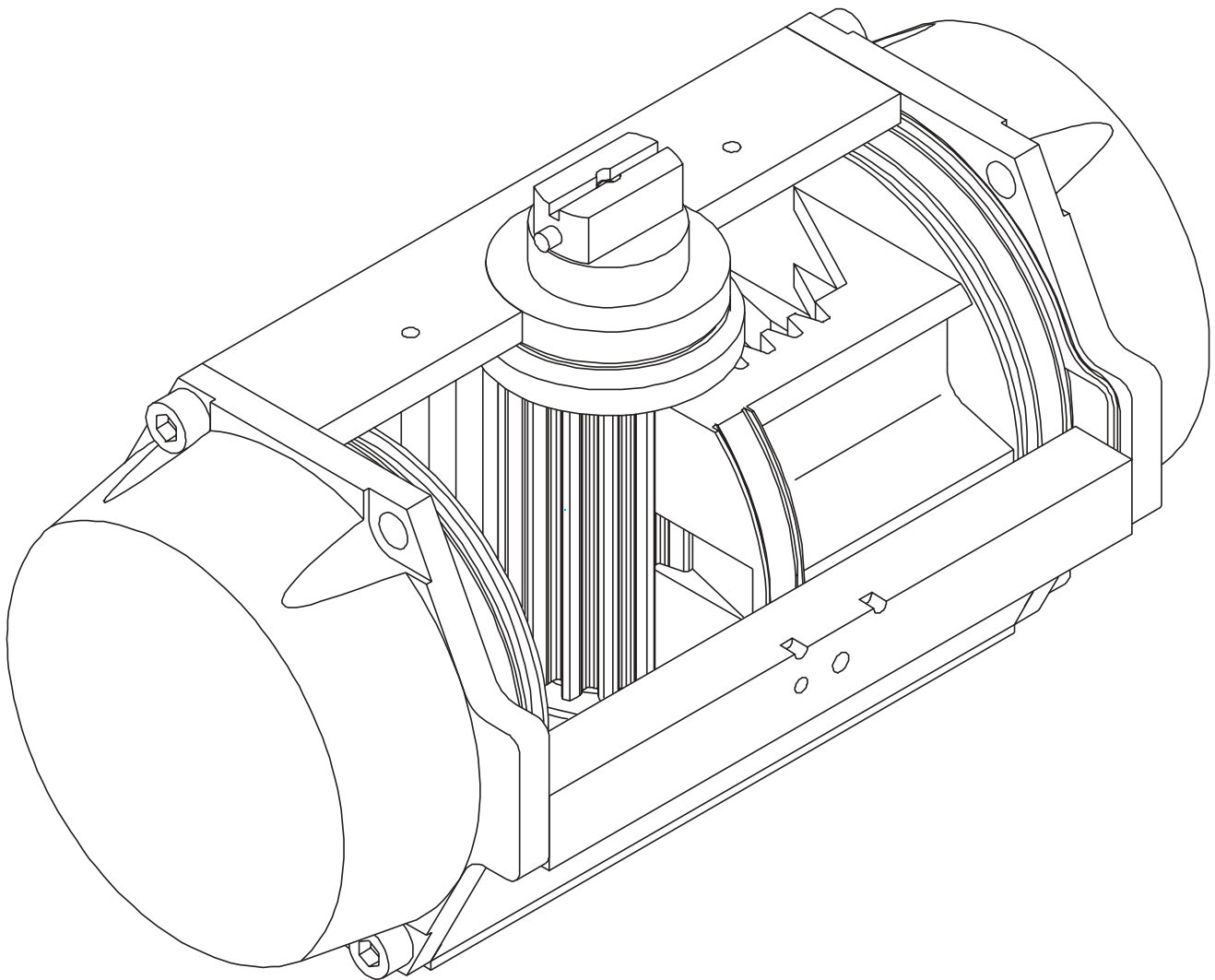




Revo

Pneumatic Valve Actuators, Series R Double Acting or with Spring Return

Installation, Operation and Maintenance



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1. Area of Application

These concise instructions apply for

Revo Double Acting Pneumatic Valve Actuators, Series R

Revo Spring Return Pneumatic Valve Actuators, Series R

Note 1:

These instructions are only valid in connection with the instructions for the valve the actuator is mounted to.

Note 2:

For information that is already required during the planning phase reference is made to CRANE Process Flow Technologies <Publications>, which can be viewed on the CRANE Process Flow Technologies <Homepage> www.craneflow.de, www.craneflow.com or which are available from the manufacturer, in order to keep the arrangement of this instruction manual as clear as possible. These publications also contain a description of the actuator.

Note 3:

Since the pneumatic actuator can also be used with control media other than compressed air, it is hereafter simply referred to as "actuator".

2. Intended Use

These Revo actuators are intended

- for installation to a valve, attachment of a solenoid valve and connection of this solenoid valve to a control provided by the customer,
- for operation with control medium compressed air, water or hydraulic oil of maximum 10 bar,
- on condition that in normal operation a control pressure in compliance with the type plate on the pneumatic actuator is permanently applied and that this pressure is not exceeded,
- to actuate valves with 90° travel (e.g. butterfly valves and ball valves) by executing the commands of the above mentioned control (for special applications actuators are available with travel of 120°- or 180°).
- An actuator properly mounted on the valve shows the position of the valve by means of a optical indicator.
- An (optional) "position indicator" module mounted to the actuator is used to signalise the position of the valve to the control provided by the customer.

Double-Acting Actuators

stop at the current position in case of a control pressure failure. With control pressure applied, but after a shut-down or failure of the control voltage on the solenoid valve, it solely depends on the control of this solenoid valve to which position the actuator will travel.

Unless otherwise specified by the customer, the actuator should close.

Spring Return Actuators with Spring Closing:

travel to safe position "CLOSED" in case of failure / control pressure shut-down.

Spring Return Actuators with Spring Opening

travel to safe position "OPEN" in case of failure / control pressure shut-down.

Design and control of the solenoid valve must ensure the above mentioned functions of a spring reset actuator.

Notes on equipment for manual emergency actuation in case of control pressure failure:

Double-Acting Actuators:

The extension of the control shaft has a double-D as standard, which is most suitable for manual operation of the actuator with an appropriate open-end spanner.

Spring Return Actuators

can only be actuated with the assistance of an (optionally available) additional gearbox, these are also recommended for larger double-acting actuators (size 090 and upwards).

The actuator is not intended to be used for purposes other than the ones specified hereunder. We would particularly like to point out that the actuator has not been approved for:

- a manual emergency actuation using the extension of the control shaft while control pressure is applied.
- emergency operation of spring reset actuators using open-end spanner or similar tools.
- operation of electrical modules with inadequate protection class (acc. to EN 60529), especially the installation and operation of actuators with electric accessories (solenoid valves, position indicators and/or position controllers) without approved explosion protection in compliance with EN 50014, EN50018, EN50019 or EN 50020 in potentially explosive environments.
- use of control media other than those specified in these instructions without the consent of the manufacturer.
- use of control pressures higher than 10 bar.
- use of the actuator in a chemically aggressive environment without the consent of the manufacturer.
- operation of the actuator at ambient temperatures above 60°C or below minus 20°C without the consent of the manufacturer.

3. Declaration of Manufacturer

3.1 Declaration of Manufacturer acc. to Machine Directive 98/37 EEC

The manufacturer

Crane Process Flow Technologies GmbH

Heerdter Lohweg 63-71

D 40459 Düsseldorf

Germany

declares that the actuators:

Revo double-acting pneumatic valve actuator, series R

Revo pneumatic valve actuator with spring accumulator, series R

1. are incomplete machines as defined by the EC machine directive 98/37 EEC, but meet the requirements of this directive,
2. must only be operated in compliance with the accompanying operating instructions (also the ones for the supplied additional electric modules).

Start-up of these actuators is not permitted until conformity with the specified EC-directive has been declared for the plant equipped with the actuator/ valve unit.

Applied technical specifications:

EN 292, Part 1 and Part 2

EN 5211, Part 3, Draft 2002

Type description and technical features

Safety of machines:

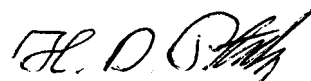
Technical principles and specifications

Design standard for pneumatic piston actuators

See paragraphs 1 and 2 in these operating instructions

Modifications to actuators and/or additional modules affecting the technical data specified in these operating instructions, the use as specified in section 2 <intended use> and essentially change the actuator and/or a module, will make these declarations null and void.

