

# RCC200

## Pneumatic Actuators

# Instruction

### Type and Design

DA = Double Acting. Actuator with pneumatic operation in both directions.

SR = Spring Return. Actuator with spring return.

RCC 210, 230, 250 and 70 have 1 piston.

RCC 220, 240, 260 and 80 have 2 pistons.

### Operating Medium

Accepted operation media for PED: Non-dangerous fluids (group 2 according to directive 97/23/EC). Other media: Consult factory. Operating media shall be dust and oil-free.

The dew point shall be equal to  $-20\text{ }^{\circ}\text{C}$  or, at least,  $10\text{ }^{\circ}\text{C}$  below the ambient temperature.

The maximum particle size must not exceed  $40\text{ }\mu\text{m}$ .

The exhaust air should pass through a filter silencer before it is let out into the workshop.

### The Application of the Scotch Yoke Design

The Scotch Yoke of the RCC200 actuators has canted slots. Thus the actuator can be given different function depending on how the pistons are mounted in the actuator. The pistons are mounted according to Fig.3, page 4, or Fig.3a, in order to achieve the following functions.

According to Fig.3:

DA-Actuator with adjustable closed valve position (clockwise end of travel).

SRF-Actuator with spring opening (counter clockwise direction), adjustable closed valve position (clockwise end of travel).

According to Fig.3a:

DAAO (DATP)-Actuator with adjustable open valve position (counter clockwise end of travel).

SR-Actuator with spring closing (clockwise direction), adjustable open valve position (counter clockwise end of travel).

The possibility to turn the pistons can be used in several ways in order to make the actuators suit the customer's requirements.

## WARNING!

RCC actuators must only be used as actuators on valves. Levers, racks and similar cannot be used to transmit movement without protective equipment. Pinch risk in the valve opening when test trimming non-installed valves.

### Manual Operation

## WARNING!

It is very risky to try to operate the actuator manually by using the key grip on the driving shaft. The accumulated energy inside the actuator may instantaneously be set free.

The actuator can be equipped with handwheel for manual operation, RCC-M1, (see fig 6). Other methods on request.

## WARNING!

All manual operations must be carried out with a vented actuator.

### Installation and Adjustment

All types of actuators can be mounted in various positions, e.y. vertical or horizontal.

When mounting on a valve, ensure that the actuator shaft and the valve stem are centered, and that a play of  $0,5\text{-}1\text{ mm}$  exists between shaft and driving bush depending on actuator size.

Ensure especially that actuator and driving bush are mounted correctly in relation to each other, considering that the actuator shaft has an octagonal hole and that a faulty mounting of  $45^{\circ}$  is possible. (Not for RCC70-80).

This naturally also applies to direct mounting on a valve. The guide ring (37) can be dismantled when not in use. After mounting, it may be necessary to adjust the turning angle of the actuator.

#### Tightening torques for lock nuts on page 2.

As mentioned previously, the DA actuators can, as standard, be adjusted in closed valve position and the SR actuators in open position.

The adjustment occurs by loosening the lock nut on the end plate, after which the set screw is turned clockwise for reduced and anti-clockwise for increased rotary motion.

The adjustment range is  $\pm 3^{\circ}$ .

RCC220, 240, 260 and 80 have two adjustment screws.

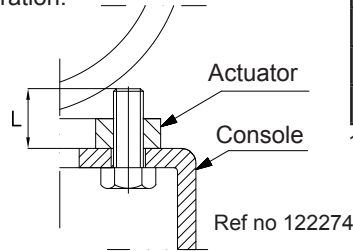
**It is important that both screws is touching the piston in question.**

The actuator is supplied with an indicator on the driving shaft. The indicator can be mounted in 2 optional positions for different valve functions, mounting directions, etc.

## Tightening Torques for Screws and Lock Nuts

The actuators must be screwed onto the console with the correct tightening torque in order to remain stable during operation.

Please use as long screws as possible without the threads grounding.



