



0036

## CHEMSUN PT - Quarter-Turn Actuator Type PTS AND PTD

### Application:

Single- or double-acting piston actuator for control and shut-off valves with rotating flow restrictors, especially with high process demand in chemical plants:

- quarter turn 90°
- air supply to 8 bar
- temperatures -20°C to 80°C

The pneumatic quarter-turn actuators type PTS and PTD are piston actuators for control or OPEN / CLOSED operation. The actuators distinguish themselves by:

- externally adjustable end stops ( $\pm 4^\circ$ ),
- square position diagonal (Europ. Standard) or parallel,
- freely-adjustable position indicator (in 45° steps),
- assembly and modification without special tools,
- encapsulated spring assembly,
- transmission through involute gearing,
- direction of rotation reversible **without** additional components,
- proven surface refinement by means of Kesternich and salt spray test,
- connection of additional equipment according to VDI/VDE 3845,
- attachments according to DIN/ISO 5211,

### Versions:

- **Type PTS**  
Pneumatic quarter-turn actuator, single-acting with spring-return mechanism in the sizes 050 to 500
- **Type PTD**  
Pneumatic quarter-turn actuator, double-acting without spring-return mechanism in the sizes 050 to 500

### Special designs:

- with emergency manual actuation
- for continuous operation at temperatures from -20° to 150°C through use of Viton O-rings
- for continuous operation at temperatures from -40° to 80°C with silicon seals
- actuators with extended turning range 120° and 180°
- dosage actuator with adjustable central position
- 3-position actuator
- actuator with hydraulic adjustment of rotating speed
- stainless steel AT quarter-turn actuator



Fig. 1- ChemValve-Schmid Quarter Turn Actuator, Type PTS115



Fig. 2- ChemValve-Schmid PT Quarter Turn Actuator, Type PTS300



**Additional equipment and add-on pieces:**

For the actuators, the following accessories are available either individually or in combination:

- positioner
- limit switch
- solenoid valves
- air supply stations
- pressure gauge set
- throttling device

Further accessories are available on request for customer specifications. Details on request.

**Principle of operation:**

The regulating pressure  $p_{st}$  generates a force at the piston surface which, in the single-acting version, can be compensated by the springs arranged in the actuator, and in the double-acting version, by an appropriate back pressure. The force generated at the pistons is converted into rotation by means of the pinion shaft. Adjustable end stops for OPEN and CLOSED operation permit a fine setting of the end positions by  $\pm 4^\circ$ .

In the case of the single-acting version, the number of springs determines the spring return torque and the required air supply pressure.

**Safety position:**

For the actuator type PTS two different directions of rotation are possible, becoming effective by release pressure on the pistons or in the case of air supply failure. The viewing direction is from the actuator to the valve.

**Springs rotating to the right**

In case of pressure loss, rotation to the right.

**Springs rotating to the left**

In case of pressure loss, rotation to the left.

The actuator type PTD is designed without springs. A defined final position is not achieved in the case of air supply failure.

**General technical data:**

Operation	single-acting	double-acting
max. perm. air supply pressure	8 bar	
sizes	050 • 063 • 075 • 088 • 100 115 • 125 • 145 • 160 • 180 200 • 240 • 265 • 300 • 500	
perm. temperature range	continuous operation -20°C to 80°C	
connection to valve	DIN / ISO 5211	
connection for positioner or signal equipment	Type 050 to 100	VDI / VDE 3845, size 1
	Type 115 to 160	VDI / VDE 3845, size 2
	Type 180 to 300	VDI / VDE 3845, size 4
	Type 500	VDI / VDE 3845, size 5
connection for solenoid valve	VDI / VDE 3845	

Table 1 – Technical Data

**Materials:**

body	AlMgSi0,5 F25
cap	GD - AISi8 .5 Cu3.5 Fe
shaft	ASTM A105
spring-cartridge	ASTM A401
pistons	GD - AISi8 .5 Cu3.5 Fe

Table 2 - Materials ( WN = Material code )

**Air drive torque:**

Fig. 3 shows the available air drive torque

- $M_{dLE}$  for the single-acting version
  - $M_{dLD}$  for the double-acting version
- and the available spring drive moment  $M_{dF}$  in relation to the angle of rotation.

The course of the operating torque is valid for the correct combination of the respective air supply pressure with the wright number of springs (values in the data sheet underlined and printed bold).

