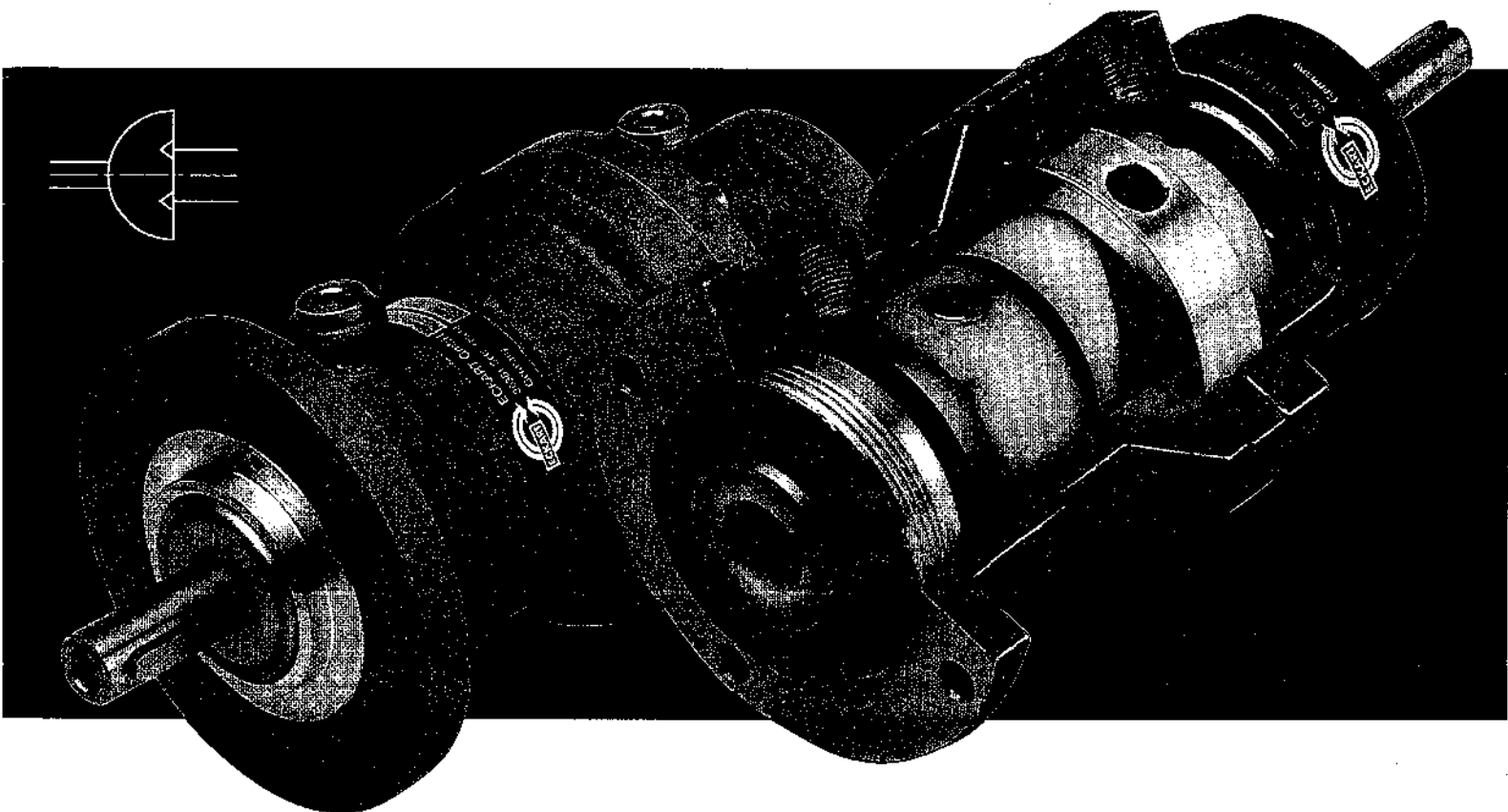


# Rotary actuator PSM

Pneumatic /10 bar



**GATEWAY**  
to new technologies

## **extremely lightweight construction, compact form**

- material combination of aluminium alloys and modified plastics produces extremely low weight rotary actuator

## **torque, efficiency**

- the torque is equal in both directions of rotation and across the entire angle of rotation
- outstanding sets of slide combinations, low-friction seals and rolling friction in the reversing grooves produce optimum efficiency

