



**PNEUMATIC ACTUATORS**

***PT series***

## Description

Our Pneumatic Actuator Series PT combines a number of custom-required features and based on its large and finely subdivided torque bandwidth it is the perfect solution for nearly all requirements in the field of valve automation.

The well proven rack&pinion construction ensures a durable and reliable usage in continuous operation even in harshest conditions and is the key to process reliability for decades. It provides maximum torque output in combination with compact and weight-saving design.

Through the structural design with internal slide-bearings, actuators of the PT series are completely main-

tenance free. All requirements of a simple service are achieved by the working principle and pre-loaded safety springs.

Thanks to the consideration of all common standards in respect of connection interfaces, PT-actuators provide maximum modularity in terms of combination with valves and accessories such as solenoid valves, position feedback systems or positioners.

Based on the usage of high quality stainless steel alloys and an additional powder coating, the actuators provide the highest level of corrosion-resistance and can be easily used in demanding environments.

# Function

Actuators of the PT series are pneumatic double-piston rotary actuators, which are primarily used for the automation of quarter-turn valves such as ball valves, butterfly valves or plug valves. They are generally provided in two different functions: single acting and double-acting.

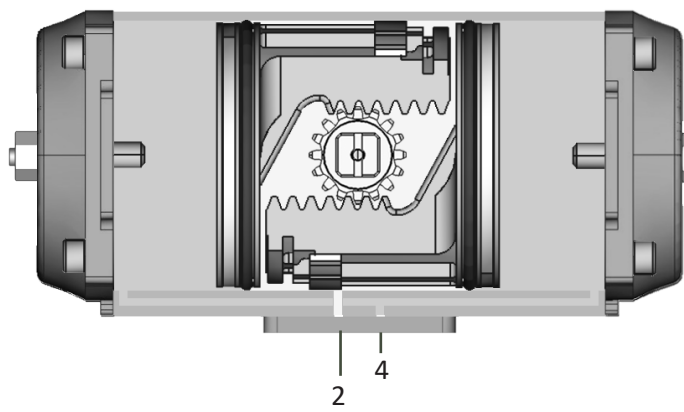
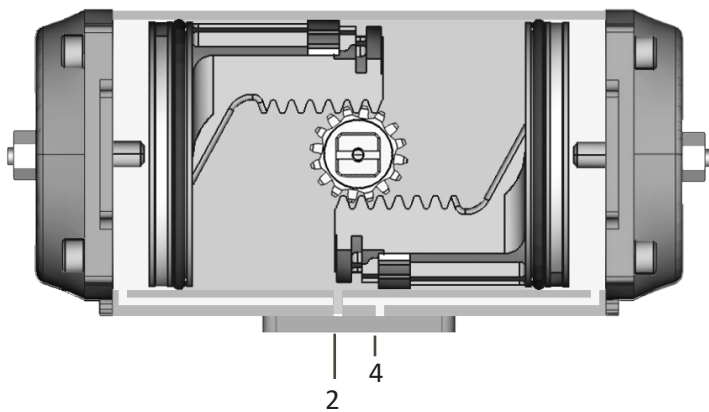
## Double-acting function

In the double-acting actuator version, the movement in both directions gets generated by the control pressure.

Via connection port „A“ the pressure chamber between the two pistons gets pressurized and the pistons move out. The resulting force is transmitted to the pinion and effects a rotational movement.

Double piston principle means that two pistons create two pressure chambers. By inflating one of these chambers the pistons are moved into opposite directions either towards or away from each other. The resulting force is provided to the central actuator pinion via toothed racks which are connected with the pistons and so creates a constant torque over the entire pivoting angle.

Once the outer pressure chamber is pressurized via connection port „B“, the pistons move towards each other again and the rotation process is reversed..