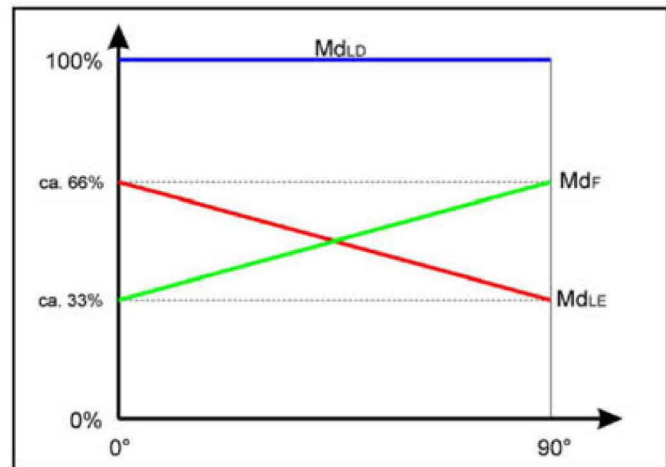


Fig. 3 – Course of operating torque at recommended air inlet pressure

**Operating torques:**

The operating torques for double- and single-acting actuators are available in the data sheet.

**Interesting innovations in this generation of actuators:**

The quarter-turn actuators are characterized by a number of technical improvements and interesting innovations, and were developed with an eye on the latest amendments to the ISO 5211.

- **Position of the end caps with security against faulty handling**  
The setting of the two end stops is effected at the external stop screws via a cam system ( Fig. 4 ). In order to rule out any risk of injury when unscrewing the stop screws while under pressure, these screws are fitted with special air vent slots. Due to the clearly audible venting of the actuator before completion of unscrewing, the employee is sufficiently warned.  
In order to provide visual proof of the adjustment of the screws, they are coated ex works with a sealing wax.

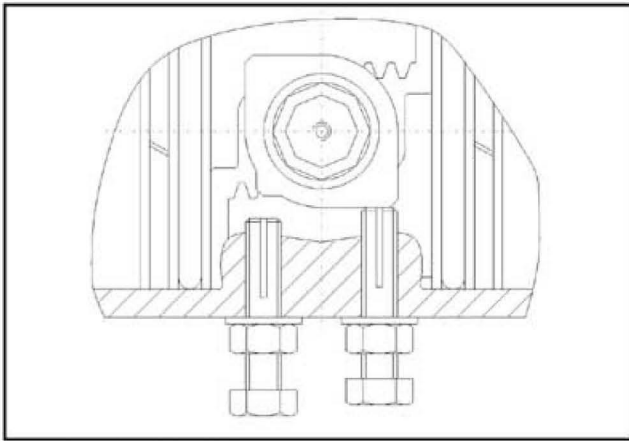


Fig. 4 – Positioning of the end stops

• **Setting of the square end**

A more flexible installation is achieved through the 45°-step setting of the square in the shaft drive.

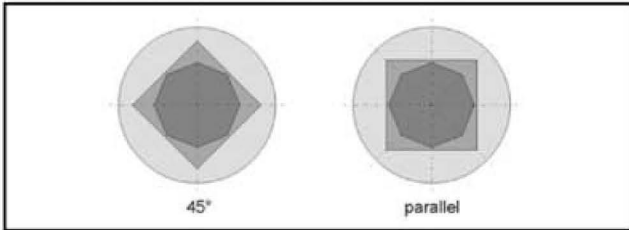


Fig. 5 – Setting of the square

The required settings can be achieved through a rotation of the shaft. In order to obtain the correct display of position, the seat of the position indicator (upper end of shaft) has been octagonally finished, therefore permitting the position indicator also to be mounted in 45°- steps.

• **Multifunctional position indicator**

The new position indicator may be employed for a 45° or 90° position ( Fig. 6 ). An optical display is realized by means of inserts in the position indicator. These may be variably installed.

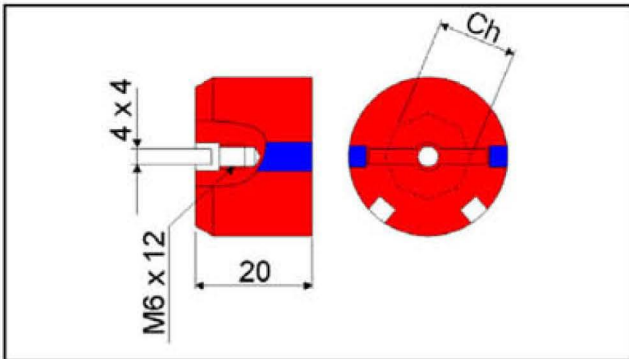


Fig. 6 – Position indicator

The position indicator has a VDI/VDE – interface. This permits practically all standard accessories to be mounted without difficulty.

