"	1/8"	1/8"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	3/8"	1/2"	1/2"	1/2"	1/2"
A	118	136	153.5	203.5	241	259	304	333	394.5	422.5	474	528	605	710	812	876	950
B	66	69	85	102	115	127	145	157	177	196	220.5	245	298.5	330	383	410	518
C	62	72	84.5	93	106	118.5	136	146.5	166	181	200	221.5	262	330	371	418	528
D	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M6x10	M6x10	M6x10	M6x10	M6x10
E	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M6x10
F	80	80	80	80	80	80	80	80	80	80	130	130	130	130	130	130	200
G	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	50
N	11	11	11	17	17	17	27	27	27	27	36	36	36	36	36	36	36
P	15	20	20	20	20	20	30	30	30	30	50	50	50	50	50	50	80
Q	42	42	50	50	50	70	70	70	102	102	140	140	165	165	165	165	165
Q1	-	-	-	70	70	102	102	102	125	125	-	-	-	-	-	254	254
Q2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	298
R	32	32	32	32	32	32	32	32	32	32	32	32	45	45	45	45	45
S	24	24	24	24	24	24	24	24	24	24	24	24	40	40	40	40	40
W	M5	M5	M6	M6	M6	M8	M8	M8	M10	M10	M16	M16	M20	M20	M20	M20	M20
W1	-	-	M8	M8	M8	M10	M10	M10	M12	M12	-	-	-	-	-	M16	M16
W2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M20
Z1	42	42	42	42	42	42	58	58	67.5	67.5	80	80	115	115	115	115	115

*Torque at 6 bar supply pressure, SC -> minimum spring torque (Fail safe action)

Time OPEN 1)	0,15	0,2	0,2	0,25	0,25	0,3	0,3	0,35	0,4	0,5	0,5	0,6	0,7	0,8	0,9	1,1	1,2	1,4	1,5	1,7	2	2,2	2,7	3,2	3,5	4	4,5	5	6	6	7,5	8	10	
Time CLOSE 1)	0,2	0,25	0,25	0,3	0,3	0,35	0,4	0,5	0,5	0,6	0,7	0,8	0,9	1,1	1,2	1,4	1,5	1,8	1,8	2,1	2,4	2,8	3,5	4	4,1	4,6	4,5	5	6	7	7	8,5	9	11
Vol. OPEN 2)	0,06	0,09		0,16		0,31		0,51		0,71	1,19	1,54	2,41	3,14	4,26	5,94	10		14,5		20		25		49									
Vol. CLOSE 2)	0,1	0,15		0,26		0,49		0,78	1,11	1,8	2,34	3,78	4,92	6,89	9,46	15,2	21,38		33		40		84											
ca. Weight 3)	0,75	0,9	1,0	1,1	1,6	1,7	2,7	3,1	3,7	4,3	5,2	6,1	8,0	9,3	9,8	12	14	17	18	22	24	33	34	42	53	67	74	93	123	155	127	169	170	238

1) Sec. 2) L 3) kg

Note:

(A) the above indicated moving time of the actuator is obtained under the following test conditions:

For type DR/SC10 - DR/SC600: (1) room temperature, (2) actuator stroke 90°, (3) solenoid valve with Ø 4 mm and flow capacity Qn 400L/min., (4) inside pipe Ø 8 mm, (5) medium clean air, (6) air supply pressure 5,5 bar (79,75 Psi), (7) actuator without external resistance load.

For type DR/SC900 - DR/SC10000: (1) room temperature, (2) actuator stroke 90°, (3) solenoid valve with Ø 11 mm and flow capacity Qn 6000L/min., (4) inside pipe Ø 11 mm, (5) medium clean air, (6) air supply pressure 5,5 bar (79,75 Psi), (7) actuator without external resistance load.

Caution: It has to be expected, that for field applications, when one or more of the above parameters are different, the moving time will be different.



