



Pneumatic Cylinders

Ø10 to Ø125 mm P1S Series
According to ISO 6432 - 6431

PDE2535TCUK



ENGINEERING YOUR SUCCESS.



Important

Before attempting any external or internal work on the cylinder or any connected components, make sure the cylinder is vented and disconnect the air supply in order to ensure isolation of the air supply.



Note

All technical data in this catalogue are typical data only. Air quality is essential for maximum cylinder service life (see ISO 8573).



WARNING

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

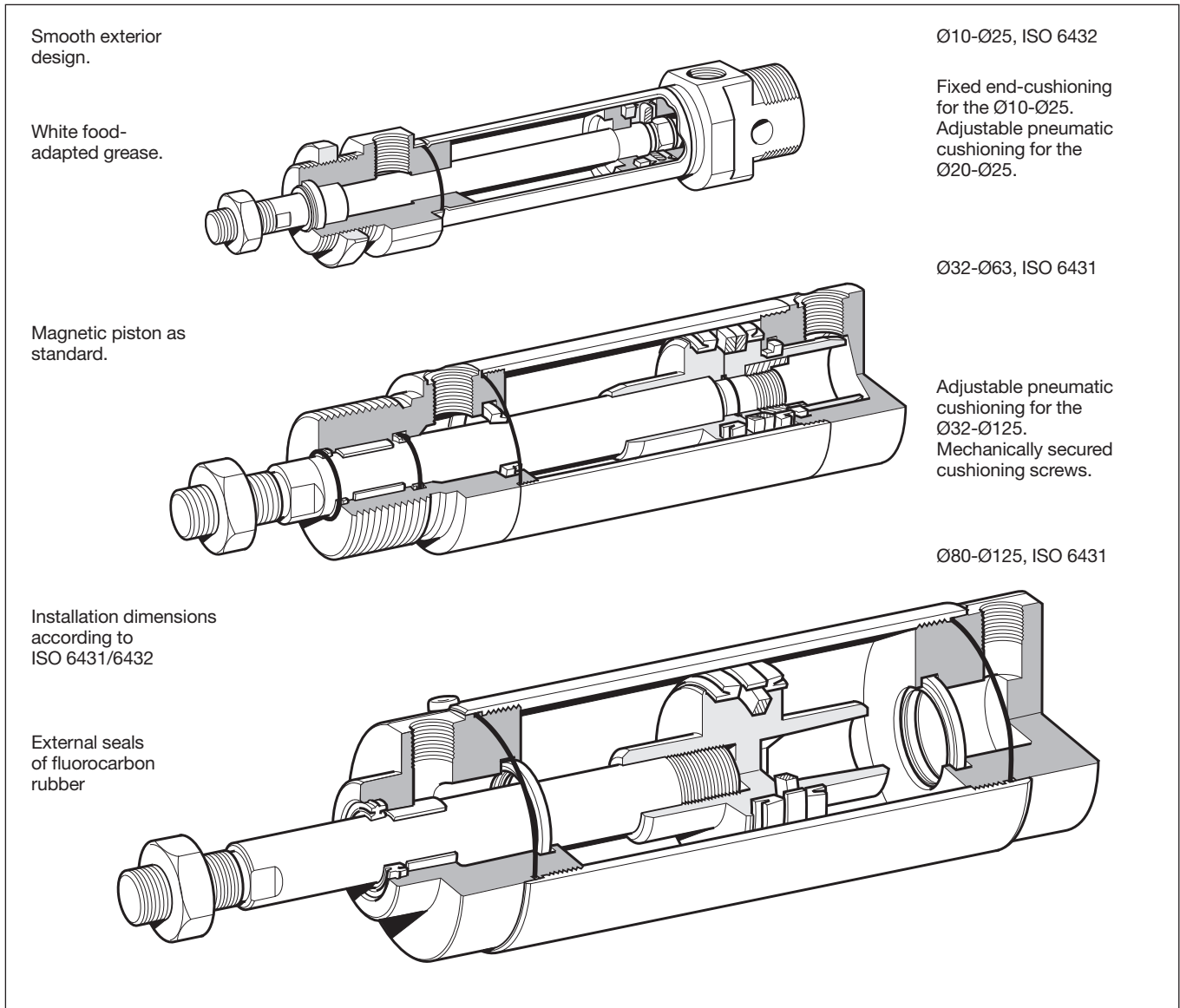
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P1S Series Stainless Steel Pneumatic Cylinders