"L" is the screw length according to drawing

## Tightening Torques i Nm

Actuator	Screw (4)	Lock nut DA (2)	Lock nut SR (29)
RCC210-220	5,5	17	7
RCC230-240	5,5	33	17
RCC250-260	23	90	33
RCC270-280	76 55 <sup>1</sup>	120	120

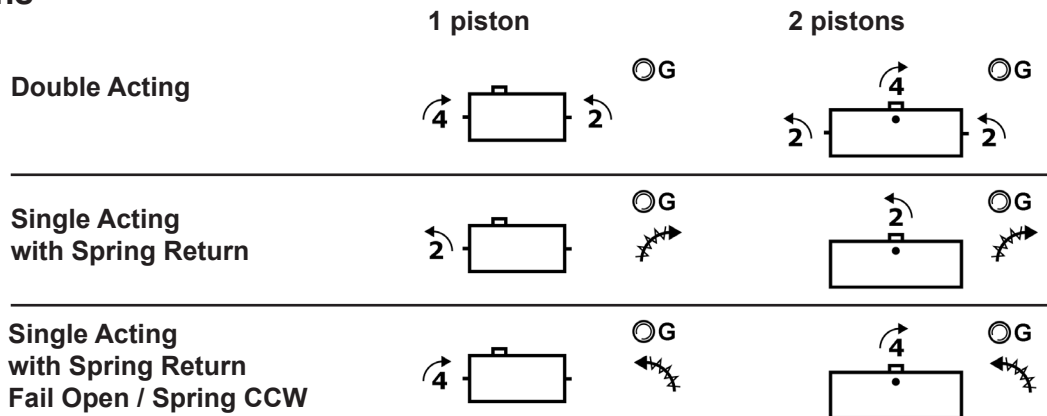
1) Tightening torque with Stainless steel screw. A2 70 quality

Strength class min. 8.8. Lightly oiled screws.

## Tightening Torques in Nm

Actuator	DIN flange	Thread	L max (mm)	Screw length (mm)									
				8	10	12	14	16	18	20	24	28	32
RCC210-220	F05	M6	11	8,8	9,2	-	-	-	-	-	-	-	-
RCC210-220	F07	M8	14	-	21	23	23	-	-	-	-	-	-
RCC230-240	F07	M8	14	-	21	23	23	-	-	-	-	-	-
RCC230-240	F10	M10	17	-	-	40	45	45	-	-	-	-	-
RCC250-260	F10	M10	17	-	-	40	45	45	-	-	-	-	-
RCC250-260	F12	M12	21	-	-	-	60	70	75	75	-	-	-
RCC270	F14	M16	25	-	-	-	-	125	140	155	185	-	-
RCC270	170x110	M16	25	-	-	-	-	125	140	155	185	-	-
RCC280	F12	M12	25	-	-	-	-	70	75	75	75	-	-
RCC280	F16	M20	32	-	-	-	-	-	-	-	280	330	360
RCC280	F25	M16	25	-	-	-	-	125	140	155	185	-	-

## Air Connections



## Lubrication

RCC actuators are permanently lubricated and additional lubrication is normally not required. However, for actuators performing 100,000 operation cycles or more under heavy load, an oil mist lubrication is recommended.

Oil mist lubrication requires a mineral oil type ISO VG32 according to DIN 51524HLP for usage in temperature range -10 to +70 °C. When adjusting oil mist lubrication, make sure the actuator gets moist inside. Started oil mist lubrication must continue.

If the actuator is equipped with pneumatic or electropneumatic positioner, oil mist must not be used.

## Recommended Lubrication Grease

Cylinder bore and drive shaft with shaft sealings	Grease
RCC200 Standard	Klübersynth AR 34-402
RCC200 high temp	Klübertemp HM 83-402
RCC200 low temp	Klüber Isoflex Topas NCA 52
Piston roller (21) + bearing	Grease
RCC200 high temp	Klübertemp HM 83-402
All other RCC200	Cargo Red Grease

## Instructions for Dismantling of RCC200-SR Actuators

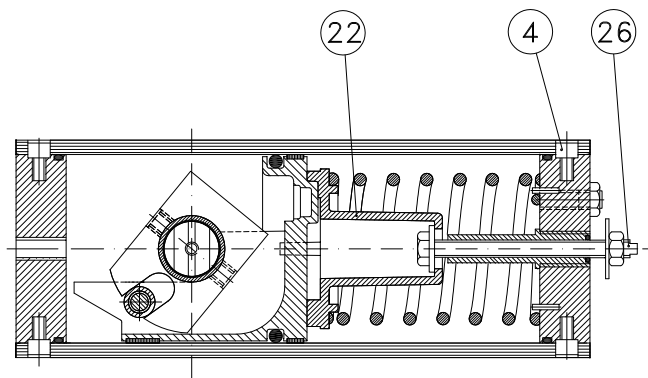
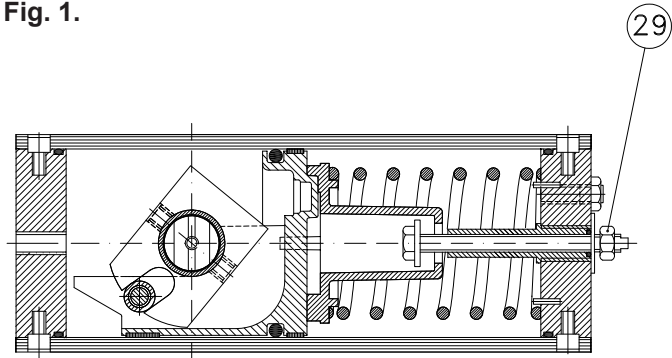
### RCC 210, 230, 250 and 270