• **Direct assembly**

By exchanging the standard inserts by metal inserts, the multifunctional position indicator can be quickly and simply prepared for the direct attachment of special limit switches.

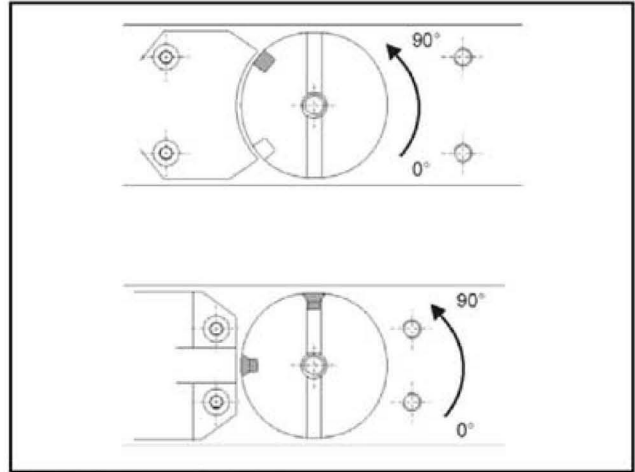


Fig. 7 – Multifunctional position indicator

• **Technical details**

The tooth profile and therefore the force transmission of the toothed rack - shaft principle were consequently optimised by employing involute gearing.

A further technical measure is the strengthening of the shaft diameter and bearing shells. This permits an even greater force absorption by the newly developed body.

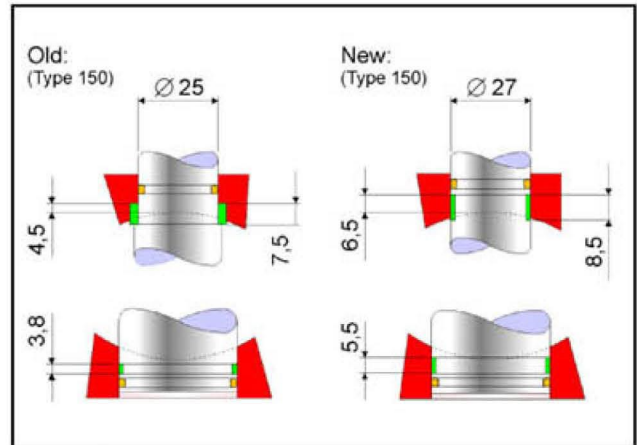


Fig. 8 - Bearing

**Dimensions and weights**

The dimensions and weights for the actuators type PTS and PTD are available in the data sheet.



0036

**CHEMSUN TypePTS/PTD**  
Size 050 - 500 PT-Quarter-Turn Actuator

**Torques in Nm for double-acting Type PTD Actuators**

Type PTD	2.5bar	3.0bar	3.5bar	4.0bar	4.5bar	5.0bar	5.5bar	6.0bar	7.0bar	8.0bar
PTD050	8.3	10.0	11.6	13.3	15.0	16.6	18.3	19.9	23.3	26.6
PTD063	14.7	17.6	20.5	23.5	26.4	29.3	32.2	35.2	41.0	46.9
PTD075	29.1	34.9	40.7	46.5	52.3	58.2	64.0	69.8	81.4	93.0
PTD088	45.7	54.9	64.0	73.2	82.3	91.5	101	110	128	146
PTD100	66.5	79.7	93.0	106	120	133	146	160	186	213
PTD115	107	129	150	172	193	215	236	258	301	344
PTD125	138	166	194	221	249	277	304	332	387	443
PTD145	217	261	304	348	391	434	478	521	608	695
PTD160	283	340	397	453	510	567	623	680	793	907
PTD180	383	459	536	612	689	765	842	918	1071	1224
PTD200	531	638	744	850	956	1063	1169	1275	1488	1700
PTD240	935	1122	1309	1496	1683	1870	2057	2244	2618	2992
PTD265	1347	1617	1886	2156	2425	2695	2964	3234	3772	4311

