

# RC88

## Pneumatic actuators

# Instruction

### Type and design

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

SR = Spring Return actuator with spring return.

### Operating medium

If the operating medium is instrument air, it shall be dust and oil-free. Accepted operating medium: Non-dangerous fluids (group 2 according to directive 97/23/EC). 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 must pass through a filter silencer before it is let out into the workshop.

### Hand 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 disengagable gearbox on the underside of the actuator for manual operation.

#### WARNING!

All manual operation must be carried out using a vented actuator.

### The possibilities of the Scotch Yoke construction

The Scotch Yoke of the RC 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.1, page 3, or Fig.4, in order to achieve the following functions.

According to Fig.1:

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.4:

DAAO-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 suit the actuators to the customer's requirements.

### Installation and adjustment

#### WARNING!

RC actuators must only be used as actuators on valves. Levers, racks and similar cannot be used to transmit movement without protective equipment.

All types of actuators can be mounted in various positions, e.g. vertical or horizontal. When mounting on a valve, ensure that the actuator shaft and the valve stem are centered, and that a play of ca. 1–2 mm exists between shaft and driving bush. After mounting, it may be necessary to adjust the turning angle of the actuator.

**Tightening torques for screws and lock nuts on page 6.**

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 and turning the set screw clockwise for reduced and anti-clockwise for increased rotary motion. The adjustment degree is  $\pm 3^{\circ}$ . RC88 has 4 adjustment screws. **It is important that all screws are in contact with the piston in question.**

#### WARNING!

Pinch risk in the valve opening when test running non-installed valves.



## Service of RC88

### WARNING!

Before dismantling, check that the compressed air and possible power supply are disconnected.  
Dismantling of SR unit: See instruction on page 5.

### Exchange of piston sealings and support element

1. Please read the warning above!
2. Dismantle the actuator from the console.
3. Dismantle the end plates (5) or the spring houses (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 few rods in the holes on the outside of one piston. By pressing together and pulling these rods simultaneously, the piston is dismantled from the cylinder.
5. If the O-rings (12) are worn, they must be replaced.
6. Replace the support band (14) if it is worn.
7. Replace the support element (9) if it is worn. If it has been glued, the whole piston is replaced.
8. Grease the cylinder surfaces with a high quality grease, for instance a ball bearing grease.
9. Mount the pistons.
10. Mount the end plates and adjust the turning angle .

### Exchange of shaft sealings and support washers

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

1. Please read the warning above!
2. Dismantle the actuator from the console.
3. Dismantle the retaining rings (31) around the shaft.
4. Dismantle worn details.
5. Fit the new O-rings (18).
6. Fit new washers (32) and (33) under the retaining rings.
7. Use a grease according to the lubrication list when mounting.
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) can easily be replaced when the pistons and shaft sealings are dismantled as above.

### Lubrication

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

Oil mist lubrication requires a mineral oil type ISO VG32 acc. to DIN 51524 HLP for usage in temperature range -10 to +70°C. Oil mist lubricator must be set at lowest possible value. Commenced oil mist lubrication must continue. If the actuator is equipped with pneumatic or electro-pneumatic positioner, oil mist must not be used.

### Recommended Lubrication Grease

Cylinderbore and drive shaft with shaft sealings	Grease
RC88 Standard	Klübersynth AR 34-402
RC88 high temp	Klübertemp HM 83-402
RC88 low temp	Klüber Isoflex Topas NCA 52

Piston roller (21) + bearing	Grease
All RC88	Cargo Red Grease

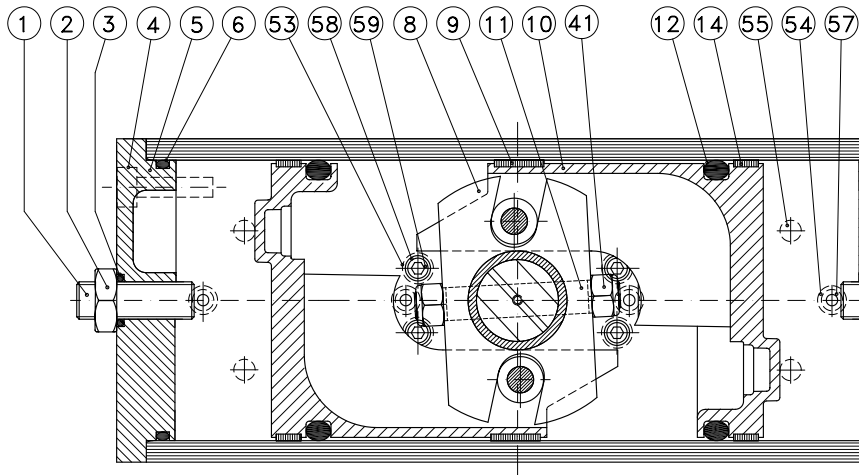
Oil mist lubrication and grease containing polyglycole, ester or other aggressive additives shall be avoided.