Düsseldorf, date *18. August 1998*



H. Ptak, Managing Director

3.2 Notes Concerning the Pressure Equipment Directive 97/23 EEC

These actuators are dimensioned as positioning devices in accordance with article 1, section (3.10) of the pressure equipment directive and are therefore no pressure equipment as defined by the EC pressure equipment directive 97/23 EEC.

3.3 Declaration of Manufacturer for Electric Accessories

are – if applicable – enclosed with the delivered accessories.

4 Notes on Safety

4.1 Important Information for the User

The actuators described hereunder have been designed and manufactured in compliance with standards and regulations stipulated above. They therefore comply with the latest technical standards and meet the requirements of these standards.

However, safety during operation in practice can only be achieved if all necessary measures are applied. It is the responsibility of design engineer and operator of pipeline systems equipped with valve and actuator to plan appropriate measures and to monitor their implementation and execution.

In particular the operator must ensure that

- the actuator is only used as described in section 2 <Intended Use>,
- the control medium is compatible with the material of the actuator (anodised aluminium),
- the actuator is only operated in fault-free, fully functional condition and the function of the safety installations in control pressure generation and distribution system and in the electric control provided by the customer are checked at regular intervals,
- all guards and safety installations for electrically and mechanically moved parts of the actuator and its accessory modules are maintained in as-delivered condition and the safety covers of junction boxes are properly closed again after electrical connection,

- only appropriately qualified and authorized personnel plans and connects the actuator, operates the control system and is regularly instructed about all relevant issues concerning local regulations for health and safety at work – also for electrical equipment,
- this person has the necessary equipment available to carry out the work steps described hereunder,
- this person is familiar with these operating instructions and the instructions for the associated valve and observes the information contained therein,
- repairs and conversions on spring reset actuators are only performed under the supervision of a safety expert.

If the information contained in these instructions is not observed, the liability of **Crane Process Flow Technologies GmbH** for the above mentioned products shall become null and void.

4.2 General Safety Regulations

Basically the same safety regulations apply for actuators as well as the equipment for the generation and distribution of control pressure and for the electrical control system they are connected to. Compliance with these regulations is also assumed for operation of the actuator.

The following must be additionally observed, especially for these pneumatic/hydraulic actuators:

- actuators are designed for control pressures of max. 10 bar; compressed air, neutral gas, water or hydraulic oil at room temperature may be used. In order to protect the solenoid valves, the control medium should be filtered with a mesh size of 40 µm (see ISO 8573-1, class 5). Compressed air must be dried and may be slightly oiled for special applications.
- manual emergency actuation of double-acting actuators with double-D on the extension of the control shaft is only permitted if no control pressure is applied to the actuator. For actuation use only exactly fitting open-end spanners.
- manual emergency actuation of spring reset actuators must only be performed using an

additionally mounted manual emergency device (e.g. uncoupling worm gears). Such equipment are also recommended for double-acting actuators of size 090 and bigger. In this case the following also applies: Do not actuate while control pressure is applied.

- work on electric connections must only be carried out by appropriately trained specialists with responsibility for the control of the entire plant.
- if these actuators are not delivered by the manufacturer together with the valve, but are to be installed by the customer, the information in section 9.1 <Installation of an Actuator...> must be strictly observed.

4.3 Particular Risks



Under normal conditions the actuator must only be operated with the safety installations in place. If these need to be removed for adjustment or connecting work, all connections to the control medium must be disconnected beforehand.



Electrical assemblies shall only be operated with safety covers closed and connections covered. If these need to be removed for adjustment/connecting work, connections for supply and control voltage must be disconnected beforehand. Adjustments to be made in live condition must be performed with properly insulated tools.



Bei großer Hubfrequenz kann die Temperatur des Antriebs so hohe Werte annehmen, dass Verletzungsgefahr besteht. Deshalb Vorsicht beim Berühren des Antriebsgehäuses.

5. Transport and Storage

(A valve with) actuator is a high-quality product and as such must be handled, transported and stored with utmost care, in order to avoid damage to actuator and additional assemblies.



If lifting tackle (ropes or similar) is used on the lifting eyelets (bores) of the actuator provided for this purpose, these must only be used to mount the actuator to the valve, but under no circumstances to transport the unit (valve + actuator).

- If the actuator or the unit (valve/actuator) is to be stored prior to installation, it must be sufficiently protected against harmful influences from dust, dirt and moisture.
- The actuator or the unit (valve/actuator) shall be stored in its original packaging material (on a pallet or similar).
- The unit (valve/actuator) shall not be permanently exposed to full sunlight – even if properly packed.
- The actuator or the unit (valve/actuator) must not be actuated.

If the packaging does not show any transport damage the actuators or the unit valve/actuator should only be unpacked just before installation. Unpacked parts must be properly protected against any dirt, moisture and corrosion.

6. Installation and Connection to the Control System

For the most part actuators are delivered ready for installation together with the necessary electrical assemblies (solenoid valve, position indicator and/or position control). Should this not be the case, the actuators must be mounted to the valve and/or electrical assemblies to the actuator by the customer, before the valve is installed in the pipeline. The instructions in section 9.1 <Installation of an Actuator...> must be strictly followed.

When installing a solenoid valve the following section 6.2 must be observed.



When starting installation work one must make sure that the system data for control pressure, control voltage and frequency for all assemblies are in compliance with the technical data specified on the type plate of the actuator and/or the module.

Consumption of control medium and recommended supply line cross-sections are listed in table 1. The shortest possible closing speed mentioned in this table is a reference value for standard double-acting actuators without mounted valve and with optimal supply and discharge of control medium. Friction inside the valve will considerably extend this limit value.

As far as the following description concerns pneumatic control systems, the instructions analogically also apply for hydraulic systems with a pressure of up to 10 bar (e.g. water).

6.1 Installation of a Valve with Pneumatic Actuator into the Pipeline



When connecting electric/pneumatic supplies to the accessory modules for controlling the valves, the special instructions for these electrical accessory modules must be strictly observed.

The actuator is normally delivered together with the valve and is in this case adjusted to the end positions of the valve. Position indicated included in the delivery are normally also adjusted to the end positions, a solenoid valve in the scope of delivery is normally mounted to the actuator.

If the electrical pneumatic modules solenoid valve, unit switches and/or position controller are delivered as separate items, this (these) module(s) must first be mounted to the valve, before the complete unit is installed into the pipeline, see section 6.2.

The interfaces for the installation of the modules solenoid valve and/or position indicator and/or position controller rotation are standardised acc. to VDI / VDE 3845.



On an actuator of standard design the supply of control medium through port "A" causes an anti-clockwise rotation and the supply through port "B" a clockwise actuation.

Spring reset actuators must only be supplied with control medium through port "A". See Fig. 1

If, for example, the actuator is separately delivered as a spare part, the instructions in sections 9.1, 9.3 and 9.4 must be observed. In this case it is recommended to mount the actuator to the valve prior to the first installation of the valve into the

Table 1: Important actuator data

Size	001	002	006	012	025	050	090
Volume/travel [L]	0,12	0,17	0,25	0,35	1,0	1,6	2
Compressed air line (length up to 6m)	6 mm	6 mm	6 mm	6 mm	6 mm	8 mm	8 mm
Strokes/lifetime *)	500.000	500.000	500.000	500.000	500.000	500.000	500.000
Min. closing time [s] approx.**)	0,25	0,35	0,4	0,5	0,7	0,9	1,1

Size	130	180	205	380	630	960	H15
Volume/travel [L]	3	4	6	8,5	17	23	32
Compressed air line Standard	8 mm	8 mm	10 mm	10 mm	10 mm	10 mm	10 mm
Strokes/lifetime minimum *)	250.000	250.000	100.000	100.000	100.000	25.000	25.000
Min. closing time [s] approx.**)	1,3	1,4	1,6	2	2,5	2,8	3,5

*) acc. to draft ISO 5211 (CEN / TC 69 / WG 1 / SG 10, para. 4.2)

**) These data are limit or reference values for double-acting drives with 6 bar control pressure and apply only for the actuator (no valve attached).