## **adjustable drive shaft datum (standard)**

allowing exact positioning of the drive shaft keys, therefore

- facilitating the machining of the coupling
- permitting re-adjustments whenever required

## **replaceable pins**

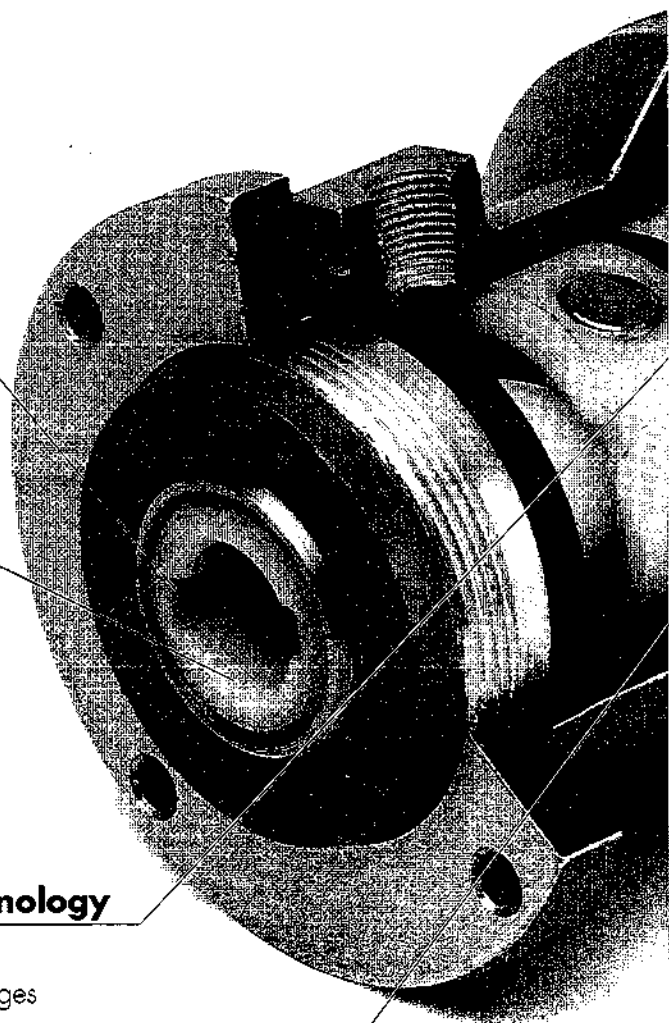
- the design of the standard shaft with keyway permits the insertion of interchangeable pins or hubs in line with requirements
- connecting profiles of your choice can be used

## **sophisticated sealing technology**

- longer seal life
- solid seals mean no internal leakages

## **wear-resistant slide surface**

- long service life of rotary actuator
- excellent sliding characteristics
- all sliding surfaces honed and surface-hardened



### **large-area press-fit joint**

- assuring positive power/torque transmission even at peak load conditions
- proven technology from hydraulics



**HYDRAULIK  
PNEUMATIK**

### **tapping for location pin**

- tapping in the control PSM cam shaft allows you to fit pins and control switches of your choice

### **externally adjustable end stop (standard)**

- the angle of rotation as supplied can be re-adjusted at any time to within  $\pm 5^\circ$  while the shaft adjust facility will provide the required position of the keys

### **contents**

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Dimensions and technical data	8
<del>End assembling</del>	<del>9</del>
Examples of application	10

### **rotation up to 360° or more**

- standard rotations are 90°, 180° and 360°
- any intermediate angle of rotation, including over 360°, can be supplied