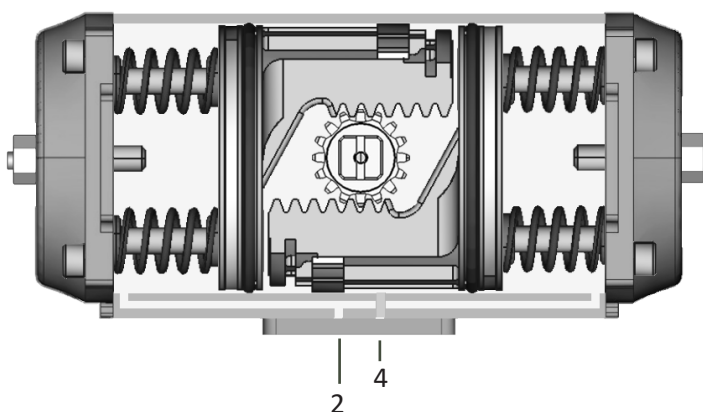
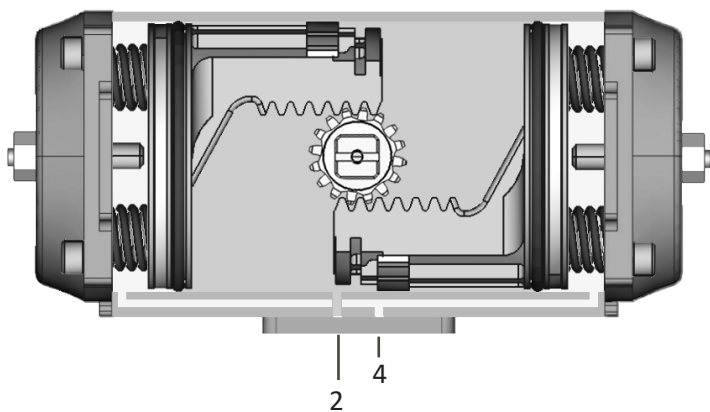


## Single-acting function

In the single-acting actuator version, the movement into one rotation direction gets generated by the control pressure and the movement of the reverse rotation by integrated safety springs. Via connection port „A“ the pressure chamber between the two pistons gets pressurized, the pistons move out and compress the integrated spring cartridges. At the same time the force resulting at the pistons is transmitted to the pinion and effects a rotational movement.

Once the pressure chamber is vented via port „A“, the springs push the pistons towards each other and the rotation process is reversed.

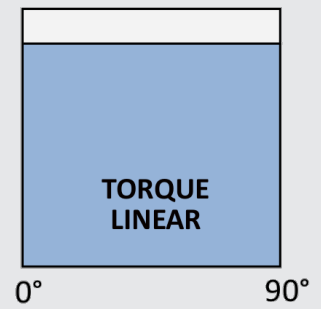
The single acting actuator version thereby provides a safety function for the case of pressure loss.



# Torque

## Torque diagram double acting

The double-acting actuator version provides a linear and constant torque over the complete pivoting angle in both pivoting directions.



Size	Torque in Nm at control pressure in bar (g)												
	2 bar	2.5 bar	3 bar	3.5 bar	4 bar	4.5 bar	5 bar	5.5 bar	6 bar	6.5 bar	7 bar	7,5 bar	8 bar
045	6,0	7,6	9,1	10,6	12,1	13,6	15,1	16,6	18,1	19,6	21,1	22,7	24,2
060	14,2	17,8	21,3	24,9	28,4	32,0	35,5	39,1	42,6	46,2	49,7	53,3	56,8
085	30,8	38,5	46,2	53,9	61,6	69,4	77,1	84,8	92,5	100,2	107,9	115,6	123,3
105	65,8	82,2	98,7	115,2	131,6	148,0	164,4	180,9	197,3	213,8	230,2	246,7	263,1
125	103	128	154	180	205	231	256	282	308	334	359	385	410
140	175	219	263	307	351	395	439	482	526	570	614	658	702
160	267	334	401	468	535	601	668	735	802	869	935	1002	1069

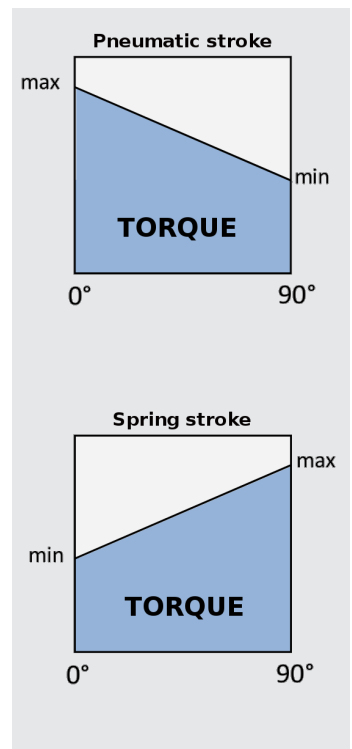
## Torque diagram single acting

Single-acting actuators don't provide a consistent torque throughout the entire pivoting angle due to the integrated spring cartridges. We differentiate between the torque diagrams of the pneumatic stroke and the spring stroke.