Stainless steel cylinders

Parker Pneumatic's range of stainless steel cylinders has been specially designed for use in difficult environments. Smooth design, external seals of fluorinated rubber and prelubrication with our food-industry-approved grease according to USDA-H1 make the cylinders particularly suitable for food industry use. All cylinders have magnetic pistons for proximity position sensing. Fixing dimensions to ISO 6431/6432 simplify installation and make the cylinders physically interchangeable throughout the world.

ISO 6432

The cylinders are available in two versions. One with fixed end-cushioning and is available in 10, 12, 16, 20 and 25 mm diameters. A single-acting version with spring return in the negative direction, is available in the same diameters.

One version has adjustable pneumatic end-cushioning and is available in 20 and 25 mm diameters.

ISO 6431

The ISO cylinders are double-acting round cylinders with several types of cylinder mountings as standard. The cylinders are available in 32 to 125 mm diameters, incorporating adjustable end-cushioning. As with the ISO 6432 it is designed to comply with hygiene requirements in accordance with the EU Machine Directive.

The cylinder can be dismantled to facilitate service and maintenance.

P1S Series Stainless Steel Pneumatic Cylinders

Stainless steel construction

The cylinders are made for use in particularly demanding environments. The piston rod, cylinder tube and end covers are all of stainless steel.

Effective end-cushioning

A version of ISO 6432 Ø10-Ø25 incorporates fixed end-cushioning, while the cylinders Ø20-Ø125 have pneumatic end-cushioning with adjusting screws for exact setting, permitting heavier loads and higher speeds for short cycle times.

Smooth external design

The end covers have no recesses or other grooves that could collect dirt or liquid. Cleaning is easy and effective.

Dry operation

Particular attention has been paid to the design of the cylinders' scraper rings, piston rod bearings and piston rod seals. Self-lubricating materials permit regular washing/degreasing of the piston rod. This is important in applications where hygiene and cleaning must be of high standard.

Proximity position sensing

All cylinders in normal temperature design are fitted with a magnet for proximity position sensing. Electronic type sensors and reed switches are available. They are supplied with either flying lead or cable plug connector.

Complete range of mountings

A complete range of stainless steel mounting accessories with ISO dimensions is available.

Variants

In addition to the basic design, several standard variants of these stainless steel cylinders are available to fulfill more demanding requirements in terms of performance and environmental conditions:

- Cylinders with special stroke lengths
- Cylinders with extended piston rods
- Single-acting cylinders (Ø10-Ø25)
- High-temperature versions for operation in temperature range:
 - Ø10 to Ø16 mm from -10 °C to +120 °C (not magnetic piston)
 - Ø20 to Ø125 mm from -10 °C to +150 °C (not magnetic piston)



Double acting Ø10-Ø25, fixed end-cushioning



Double acting Ø20-Ø25, adjustable end-cushioning



Double acting Ø10-Ø25, through piston rod



Single acting Ø10-Ø25



Double acting Ø32-Ø63



Double acting Ø80-Ø125

P1S Series Stainless Steel Pneumatic Cylinders

Cylinder forces, double acting variants

Cyl. bore/ pist. rod mm	Stroke	Piston area cm ²	Max theoretical force in N (bar)									
			1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0
10/4	+	0.8	8	16	24	31	39	47	55	63	71	79
	-	0.7	7	13	20	26	33	40	46	53	59	66
12/6	+	1.1	11	23	34	45	57	68	79	90	102	113
	-	0.8	8	17	25	34	42	51	59	68	76	85
16/6	+	2.0	20	40	60	80	100	120	141	161	181	201
	-	1.7	17	35	52	69	86	104	121	138	156	173
20/8	+	3.1	31	63	94	126	157	188	220	251	283	314
	-	2.6	26	53	79	106	132	158	185	211	238	264
25/10	+	4.9	49	98	147	196	245	295	344	393	442	491
	-	4.1	41	82	124	165	206	247	289	330	371	412