Absperrklappen
Industriearmaturen
Schüttguttechnologie

Air Consumption
in litre/stroke and m³/stroke
DR/SC00010-10000

WAREX®
VALVE Powder and Bulk Technology

Air Consumption of AT-Actuators with 90° turning angle in litre/stroke

Actuator		Air Supply Pressure P_e in bar									
		2.5	3	3.5	4	4.5	5	5.5	6	7	8
00010	DR	0,56	0,64	0,72	0,80	0,88	0,96	1,04	1,12	1,28	1,44
	SC/SO	0,21	0,24	0,27	0,30	0,33	0,36	0,39	0,42	0,48	0,54
00015	DR	0,84	0,96	1,08	1,20	1,32	1,44	1,56	1,68	1,92	2,16
	SC/SO	0,32	0,36	0,41	0,45	0,50	0,54	0,59	0,63	0,72	0,81
00030	DR	1,47	1,68	1,89	2,10	2,31	2,52	2,73	2,94	3,36	3,78
	SC/SO	0,56	0,64	0,72	0,80	0,88	0,96	1,04	1,12	1,28	1,44
00060	DR	2,80	3,20	3,60	4,00	4,40	4,80	5,20	5,60	6,40	7,20
	SC/SO	1,09	1,24	1,40	1,55	1,71	1,86	2,02	2,17	2,48	2,79
00100	DR	4,52	5,16	5,81	6,45	7,10	7,74	8,39	9,03	10,32	11,61
	SC/SO	1,79	2,04	2,30	2,55	2,81	3,06	3,32	3,57	4,08	4,59
00150	DR	6,37	7,28	8,19	9,10	10,01	10,92	11,83	12,74	14,56	16,38
	SC/SO	2,49	2,84	3,20	3,55	3,91	4,26	4,62	4,97	5,68	6,39
00220	DR	10,47	11,96	13,46	14,95	16,45	17,94	19,44	20,93	23,92	26,91
	SC/SO	4,17	4,76	4,76	5,95	6,55	7,14	7,74	8,33	9,52	9,52
00300	DR	13,58	15,52	17,46	19,40	21,34	23,28	25,22	27,16	31,04	34,92
	SC/SO	5,39	6,16	6,93	7,70	8,47	9,24	10,01	10,78	12,32	13,86
00450	DR	21,67	24,76	27,86	30,95	34,05	37,14	40,24	43,33	49,52	55,71
	SC/SO	8,44	9,64	10,85	12,05	13,26	14,46	15,67	16,87	19,28	21,69
00600	DR	28,21	32,24	36,27	40,30	44,33	48,36	52,39	56,42	64,48	72,54
	SC/SO	10,99	12,56	14,13	15,70	17,27	18,84	20,41	21,98	25,12	28,26
00900	DR	39,03	44,60	50,18	55,75	61,33	66,90	72,48	78,05	89,20	100,35
	SC/SO	14,91	17,04	19,17	21,30	23,43	25,56	27,69	29,82	34,08	38,34
01200	DR	53,90	61,60	69,30	77,00	84,70	92,40	100,10	107,80	123,20	138,60
	SC/SO	20,79	23,76	26,73	29,70	32,67	35,64	38,61	41,58	47,52	53,46
02000	DR	88,20	100,80	113,40	126,00	138,60	151,20	163,80	176,40	201,60	226,80
	SC/SO	35,00	40,00	45,00	50,00	55,00	60,00	65,00	70,00	80,00	90,00
03000	DR	125,58	143,52	161,46	179,40	197,34	215,28	233,22	251,16	287,04	322,92
	SC/SO	50,75	58,00	65,25	72,50	79,75	87,00	94,25	101,50	116,00	130,50
04000	DR	185,50	212,00	238,50	265,00	291,50	318,00	344,50	371,00	424,00	477,00
	SC/SO	70,00	80,00	90,00	100,00	110,00	120,00	130,00	140,00	160,00	180,00
05000	DR	227,50	260,00	292,50	325,00	357,50	390,00	422,50	455,00	520,00	585,00
	SC/SO	87,50	100,00	112,50	125,00	137,50	150,00	162,50	175,00	200,00	225,00
10000	DR	465,50	532,00	598,50	665,00	731,50	798,00	864,50	931,00	1064,00	1197,00
	SC/SO	171,50	196,00	220,50	245,00	269,50	294,00	318,50	343,00	392,00	441,00

Calculation:

$Q = n \cdot V \cdot (p_e + p_{amb}) / p_{amb}$; Q = air consumption; n = Cycles; p_e = control pressure; p_{amb} = air pressure