At the beginning of the pneumatic stroke the springs are mostly relaxed and the maximum pneumatic torque is available for the valve-operation. In the course of the air stroke the springs get compressed and the rising spring force linearly reduces the available pneumatic torque to operate the valve. In the end position the torque of the air stroke reaches its minimum value, the so-called minimum pneumatic torque.

The spring stroke starts with maximum tensioned springs and accordingly offers the maximum spring torque at the beginning of the reverse movement. In the course of the spring stroke the springs progressively relax so that the actuator torque linearly reduces until it reaches the minimum spring torque in the end position.

Thus, at the starting point of each movement the maximum torque is available to overcome the breakaway torque.



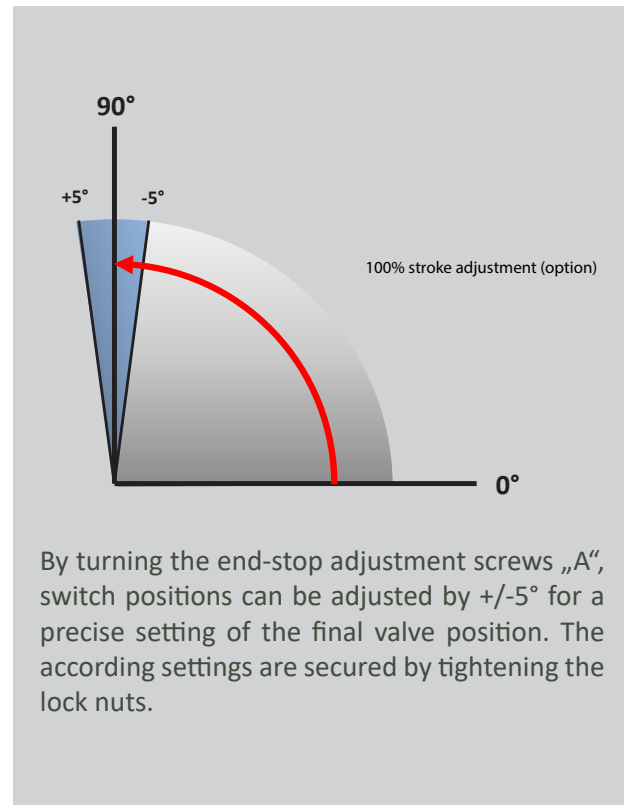
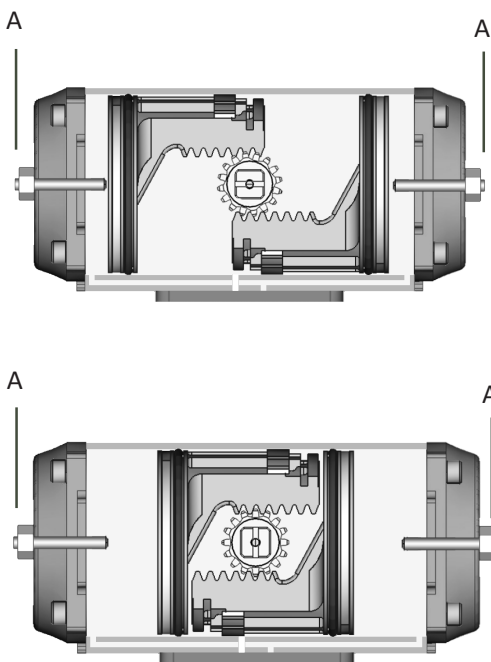
# Torque

Torque in Nm at control pressure in bar (g)