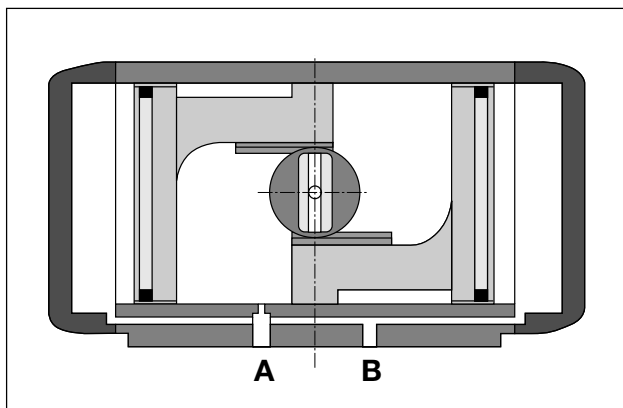


Fig. 1 Revo Actuator series R

pipeline and to the unit according to 6.1.1.

Installation of valve with actuator should be performed in the following sequence:

6.1.1 Checking the Actuator Position before Installation

If not specified differently in the purchase order, the actuator is delivered in a space-saving position parallel to the pipeline.

If it needs to be installed 90° offset:

- convert the actuator as described in section 9.2 „Conversion of the actuator shaft“ in the detailed instructions.

6.1.2 Checking the Actuator Position before Installation

- **if delivered without electrical position indicator:**

The red indicator pins and the slot on the front face of the extended control shaft at the top of the actuator must indicate the position of the valve (position of valve disc or bore in ball valve):

- Slot diagonal to pipeline axis: Valve is closed,
- Slot parallel to pipeline axis: Valve is open.

If the positions of valve and indicator do not match, see section 9.2 .

- **if delivered with electrical position indicator:**

The visual indicator “OPEN” and “CLOSED” in the module must be compared with the position of the valve. If the positions of valve and

indicator do not match: Plug the indicator in the accessory module position indicator (electric/ pneumatic) into a different socket.



An incorrect position indication is a potential risk for later operation. Valves/actuators with incorrect position indication must not be installed and should be rejected.

6.1.3 Installation into the Pipeline

Installation of the unit (valve/actuator) into the pipeline is described in the operating instructions for the valve, these instructions must be treated with priority.

The following is additionally valid:



Actuators must be appropriately supported in order to relieve the valve housing from excessive loads. They must be supported if their size and/or installation orientation applies any bending strain to the valve.



Actuators of any size must not be subjected to any external loads, since this may damage or even destroy the valve. Actuators are no "stepladders".

6.2 Connecting the Solenoid Valve

The actuator is controlled by a solenoid valve. The solenoid valve is normally connected to the actuator via the standardized interface on the side of the actuator. The connection to the control must

- meet the requirements specified in section 2 "Intended Use",
- be in compliance with the documentation of the solenoid valve included in the delivery.

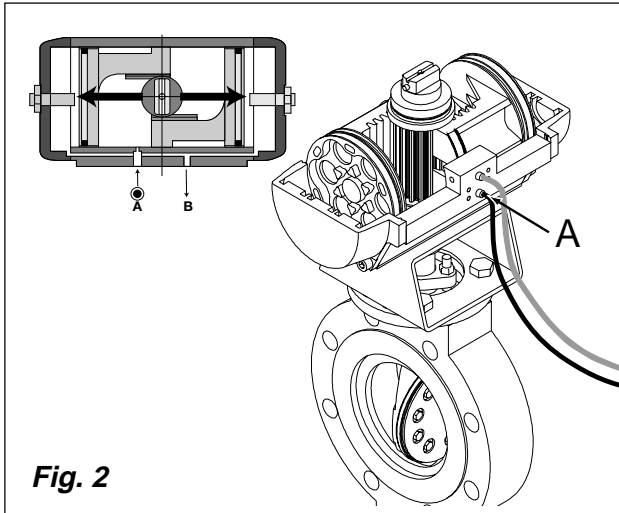


Note: This must be observed particularly if the solenoid valve has not been delivered together with the actuator.

- be in compliance with the following schematics in Fig. 2 to 5.

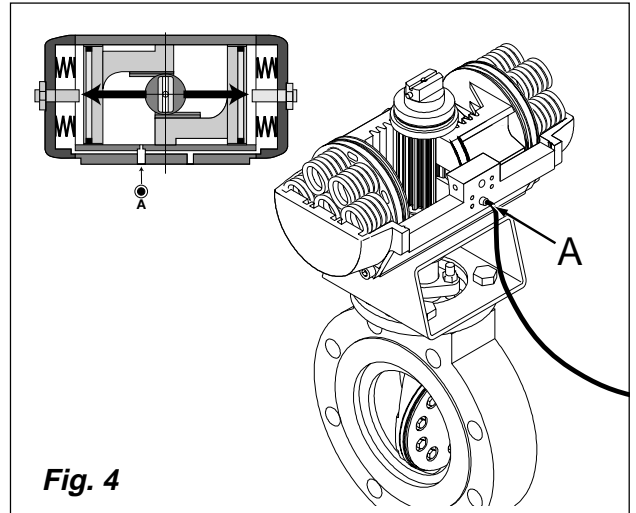
Air connections double acting

Air supply to port A: anti-clockwise/open

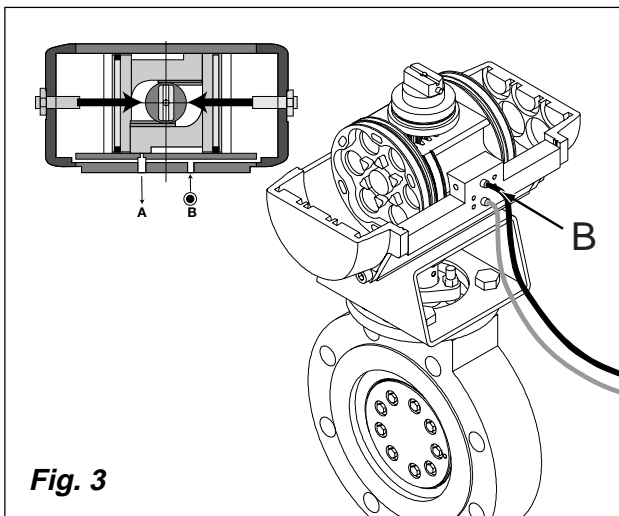


Air connections with spring return

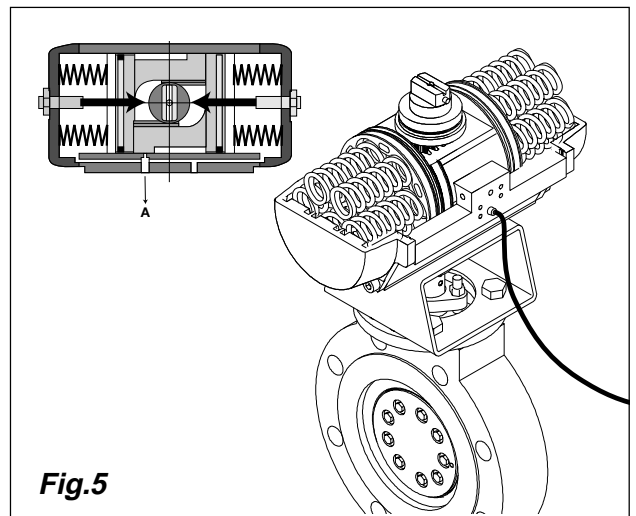
Air supply to port A: anti-clockwise/open



Air supply to port B: clockwise/closed



Spring return: clockwise/closed



Recommended inner Pipe Diameters for Compressed Air Lines

Actuator size	up to 1,20 m	longer than 1,20 m, max. 6 m
001 - 025	6 mm	6 mm
050 - 180	6 mm	8 mm
205 - H15	6 mm	10 mm

6.3 **Connecting the Position Indicator and/or Position Controller Module (if present)**

This type of module may already be installed (or can be mounted) to the interface on top of the actuator, instead of the visual position indicator. It's main purpose is to indicate the end positions of the valve, either "OPEN" and "CLOSED" or intermediate positions on valves used for throttling/regulation.

The electric (and pneumatic) connection must be in accordance with the documentation for position indicator and/or position controller supplied with the delivery.

6.4 **Tests upon Completion of Installation**

Once the installation of a valve/actuator unit is completed, it is highly recommended to perform the following test steps on each valve:

Is the "local" control pressure sufficient?

At least the control pressure determined by the design of the actuator must be available directly on the solenoid valve.

Is the solenoid valve correctly connected?

