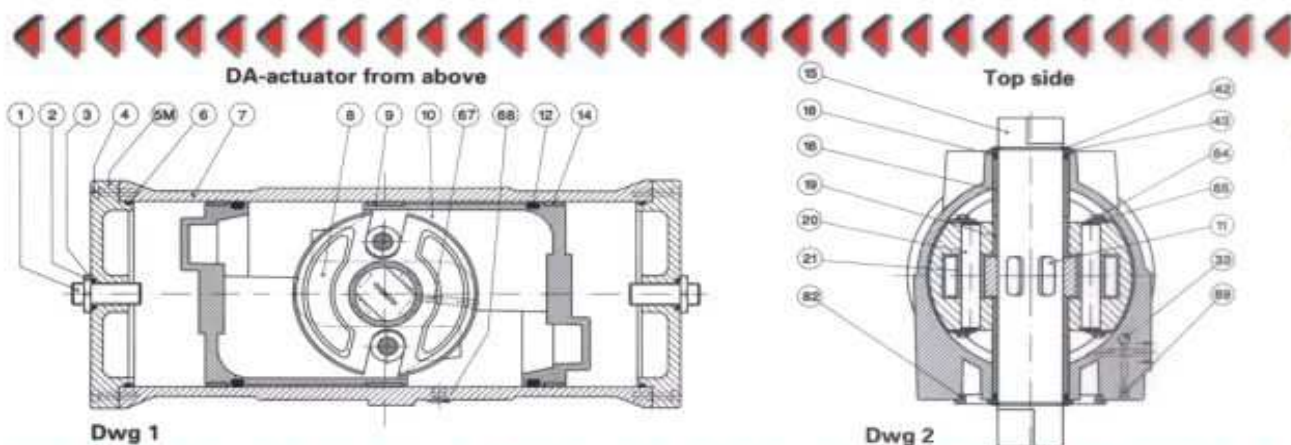




**RCG 90-100  
Pneumatic Actuator  
For  
Demanding  
Applications**



**RCG 90-100-01**



## SERVICE OF RCG90-100

### WARNING!

*Before dismantling, check that the compressed air and possible power supply are disconnected. Dismantling of SR unit: See instruction on page 4. Dismantling of SR unit with manual operation unit type M1: See instruction 369.*

### Exchange of O-rings to pistons and support elements

*A strong screw vice and suitable lifting device are necessary for the work below.*

1. *Please read the warning above!*
2. Dismantle the actuator from the console.
3. Dismantle the end plates (5M) and (5U) (not pictured) or the spring house (26).
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 back side of one piston. By pressing together and pulling these rods simultaneously, the piston is dismantled from the cylinder.
5. If the piston O-ring (12) is worn, it must be replaced.
6. Replace the support ring (14) if it is worn.
7. Replace the support element (9) if it is worn.
8. Grease the cylinder surfaces with a high quality grease, for instance a ball bearing grease.
9. Mount the end plates and adjust the shaft turning angle.

### Exchange of shaft sealings and bearings

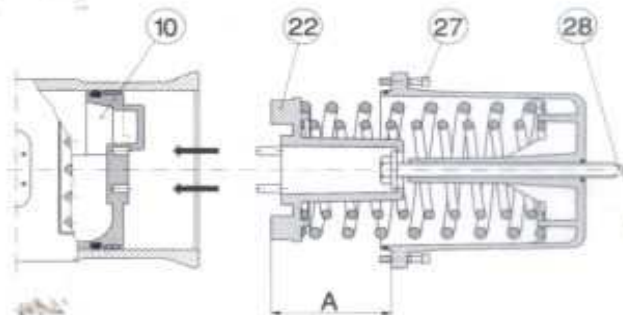
The shaft bearings (18) and the bearings (16) can easily be replaced.