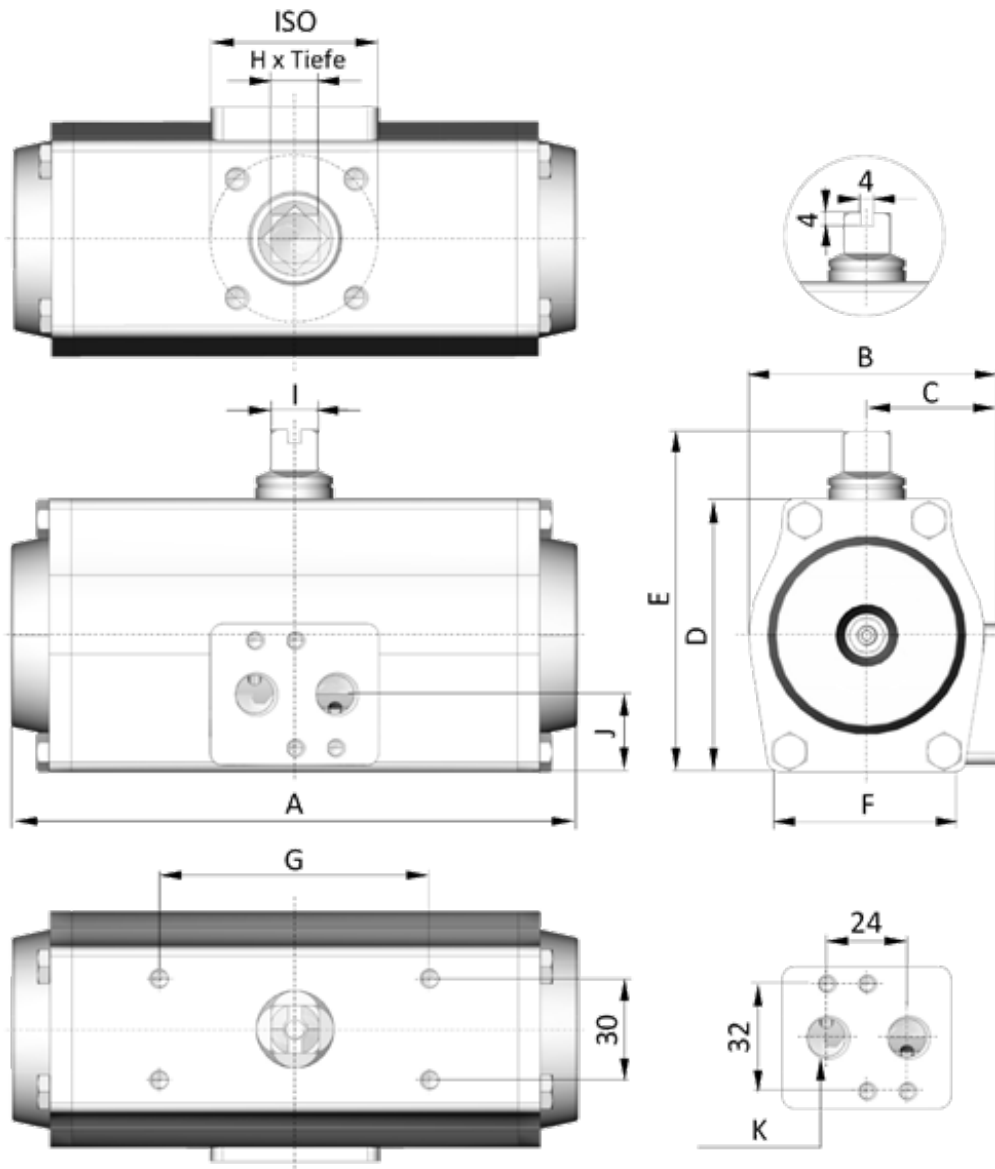
Typ	Spring set	Torque spring stroke in Nm		3 bar		3,5 bar		4 bar		4,5 bar		5 bar		5,5 bar		6 bar		7 bar		8 bar			
				max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min
		max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min
045	5	4,6	2,9	6,0	4,3																		
	6	5,5	3,5	5,4	3,3	6,9	4,8																
	7	6,5	4,1	4,8	2,3	6,3	3,8	7,8	5,3														
	8	7,4	4,6	4,2	1,3	5,7	2,8	7,2	4,3	8,7	5,8	10,2	7,3										
	9	8,3	5,2			5,1	1,9	6,6	3,4	8,1	4,9	9,6	6,4	11,1	7,9	12,6	9,4						
	10	9,2	5,8					6,0	2,4	7,5	3,9	9,0	5,4	10,5	6,9	12,0	8,4	15,0	11,4	18,1	14,5		
	11	10,1	6,4							6,9	2,9	8,4	4,4	9,9	5,9	11,4	7,4	14,4	10,4	17,5	13,5		
	12	11,1	7,0									7,8	3,5	9,3	5,0	10,8	6,5	13,8	9,5	16,9	12,6		
060	5	10,4	6,8	14,2	10,3																		
	6	12,5	8,2	12,7	8,1	16,2	11,7																
	7	14,6	9,6	11,2	5,9	14,8	9,5	18,3	13,0														
	8	16,7	10,9	9,8	3,7	13,4	7,3	16,9	10,8	20,5	14,4	24,0	17,9										
	9	18,8	12,3			11,9	5,1	15,4	8,6	19,0	12,2	22,5	15,7	26,1	19,3	29,6	22,8						
	10	20,9	13,7					14,0	6,4	17,6	10,0	21,1	13,5	24,7	17,1	28,2	20,6	35,3	27,7	42,4	34,8		
	11	22,9	15,0							16,2	7,8	19,7	11,3	23,3	14,9	26,8	18,4	33,9	25,5	41,0	32,6		
	12	25,0	16,4									18,2	9,1	21,8	12,7	25,3	16,2	32,4	23,3	39,5	30,4		
085	5	23,0	15,8	29,5	21,9																		
	6	27,6	19,0	26,2	17,1	33,9	24,9																
	7	32,2	22,1	22,9	12,3	30,6	20,0	38,3	27,7														
	8	36,8	25,3	19,6	7,4	27,3	15,1	35,0	22,8	42,8	30,6	50,5	38,3										
	9	41,4	28,5			23,9	10,3	31,6	18,0	39,4	25,8	47,1	33,5	54,8	41,2	62,5	48,9						
	10	46,0	31,6					28,3	13,2	36,1	21,0	43,8	28,7	51,5	36,4	59,2	44,1	74,6	59,5	90,0	74,9		
	11	50,6	34,8							32,8	16,1	40,5	23,8	48,2	31,5	55,9	39,2	71,3	54,6	86,7	70,0		
	12	55,2	38,0									37,1	19,0	44,8	26,7	52,5	34,4	67,9	49,8	83,3	65,2		
105	5	49,2	31,6	65,3	46,8																		
	6	59,1	38,0	58,7	36,5	75,3	53,1																
	7	68,9	44,3	52,1	26,2	68,6	42,7	85,0	59,1														
	8	78,7	50,6	45,4	15,8	61,9	32,3	78,3	48,7	94,7	65,1	111,1	81,5										
	9	88,6	56,9			55,3	22,0	71,7	38,4	88,1	54,8	104,5	71,2	121,0	87,7	137,4	104,1						