# Function and features

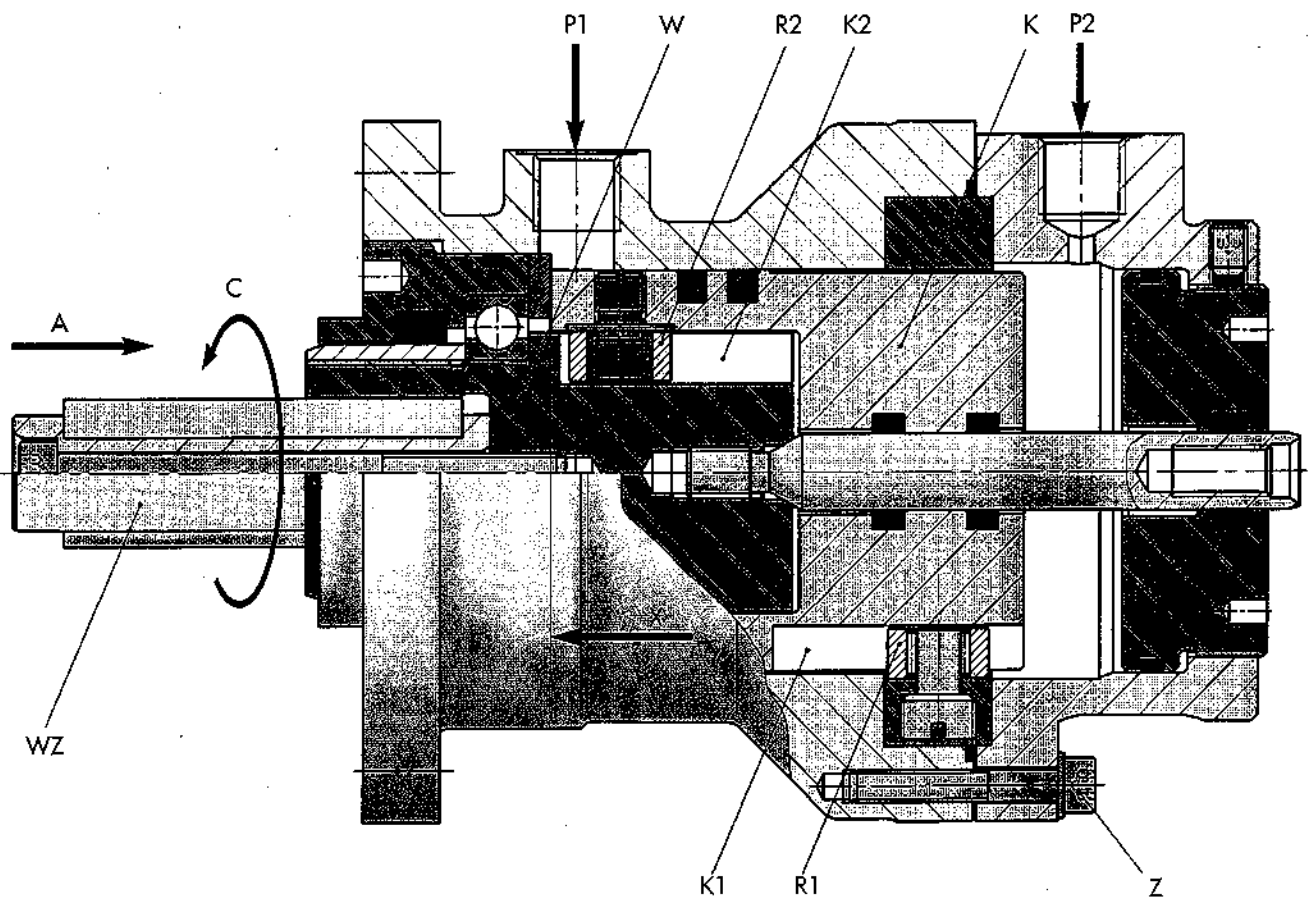


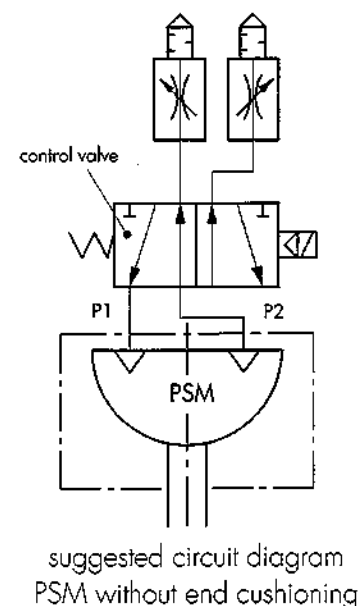
figure 2

## Operation

- Around the circumference of the piston K (figure 2) are curved grooves K1 into which the guide rollers R1 engage.
- On applying pressure via the ports P1 and/or P2, the piston K is moved.
- When the guide rollers R1 engages into the curved grooves K1 the piston K is forced into a rotary movement.
- This rotary movement is transferred via the guide rollers R2 to the shaft W.
- The rotary movement is transferred via the curved grooves keys K2 in the shaft W which rotate in the opposite direction to the curved grooves K1.
- The opposed direction of the curved grooves causes a simple stroke of the piston to produce a doubling of the angular movement as well as a doubling of the speed.
- The rolling friction means that mechanical losses are minimal.