1. *Please read the warning above!*
2. Dismantle the actuator from the console.
3. The spring tensioning screw (28), 1 or 2 pcs, on SR actuators is turned anti-clockwise until the whole spring force is unloaded.
4. Dismantle the seeger locking device around the shaft.
5. Dismantle the worn details. The bearings are dismantled by boring, threading and pulling with fitting screws.
6. Use a high quality lubrication grease when mounting, for instance a ball bearing grease.
7. Fit the new bearings.
8. Fit new washers under the seeger locking devices.
9. *Fit the new seeger locking devices with the rounded inner edge towards the centre of the actuator. Do not stretch them more than necessary.*
10. *Check that the seeger locking devices are tightly fitted without play in their grooves.*
11. Adjust the turning angle with screws (28) on SR actuators.

### Converting to SR actuators

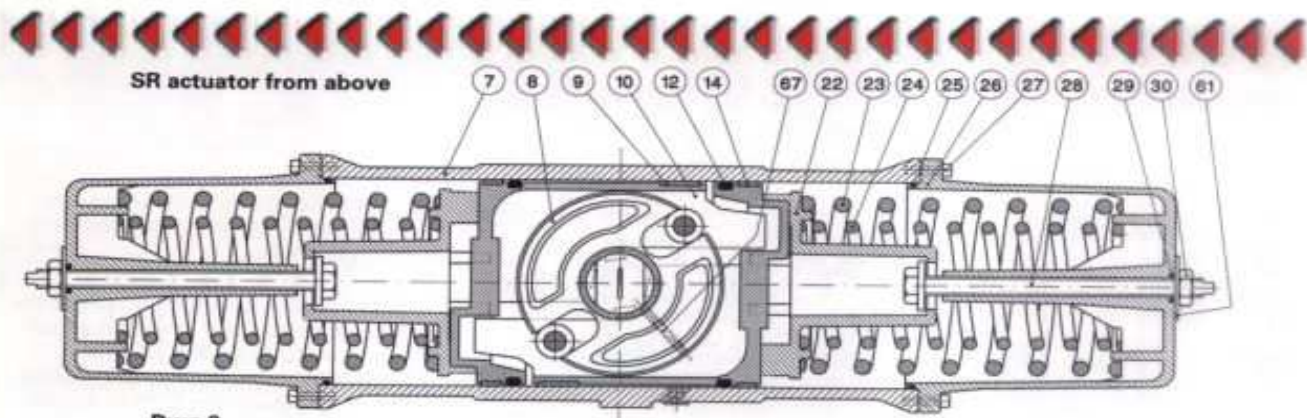
All DA actuators can be changed into SR actuators by adding spring conversion kits according to the following instructions:

1. *Please read the warning on the left!*
2. Dismantle the end plates. (The description is for RCG100 which has two pistons).
3. Dismantle the pistons.
4. Mount the pistons according to Dwg. 3 on page 3. Also see the text under "Exchange of O-rings".
5. Check that the spring is correctly pre-tensioned according to the drawing below.  
The measurement A should be 228 mm.



Adjustment is made with screw (28).

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 position.
  9. Put the screws (27) in place. When tightening the screws, the spring force is transmitted from the tensioning screw (28) to these screws.
- Tightening torques according to table on page 3.**
10. The turning angle of the actuator is adjusted with the tensioning screw (28).