	10	98,4	63,3					65,0	28,0	81,4	44,4	97,8	60,8	114,3	77,3	130,7	93,7	163,6	126,6	196,5	159,5		
	11	108,3	69,6							74,7	34,0	91,1	50,4	107,6	66,9	124,0	83,3	156,9	116,2	189,8	149,1		
	12	118,1	75,9									84,5	40,1	101,0	56,6	117,4	73,0	150,3	105,9	183,2	138,8		
125	5	78,4	52,4	99,0	71,5																		
	6	94,1	62,8	87,9	55,0	113,3	80,5																
	7	109,7	73,3	76,8	38,5	102,3	64,0	127,8	89,5														
	8	125,4	83,8	65,8	22,0	91,3	47,5	116,8	73,0	142,3	98,5	167,8	124,0										
	9	141,1	94,2			80,3	31,0	105,8	56,5	131,3	82,0	156,8	107,5	182,8	133,5	208,8	159,5						
	10	156,8	104,7					94,8	40,0	120,3	65,5	145,8	91,0	171,8	117,0	197,8	143,0	248,8	194,0	299,8	245,0		
	11	172,4	115,2							108,8	48,5	134,8	74,5	160,8	100,5	186,8	126,5	237,8	177,5	288,8	228,5		
	12	188,1	125,7									123,7	58,0	149,7	84,0	175,7	110,0	226,7	161,0	277,7	212,0		
140	5	129,0	85,8	172,6	127,2																		
	6	154,8	102,9	154,6	100,1	198,7	144,2																
	7	180,5	120,1	136,6	73,0	180,6	117,0	224,6	161,0														
	8	206,3	137,3	118,5	45,8	162,5	89,8	206,5	133,8	250,5	177,8	294,5	221,8										
	9	232,1	154,4			144,5	62,7	188,5	106,7	232,5	150,7	276,5	194,7	320,0	238,2	363,5	281,7						
	10	257,9	171,6					170,4	79,5	214,4	123,5	258,4	167,5	301,9	211,0	345,4	254,5	433,4	342,5	521,4	430,5		
	11	283,7	188,7							196,8	96,9			240,3	140,4	283,8	183,9	327,3	227,4	415,3	315,4	503,3	403,4
	12	309,5	205,9									222,3	113,2	265,8	156,7	309,3	200,2	397,3	288,2	485,3	376,2		
160	5	208,3	139,7	254,0	181,8																		
	6	250,0	168,0	224,6	137,9	291,6	204,8																
	7	292,0	196,0	195,2	94,0	262,2	161,0	329,2	228,0														
	8	333,0	223,0	165,8	50,2	232,8	117,2	299,8	184,2	366,3	250,7	432,8	317,2										
	9	375,0	251,0			203,9	73,8	270,4	140,3	336,9	206,8	403,4	273,3	470,4	340,3	537,4	407,3						
	10	417,0	279,0					241,0	96,4	307,5	163,0	374,0	229,5	441,0	296,5	508,0	363,5	641,0	496,5	775,0	630,5		
	11	458,0	307,0							277,6	118,6	344,6	185,6	411,6	252,6	478,6	319,6	611,6	452,6	745,6	586,6		
	12	500,0	335,0									315,2	141,7	382,2	208,7	449,2	275,7	582,2	408,7	716,2	542,7		