#### WARNING!

The procedure below must be followed for safe dismantling of pretensioned spring packs.

1. The actuator must be pressureless.
2. Check that the springs can press the piston into starting position according to figure 1.
3. Disconnect all possible power supply.
4. Loosen the lock nut (29).
5. Turn the tensioning screw (26) anti-clockwise until it lies lightly against the spring guide (22).
6. Dismantle the spring pack by loosening the screws (4).
7. Dismantling must be carried out with the utmost care. In the case of the slightest uncertainty - contact the supplier.

Fig. 1.



Ref no 106623

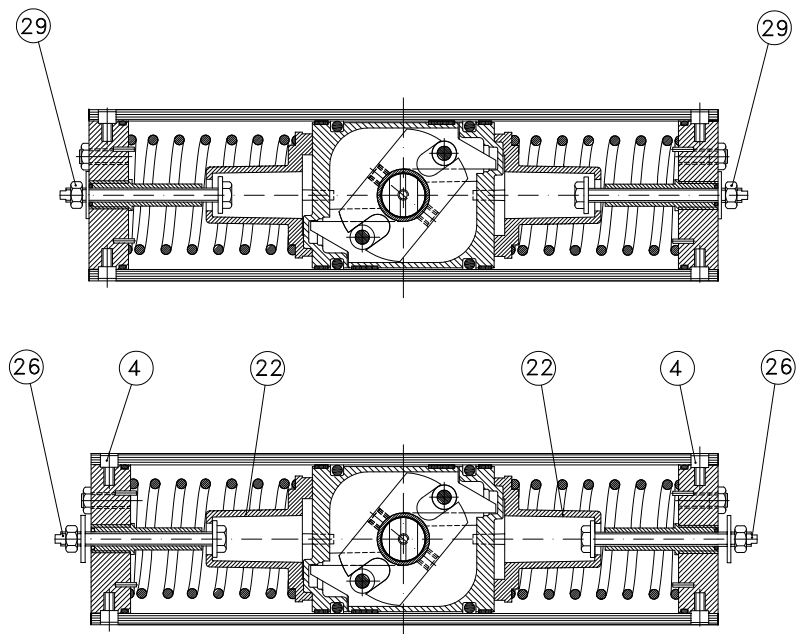
### RCC 220, 240, 260 and 280

#### WARNING!

The procedure below must be followed for safe dismantling of pretensioned spring housings.

1. The actuator must be pressureless.
2. Check that the springs can press the piston into starting position according to figure 2.
3. Disconnect all possible power supply.
4. Loosen the lock nuts (29).
5. Turn both spring tensioning screws (26) clockwise so that you feel the spring is not pulling the screw.
6. Turn the left spring tensioning screw (26) anti-clockwise until it lies lightly against the spring guide (22) and dismantle the left spring pack by loosening the screws (4).
7. Dismantle the right spring pack in the same manner as the left one.
8. Dismantling must be carried out with the utmost care. In the case of the slightest uncertainty - contact the supplier.

Fig. 2.



Ref no 106633

Fig. 3.