Dwg 3

Material table for RCG90-100

According to Dwg 1-3

Part No	Description	Number DA		Number SR		Material	Surface treatment
		90 DA	100 DA	90 SR	100 SR		
1	Adjusting screw	1	2	—	—	Stainless steel	Zinc plated
2	Lock nut	1	2	—	—	Steel	Zinc plated
3	O-ring	1	2	—	—	Nitrile	—
4	Screw	24	32	8	—	Steel	Zinc plated
5M	End plate with centre hole	1	2	—	—	Steel	Epoxy painted
5U	End plate without centre hole	1	—	1	—	Steel	Epoxy painted
6	O-ring	2	2	1	—	Nitrile	—
7	Cylinder	1	1	1	—	Ductile iron	Epoxy painted
8	Scotch Yoke	1	1	1	1	Steel	Tempered
9	Support element	1	2	1	2	PTFE carbon filled	—
10	Piston	1	2	1	2	Aluminium	—
11	Key	4	4	4	4	Key steel	—
12	O-ring	1	2	1	2	Nitrile	—
14	Support band	1	2	1	2	PTFE carbon filled	—
15	Driving shaft	1	1	1	1	Steel	Zinc plated and yellow chromed
16	Bearing	2	2	2	2	POM	—
18	O-ring	2	2	2	2	Nitrile	—
19	Support ring	2	2	2	2	POM	—
20	Shaft	1	2	1	2	Steel	Hardened
21	Bearing roller	1	2	1	2	Steel	Hardened
22	Spring steering	—	—	1	2	Ductile iron	—
23	Spring external	—	—	1	2	Spring steel	Corrosion protected
24	Spring internal	—	—	1	2	Spring steel	Corrosion protected
25	O-ring	—	—	1	2	Nitrile	—
26	Spring housing	—	—	1	2	Ductile iron	Epoxy painted
27	Screw	—	—	16	32	Steel	Zinc plated
28	Pre-tensioning screw	—	—	1	2	Steel	Zinc plated
29	O-ring	—	—	1	2	Nitrile	—
30	Lock nut	—	—	1	2	Steel	Zinc plated
33	Sealing plug	1	2	1	2	Steel	—
42	Circlip	2	2	2	2	Spring steel	Dacrolite
43	Support ring	2	2	2	2	POM	—
61	Marking washer, example "80 psi"	—	—	1	2	Aluminium	Anodized
64	Screw to support element	4	8	4	8	Steel	Zinc plated
65	Washer to No 64	4	8	4	8	Steel	Zinc plated
67	Stop screw	2	2	2	2	Steel	—
68	Plug in DA end plate + cylinder	2	3	1	1	Steel	Zinc plated
69	Plug	1	1	1	1	Steel	Zinc plated

**Tightening torques in Nm, bottom side of actuator**  
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.

M16: 190 Nm  
M20: 370 Nm

Resistance class min. 8.8. Lightly oiled screws.

**Number of screws for the bottom side of the actuator**  
Example: An RCG100-DA which is used at 10 bar pressure needs 10 pcs M20 screws in order to transmit the full torque. An RCG90-DA needs under the same conditions 8 pcs M16 screws.

**Other tightening torques:**

Retaining screws, end plate: 78 Nm  
Lock nut, DA end plate: 150 Nm  
Lock nut, SR housing: 100 Nm

# RCG90-100

## Pneumatic actuators

### TYPE AND DESIGN

DA = Double acting. Actuator with pneumatic operation in both directions.  
SR = Spring return. Actuator with spring return. RCG90 has 1 piston. RCG100 has 2 pistons.

### LUBRICATION

RCG 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 class 1 for usage in temperature range  $-10^{\circ}$  to  $+70^{\circ}\text{C}$ . 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.

### OPERATING MEDIUM

The air or inert gas to be used must be filtered to  $50\ \mu\text{m}$  particle size or less. If the operating temperature is below  $+5^{\circ}\text{C}$ , the air dew point must be below the application temperature. The exhaust air must pass through a filter silencer before it is let out into a workshop.

The spring houses on SR actuators which normally "breathe" through the right port, **must not be in connection with corrosive atmosphere**. Our technicians will show a suitable method to avoid this.

### HAND OPERATION

#### WARNING!

*It is practically impossible and 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, RC-M1, see information leaflet No 372. Other methods are available on request.

#### WARNING!

*All manual operations must be carried out using a vented actuator.*

### THE PRINCIPLE AND APPLICATION OF THE SCOTCH YOKE CONSTRUCTION

The Scotch Yoke of the RCG actuators has angled slots. Thus the output torque can be given diffe-

rent values depending on how the pistons are mounted in the actuator.

As standard the DA actuators are mounted as shown on Dwg. 1. This design allows for highest torque at "closed" valve position. The pistons are then in their outermost position and can be fine adjusted  $\pm 3^{\circ}$ .

The SR actuators have the pistons rotated  $180^{\circ}$  in relation to the DA actuators according to Dwg. 3. This gives an increase of the torque towards the end of the rotary motion, although the spring force is diminished.