## Pivoting angle adjustment

All actuators of the PT series function via a stroke limiter, which in the switch position has a different setting range from standard values + 5 / -5, optionally even for the entire swivel range (also 100%).



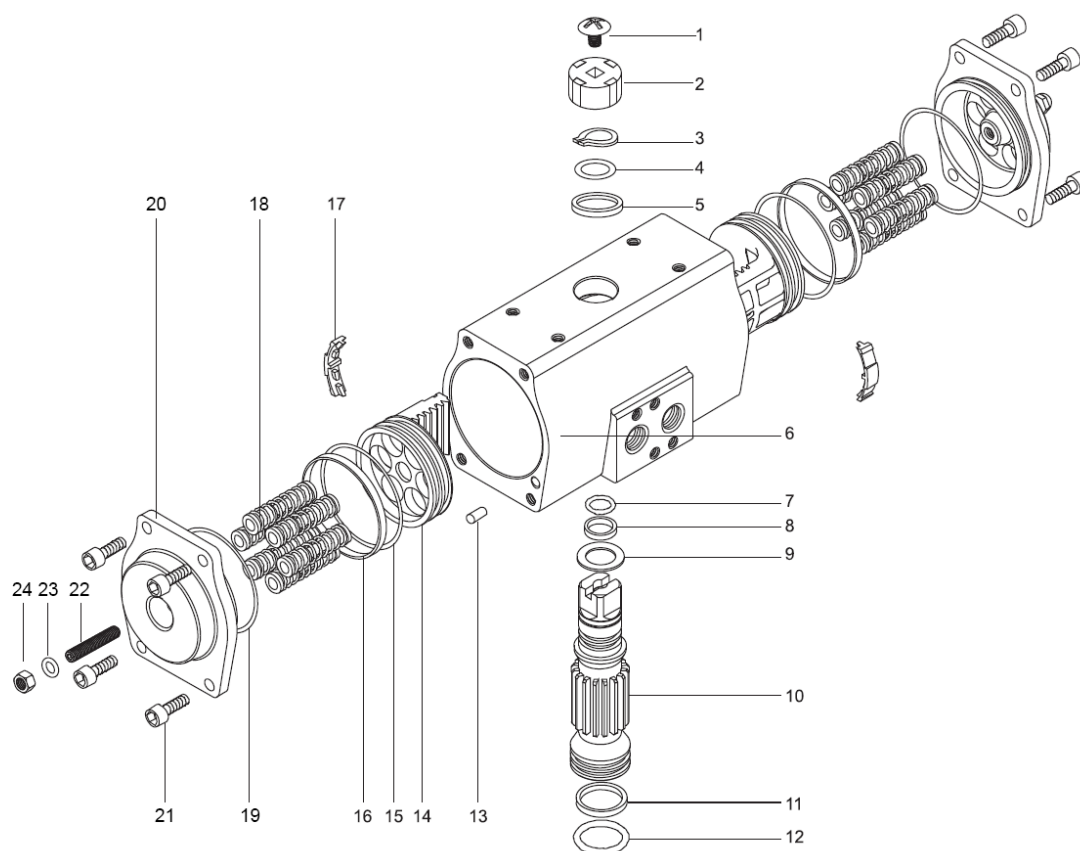
# Dimensions



Size	A	B	C	D	E	F	G	ISO	H	I	J	K
045	148	70	41	65	95	48	80	F03 + F05	14x14	16	23	G1/4"
060	167	78	43	81	111	58	80	F05	14x18	16	23	G1/4"
085	197	102	54	108	138	75	80	F05 + F07	17x21	16	24	G1/4"
105	251	122	64	133	163	92	80	F07	17x26	16	24	G1/4"
125	284	140	72	155	185	96	130	F07 + F10	22x26	22	28	G1/4"
140	360	154	78	172	202	112	130	F10 + F12	27x31	22	34	G1/4"
160	420	173	86	197	227	127	130	F10 + F12	27x31	22	39	G1/4"