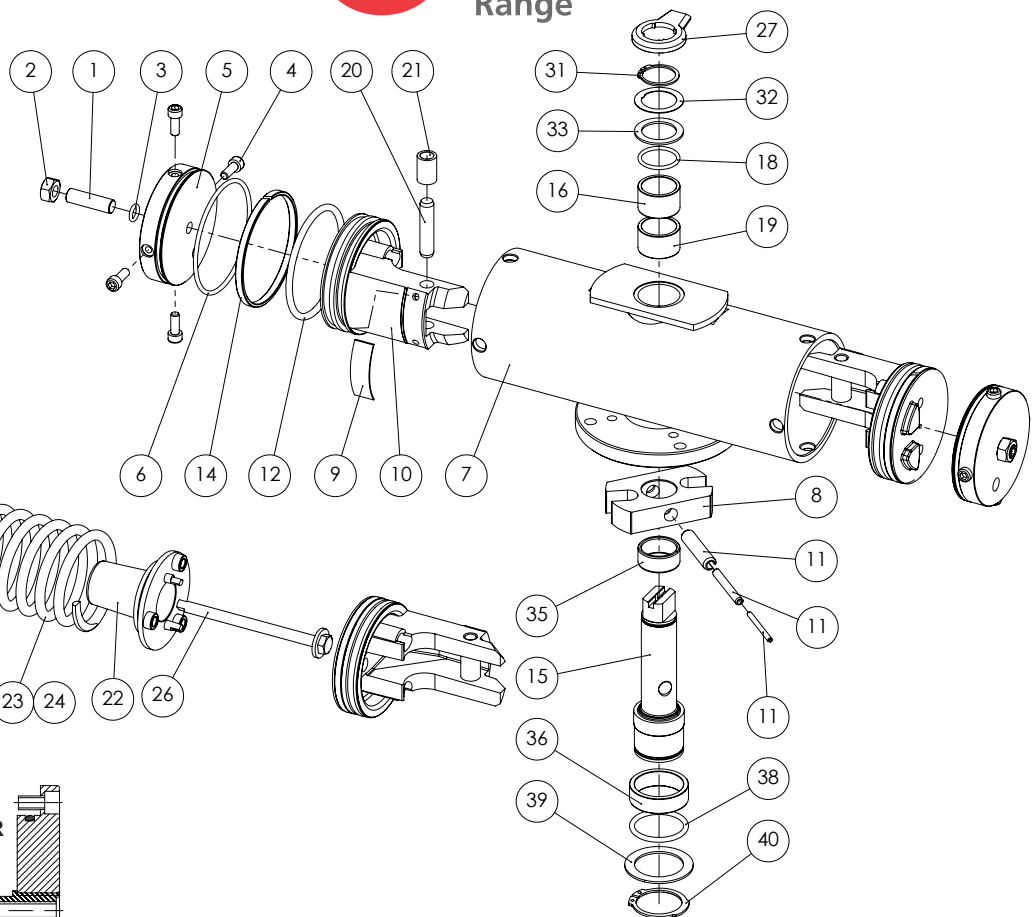
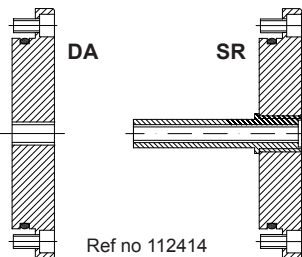
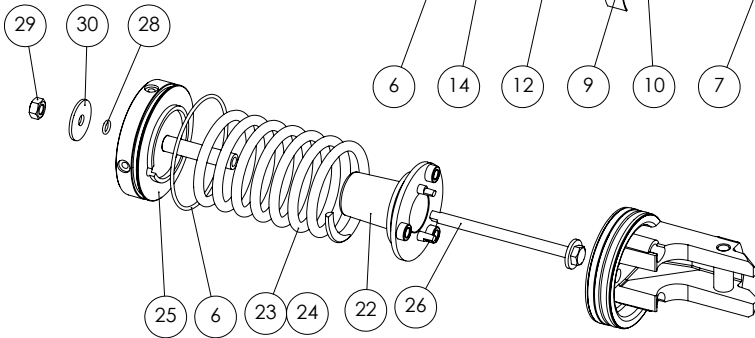


Fig. 3a.



Ref no 112414

Ref no 010510

## Service of RCC210-280

### WARNING!

Before dismantling, check that the compressed air and possible power supply are disconnected.  
Dismantling of SR unit, see instruction on page 3.  
Dismantling of SR unit with manual operation unit type M1, see instruction on page 6.

### Exchange of Piston Sealings and Support Elements

1. Please read the warning above!
2. Dismantle the actuator from the console.
3. Dismantle the end plates (5) or the spring packs (25).
4. Fasten the actuator shaft between soft jaws in a vice and turn the actuator until the pistons reach the cylinder end. Then place a pair of rods in the holes on the outside of one piston. By pressing together and pulling rods simultaneously, the piston is dismantled from the cylinder. Now also bearings etc can be replaced (see Exchange of Shaft Bearings).
5. If the piston o-ring (12) is worn, it must be replaced.
6. Replace the support band (14) if it is worn.
7. Replace the support element (9) if it is worn.
8. Grease the cylinder surface with a grease according to the lubrication list on page 2.
9. Fit piston/s correctly positioned, see "The Application of the Scotch Yoke Design" on page 1.
10. Fit the end plate/s or spring pack/s and adjust the shaft turning angle.