When the pistons in an SR actuator are mounted according to Dwg. 1, the function is changed from "spring closes" to "spring opens". The adjustment of the end position will then take place in "closed position".

If the pistons in a DA actuator are mounted according to Dwg. 3, the fine adjustment will take place in "open" valve position. The actuators can be supplied with adjustment in both end positions on request. The possibility to turn the pistons can be used in several ways in order to suit the actuators to the customer's requirements. For further information on this, please consult factory.

### INSTALLATION AND ADJUSTMENT

#### WARNING!

*RC actuators must only be used as 1/4-turn 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.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 ca. 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 lock nuts on page 3.

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  $\pm 3^{\circ}\text{C}$ .

RCG100 has two adjustment screws. **It is important that both screws are in contact with the piston in question.**

#### WARNING!

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

# ▶ RCG90-100 ◀

## Pneumatic Actuators

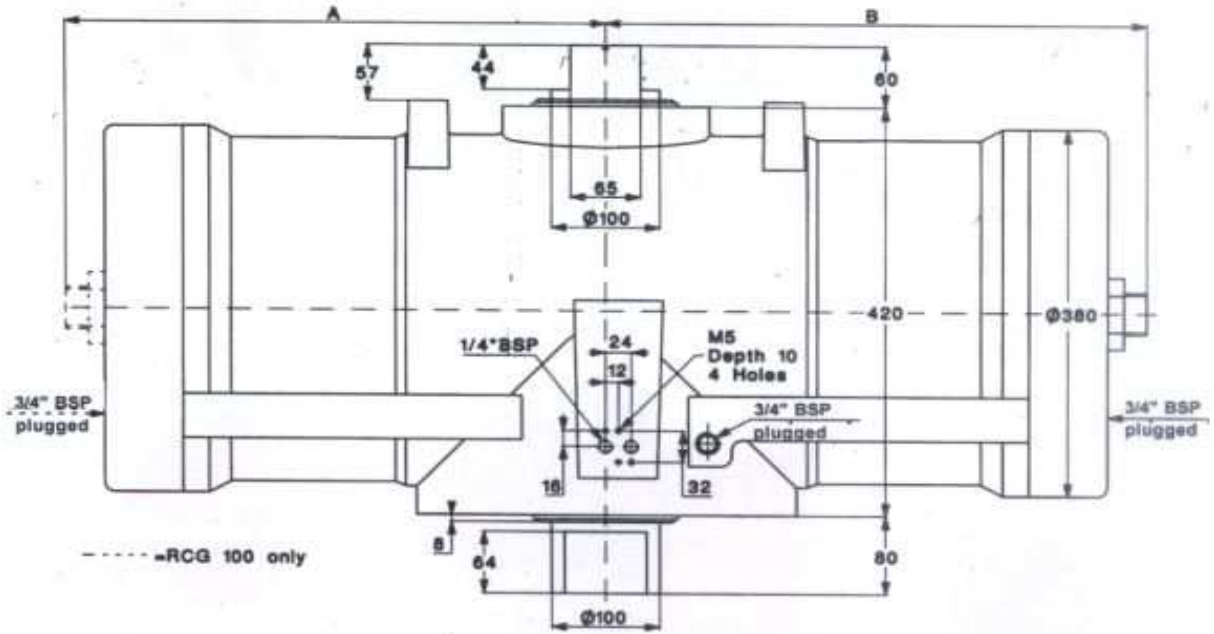


### For demanding applications

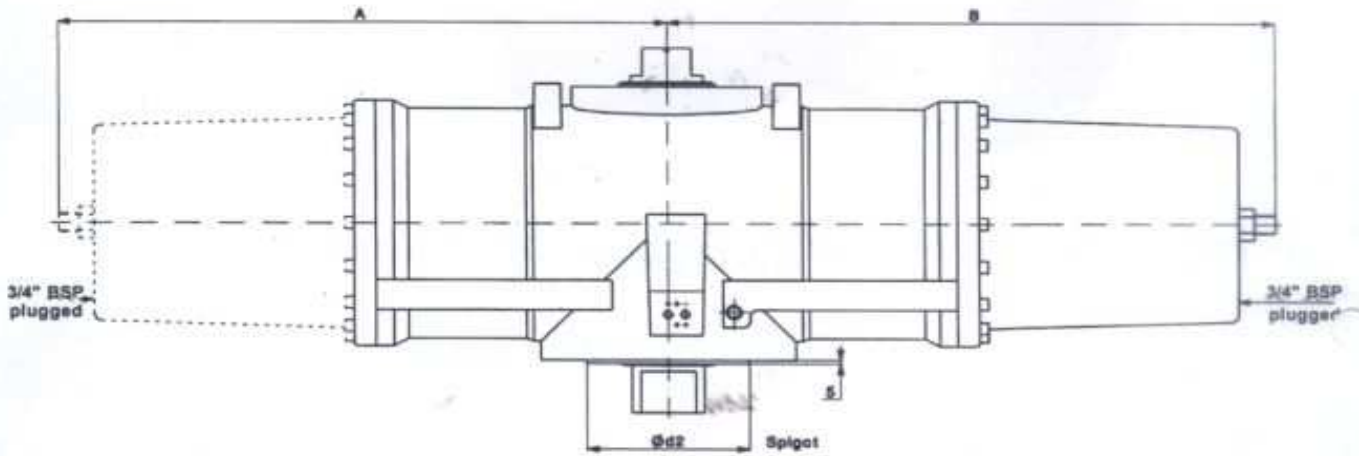
- ▶ Strong, compact actuators for large valves and high torques
- ▶ Epoxy coated ductile iron in cylinder, end plates and spring housing
- ▶ Connection according to DIN3337/ISO5211 to valve
- ▶ Connection according to VDI/VDE3845 to solenoid valve
- ▶ Prepared for quick operation (extremely fast emergency)
- ▶ Optional: Manual override