### Converting to SR actuators

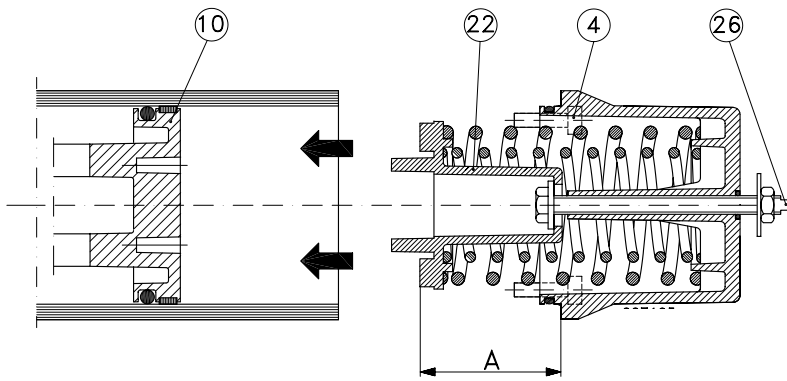
All DA-actuators can be changed into SR actuators by adding spring conversion kits according to the following:

1. Please read the warning above!
2. Dismantle the end plates.
3. Dismantle the pistons. See "Exchange of piston sealings and support element".
4. Mount the pistons according to fig. 4 on page 3.
5. Check that the spring is correctly pre-tensioned. The "A" measure in fig. 3 should be 137 mm.
6. The spring guide (22) is centered towards the piston with the aid of 2 pins.
7. The SR units must be turned so that one of the three support points lies between the bosses on the piston (10).
8. Mount the SR unit when the pistons are in their innermost positions.
9. Put the screws (4) in place. When tightening the screws, the spring force is transmitted from the tensioning screw (26) to these screws. **Tightening torques according to page 6.**
10. The turning angle of the actuator is adjusted with the tensioning screws (26). **It is important that all screws are in contact with the piston in question.**