### Exchange of Shaft Sealings and Support Washers

The O-rings (18) and (38) and the support washers (32/33) and (39) can easily be replaced as below.

1. Please read the warning on the left!
2. Dismantle the actuator from the console.
3. Dismantle the retaining rings (31) and (40) around the shaft.
4. Dismantle the worn details.
5. Grease well when fitting o-rings, washers and retaining rings. Use a grease according to the lubrication list on page 2 when mounting.
6. Fit the new O-rings (18) and (38).
7. Fit new washers under the retaining rings.
8. Fit the new retaining rings.
9. **Check that the retaining rings are tightly fitted without play in their grooves.**

### Exchange of Shaft Bearings

The bearings (16) and (36) and also the support ring (19) on the RCC210-240 can easily be replaced when the pistons and shaft sealings are dismantled as above. For larger actuators, please contact the supplier.

### Material Table for RCC210 - RCC260 and RCC70 - RCC80

Part No	Description	Number DA	Number SR	Material	Surface treatment
1	Adjusting screw <sup>1</sup>	1	-	Stainless steel	-
2	Lock nut <sup>1</sup>	1	-	Stainless steel	-
3	O-ring <sup>1,5</sup>	1	-	Nitrile	-
4	Screw	8-18	8-18	Stainless steel	-
5M	End plate for adjustment screw <sup>1</sup>	1	-	Steel	Epoxy painted
5U	End plate without adjustment screw	1	1	Steel	Epoxy painted
6	O-ring <sup>5</sup>	2	2	Nitrile	-
7	Cylinder including mounting flanges	1	1	Steel	Epoxy painted
8	Scotch yoke	1	1	Steel	Hardened / forged
9	Support element <sup>1,5</sup>	1	1	POM /	-
10	Piston <sup>1</sup>	1	1	Aluminium	-
11	Roll pin double <sup>2,3</sup>	1	1	Spring steel	-
12	O-ring <sup>1,5</sup>	1	1	Nitrile	-
14	Support ring <sup>1,5</sup>	1	1	POM/PTFE	-
15	Drive shaft	1	1	Sizes 70-80: Steel Others: Stainless Steel	Zinkplated, chromated -
16	Bearing	2	2	Polymer material	-
18	O-ring <sup>5</sup>	2	2	Nitrile	-
19	Support ring	2	2	Polymer material	-
20	Shaft <sup>1</sup>	1	1	Steel	-
21	Bearing roller <sup>1</sup>	1	1	Steel	-
22	Spring guide <sup>1</sup>	-	1	Aluminium	-
23	Spring external <sup>1</sup>	-	1	Spring steel	Corrosion protected
24	Spring internal <sup>1,4</sup>	-	1	Spring steel	Corrosion protected
25	Spring return end plate <sup>1</sup>	-	1	Steel	Epoxy painted
26	Pre-tensioning bolt <sup>1</sup>	1	1	Sizes 70-80: Steel Others: Stainless Steel	Zinkplated -
27	Indicator	1	1	Polymer material	-
28	O-ring <sup>1,5</sup>	-	1	Nitrile	-
29	Lock nut <sup>1</sup>	-	1	Stainless Steel	-
30	Marking washer	-	1	Aluminium	-
31	Retaining ring <sup>5</sup>	1	1	Spring steel	Corrosion protected
32	Middle washer <sup>5</sup>	1	1	Polymer material	-
33	Support washer, upper <sup>5</sup>	1	1	Polymer material	-
35	Support ring, lower	1	1	Polymer material	-
36	Bearing, lower	1	1	Polymer material	-
38	O-ring, lower <sup>5</sup>	1	1	Nitrile	-
39	Support washer, lower <sup>5</sup>	1	1	Polymer material	-
40	Retaining ring, lower <sup>5</sup>	1	1	Spring steel	Corrosion protected

Table is for standard version.

1) For actuator sizes 220, 240, 260 and 80: The double amount of details.