**REMOTE CONTROL**

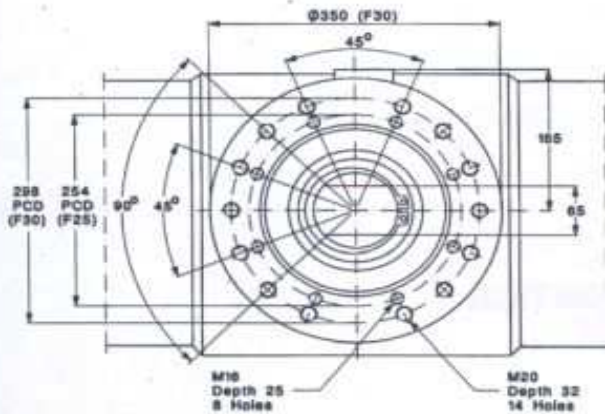
# RCG-DA



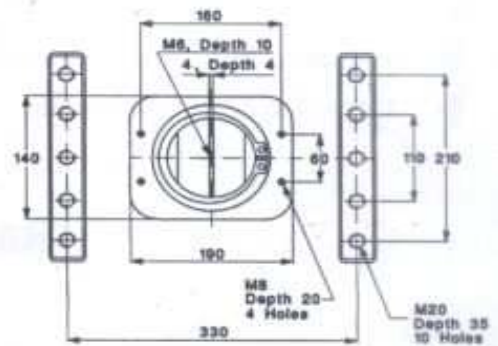
# RCG-SR



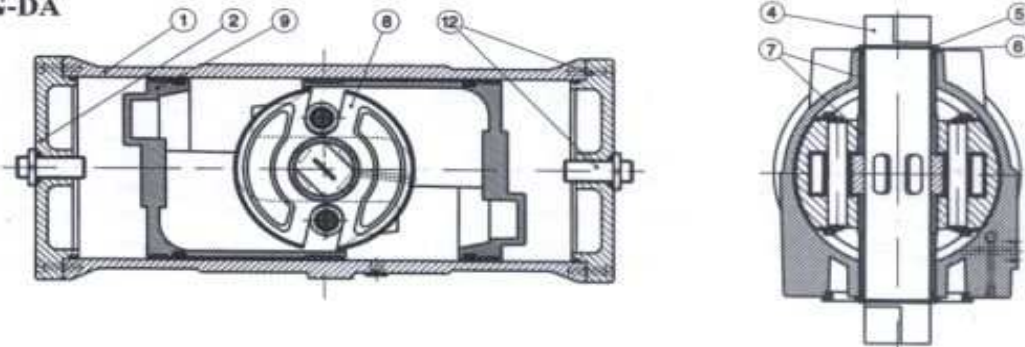
## Mounting face



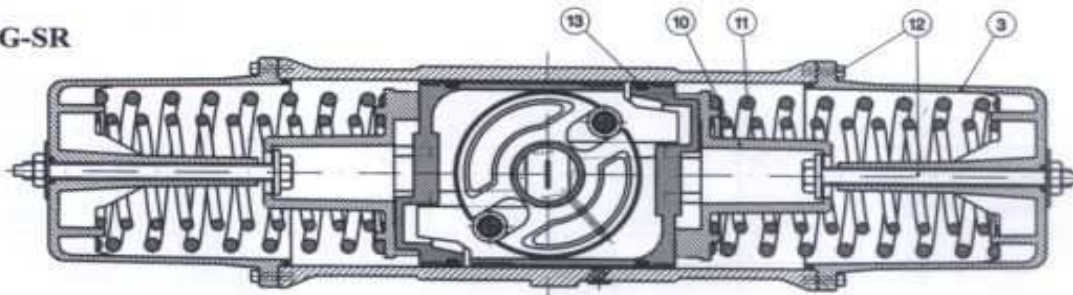
## Top side



RCG-DA



RCG-SR



Material table for RCG90-100, DA and SR

Part No.	Description	Material	Part No.	Description	Material
1	Cylinder	Ductile iron, Epoxy coated	8	Scotch Yoke	Alloyed, forged steel
2	End plates	Steel, Epoxy coated	9	Piston	Aluminium
3	Spring housings	Ductile iron, Epoxy coated	10	Spring steering	Ductile iron, painted
4	Shaft	Carbon steel, zinc and yellow chromated <i>Option: Stainless steel</i>	11	Springs	Spring steel, painted
5	Circlips	Spring steel, Dacrolite-treated	12	Fastening and adjustment screws	Carbon steel, zinc-plated <i>Option: Stainless steel</i>
6	Thrust washers	POM (Delrin) <i>Option: Stainless steel</i>	13	O-Rings	Nitrile
7	Bearing & Support ring	POM (Delrin) <i>Option: Tin bronze</i>			

We reserve our right for modifications caused by technical development.



**Torque Nm At existing air pressure.**  
**DA: Double Acting Actuator.**

Type	Position	2,8 bar 40 psi	3,5 bar 50 psi	4,2 bar 60 psi	4,5 bar 65 psi	5,5 bar 80 psi	6 bar 87 psi	7 bar 100 psi	8,5 bar 120 psi	10 bar 145 psi
RCG 90-DA	0°	3300	4170	5050	5500	6800	7400	8340	10400	12600
	50°	1580	2010	2440	2650	3280	3570	4020	5000	6070
	90°	2440	3100	3750	4080	5050	5500	6200	7700	9300
RCG 100-DA	0°	6760	8600	10400	11300	14000	15250	17000	21400	25900
	50°	3200	4050	4900	5380	6600	7200	8100	10000	12200
	90°	5020	6380	7700	8400	10400	11350	12750	15900	19200