Definition Stroke:

DR -> 1 stroke corresponds to 1 x OPEN (0°-90°) and 1 x CLOSE (90°-0°)

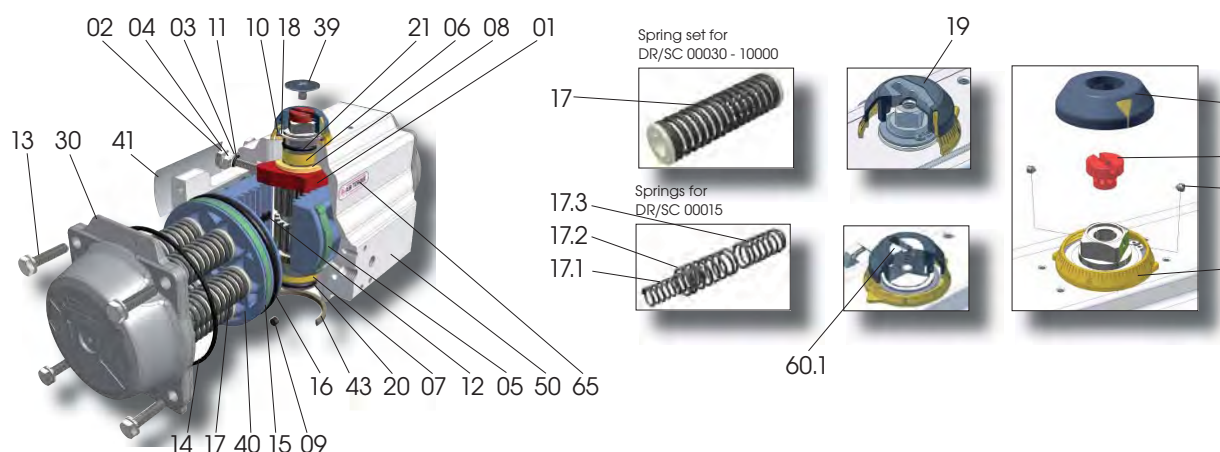
SC -> 1 stroke corresponds to 1 x OPEN (0°-90°); CLOSE (90°-0°) with springs

Air Consumption of AT-Actuators with 90° turning angle in m³/stroke

conversion: 1L = 0,001 m³ / 1000L = 1m³

Actuator		Air Supply Pressure P_e in bar									
		2.5	3	3.5	4	4.5	5	5.5	6	7	8
00010	DR	0,00056	0,00064	0,00072	0,00080	0,00088	0,00096	0,00104	0,00112	0,00128	0,00144
	SC/SO	0,00021	0,00024	0,00027	0,00030	0,00033	0,00036	0,00039	0,00042	0,00048	0,00054
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
10000	DR	0,4655	0,532	0,5985	0,665	0,7315	0,798	0,8645	0,931	0,1064	0,1197
	SC/SO	0,1715	0,196	0,2205	0,245	0,2695	0,294	0,3185	0,343	0,392	0,441