2)RCC240 has triple roll pins

3)RCC70-80 have a solid steel pin

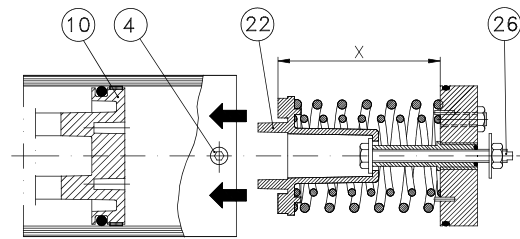
4)Not in the picture. Do not exist for sizes 210 and 220

5)Included in seal kit

## Mounting of spring pack

1. Please read the warning on page 3!
2. Dismantle the end plates. (The description is for RCC220, 240, 260 and 80 which have two pistons).
3. Dismantle the pistons. See text under "Exchange of piston sealings and support elements" on page 4.
4. Mount the pistons according to figure 1 on page 3, (for spring clock wise)
5. Check that the spring is correctly pre-tensioned according to table 2 (page 2) and figure 4.
6. The pre-tensioning screw (26) is screwed in (clockwise) until it starts to run easy. The spring force has then been transferred from the screw to the piston.
7. Piston outermost position is then adjusted with the pre-tensioning screw to limit actuator stroke.
8. Tighten the locknut.

Fig. 4.



Ref no 106643

Adjustment is made with screw (26).

Size	X	
210 / 220	89	[mm]
230 / 240	118	[mm]
250 / 260	161	[mm]
70 / 80	312	[mm]

## Instructions for Dismantling of RCC200-SR Actuators with Manual Operation Unit Type M1

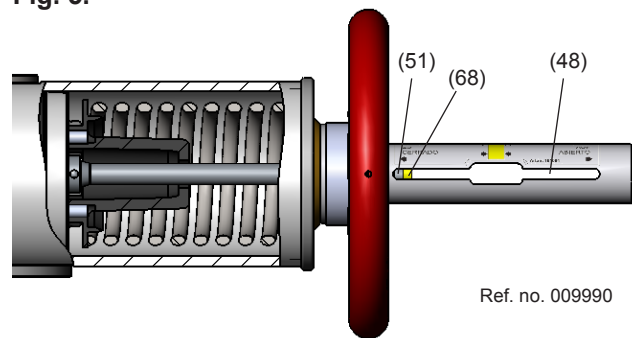
### WARNING!

Do not remove the protective tube (50) and handwheel from the spring housing as long as the springs are tensioned. This procedure must be followed for safe dismantling of pre-tensioned spring packs.

1. The actuator must be pressureless.
2. Check that the springs can press the piston back into its starting position according to figure 1. The upper shaft journal must not be turned.
3. Disconnect possible power supply.
4. Turn the handwheel so that the threaded stem (51) moves toward the actuator until it stops and the yellow marker (68) can just barely be seen in the plastic tube (49).
5. For sizes RCC220, 240, 260 and 80 (i.e. actuators with two pistons): adjust the tensioning screw (26) in the opposite spring housing anti-clockwise until it lies against the spring guide (22). Dismantle the spring pack by loosening the screws (4).
6. For all sizes: then turn the handwheel until there is resistance and the yellow marker (68) can be seen within the "AUTO" position.
7. Dismantle the spring pack of the manual override by loosening the retaining screws (4) and turning the handwheel several turns in the direction which gives the least resistance.

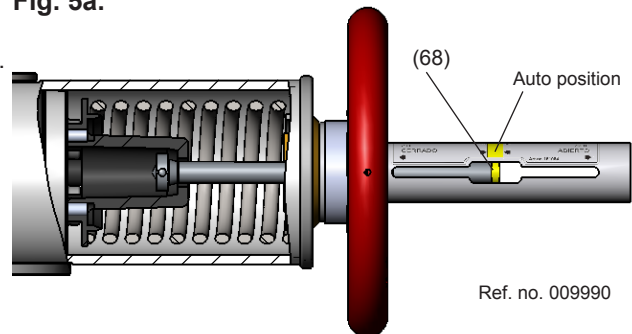
Dismantling must be carried out in the above order with the utmost care. In the case of the slightest uncertainty - contact the supplier.

Fig. 5.



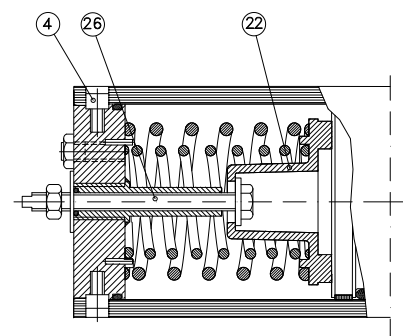
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Fig. 5a.