**SR: Spring Return Actuator. Springs adapted to air pressure.**

Type	Function	Position	2,8 bar / 40 psi		3,5 bar / 50 psi		4,2 bar / 60 psi		4,5 bar / 65 psi		5,5 bar / 80 psi		6 bar / 87 psi		7 bar / 100 psi		
			Air	Spring	Air	Spring	Air	Spring	Air	Spring	Air	Spring	Air	Spring	Air	Spring	
RCG 90-SR	Air opens	0°	1920		2440		2960		3200		4000		4350		5000		
		60°	760		960		1160		1240		1560		1700		1950		
		90°	920		1160		1400		1560		1920		2100		2400		
	Spring closes	90°		1440		1840		2240		2440		3040		3300		3800	
		30°		700		880		1064		1160		1440		1550		1800	
		0°		1040		1360		1640		1760		2200		2400		2750	
RCG 100-SR	Air opens	0°	3840		4880		5920		6440		8000		8700		10000		
		60°	1540		1960		2360		2580		3200		3500		4000		
		90°	1920		2440		2960		3220		4000		4350		5000		
	Spring closes	90°		2980		3780		4600		5000		6200		6750		7750	
		30°		1440		1840		2220		2420		3000		3250		3750	
		0°		2160		2740		3340		3620		4500		4900		5620	

**Measurements and weights**

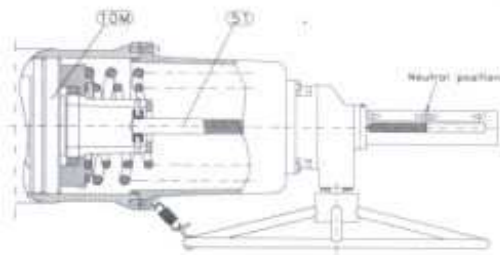
Measurement: mm Weight: kg

Type	A	B	d2(f8)	Weight	Air consumption	
					Anti clockwise rotation	Clockwise rotation
RCG 90-DA	415	520	200	280	130	305
RCG 90-SR	415	850	200	350	305	-
RCG 100-DA	520	520	230	305	260	265
RCG 100-SR	850	850	230	445	265	-

Operating times when using existing air connections: 3-60 seconds depending on the dimension of the connecting pipes, solenoid valves, etc.

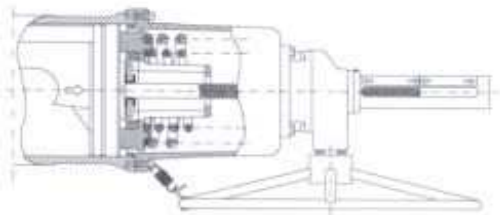
# RCG90-100

## With manual override unit M1



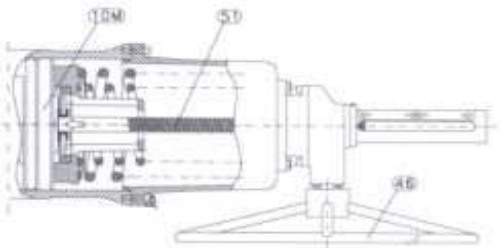
### Neutral position

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



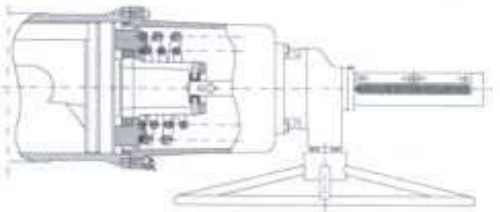
### End position adjustment

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



### Manual operation

RCG-DA: The handwheel (46) is turned anti-clockwise. The stem (51) and the piston (10M) are pressed inwards. The valve opens.  
RCG-SR: The handwheel is turned clockwise. The stem and the piston are pressed inwards (by spring force or by handwheel force). The valve closes.



### Manual operation

RCG-DA: The handwheel is turned clockwise. The stem and the piston are drawn outwards. The valve closes.  
RCG-SR: The handwheel is turned anti-clockwise. The stem and the piston are drawn outwards. The valve opens.