## Change pin WZ

The basic version of the Eckart PSM has a hollow shaft with drive shaft keys. An optional change pin WZ may be inserted and fixed at the end with a screw. Other



suggested circuit diagram  
PSM without end cushioning

drive elements can be incorporated without problems, e.g. external square, internal square socket, flanged shaft, serrated shaft, multi-notch profiles, etc.

## Initial drive shaft position

The initial drive shaft position can be set in the angular minute area. All models are supplied 90° offset to the position shown in figure 2 with piston K resing against stop X.

After loosening the screws Z (1/2 turn), any drive shaft or key position can be adjusted. Once the required adjustment has been made, tighten the screws Z again.

## Torque output

The stated torque figures are effective torques, with the pressure versus the torque curve being virtually linear. Heavy duty, multi-shift or high frequency applications require a safety factor between 1.2 and 1.5. Torque output is equal in both directions.

## Shaft rotation

From view A (figure 2), with piston K resting against stop X, the shaft will rotate anti-clockwise (arrow C) when pressure is applied to port P.

## Rotation

Standard rotations are 90°, 180° and 360°. Other rotations can be supplied on request by using the model with the next higher standard rotation and limiting the rotation of the piston to the desired angle. Also available are specials with rotations in excess of 360°.

## Backlash

Standard backlash for all models is approximately 30 to 45 angular minutes.

## Externally adjustable end stop

This standard feature allows re-adjustment of the angle of rotation as supplied within  $\pm 5^\circ$ .

## Operating temperature

The temperature at which the rotary actuator can be used ranges from -10°C to +50°C.

Please contact us if you intend to use the actuator outside these limits.

## Medium

Filtered, lubricated compressed air.

## End of stroke

The end stops are designed to withstand the force created by the maximum allowable operating pressure or the maximum permissible torque output. If they are used to stop the load, the forces acting on them, including forces of inertia, must not exceed the force created by the maximum operating pressure.

If the forces are exceeded, end cushioning Z1 (see page 9) or external shock absorbers (see page 6, PVV - second shaft borehole) should be used.

## Filtration

Filters should be installed in the suction line downstream of the directional valve. Check filter elements regularly following manufacturers instructions. Filter pores should not exceed 40µm. Maintenance periods should be observed as specified by the filter manufacturer.

## Leakage

The PSM rotary actuator is comparable to well sealed linear cylinders because of its solid seals. This is why the maximum load can be held in any intermediate position. From size 63, the PSM piston is double sealed.

## Installation and running in

Instructions for installation and running in are provided with every rotary actuator along with a list of spare parts.

## Maintenance

The rotary actuator is grease-lubricated and is, in principle, maintenance-free. Nevertheless it is recommended that lubricators are connected in the incoming circuit. Water separators should always be available.

## Non-standard options

In addition to the options listed in this catalogue, a wide range of special features can be supplied. These include change pins according to your choice, special seals, etc. Please contact our applications department for further information.

## SZ - Locating pin

The pin (figure 3) allows fitting of cams (option Z5) or other control equipment and screws into the tapping provided at the back end of the shaft where it can be secured with a metal adhesive, if required. It should not be used for torque transmission or limiting the angle of rotation.

## Z5 - Cam

The cam Z5 (figure 3) is clamped onto the locating pin SZ and serves to operate the proximity switches. If two proximity switches are required, two cams are fitted. Both cams remain individually adjustable.

## PW - Second shaft borehole

The second shaft borehole PW (figure 4) with drive shaft key is suitable for torque transmission. This allows elements which must take up torsion and bending force to be built on. If necessary, shock absorbers can also be operated via a lever arm.

## HB - Manual control

The manual control HB (figure 4) is mainly intended for operating valves or butterfly valves.