EXTRACT FROM THE TABLE FOR PURPOSE OF EXAMPLIFICATION OF THE CONVERSION



Pos.	Pcs. / Remarks		Part Description	Material
01	1		Octi-Cam (Stop arrangement)	Stainless Steel (for DR/SC00015 - DR/SC00150) Carbon Steel / Nodular Cast Iron, coated
02	2		Stop Cap Screw	Stainless Steel
03	2		Washer	Stainless Steel
04	2		Nut (Stop Screw)	Stainless Steel
05	2		Bearing (Piston Back)	High-grade polymers
	4	for DR/SC 10000 U		
06	1		Bearing (Pinion Top)	
07	1		Bearing (Pinion Bottom)	
08	2		Thrust Bearing (Pinion)	High-grade polymers
09	2		Plug (Transfer Port)	M-NBR / Silikon
09.1	2	for DR/SC 05000 U - 10000 U	O-Ring Plug	M-NBR / Silikon
10	1		Thrust Washer (Pinion)	Stainless Steel
11	2		O-Ring (Stop Screw)	M-NBR
12	2		Piston Guide	High-grade polymers
13	8	for DR/SC 00015 U - 02000 U	Cap Screw	Stainless Steel
	12	for DR/SC 03000 U - 04000 U		
	16	for DR/SC 05000 U - 10000 U		
13.1	16	for DR/SC 10000 U	Washer (Cap Screw End Cap)	Stainless Steel
14	2		O-Ring (End Cap)	M-NBR
15	2		Bearing (Piston Head)	High-grade polymers
16	2		O-Ring (Piston)	M-NBR
17	max.12	for DR/SC 00030 U - 10000 U	Spring (Cartridge)	SiCr Spring Alloy Steel Coated
17.1			Spring	
17.2	max. 2	for DR/SC 00015 U	Spring	
17.3			Spring	
18	1		Spring Clip (Pinion)	SiCr Federstahl, ENP
19	1	for DR/SC 00015 U - 00030 U	Position Indicator	High-grade polymers / Stainless Steel
19.0	1		Graduated Ring	High-grade polymers
19.1	1	for DR/SC 00015 U - 00030 U	Position Indicator	High-grade polymers
19.5	1	for DR/SC 00015 U - 00030 U	Top Adaptor	anodisierte Aluminiumlegierung
19.6	2	for DR/SC 00015 U - 00030 U	Hex. Socket Screw (f. Top Adaptor)	Stainless Steel
20	1		O-Ring (Pinion Bottom)	M-NBR
21	1		O-Ring (Pinion Top)	M-NBR
30	2		End Cap	Die Cast Aluminium Alloy, anodized Cast Aluminium Alloy, anodized (for DR/SC10000)
39	1		Cap Screw (Indicator)	High-grade polymers
40	2		Piston	Die Cast Aluminium Alloy, anodized Cast Aluminium Alloy, anodized (for DR/SC10000)
41	1		Actuator Label	Polyester Aluminium
43	1		Spigot (o.r.*)	extruded Aluminium Alloy, coated
50	1		Body	Cast Aluminium Alloy, coated (DR/SC 05000+10000)
60	1		Drive Shaft	extruded Aluminium Alloy, anodized (DR/SC 10000) Steel, ENP
60.1	1	not for all Versions	Integral Drive Shaft	Stainless Steel, ENP
65	1		Plastic Insert	High-grade polymers

○ Included in Complete Spare Part Kit □ Included in O-Ring- Spare Part Kit

*on request



EU Declaration of Conformity in accordance with the EC Machinery Directive 2006/42/EC ATEX Directive 2014/34/EU Pressure Equipment Directive 2014/68/EU (PED)

Machinery Directive 2006/42/EC (Art. 13)

Declaration of incorporation of partly completed machinery (Annex II B):

Referring to the machinery directive 2006/42/EC (Art. 2 g) the pneumatic actuators manufactured by **Warex Valve** can be classified as 'partly completed machinery'.

We hereby state that the products listed below are in compliance with the essential health and safety requirements.

Before actuators are put into operation, the machine in which these actuators are installed must meet the requirements of Directive 2006/42/EC.

Description of the product range:	Pneumatic rotary actuators type Warex Valve 4G, 4GU, AT, PT
Function:	Double-acting DR/DL and single-acting SC/SO
Actuator sizes:	00010 to 10000 and 045 to 1004 (special versions included)
Serial number:	Air Torque actuators are marked with serial numbers.

Observe the instructions in the Operating Manual for commissioning, installation and maintenance of the above described rotary actuators.

ATEX Directive 2014/34/EU (see manufacturer and safety declaration SN_ATX19AT-RP)

The pneumatic actuators manufactured by **Warex Valve** are designed, manufactured and classified according to the ATEX Directive 2014/34/EU (see actuator label and safety instructions); their application in potentially explosive atmospheres is part of the classification as indicated on the label and in accordance with the relevant ATEX safety instructions.