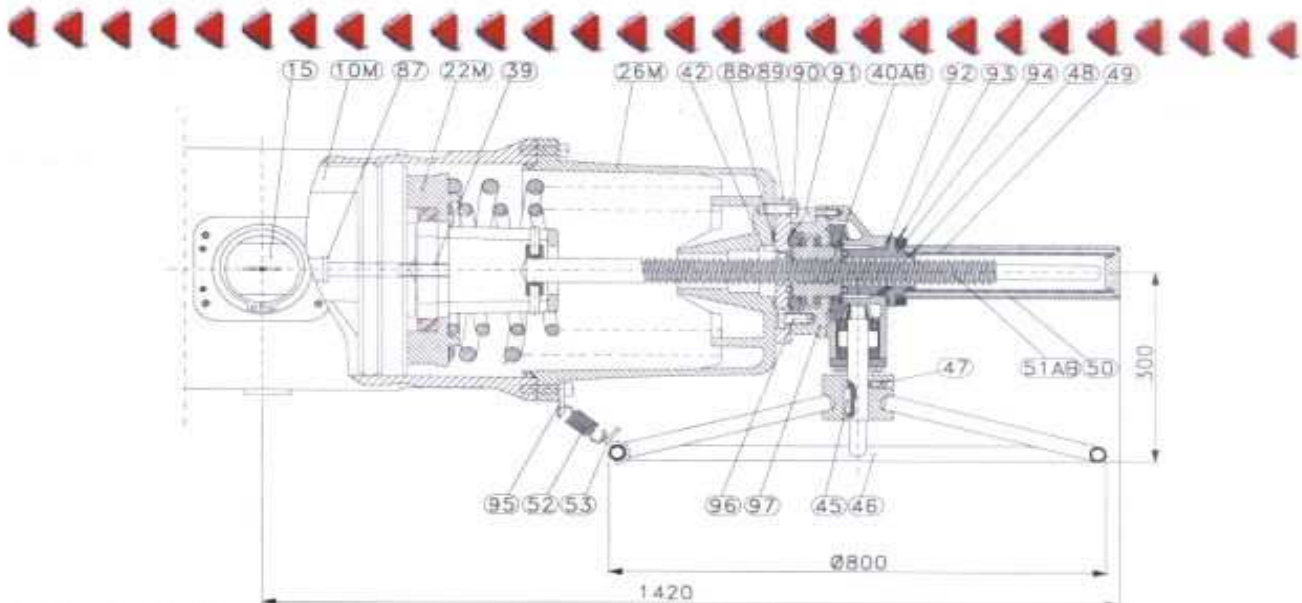
The actuator drive shaft is thus turned in the same direction as the handwheel. When the actuator has been manually operated, a return to the neutral position must take place before remote operation can be performed again.

RCG-SR in "Fail open" design and RCG-DA actuators with "SR-mounted" pistons have reversed function compared to the above.

### WARNING!

When dismantling. Please see Instruction No 369.

INSTRUCTION No 372A



Springs only in SR execution. Otherwise the drawing shows a DA actuator in "open" position.

**Material table for M1 to RCG90-100**

Pos	Description	Material
10M	Piston in manual operation design	Aluminium
15	Shaft (standard design)	Steel, yellow chromated
22M	Spring guide M	Ductile iron
26M	Housing for manual operation	Ductile iron
39	Retaining screw	Steel
40A	Stem nut for RCG-DA (right hand thread)	Aluminium bronze
40B	Stem nut for RCG-SR (left hand thread)	Aluminium bronze
42	O-ring (2 pcs)	Nitrile
45	Key	Key steel
46	Handwheel with hub	Steel, epoxy painted
47	Set screw	Stainless steel
48	O-ring (2 pcs)	Nitrile
49	Tube, transparent	Acrylic plastic
50	Protective tube	Steel, epoxy painted
51A	Stem for RCG-DA (right hand thread)	Steel
51B	Stem for RCG-SR (left hand thread)	Steel
52	Spring	Stainless spring steel
53	Fastening hook	Steel, zincified
87	Tredo-sealing (2 pcs)	Aluminium / nitrile
88	O-ring	Nitrile
89	Connection flange	Steel, epoxy painted
90	Screw (8 pcs)	Stainless steel
91	O-ring	Nitrile
92	O-ring	Nitrile
93	Set screw	Steel
94	Cuff sealing	Steel, zincified and yellow chromated
95	Spring fastener	Stainless steel
96	Screw (4 pcs)	Stainless steel
97	Bevel drive 4:1	Cast iron, epoxy painted

We reserve our right for modifications caused by technical development.