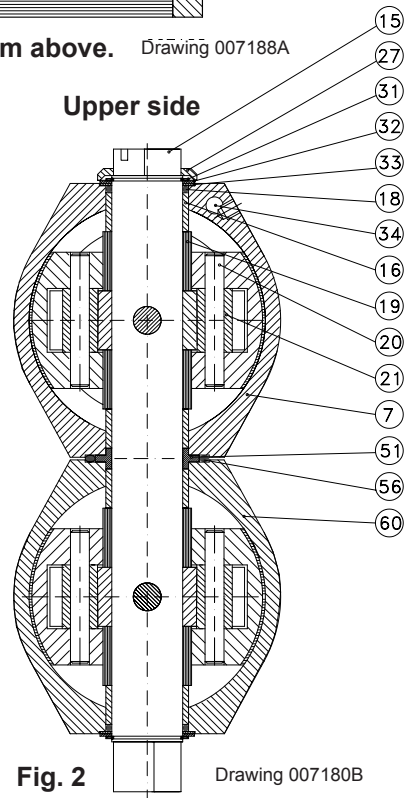


**Fig. 1** RC88-DA actuator. Upper cylinder from above. Drawing 007188A

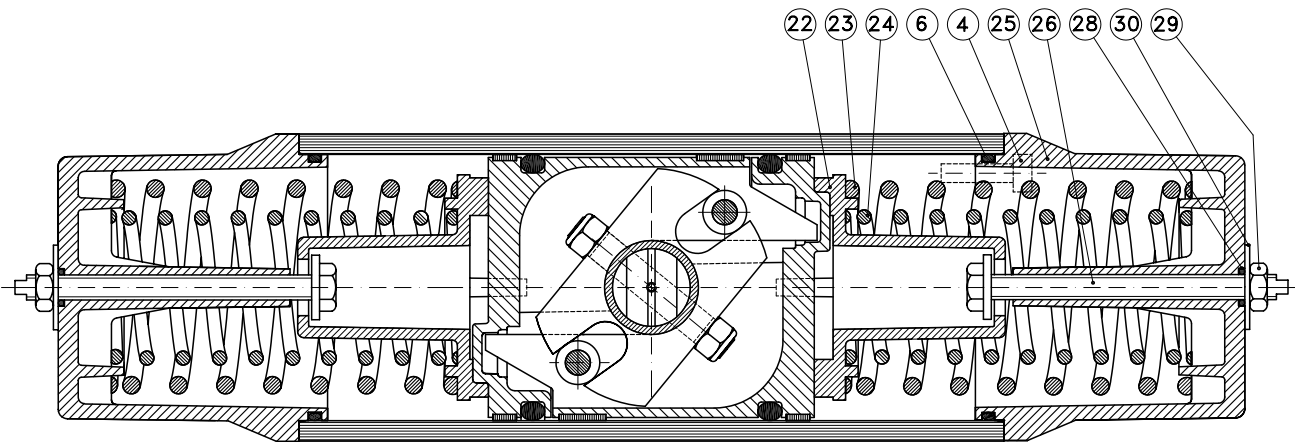


**Fig. 3**

Drawing 007195A



**Fig. 2** Drawing 007180B



**Fig. 4** RC88-SR actuator. Upper cylinder from above. Drawing 007192A

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## Material table for RC88

Part No.	Description	No. 88-DA	No. 88-SR	Material	Surface treatment
1	Adjusting screw	4	-	Steel	Zinc plated
2	Lock nut	4	-	Steel	Zinc plated
3	O-ring <sup>1</sup>	4	-	Nitrile	-
4	Screw	32	32	Steel	Zinc plated
5	End plate	4	-	Aluminium	Powder coated
6	O-ring <sup>1</sup>	4	4	Nitrile	-
7	Cylinder, upper	1	1	Aluminium	Anodized
8	Scotch Yoke	2	2	Steel	Corrosion protected
9	Support element <sup>1</sup>	4	4	POM/PTFE	-
10	Piston	4	4	Aluminium	-
11	Locking screw	2	2	Steel	-
12	O-ring <sup>1</sup>	4	4	Nitrile	-
14	Support band <sup>1</sup>	4	4	PTFE, filled	-
15	Driving shaft	1	1	Steel	Chemically zinc
16	Bearing	4	4	Polymer material	-
18	O-ring <sup>1</sup>	4	4	Nitrile	-
19	Support ring	4	4	Polymer material	-
20	Piston shaft	4	4	Steel	Hardened
21	Piston roller	4	4	Steel	Hardened
22	Spring steering	-	4	Aluminium	-
23	Spring, external	-	4	Spring steel	Corrosion protected
24	Spring, internal	-	4	Spring steel	Corrosion protected
25	Spring housing	-	4	Aluminium	Powder coated
26	Pre-tensioning screw	-	4	Steel	Zinc plated
27	Indicator	1	1	Polymer material	-
28	O-ring <sup>1</sup>	-	4	Nitrile	-
29	Lock nut	-	4	Steel	Zinc plated
30	Marking washer	-	4	Aluminium	Anodized
31	Retaining ring <sup>1</sup>	2	2	Spring steel	Corrosion protected
32	Middle washer <sup>1</sup>	2	2	Stainless spring steel	-
33	Support washer <sup>1</sup>	2	2	Stainless spring steel	-
34	Sealing plug	2	2	Nitrile	-
41	Nut	2	2	Steel/nylon	Zinc plated
51	Guide ring	1	1	Aluminium	Anodized
53	Spacer	4	4	Stainless steel	-
54	Spacing sleeve	2	2	Stainless steel	-
55	Guide pin	8	8	Stainless steel	-
56	O-ring <sup>1</sup>	1	1	Nitrile	-
57	O-ring <sup>1</sup>	8	8	Nitrile	-
58	Plane sealing <sup>1</sup>	4	4	Steel/Nitrile	Corrosion protected
59	Screw	4	4	Steel	Zinc plated
60	Cylinder, lower	1	1	Aluminium	Anodized

1) Included in seal kit.