*PW and HB are only available with solid through-shaft, NOT with the standard hollow shaft. The other shaft end matches the dimensions of the change pin VVZ (see page 7). The torque using these versions is around 5% less.*

## Z6 - Control switch assembly (figure 5)

- including SZ and Z5 (figure 3)

### Technical data:

proximity switch:	PNP normally open M8 x 1
nominal switching distance:	1.5 mm
operating voltage:	10 to 30 VDC
load current:	200 mA
connection type:	Plug M12 x 1
protection class:	IP 67 / IP 65

*Plug not included!*

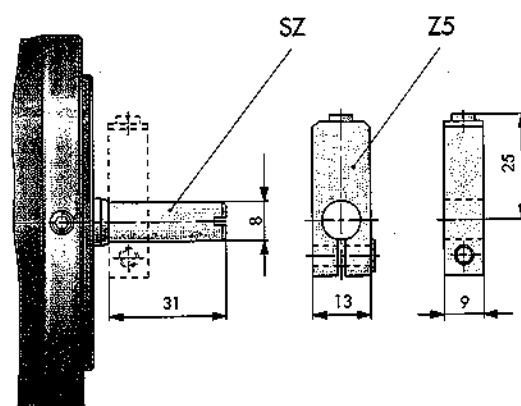
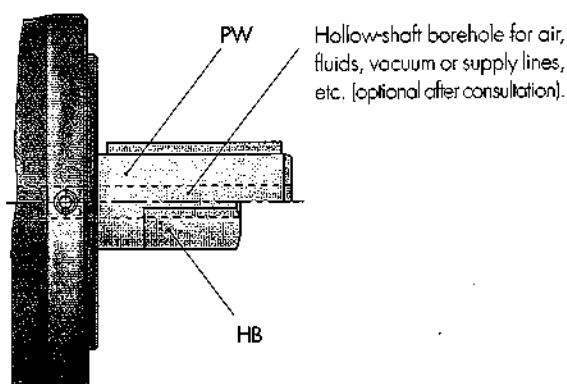