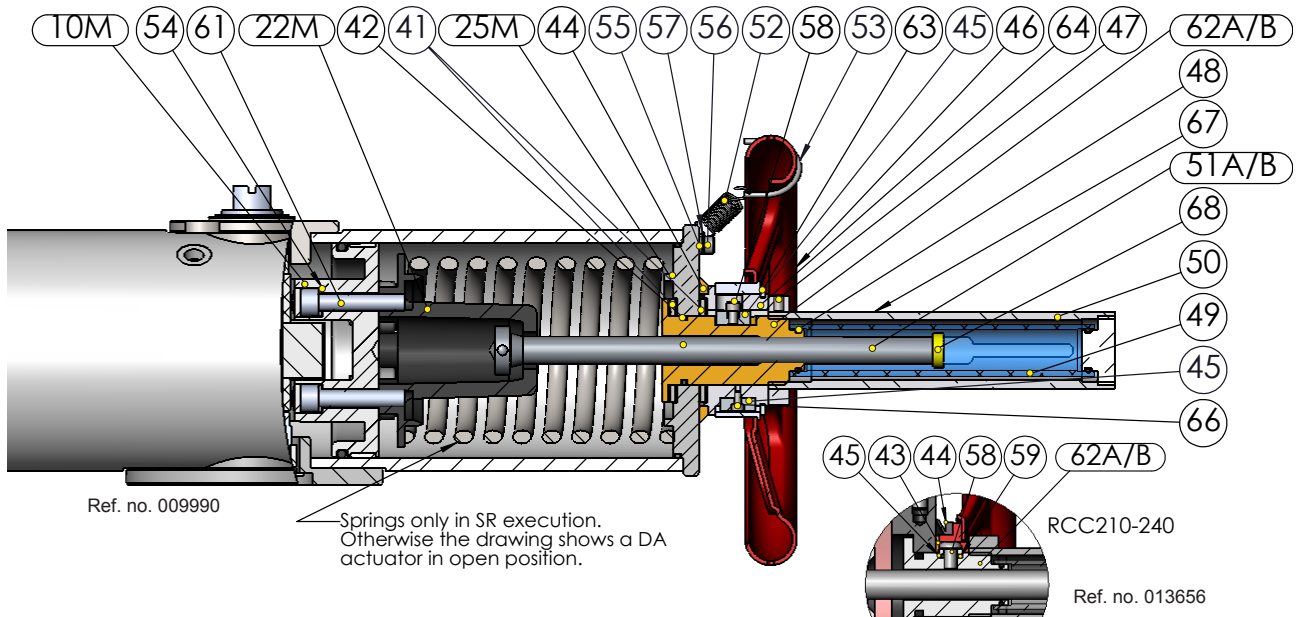
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Fig. 5b.



Ref no 112263

Fig. 6.

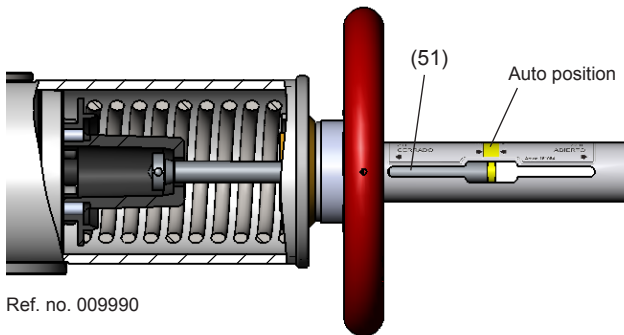


### Material Table for RCC210 - RCC260 and RCC70 -RCC80 M1

Part No	Description	Num.	Material	Surface treatment
10M	Piston M	1	Aluminium	-
22M	Spring guide M	1	Aluminium	-
25M	Spring housing M	1	Aluminium	Powder coated
41	Needle roller bearing RC250-80 (Bearing + 2 washers)	2	Ball bearing steel	-
42	O-ring	1	Nitrile	-
43	Slide bearing RCC210-240	2	Bronze	-
44	Cuff sealing	1	Nitrile/Steel	Zink plated
45	Key	1 (2) <sup>1</sup>	Steel	-
46	Handwheel	1	Aluminium RCC80: Steel	Zink plated Powder coated
47	Set Screw	1	Stainless steel	-
48	O-ring	1	Nitrile	-
49	Tube, transparent	1	Acrylic Plastic	-
50	Protecting tube	1	Steel	Zinc plated
51A	Stem, DA (right threaded)	1	Steel	-
51B	Stem, SR (left threaded)	1	Steel	-
52	Spring	1	Stainless spring steel	-
53	Locking hook	1	Stainless steel	-
54	Tredo-sealing	2	Nitrile/Steel	Zink plated
55	Spacer, RCC210-260	1	Stainless steel	-
56	Screw, RCC210-260	1	Stainless steel	-
57	Spring holder	1	Stainless steel	-
58	Screw	1	Steel	Zink plated
59	O-ring, RCC210-240	1	Nitrile	-
61	Screw	2	Steel	Zink plated
62A	Stem nut, DA (Right threaded)	1	RCC210-240: Brass RCC250-80: Ductile iron	- Zink plated
62B	Stem nut, SR (left threaded)	1	RCC210-240: Brass RCC250-80: Ductile iron	- Zink plated
63	Retaining ring, RCC250-80	1	Steel	Corrosion protected
64	Handwheel bushing, RCC250-80	1	Stainless steel	-
66	Screw, RCC250-80	1	Steel	Zink plated
67	Label	1	Polymer material	-
68	Indicator ring	1	Polymer material, yellow	-