With control pressure applied, but failure of the control signal (to check: pull out plug), the valve must travel to the following position:

double-acting actuator:

The valve closes or opens, see section 2, Intended Use, note 1

actuator, spring closing:

The valve must travel to safety position "CLOSED".

actuator, spring opening:

The valve must travel to safety position "OPEN".

If this fails check control system and/or solenoid valve.

Check actuating function and indication:

With control pressure applied the control commands "OPEN" and "CLOSE" must move the valve to the corresponding end positions.

The visual indicator on the actuator must show this correctly. If this fails check the actuator control.

Connection actuator/valve properly tightened?

During the function test no relative movements

should occur between valve, mounting bridge (if applicable) and pneumatic actuator.

If necessary tighten the fastening screws.

(if module is available) check electrical position indicator:

The electrical signals for indication "OPEN" and "CLOSED" can be compared with visual indication of the valve. Signal and indication must match.

If this fails check control system and/or position indicator.

If a valve cannot be actuated correctly as described above, even though it is properly connected, actuator and/or valve must be replaced.

Once the installation has been completed valves should generally remain in "open" position for pressure testing the pipeline section.

7. **Start-up**

The actuator can only be started via the plant control after all tests described in the previous section 6.4 have been completed without objections. The instructions for valves supplied by CRANE Process Flow Technologies specify whether and which additional steps are required for start-up.

The technical rating of the actuator for permanent operation can be found in section 6, table 1.



Important for operation with short closing times: The wear inside the valve may be disproportionately high. With the installation of throttle valves in the supply line or in the discharge line for the control medium the travel time can be extended to a normal value.



In any case the travel frequency must be limited to such an extend, that the temperature measured on the actuator housing does not exceed 80°C during continuous operation.

8. Troubleshooting

When rectifying a fault section 4: <Notes on Safety> must be strictly observed.

Note: In case of malfunctions in the valve: Follow the instructions for the valve.

Type of fault	Action	Remark
Actuator does not respond to control signal	Check control pressure on actuator: The minimum pressure for the torque-rating of the actuator is required. If the control pressure is sufficient, but the actuator does still not respond: Check whether the valve hard to move: For remedy refer to the instructions for the valve. If the valve is also free of faults: Check control and/or dismantle the actuator, see section 9.4.	<p>Note 1: When working on electric modules strictly observe the warnings in section 4.3!</p> <p>Note 2: If a module needs replacement or spare parts: Always specify all data mentioned on the type plate of this module in your order.</p>
Solenoid valve does not switch	Check supply voltage on coil housing. Check whether the coil is compatible with the control voltage. If the magnetic coil is OK: Observe the instructions for the solenoid valve.	
Valve open/close too quickly	Install a restrictor into the supply or discharge line on the solenoid valve.	
Valve is leaking	If the leak is to be eliminated by changing the end position "CLOSED": Adjust the setscrew in the actuator (option or Series 6), see section 9.5 of the detailed instructions	
Actuator consumes air in end position "OPEN" and "CLOSED"	Check the solenoid valve and its mounting on the actuator. If there is no leakage on the solenoid valve: Dismantle the actuator and renew the seals inside the actuator, see section 9.4.	

9. Work on the Pneumatic Actuator

CRANE Process Flow Technologies as manufacturer delivers Revo pneumatic actuators normally

- in the design that has been ordered (double-acting or with springs),
- in size and rating adapted to the valve,
- with the required accessories, if ordered,
- adjusted and mounted to the valve – as standard positioned parallel to the pipeline.

If an actuator needs to be subsequently converted in exceptional cases, this may also be performed by the user. If the actuator needs to be dismantled for this purpose, this should generally be done in an appropriate workshop with experts for the assembly of high-quality function parts.

9.1 Mounting an Actuator to the Valve



For better understanding of the following instructions you may also use the publications mentioned in section 1, Area of Application, under note 2.

Revo valve actuators have an interface to the valve in accordance with ISO 5211 and a form-closed bore in the control shaft (3), which

- either in form of a square socket acc. to ISO 5211 in the end positions of the actuator positioned 45° “on the tip”,
- or as square socket acc. to ISO 5211 parallel to the longitudinal axis of the housing,
- or in form of a dihedron acc. to ISO 5211 parallel to the position of the disc of the valve.

The actuator ordered must match the valve.

The valve must

- have a fitting control spindle end and
- a matching fastening flange acc. to ISO 5211, this must be checked before the installation.

Please observe when mounting the actuator to the valve that

- the longitudinal axis of the actuator should normally be orientated parallel to the pipeline axis,
- the fastening screws match the standardized thread depth acc. to table 2 (see above). Screws too short or too long for the thread depth must not be used,
- the position indicator on the pneumatic drive matches the position of the valve. If a conversion is required, please refer to the next section 9.2.

Table 2: Connection measurements

Size	001	002	006	012	025	050	090
Thread depth [mm]	8	8	6,5/7,5/8	9	9	12	12/16
Square s =	9	9/11	11/14	14	14	17	17/22
Double-D =	on request						

Size	130	180	205	380	630	960	H15
Thread depth [mm]	16/18	18	20/25	20/25	25/32	25/32	25/32
Square s =	22/27	27	27/36	27/36	36/46	46/55	55/75
Double-D =	on request						



If the actuator has already been mounted by the supplier, the supplier is solely responsible for correct adjustment of the position indicator..

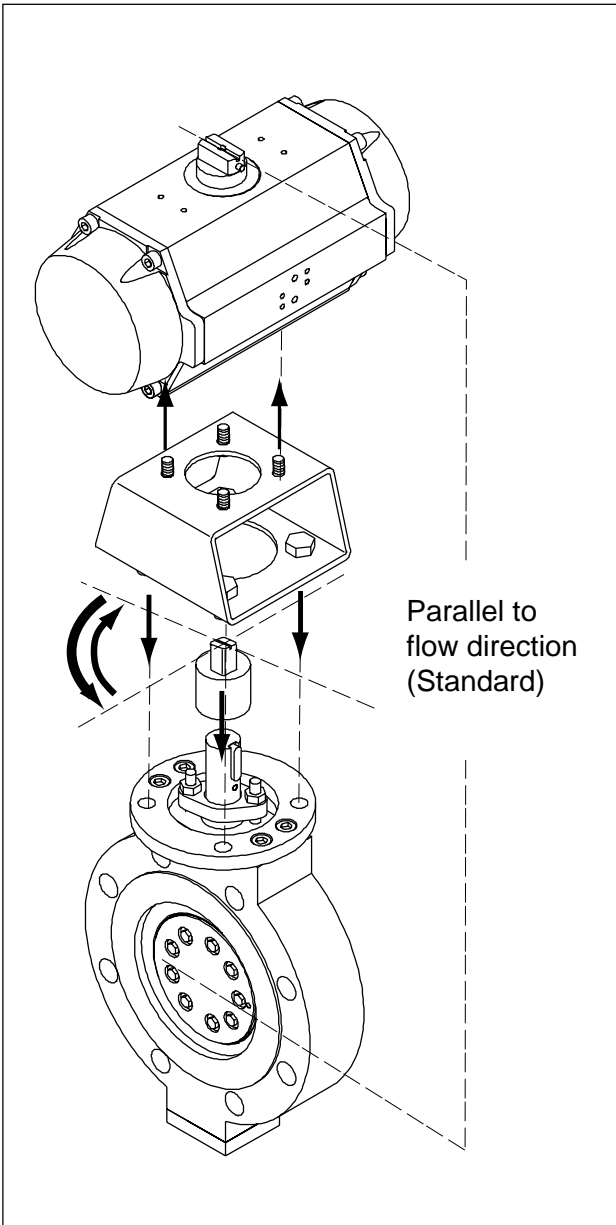


Fig. 6 Mounting an Actuator to the Valve

9.2 Conversion of Drive Shaft to Change the Position Indicator

If the position indicator is not correctly adjusted or the position of the actuator to the valve needs to be changed 90° by the customer, the control shaft with its position indication must be turned for 90°.



Be careful when removing the actuator from the valve installed in the pipeline: The actuator must only be removed after the pressure in the pipeline has been relieved.

- Disconnect all connections to the control, unscrew the fastening screws to the mounting flange and take the actuator off the valve, see Fig. 6 in previous section 9.1,
- Disassemble the actuator, as described in section 9.4, Disassembling an Actuator,
- Assemble the actuator shaft 90° offset, reassemble the actuator.



Be careful when working on actuators with spring reset: Dismantling and assembly should be performed under the supervision of a safety expert or by the manufacturer.