**Torques in Nm for single-acting Type PTS Actuators**

Type PTS	No of springs	Air torques in Nm																		Spring torques			
		2.5bar		3.0bar		3.5bar		4.0bar		4.5bar		5.0bar		5.5bar		6.0bar		7.0bar		8.0bar		90° start	0° stop
		0° start	90° stop	0° start	90° stop	0° start	90° stop	0° start	90° stop	0° start	90° stop	0° start	90° stop	0° start	90° stop	0° start	90° stop	0° start	90° stop				
PTS050	05	4.9	3.4	6.6	5.1	8.2	6.8	9.9	8.4	11.6	10.1	13.2	11.7								4.9	3.4	
	06	4.2	2.5	5.9	4.1	7.6	5.8	9.2	7.4	10.9	9.1	12.5	10.8	14.2	12.4						5.8	4.1	
	07			5.2	3.2	6.9	4.8	8.5	6.5	10.2	8.1	11.9	9.8	13.5	11.5	15.2	13.1				6.8	4.7	
	08					6.2	3.8	7.9	5.5	9.5	7.2	11.2	8.8	12.8	10.5	14.5	12.1	17.8	15.5		7.8	5.4	
	09							7.2	4.5	8.9	6.2	10.5	7.8	12.2	9.5	13.8	11.2	17.2	14.5	20.5	17.8	8.8	6.1
	10									8.2	5.2	9.8	6.9	11.5	8.5	13.2	10.2	16.5	13.5	19.8	16.8	9.7	6.8
	11											9.2	5.9	10.8	7.6	12.5	9.2	15.8	12.5	19.1	15.9	10.7	7.4
	12													10.1	6.6	11.8	8.2	15.1	11.6	18.4	14.9	11.7	8.1
PTS063	05	9.1	6.2	12	9.1	15	12	17.9	15	20.8	17.9	23.7	20.8								8.5	5.5	
	06	8	4.5	10.9	7.4	13.8	10.3	16.8	13.3	19.7	16.2	22.6	19.1	25.6	22.1						10.2	6.7	
	07			9.8	5.7	12.7	8.7	15.7	11.6	18.6	14.5	21.5	17.4	24.5	20.4	27.4	23.3				11.8	7.8	
	08					11.6	7	14.6	9.9	17.5	12.8	20.4	15.8	23.3	18.7	26.3	21.6	32.1	27.5		13.5	8.9	
	09							13.4	8.2	16.4	11.1	19.3	14.1	22.2	17	25.2	19.9	31	25.8	36.9	31.6	15.2	10
	10									15.3	9.4	18.2	12.4	21.1	15.3	24.1	18.2	29.9	24.1	35.8	29.9	16.9	11.1
	11											17.1	10.7	20	13.6	22.9	16.5	28.8	22.4	34.7	28.2	18.6	12.2
	12													18.9	11.9	21.8	14.8	27.7	20.7	33.5	26.6	20.3	13.3
PTS075	05	18	11.7	23.6	17.6	29.6	23.4	35.4	29.2	41.2	35	47.1	40.8								17.3	11.1	
	06	15.8	8.3	21.6	14.1	27.4	19.9	33.2	25.7	39	31.5	44.8	37.3	50.7	43.2						20.8	13.3	
	07			19.4	10.6	25.2	16.4	31	22.3	36.8	28.1	42.6	33.9	48.4	39.7	54.3	45.5				24.2	15.5	
	08					23	13	28.8	18.8	34.6	24.6	40.4	30.4	46.2	36.2	52	42	63.7	53.7		27.7	17.7	
	09							26.6	15.3	32.4	21.1	38.2	27	44	32.8	49.8	38.6	61.5	50.2	73.1	61.8	31.1	19.9
	10									30.2	17.7	36	23.5	41.8	29.3	47.6	35.1	59.2	46.7	70.9	58.4	34.6	22.1
	11											33.8	20	39.6	25.8	45.4	31.7	57	43.3	68.7	54.9	38.1	24.3
	12													37.4	22.4	43.2	28.2	54.8	39.8	66.4	51.4	41.5	26.5
PTS088	05	27.4	16.8	36.5	26	45.7	35.1	54.8	44.3	63.9	53.4	73.1	62.6								28.9	18.3	
	06	23.7	11.1	32.8	20.2	42	29.3	51.1	38.5	60.3	47.6	69.4	56.8	78.6	65.9						34.7	22	
	07			29.2	14.4	38.3	23.6	47.5	32.7	56.6	41.9	65.7	51	74.9	60.1	84	69.3				40.4	25.7	
	08					34.6	17.8	43.8	26.9	52.9	36.1	62.1	45.2	71.2	54.4	80.4	63.5	98.6	81.8		46.2	29.4	
	09							40.1	21.2	49.3	30.3	58.4	39.5	67.5	48.6	76.7	57.7	95	76	113	94.3	52	33
	10									45.6	24.5	54.7	33.7	63.9	42.8	73	52	91.3	70.2	110	88.5	57.8	36.7
	11											51.1	27.9	60.2	37	69.3	46.2	87.6	64.5	106	82.8	63.5	40.4
	12													56.5	31.3	65.7	40.4	84	58.7	102	77	69.3	44
PTS100	05	41.1	27	54.4	40.3	67.7	53.6	81	66.8	94.2	80.1	108	93.4								39.4	25.3	
	06	36.1	19.1	49.3	32.4	62.6	45.7	75.9	58.9	89.2	72.2	103	85.5	116	98.8						47.3	30.4	
	07			44.3	24.5	57.6	37.8	70.8	51.1	84.1	64.3	97.4	77.6	111	90.9	124	104				55.2	35.4	
	08					52.5	29.9	65.8	43.2	79.1	56.5	92.3	69.7	106	83	119	96.3	146	123		63.1	40.5	
	09							60.7	35.3	74	48.6	87.3	61.9	101	75.1	114	88.4	140	115	167	142	71	45.5
	10									68.9	40.7	82.2	54	95.5	67.3	109	80.5	135	107	162	134	78.8	50.6
	11											77.2	46.1	90.5	59.4	104	72.7	130	99	157	126	86.7	55.6
	12													85.4	51.5	98.7	64.8	125	92	152	110	94.6	60.7