# Parts & materials



No.	Designation	Qty	Material standard	No.	Designation	Qty	Material standard
1	Screw visual indicator	1	ABS	13	Plug	1	NBR
2	Visual indicator	1	ABS	14	Piston	2	Stainless steel
3	Circlip	1	Stainless steel	15	O-ring (piston)	2	NBR
4	Thrust washer	1	Stainless steel	16	Guidance ring (piston)	2	POM
5	Outside washer	1	POM	17	Guidance segment	2	POM
6	Body	1	Stainless steel	18	Safety spring	0-12	Spring steel
7	Inside washer	1	POM	19	O-ring end cap	2	NBR
8	O-ring (pinion top)	1	NBR	20	End cap	2	Stainless steel
9	Bearing (pinion top)	1	POM	21	Cap screw	2	Stainless steel
10	Pinion	1	Carbon steel	22	O-ring (end adjustment screw)	2	NBR
11	Bearing (pinion bottom)	1	POM	23	O-ring (stroke adjustment screw)	2	NBR
12	O-ring (pinion bottom)	1	NBR	24	Nut (end adjustment screw)	2	Stainless steel



# Technical data

<b>Construction principle</b>	Pneumatic double-piston rotary actuator in rack&pinion-design with self-centering pistons; double- and single-acting execution	
<b>Materials</b>	See chapter „Parts and materials“	
<b>Temperature range</b>	Standard	-20°C to +80°C
	Low temperature version	-40°C to +80°C
	High temperature version	-10°C to +150°C
<b>Control pressure</b>	2 to 8 bar	
<b>Pressure media</b>	dry, filtered air or inert gases in respect of remaining oil-, dust and water-content according to DIN ISO 8573-1 / class 4, maximum particle diameter 30µm, dew point minimum 10°C below ambient temperature	
<b>Nominal rotation angle</b>	90° Adjustable in switch position +/-5°, (optional 100% stroke adjustment)	
<b>Torque range</b>	double-acting	to 2100 Nm
	single-acting	to 625 Nm
<b>Standards</b>	Interface actuator/feedback-unit Interface actuator/control media supply Interface actuator/valve	VDI/VDE 3845 bzw. NAMUR VDI/VDE 3845 bzw. NAMUR ISO 5211 und DIN 3337

## Typcode

	<b>PT</b>	<b>E</b>	<b>-</b>	<b>2A</b>	<b>-</b>	<b>085</b>	<b>/</b>	<b>090</b>	<b>.</b>	<b>11</b>	<b>.</b>	<b>F05/F07</b>	<b>-</b>	<b>V</b>	<b>17</b>	<b>-</b>	<b>F</b>
<b>Type</b>																	
<b>Function</b>																	
	D: double-acting E: single-acting																
<b>Stainless steel type</b>																	
	2A: V2A (1.4301) 4A: V4A (1.4404)																
<b>Size</b>																	
<b>Rotation angle</b>	Rotation angle in degree																
<b>Spring set</b>																	
<b>ISO valve interface</b>																	
<b>Stem connection</b>	V: Square acc.to ISO 5211 and DIN 3337																
<b>Stern connection dimensions</b>	Dimension in mm																
<b>Mounting direction</b>																	
	E: transversal to pipe, spring direction CW F: parallel to pipe, spring direction CW G: transversal to pipe, spring direction CCW H: parallel to pipe, spring direction CCW																

**ProtACT GmbH**  
Märkerstraße 18  
56307 Dernbach

Tel: +49 (0) 2605 96 25 19-0  
Fax: +49 (0) 2605 96 25 19-6  
Email: [protact@protact-gmbh.de](mailto:protact@protact-gmbh.de)

**Website: [www.protact-gmbh.de](http://www.protact-gmbh.de)**