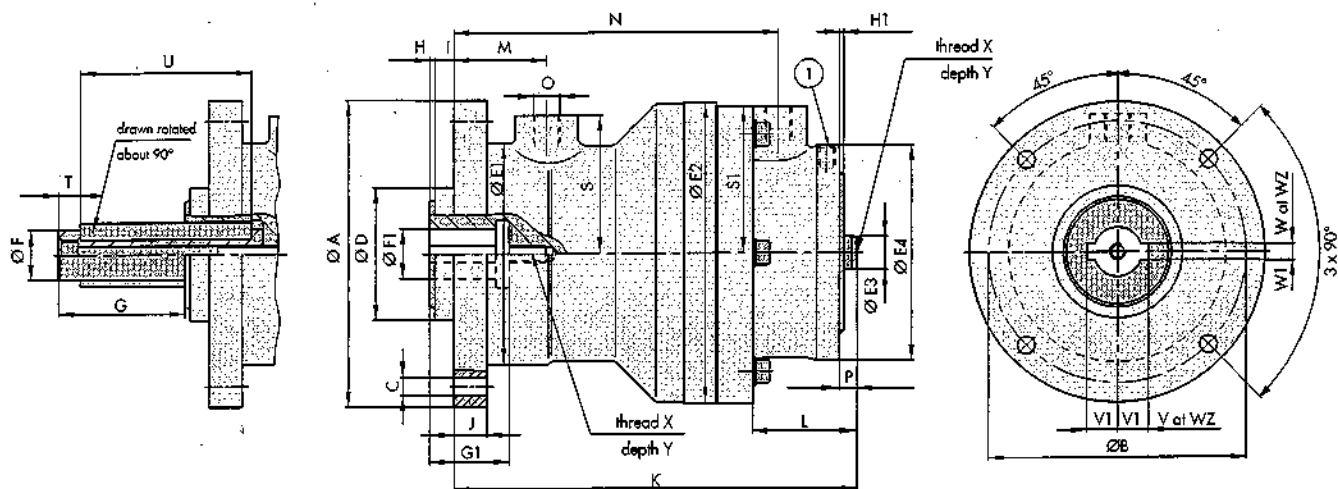
figure 3



# Dimensions

interchangeable pin - WZ

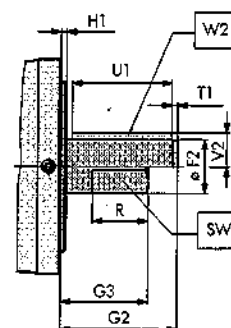
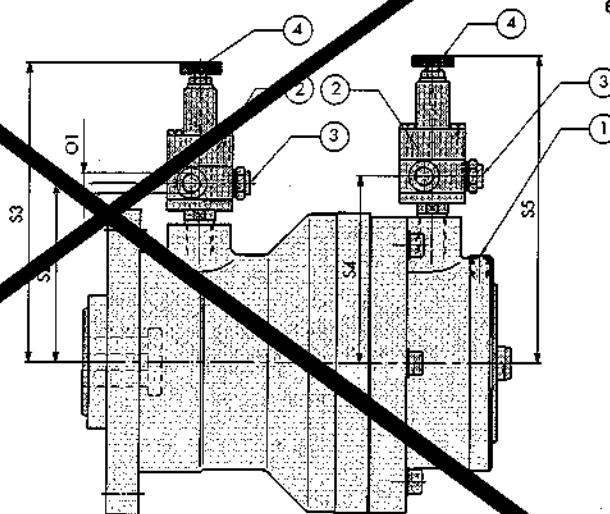
basic model of rotary actuator PSM



end cushioning - Z1

additional shaft borehole - PW  
emergency manual control - HB  
(top view)

- ① setscrew for setting angle of rotation (hexagon socket)
- ② entire damping valve can be rotated 360°
- ③ damping air bleed control (slotted screw)
- ④ damping air control



## Ordering code

**PSM . 63 – 180° / WZ / Z1 / ... / SO**

PSM series

size (piston Ø)

rotation (standard) - other rotations available on request

90°  
180°  
360°

option(s)  
omit for standard

change pin option WZ  
omit for standard

non-standard options  
(for special orders  
consult factory)  
omit for standard

rotary actuator PSM																	
size (piston-Ø)	ø A	ø B	ø C	ø D h7	ø E1	ø E2	ø E3	ø E4	ø F1 h7	G1	H	H1	I	J	90°	K 180°	360°
40	81	68	5,5	38	54	77	8	51	12	25	1,5	2	5	10	103,7	123,5	163,1
50	91	78	5,5	42	65	87	8	61	14	30	1,5	2,5	5	10	123	150,4	205,2
63	109	95	6,5	48	80	109	12	78	18	31	2	3	7	13	154,7	176,9	239,3
80	130	115	6,5	65	100	128	12	95	24	38	2	4,7	7	15	168	213,6	304,8
100	149	135	6,5	80	120	149	16	120,5	30	52	2	6	7	20	204,5	263,5	381,5

rotary actuator PSM																	
size (piston-Ø)	L			M	N			O	P	S	S1	V1	W1	X	X1	Y	Y1
	90°	180°	360°		90°	180°	360°	port size									
40	28,2	38,1	57,9	26,5	78,5	88,4	108,2	G <sup>1</sup> / <sub>8</sub>	3,5	33	37	7,8	4	M4	M5	12	18
50	34,5	48,2	75,6	28,5	92,5	106,2	133,6	G <sup>1</sup> / <sub>8</sub>	4,5	39,5	42	9,3	5	M4	M5	9	18
63	36,1	51,7	82,9	33,6	112,6	128,2	159,4	G <sup>1</sup> / <sub>4</sub>	4,5	50	53	11,8	6	M6	M8	13,5	20
80	49	71,8	117,4	33,6	122	144,8	190,4	G <sup>1</sup> / <sub>4</sub>	6,5	56	62,5	15,3	8	M6	M8	18,5	20
100	56,5	86	145	43	153,5	183	242	G <sup>3</sup> / <sub>8</sub>	8	70	73	18,3	8	M6	M8	15	20

WZ - interchangeable pin							PW - through-shaft					HB - manual control						Z1 - end cushioning				
size (piston-Ø)	øF k6	G	T	U DIN 6885	V DIN 6885	W DIN 6885	øF2 k6	T1	U1 DIN 6885	V2 DIN 6885	W2 DIN 6885	øF2	G2	G3	R	SW	O1 port size	S2	S3	S4	S5	
40	12	28	5,5	45	7,5	4	10	3	22	6,2	4	10	29	18	12	8	G <sup>1</sup> / <sub>8</sub>	53	12,5	56,5	113	
50	14	32	4,5	55	9	5	14	3,5	25	9	5	14	33	21	15	10	G <sup>1</sup> / <sub>8</sub>	59	115,5	61,5	118	
63	18	44	8	63	11,5	6	18	3	38	11,5	6	18	45,5	21,5	15	14	G <sup>1</sup> / <sub>8</sub>	69,5	125,9	71,5	129	
80	24	50	4	80	15	8	24	2,5	45	15	8	24	52,5	39,5	25	19	G <sup>1</sup> / <sub>8</sub>	75,5	132	82	138,5	
100	30	50	2	95	18	8	30	2,5	45	18	10	30	53	40	29	24	G <sup>1</sup> / <sub>8</sub>	89,5	146	92,5	149	