+ = Outward stroke
- = Return stroke

Note!
Select a theoretical force 50-100%
larger than the force required

Cylinder forces single acting variants

Indicated cylinder forces are theoretical and should be reduced according to the working conditions.

Order code	Theoretical piston force at 6 bar				Order code	Theoretical piston force at 6 bar			
	Nmax	Nmin	Spring retraction Nmax	Nmin		Nmax	Nmin	Spring extension Nmax	Nmin
Single acting. spring return					Single acting. spring-extend				
P1S-S010SS-0010	38	36	10	8.5	P1S-S016TS-0010	85	84	22.3	20.2
P1S-S010SS-0015	38	36	10	7.8	P1S-S016TS-0015	86	84	22.3	19
P1S-S010SS-0025	39	36	10	6.6	P1S-S016TS-0025	88	84	22.3	17
P1S-S010SS-0040	38	34	13	9	P1S-S016TS-0040	90	84	22.3	14
P1S-S010SS-0050	39	34	13	8	P1S-S016TS-0050	91	84	22.3	12
P1S-S010SS-0080	39	34	12	7					
P1S-S012SS-0010	53	51	16	14.4	P1S-S020TS-0010	132	130	30	28
P1S-S012SS-0015	53	51	16	13.6	P1S-S020TS-0015	133	130	30	27
P1S-S012SS-0025	55	51	16	12	P1S-S020TS-0025	135	130	30	25
P1S-S012SS-0040	52	48	19	13.4	P1S-S020TS-0040	138	130	30	22
P1S-S012SS-0050	53	48	19	12	P1S-S020TS-0050	140	130	30	20
P1S-S012SS-0080	55	48	21.4	12	P1S-S020TS-0080	139	108	31	17
P1S-S016SS-0010	102	99	22.3	20.2	P1S-S025TS-0010	205	203	38.5	36
P1S-S016SS-0015	103	99	22.3	19	P1S-S025TS-0015	207	203	38.5	34.7
P1S-S016SS-0025	105	99	22.3	17	P1S-S025TS-0025	210	203	38.5	32
P1S-S016SS-0040	106	95	22.3	14	P1S-S025TS-0040	214	203	38.5	28.5
P1S-S016SS-0050	108	95	22.3	12	P1S-S025TS-0050	217	203	38.5	26
P1S-S016SS-0080	107	95	22.5	12	P1S-S025TS-0080	223	206	36	21
P1S-S020SS-0010	163	161	30	28					
P1S-S020SS-0015	164	161	30	27					
P1S-S020SS-0025	167	161	30	25					
P1S-S020SS-0040	166	159	30	22					
P1S-S020SS-0050	168	159	30	20					
P1S-S020SS-0080	170	161	29.4	18					
P1S-S025SS-0010	256	253	44.3	41.4					
P1S-S025SS-0015	258	253	44.3	40					
P1S-S025SS-0025	262	253	44.3	37					
P1S-S025SS-0040	261	250	44.3	32					
P1S-S025SS-0050	264	250	44.3	30					
P1S-S025SS-0080	264	251	44.4	30					