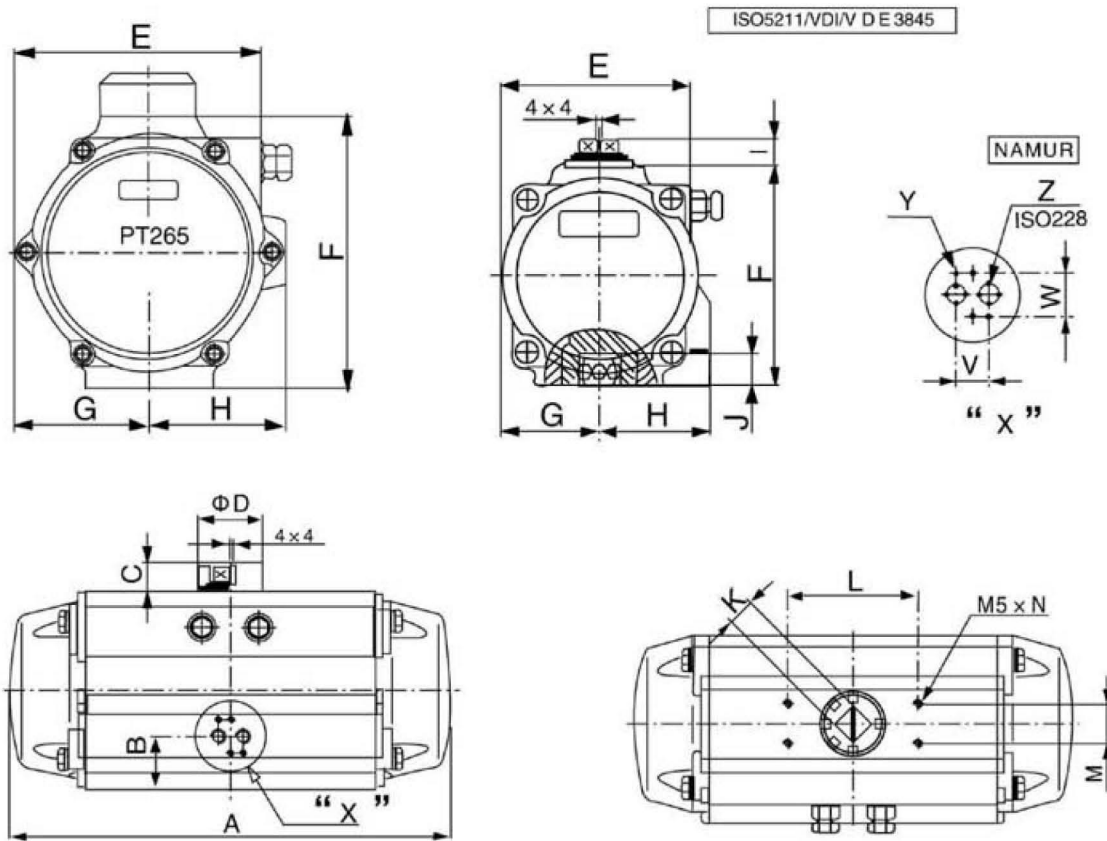


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# CHEMSUN TypePTS/PTD

Size 050 - 500 PT-Quarter-Turn Actuator

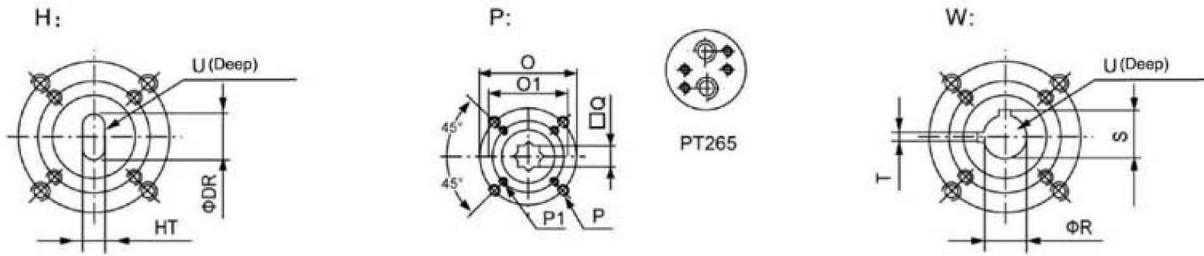
Dimensions (mm) and weights (kgs) for ChemValve-Schmid Type PT Rotary Actuators



Type	050	063	075	088	100	115	125	145	160	180	200	240	265
	PT	PT	PT	PT	PT	PT	PT	PT	PT	PT	PT	PT	PT
ISO flange	F04	F05	F05-07	F05-07	F07-10	F07-10	F07-10	F10-12	F10-12	F12	F14	F16	F16
A	140.5	158.5	210.5	247.5	268.5	315	345	408.5	437.5	487	543	633	728
B	26.5	30	30.5	32.5	37.5	42.5	45	47.5	52	58.5	62.5	78.5	165
C	20	20	20	20	20	30	30	30	30	50	50	50	50
ΦD	40	40	40	40	40	56	56	65	65	80	80	115	115
E	59	72	84.5	97.5	111	127	136	156.5	169	190.5	213	251	298.5
F	69	85	102	115	127	145	157	177	196	220.5	245	298.5	330
G	29	36	42.5	49.5	56	64	69.5	80	88	99	110	131	163.5
H	41.5	47	52	56.8	67	77	82	91.5	99	105	112	131	166
I	14.5	14.5	14.5	14.5	14.5	24.5	24.5	24.5	24.5	44.5	44.5	44.5	44.5
Jmin	12	16	16	19	19	24	24	29	29	29	38	38	48
K	11	11	17	17	17	27	27	27	27	36	36	36	36
L	80	80	80	80	80	80	80	80	80	130	130	130	130
M	30	30	30	30	30	30	30	30	30	30	30	30	30
N	4	8	8	8	8	8	8	8	8	8	8	8	8
V	24	24	24	24	24	24	24	24	24	24	24	40	40
W	32	32	32	32	32	32	32	32	32	32	32	45	45
Y	M5 x 8	M5 x 8	M5 x 8	M5 x 8	M5 x 8	M5 x 8	M5 x 8	M5 x 8	M5 x 8	M5 x 8	M5 x 8	M6 x 10	M6 x 10
Z	1/8"	1/8"	1/8"	1/8"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	3/8"	1/2"