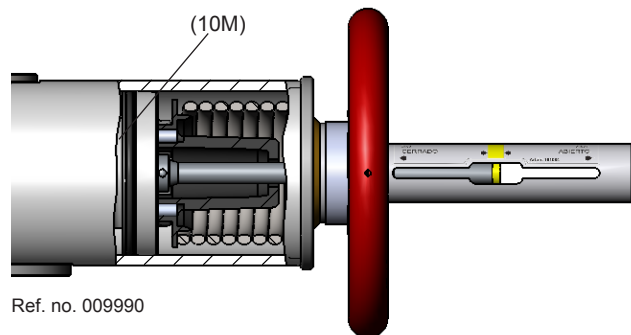
1) RCC250 - RCC80

## Function RCC-M1



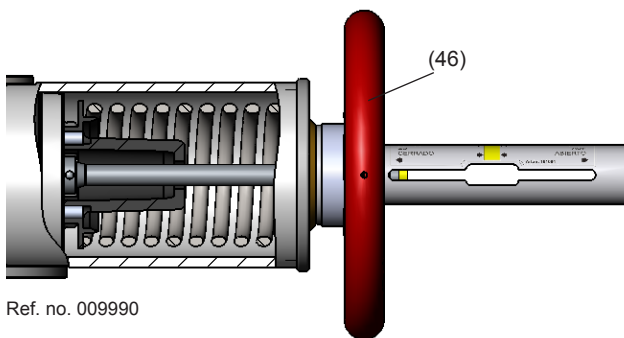
### Auto Position

With the stem (51) in Auto position, the piston (10M) can move freely and the actuator can be operated pneumatically. The picture shows a double acting actuator, DA, in "open" position or a single acting actuator, SR, in "closed" position.



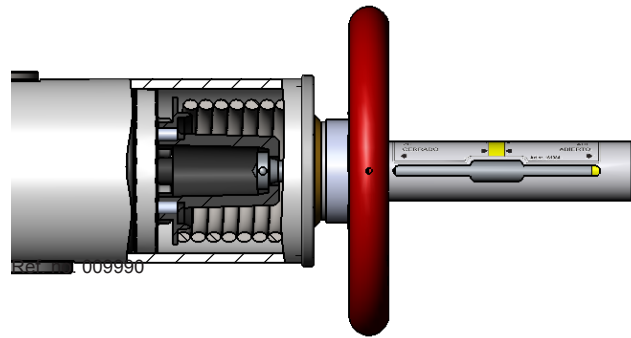
### End Position Adjustments

M1 in Auto position works as an end position stop.  
DA: Adjustment of closed valve position.  
SR: Adjustment of open valve position.  
Adjustment degree:  $+3^\circ / -90^\circ$  in relation to the end position.



### Manual Operation Open / CCW

DA/SRF: The handwheel (46) is turned counter clockwise. The stem (51) and piston (10M) are pressed inwards. The valve opens.  
SR: The handwheel is turned counter clockwise. The stem and piston are drawn outwards. The valve opens.



### Manual Operation Closed / CW

DA/SRF: The handwheel is turned clockwise. The stem and piston are drawn outwards. The valve closes.  
SR: The handwheel is turned clockwise. The stem and piston are pressed inwards. The valve closes.

The actuator shaft (15) is thus turned in the same direction as the handwheel.

When the actuator has been operated manually, a return to the Auto position must take place before remote operation can be performed again.

On dismantling the manual operation housing (25M), the actuator **must** first be ventilated, for SR actuators the stem (51) **must** also be in Auto position.