- Before mounting the actuator to the valve make sure that the position indicator is correctly adjusted, see Fig. 6 and section 9.1 Mounting an Actuator to the Valve.

9.3 Changing the Spring Force



Danger of injury: Spring reset actuators contain compressed spiral springs. In order to prevent a risk of injury caused by unprofessional work the following steps must be performed with greatest care and only under the supervision of a safety expert.



Since the spring reset is dimensioned by the manufacturer Crane Process Flow Technologies, any modifications to this dimensioning should also be coordinated with the manufacturer.

If the factory installed spring assembly in actuators with spring reset is to be changed, both covers (4) must be opened.

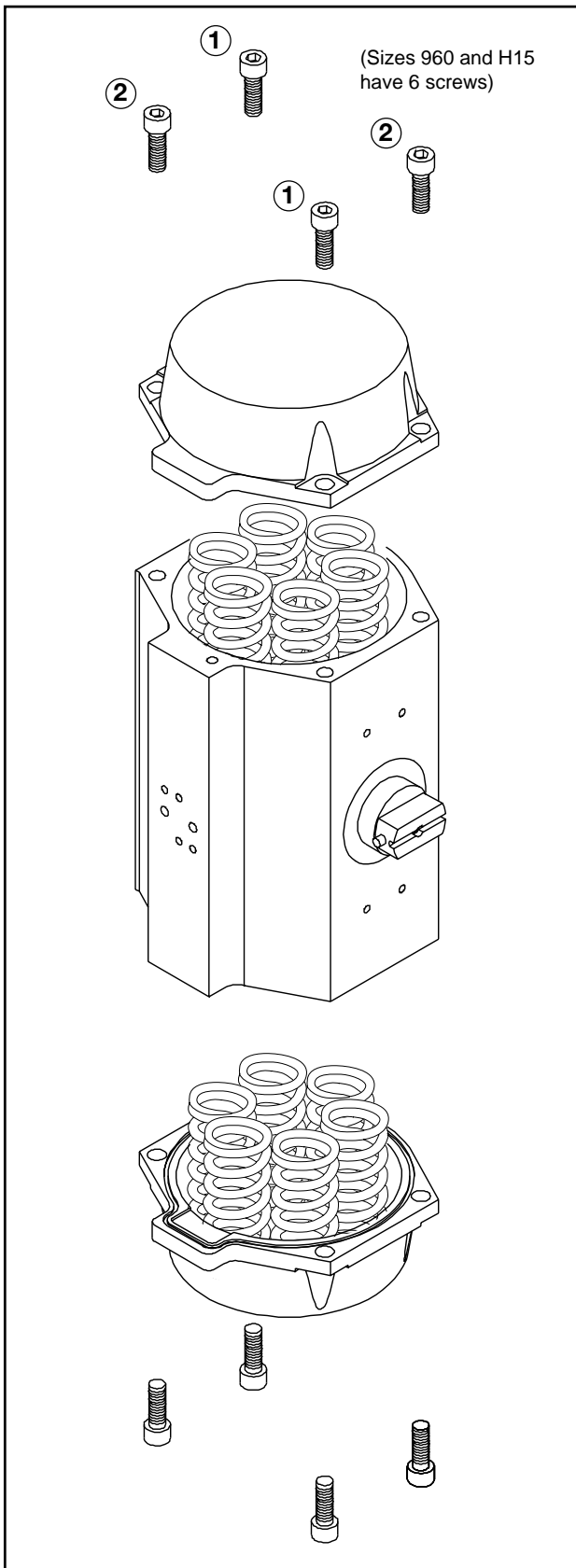


Fig. 7 Mounting an Actuator to the Valve



Note 1: First read the following instructions to end before starting to disassemble!



Note 2: It is recommended to remove the actuator from the valve and to perform the following steps in a workshop.



Attention! If the actuator is a type with spring reset loosen the screw with number 1 first, then loosen all end cap screws with number 2 evenly. Only loosen the screws for two to three turns at a time and one after the other, in order to relieve the pre-tension of the springs.

Be extremely careful while disassembling the end caps on actuators with spring reset.

The conversion should be performed in the following steps:

- Strictly depressurize the actuator beforehand, so that it travels to safety position. It is also mandatory to depressurize the valve,
- then mark the position of the actuator and remove it from the valve, disassemble all accessory modules (solenoid valve, position indicator and/or position controller),

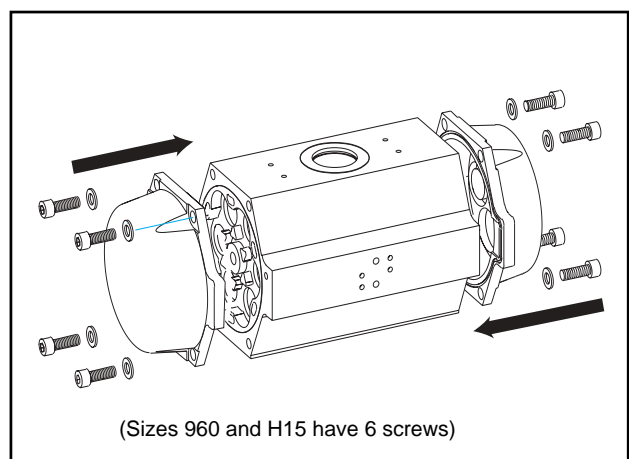


Fig. 8 Disassembling the end cap

- then loosen the first cover (4),

Before loosening the screws (15) it must be assured that the actuator is completely depressurized.

- slacken the screws (15) crosswise and in pairs uniformly and in small steps in order to relieve the springs slowly, then change the spring assembly as shown in Fig. 9 and retighten the cover (4) in reverse order.

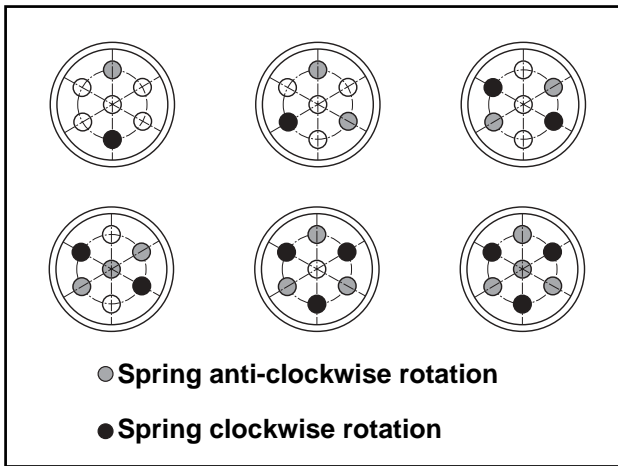


Fig. 9 Arrangement of springs on spring reset actuators

- place the cover (4) centrally on the spring pack and press it slightly down, so that the screws (5) reach into the tapped bores.



The strength of the housing material requires the reuse of all screws (15) with original length, do not use any shorter screws! (look at the shedule page 21)

- then turn the actuator around and change the springs on the opposite side in the same way.
- After this reassemble the electric modules (solenoid valve, position indicator and/or position controller).
- Then mount the actuator back to the valve, as described in section 9.1 <Mounting...>.
- Finally check the actuator with the control to find out whether the valve is correctly actuated and whether the position indication is correct.

9.4 Dismantling an Actuator

In case of a defect remove and dismantle the actuator and replace the defective part. You must only use original spare parts from the manufacturer CRANE Process Flow Technologies.



Note: First read the following instructions to end before starting to disassemble!



Be careful when working on spring reset actuators: These actuators contain compressed spiral springs. For dismantling these actuators section 9.3 must be additionally strictly observed in order to prevent the risk of injury.

- Close valves with double-acting actuators,
- depressurize double-acting and spring reset actuators,
- if possible disassemble the actuator from the valve. This requires depressurizing of the valve (if this is not possible clarify the procedure with the locally responsible safety officer!),
- then make a note of the currently indicated position of the position indicator on the actuator,
- then mark the position of the actuator on the valve and separate the actuator from the valve,
- then loosen screws (5) on covers (4) crosswise and uniformly and take off covers (4),
- then turn the dihedron on shaft head (13) and push both pistons (2) out of the drive housing, until they are disengaged,
- take both pistons (2) carefully out.

Both pistons (2) must be reassembled in correct position and with the racks to the right and left of control shaft (3), as they have been taken out, as otherwise the sense of rotation of the actuator will be reversed! See also Fig. 4 (spring closing) and Fig. 5 (spring opening).