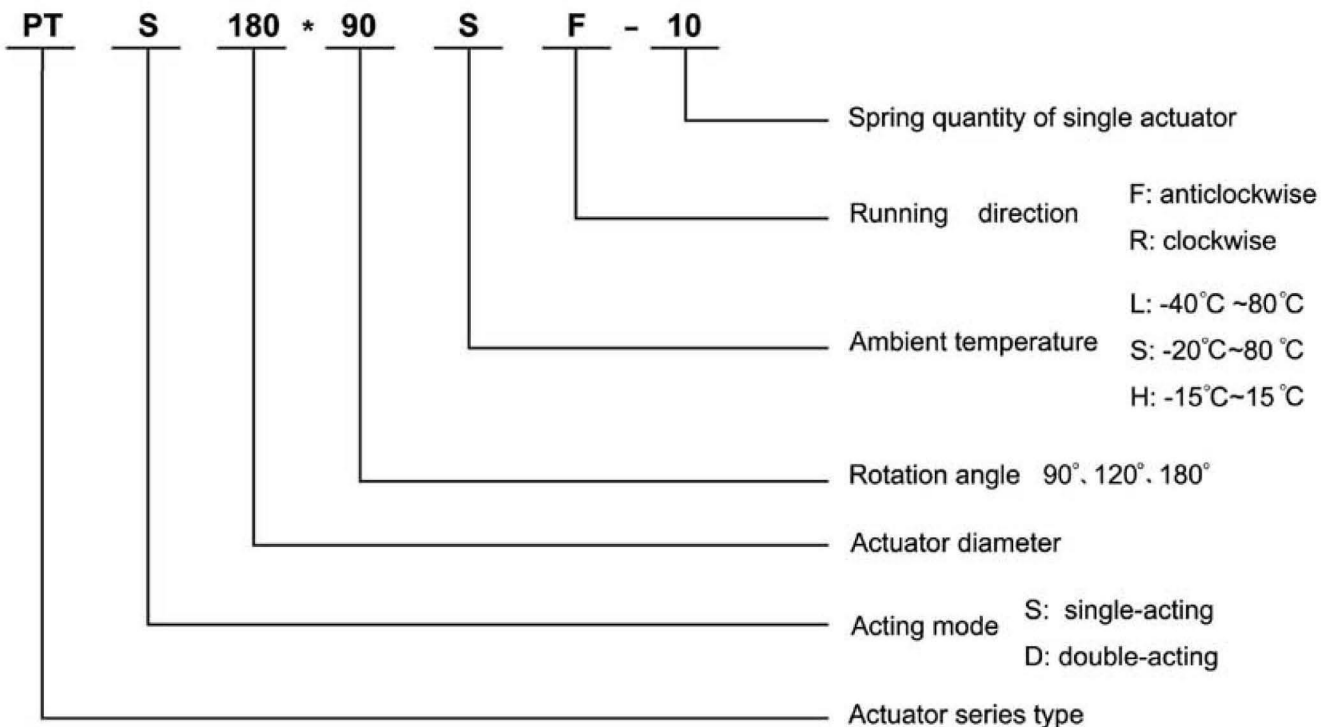


Dimensions (mm) and interfaces for attachment to valve and accessories



Type	050	063	075	088	100	115	125	145	160	180	200	240	265
	PT	PT	PT	PT	PT	PT	PT	PT	PT	PT	PT	PT	PT
ΦR	12.7	12.7	12.7	15.88	19.05	22.23	22.23	28.58	28.58	31.75	31.75	33.34	38.1
S	14.2	14.2	14.2	18.4	21.6	24.8	24.8	32.1	32.1	35.3	35.3	37.4	42.4
T	3	3	5	5	5	5	5	8	8	8	8	10	10
U	32	32	32	32	32	45	45	45	45	45	45	51	51
ΦDR	13	13	13	16.1	19.2	22.4	22.4	28.8	28.8	32	32	33.6	38.4
HT	10	10	10	12	14	17	17	22	22	24	24	27	27
ΦO1	42	50	50	50	70	70	70	102	102	125	140	165	165
ΦO	---	---	70	70	102	102	102	125	125	---	---	---	---
P1	4-M6	4-M6	4-M6	4-M6	4-M8	4-M8	4-M8	4-M10	4-M10	4-M12	4-M16	4-M20	4-M20
P	---	---	4-M8	4-M8	4-M10	4-M10	4-M10	4-M12	4-M12	---	---	---	---
□Q	11	14	14	17	17	22	22	27	27	27	36	36	46