## Instructions for dismantling of RC88-SR actuators

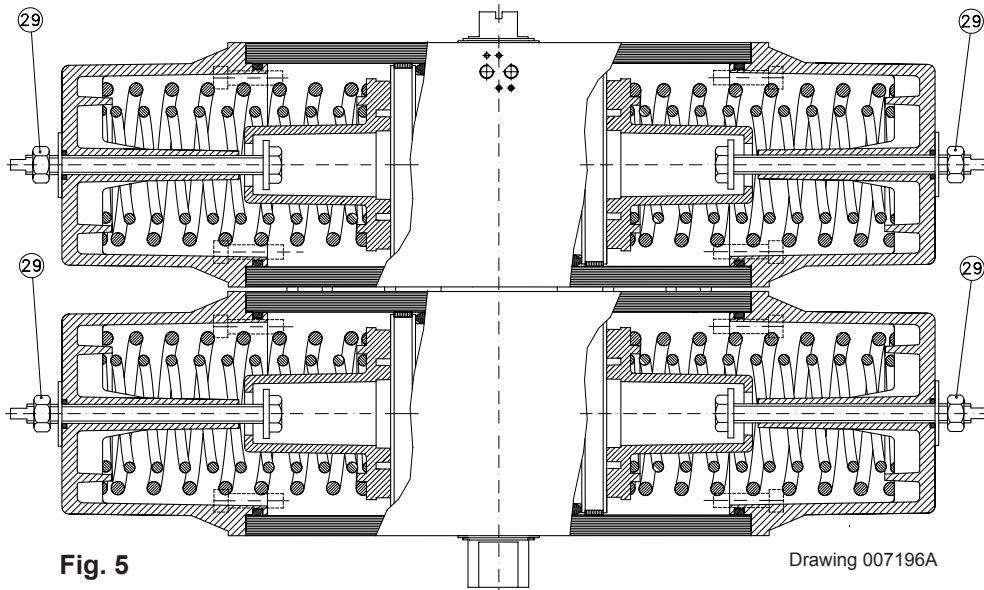


Fig. 5

Drawing 007196A

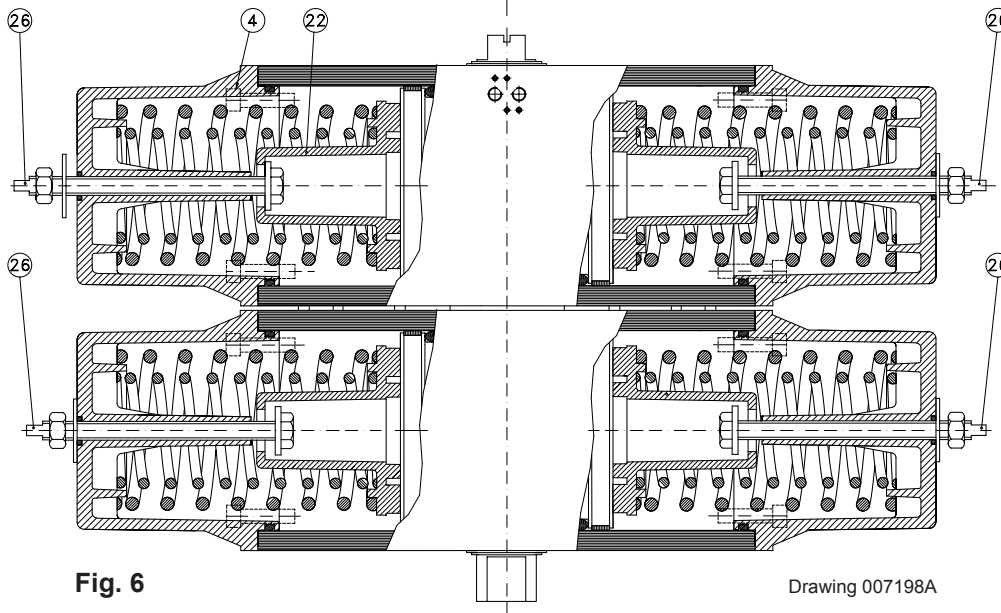


Fig. 6

Drawing 007198A

### VARNING!

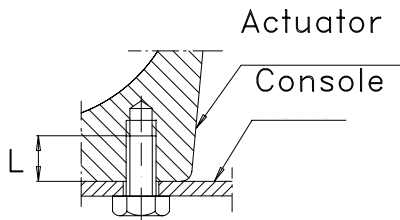
This procedure must be followed for safe dismantling of pretensioned spring housings.