You should therefore make a note of the position of both racks on the pistons before pulling them out of the housing.

- then loosen screws (24) and pull shaft (23) up and out.

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- then disengage circlip (8) with a special pliers from inside, slide it up and push down Pos.(3) together with Pos.(6)
- then check which parts are damaged and need to be replaced. Pos.(10) and all O-rings should be replaced in any case. These are available from Crane Flow as a spare part set.

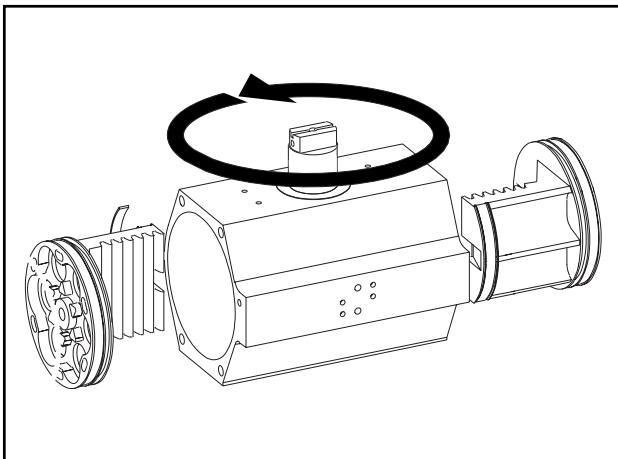


Fig. 10 Pushing down the pistons

The actuator must be reassembled and mounted to the valve in reverse order. The above mentioned spare parts set contains adhesive for Pos.(10) and lubrication grease.

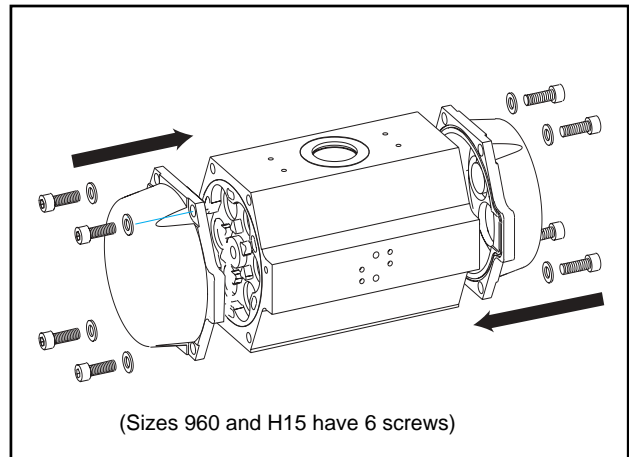


Fig. 12 Preparations for assembly

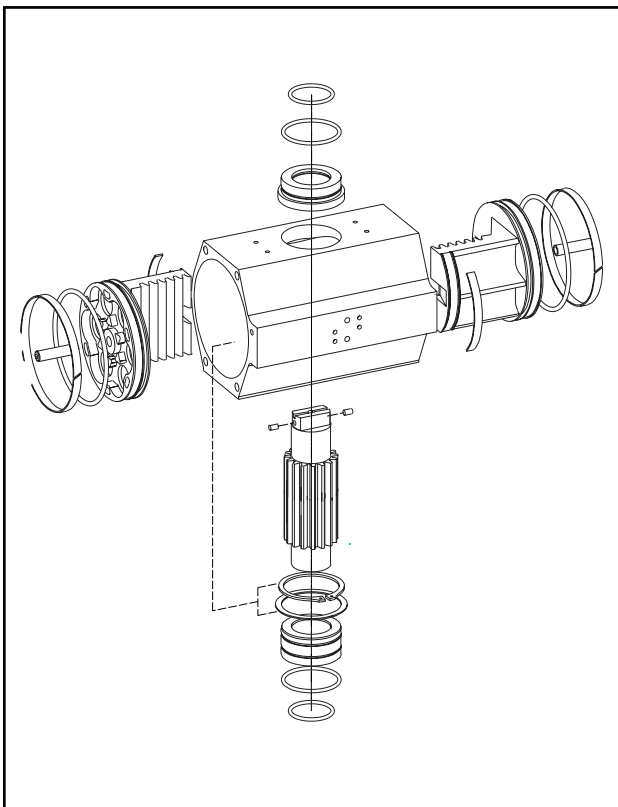


Abb. 11 Removing internal parts

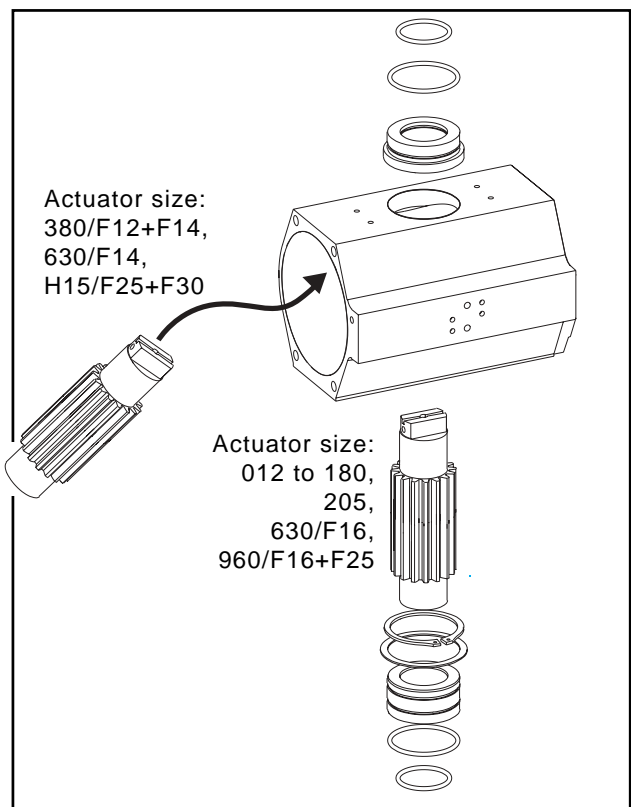


Fig. 13 Inserting the shaft

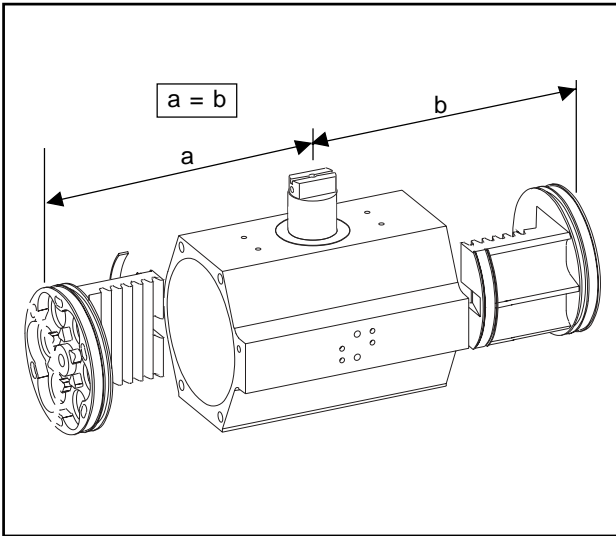


Fig. 14 Inserting the pistons

be reversed! See also Fig. 1 (spring closing) and Fig. 2 (spring opening).

Both pistons (2) must be inserted uniformly from either side!

For this purpose observe the positions of both pistons noted before disassembly.