**Coding**



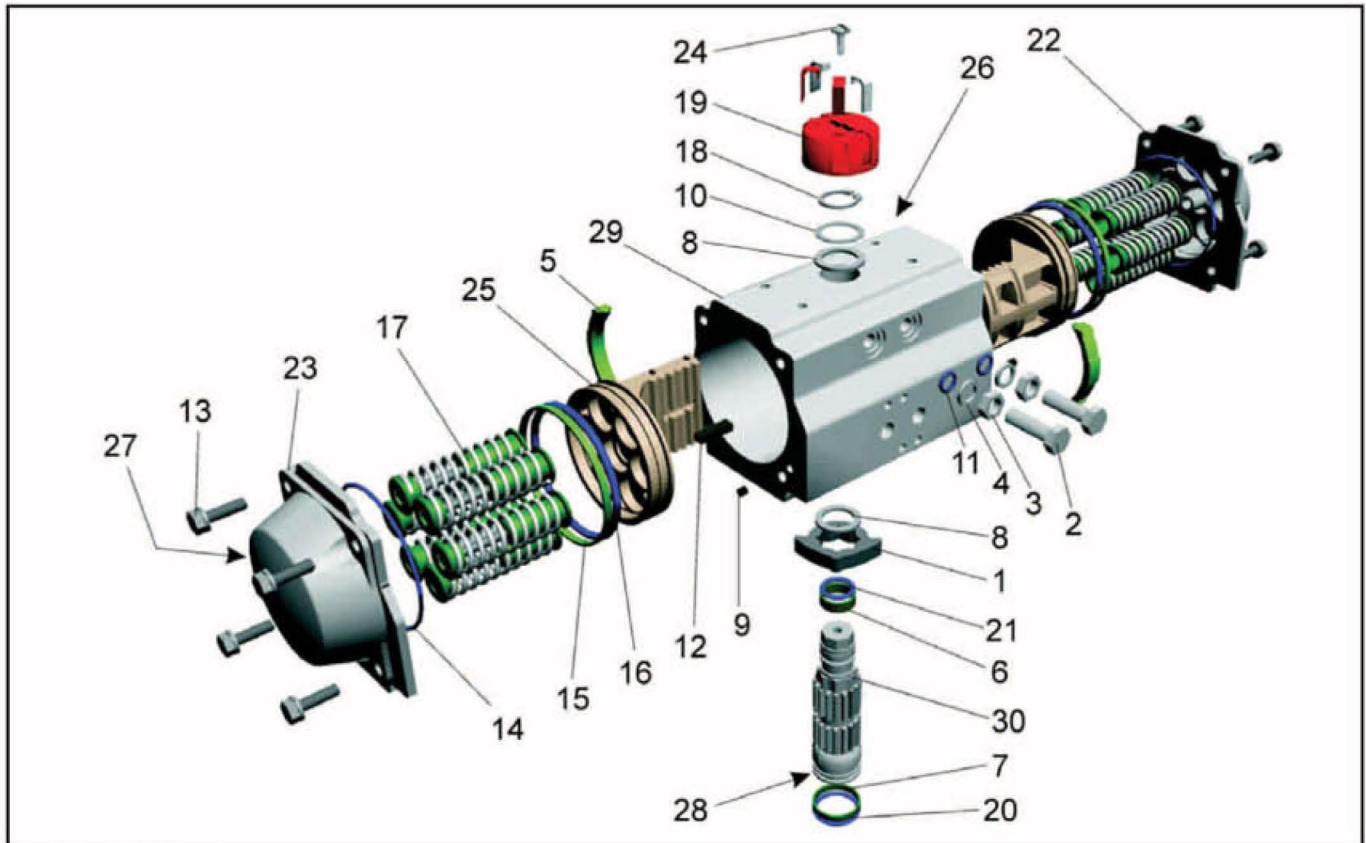


Fig. 9 – Cross-sectional drawing

Pos.	Description	Pos.	Description
1	Octi-cam (Stop arrangement)	16	O-ring
2	End stop screw	17	Spring cartridge
3	Nut	18	Spring clip
4	Washer	19	Position indicator
5	Bearing (Piston back)	20	O-ring
6	Bearing (Pinion top)	21	O-ring
7	Bearing (Pinion bottom)	22	Right end cap
8	Thrust bearing	23	Left end cap
9	Plug	24	Cap screw (Indicator)
10	Thrust washer	25	Pistons
11	O-ring	26	Identification label
12	Piston guide	27	Identification label (Cap)
13	Cap screw	28	Centering
14	O-ring	29	Body
15	Bearing (Piston head)	30	Shaft

Table 3 – Parts List

**Required data for your order:**

Actuator type: Type PTS or PTD  
 Size: 050,063,075,088,100, 115,125,145,160,180, 200,240,265,300 or 500  
 Number of springs: only for single-acting type PTS  
 Safety position: left- or right-rotating (only for single-acting type PTS)  
 Air supply: .... bar  
 Operative range: number of springs or nominal signal range  
 VDI/VDE bracket: for connection of positioner or signal equipment