1. Check that the springs can press the piston into starting position according to figure 5.
2. The actuator must be pressureless.
3. Disconnect all possible power supply.
4. Loosen the lock nuts (29).
5. Turn tensioning bolts (26) clockwise until they can be turned with the minimum force.
6. Turn the upper left tensioning bolt (26) anticlockwise until it lies against the spring steering (22) according to figure 6 and dismantle the left spring housing by loosening the screws (4).
7. Dismantle the upper right spring housing by using the same method as with the left one.
8. Dismantle the lower spring housings in the same manner as the upper ones.
9. Dismantling must be carried out with the utmost care. In the case of the slightest uncertainty – contact the supplier!



## Tightening torques for screws and locknuts

The actuators must be screwed onto the console with the correct 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 fig. 6.



**Fig. 6** Drawing 55594A

Tightening torques in Nm:

Fixing screw against console:

L = 16, Mv 125 Nm

L = 18, Mv 140 Nm

L = 20, Mv 155 Nm

L = 22 (max), Mv 170 Nm

(the information also applies for screws when mounting a console on the upper side of the actuator)

End plate screw: 76 Nm

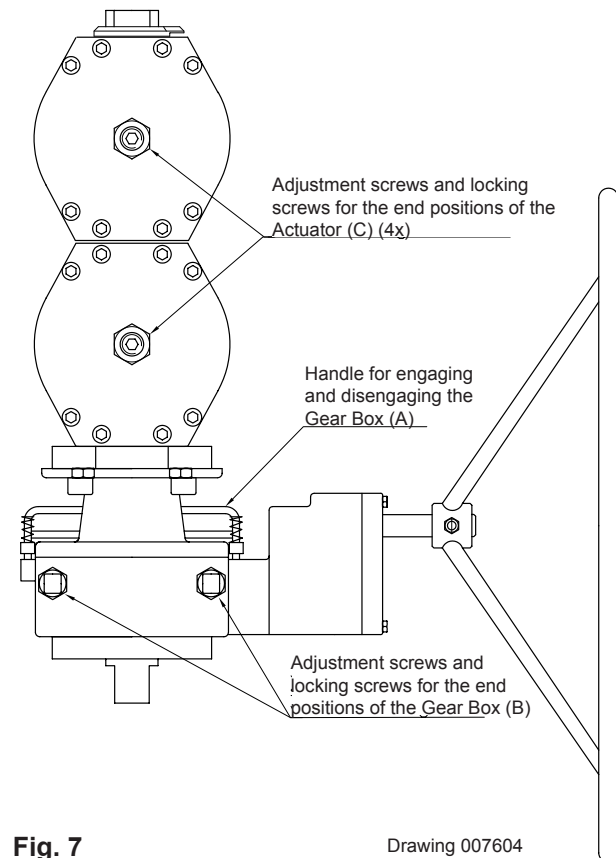
Lock nut for adjustment screw, DA and SR: 120 Nm.

## Function and calibration of the RC88 Manual Override

1. The Actuator works pneumatically when the handle (A) is in its lower, normal position. The wheel is freely rotating in both directions.

### Calibration of the Manual Override, Actuator and Gear Box, mounted on valve:

2. Unscrew the adjustment screws (B) on the gear box. Then pressurize the Actuator in the left port. In order to make it easier when handling the adjustment screws, lower the air pressure to 50 % of the nominal value once the end position is reached. The adjustment screws (C) of the Actuator are then set to the preferred position. All four of the screws must be applied. Tighten the locking nuts.
3. Pressurize the Actuator and tighten the adjustment screws (B) on the Gear Box until they are in contact with the cog segment at each end position. After the calibration the locking nuts are locked in place.
4. Apply the Manual Override to the de-pressurized Actuator by slowly turning the wheel and bringing the handle to the top position. Counter clock-wise to open and clock-wise turning to close. Check the calibration by turning the wheel to both end positions. When everything is correct the Manual Override is disengaged and transition to normal pneumatic operation is taking place.



**Fig. 7**

Drawing 007604

Ref No 706B / Art nr 980706

We reserve the right to alterations without previous notice.

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