Protection class Standard actuators version A, B, P, E and EC (see SN_ATX19AT-RP)

ATEX	Standard (-40°C / +80°C), LT (-55°C / +80°C), LLT (-60°C / +80°C)	HT (-15°C / +150°C)
	II 2 G Ex h IIC T6...T5 Gb X II 2 D Ex h IIIC T85°C...T95°C Db X	II 2 G Ex h IIC T6...T3 Gb X II 2 D Ex h IIIC T85°C...T165°C Db X

Protection class for stainless steel actuators version SC (only here: SC -> without nickel coating, see SN_ATX19AT-RP)

ATEX	Standard (-40°C / +80°C), LT (-55°C / +80°C), LLT (-60°C / +80°C)	HT (-15°C / +150°C)
	II 2 G Ex h IIC T6...T5 Gb X II 2 D Ex h IIIC T85°C...T95°C Db	II 2 G Ex h IIC T6...T3 Gb X II 2 D Ex h IIIC T85°C...T165°C Db X

The compliance has been checked according to the requirements of the following standards or regulations:

EN 1127-1:2011 EN ISO 80079-36:2016 EN ISO 80079-37:2016 EN 15714-3:2009

Pressure Equipment Directive 2014/68/EU (PED)

The pneumatic actuators manufactured by **Warex Valve** are designed in accordance with the criteria of Article 1 section 2 j) ii) and suitable for use with Group 2 **non-hazardous** media and are therefore not classified as pressure equipment under Directive 2014/68/EU.

20.11.2019

.....
Date


.....
Dipl.-Ing. (B.Sc.) Andreas Reusch, Managing Director, Warex Valve GmbH



Appareil non électrique destiné à être utilisé en atmosphères explosibles
Non electrical equipment intended for use in potentially explosive atmospheres
Apparecchi non elettrici destinati ad essere utilizzati in atmosfera potenzialmente esplosiva

Directive 2014/34/UE
Directive 2014/34/EU / Direttiva 2014/34/UE

ACCUSÉ DE RECEPTION D'UN DOSSIER TECHNIQUE
ACKNOWLEDGE RECEIPT OF TECHNICAL DOCUMENTATION
AVVISO DI RICEVIMENTO DEL FASCICOLO TECNICO

Appareil / Equipment / Apparecchiatura :

PNEUMATIC ACTUATORS / ATTUATORI PNEUMATICI

Type(s)/ Type(s) / Tipo(i) : **WAREX**

Marquage/ Marking / Marcatura :



Dépositaire / Applicant / Richiedente :

WAREX VALVE GmbH

Stauverbrink 2

D- 48308 Senden - Deutschland

L'INERIS, organisme notifié et identifié sous le numéro 0080, conformément aux articles 17 et 21 de la Directive du Conseil 2014/34/UE du 26 février 2014, accuse réception du dossier conformément à la procédure décrite au chapitre 3, article 13 1) b) ii) de la Directive.

INERIS, notified body and identified under number 0080, in accordance with articles 17 and 21 of Council Directive 2014/34/EU of the 26 february 2014, acknowledges receipt of file according to the procedure described chapter 3, article 13 1) b) ii) of the Directive.

L'INERIS, organismo notificato e identificato con il n.0080 conformemente agli articoli 17 e 21 della Direttiva 2014/34/UE del Consiglio dell'Unione Europea del 26 febbraio 2014, conferma il ricevimento del fascicolo in conformita alla procedura prevista nella rubrica 3, articolo 13 1) b) ii) della Direttiva.

La documentation technique référencée : **ATX19WX-RP dated 2019-09-16**

The technical documentation referenced : **ATX19WX-RP dated 2019-09-16**

La documentazione tecnica di riferimento : **ATX19WX-RP dated 2019-09-16**

est consignée sous le numéro d'enregistrement :

is consigned under the reference :

è depositata con il numero di registrazione :

n° INERIS-EQEN 035013/19.

no INERIS-EQEN 035013/19.

n° INERIS-EQEN 035013/19.

Dans le cadre de cet enregistrement, l'INERIS n'a pas examiné le contenu de la documentation technique.

Within the scope of the recording, INERIS did not examine the content of the technical documentation.

Nel quadro di questa registrazione, INERIS non ha esaminato il contenuto della documentazione tecnica.

Date de fin de validité :
2029.10.03

Validity completion date :
2029.10.03

Data di fine di validità :
2029.10.03

Verneuil-en-Halatte, le 2019.10.03



Signé électroniquement
Digitally signed by
Thierry HOUËIX
Ex Certification Officer
Délégué Certification

**Le Directeur Général de
l'INERIS,
Par délégation,**

**The Chief Executive Officer of
INERIS,
By delegation,**

**Il Direttore generale
dell' INERIS,
Per Delega,**

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