Note: Please observe Fig. 15 to 18 for the different types and sizes of actuators as guidance:



Both pistons (2) must be reassembled in correct position and with the racks to the right and left of control shaft (3), as they have been taken out, as otherwise the sense of rotation of the actuator will

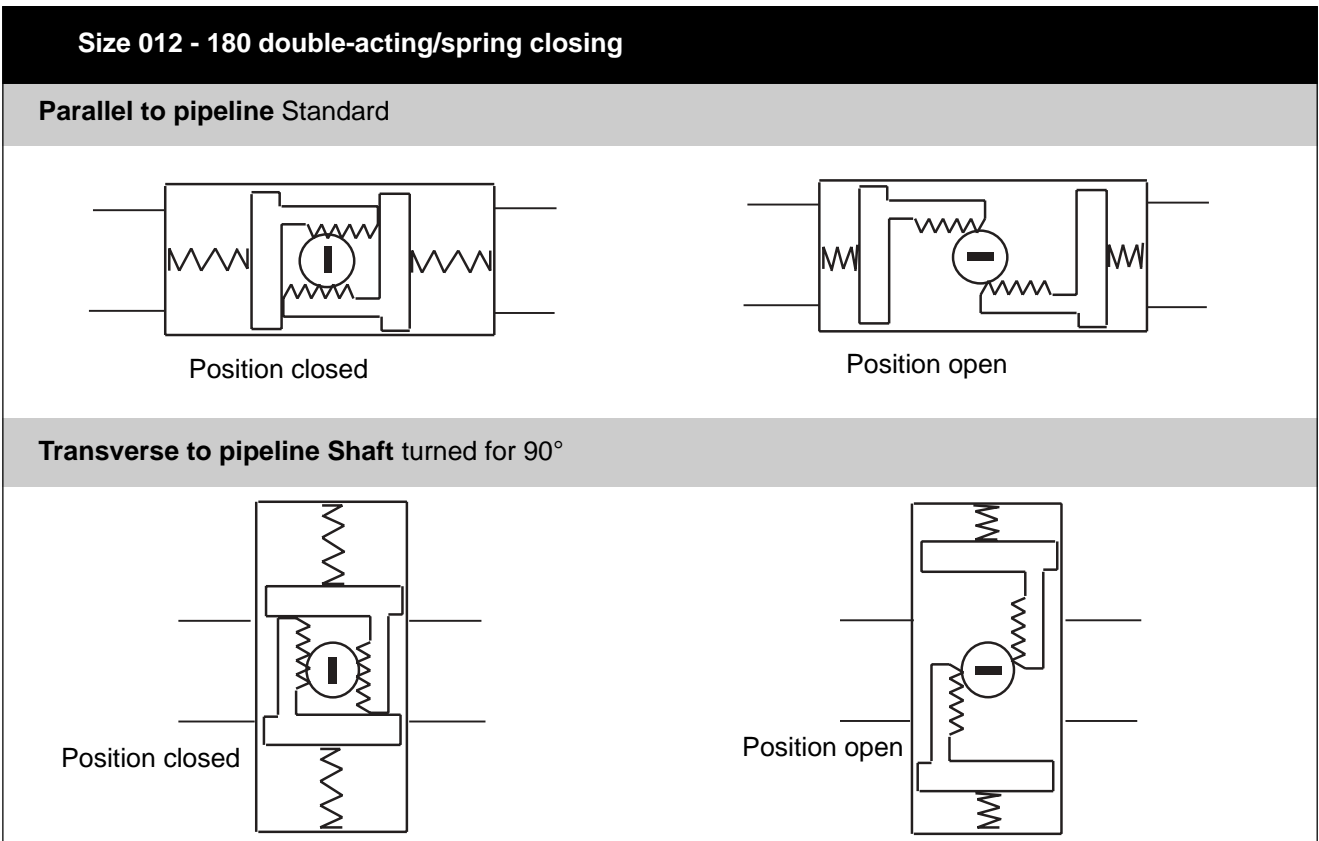


Fig. 15 Schematic of actuator double-acting and with closing spring (sizes 012 to 180)

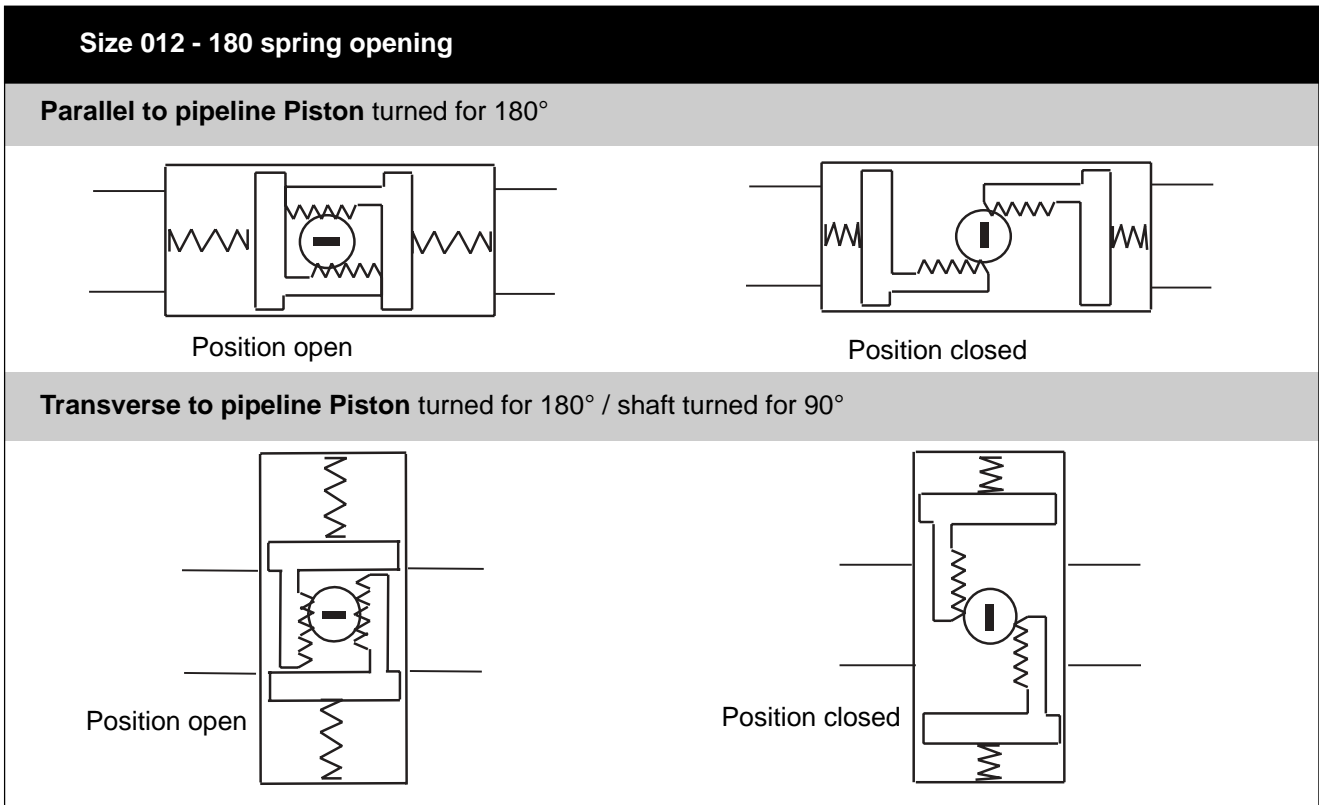


Fig. 16 Schematic of actuator with opening spring (sizes 012 to 180)