## Technical data:

size (piston-Ø)		40	50	63	80	100
torque at 6 bar (Nm)		4	9	16	39	78
rotation		standard 90°/180°/360° and any intermediate rotation, including over 360°				
medium		filtered, lubricated or filtered non-lubricated compressed air				
min. operating pressure required		0,5 bar (without end cushioning) / 3 bar (with end cushioning)				
max. allowable operating pressure		10 bar				
installation position		as required				
temperature range		- 10° bis +50° C				
absorption volume (cm³/1°)		0,15	0,30	0,60	1,30	2,60
max. admissible rotation time per 90° (s)		0,1	0,15	0,20	0,25	0,40
weight (kg) basic model	rotation 90°	0,8	1,20	2,50	3,80	5,90
	180°	0,9	1,30	2,70	4,20	6,50
	360°	1,0	1,40	3,00	5,00	8,20
weight of interchangeable pin WZ (kg)		0,045	0,075	0,14	0,30	0,57
max. radial load (N)		150	250	350	450	900
max. axial load (N)		250	350	550	850	1100

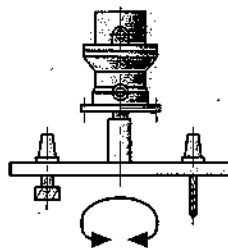
## Note:

Adherence to the data provided here is a precondition for trouble-free operation.

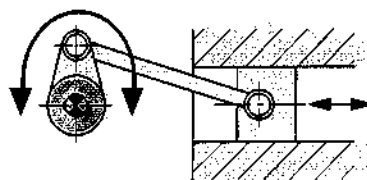
TÜV, trade union and environmental regulations must be observed.

We reserve the right to alter or improve design specifications without prior notice.

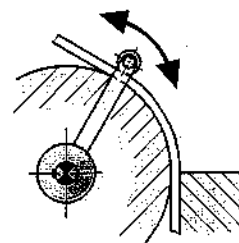




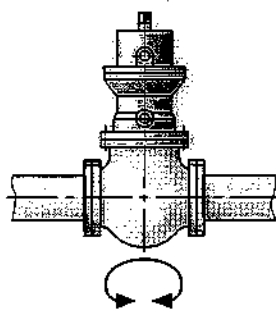
tool change



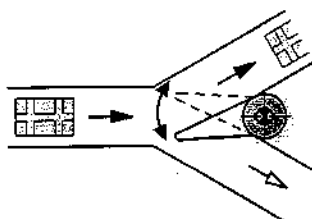
linear actuation



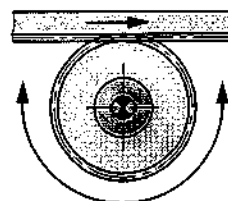
bending machines



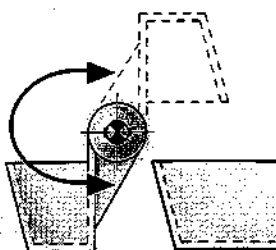
gate valve control



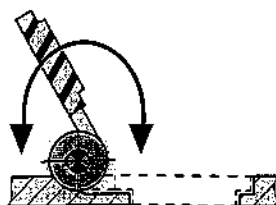
transporting



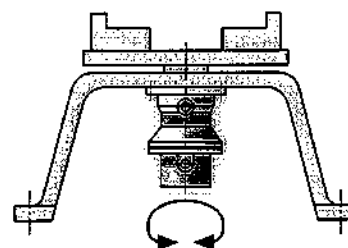
clocking



tipping devices



opening/closing



rotational devices

## Product range:

### ● Rotary actuators

Series: SM1, SM4 – 100, 250 bar – Torques up to 85.000 Nm

Series: PSM – 10 bar (pneumatic) – Torques up to 80 Nm

### ● Rotary-linear actuators

Series: HHSE – 100 bar – Torques up to 2.200 Nm, thrusts up to 122.000 N

Series: PHSE – 6 bar (pneumatic) – Torques up to 144 Nm, thrusts up to 4.700 N

### ● Hydraulic cylinders

Series: EH2 – 250 bar – bore Ø 40 mm to Ø 200 mm

### ● Special (hydraulic und pneumatic)

distributed by:



HYDRAULIK  
PNEUMATIK

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