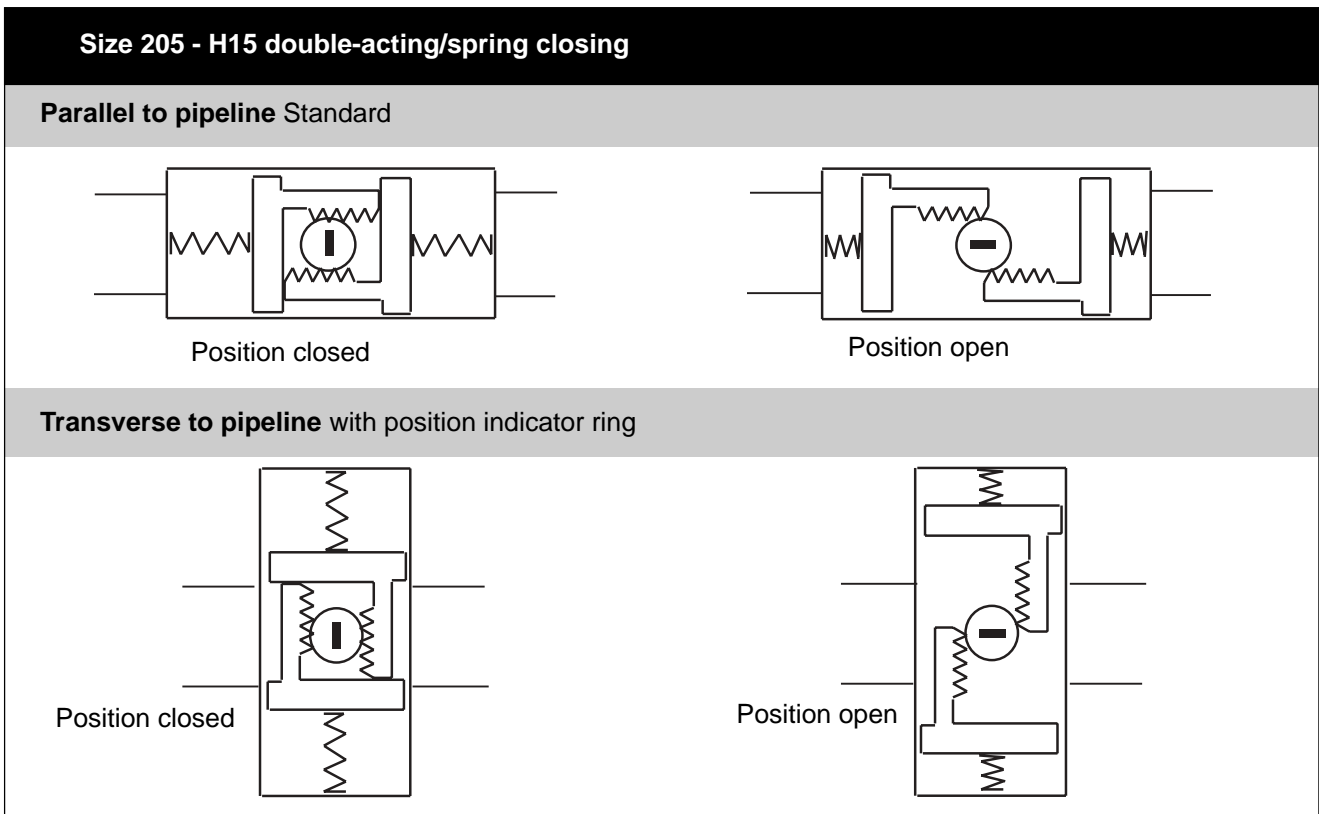


Fig. 17 Schematic of actuator double-acting/with closing spring (sizes 205 to H15)

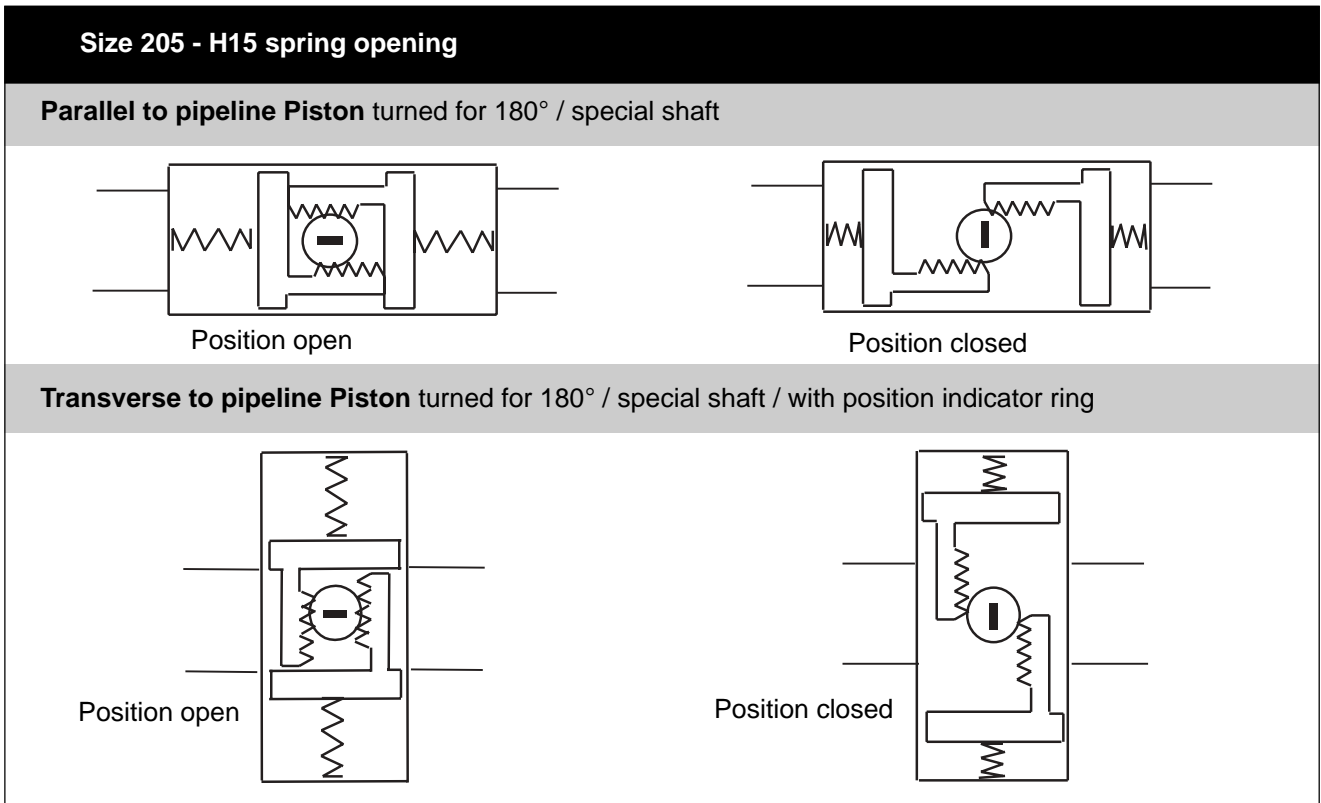


Fig. 18 Schematic of actuator with opening spring (sizes 205 to H15)

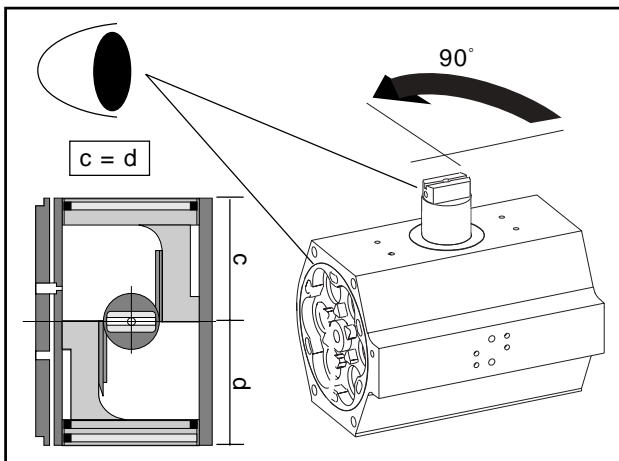


Fig. 19 in "OPEN"-position pistons must be flush with the housing

- When assembling the O-rings (12) it is advisable to lubricate these with grease on silicon or polyglycol basis before inserting them into their chamber in the cover. Do not use any mineral oil based greases or Vaseline. O-rings must not be "twisted" when being inserted into their seat.

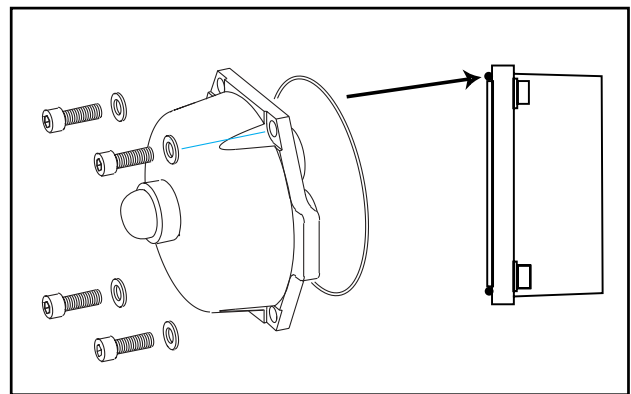


Fig. 20 Assembly of cover with O-ring



The strength of the housing material requires the reuse of all screws (15) with original length, do not use any shorter or longer screws!

10 Maintenance

Revo pneumatic actuators of series R normally do not require any maintenance.

It is quite adequate to check periodically that no control medium leaks out. In events of emergency section 8 "Troubleshooting" must be observed.

Table 1 in section 6 <Installation... into the pipeline> shows the expected lifetime under the specified rating conditions.

11 Spare Parts

Spare parts sets for the actuators are available from the manufacturer's stock and must be ordered with all details specified on the type plate.



All parts made of elastomers are organic materials, which must be stored in an environment as cool, dry and dark as possible. Due to ageing these parts should not be stored for longer than 2-3 years.

Spare parts for the valve are specified in the instructions contained in the complete delivery.

12 Further Information

can be obtained from your nearest office of CRANE Process Flow Technologies or from our head office.

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We reserve the right to modifications to all technical specifications.