Main data

Cylinder designation	Cylinder bore		Piston rod		thread	Total mass at 0 mm stroke	addition per 10 mm stroke	Air consumption	Conn. thread
	mm	cm ²	mm	cm ²					
Double acting, cushioned stroke									
P1S-S010D	10	0.78	4	0.13	M4	0.04	0.003	0.0100 ¹⁾	M5
P1S-S012D	12	1.13	6	0.28	M6	0.07	0.004	0.0139 ¹⁾	M5
P1S-S016D	16	2.01	6	0.28	M6	0.09	0.005	0.0262 ¹⁾	M5
P1S-S020D	20	3.14	8	0.50	M8	0.18	0.007	0.0405 ¹⁾	G1/8
P1S-S025D	25	4.91	10	0.78	M10x1.25	0.25	0.011	0.0633 ¹⁾	G1/8
Double acting, adjustable cushioning									
P1S-S020M	20	3.14	8	0.50	M8	0.18	0.007	0.0405 ¹⁾	G1/8
P1S-S025M	25	4.91	10	0.78	M10x1.25	0.25	0.011	0.0633 ¹⁾	G1/8
Single acting, spring return									
P1S-S010SS	10	0.78	4	0.13	M4	0.04	0.003	0.0055 ¹⁾	M5
P1S-S012SS	12	1.13	6	0.28	M6	0.08	0.004	0.0079 ¹⁾	M5
P1S-S016SS	16	2.01	6	0.28	M6	0.10	0.005	0.0141 ¹⁾	M5
P1S-S020SS	20	3.14	8	0.50	M8	0.18	0.007	0.0220 ¹⁾	G1/8
P1S-S025SS	25	4.91	10	0.78	M10x1.25	0.26	0.011	0.0344 ¹⁾	G1/8
Single acting, spring-extended									
P1S-S016TS	16	2.01	6	0.28	M6	0.10	0.005	0.0141 ¹⁾	M5
P1S-S020TS	20	3.14	8	0.50	M8	0.18	0.007	0.0220 ¹⁾	G1/8
P1S-S025TS	25	4.91	10	0.78	M10x1.25	0.26	0.011	0.0344 ¹⁾	G1/8

1) Free air consumption per 10 mm stroke length for a double stroke at 6 bar

Working medium, air quality

Working medium Dry, filtered compressed air to ISO 8573-1 class 3.4.3.

Recommended air quality for cylinders

For best possible service life and trouble-free operation, ISO 8573-1 quality class 3.4.3 should be used. This means 5 µm filter (standard filter) dew point +3 °C for indoor operation (a lower dew point should be selected for outdoor operation) and oil concentration 1.0 mg oil/m³, which is what a standard compressor with a standard filter gives.

Additional data

Working pressure max 10 bar
Working temperature max +80 °C
min -20 °C

High-temperature version Ø10 to Ø16 max +120°C
Ø20 to Ø25 max +150°C

Prelubricated, further lubrication is not normally necessary. If additional lubrication is introduced it must be continued.

ISO 8573-1 quality classes

Quality class	Pollution		Water	Oil
	particle size (µm)	max concentration (mg/m ³)	max press dew point (°C)	max concentration (mg/m ³)
1	0.1	0.1	-70	0.01
2	1	1	-40	0.1
3	5	5	-20	1.0
4	15	8	+3	5.0
5	40	10	+7	25.
6	-	-	+10	-

Material specification

Piston rod	Stainless steel, X8 CrNiS 18-10 (AISI 321)
Piston rod bearing	Multilayer PTFE/steel
End covers	Stainless steel, X5 CrNi 18-10 (AISI 304)
O-ring, internal	Nitrile rubber, NBR
Cylinder barrel	Stainless steel, X5 CrNi 18-10 (AISI 304)
Magnet holder	Thermoplastic elastomer
Magnet	Plastic-coated magnetic material
Return spring	Surface-treated steel
Cushioning screw	Stainless steel, X10 CrNiS 18-9 (AISI 303)

Variants Mini ISO:

Standard-temperature version, type S:

Piston rod seal	Nitrile rubber, NBR
Piston complete	Nitrile rubber, NBR/steel

High-temperature version, type F:

Piston rod seal	Fluorocarbon rubber, FPM
Piston complete	HNBR/steel

Cylinders with outer sealings in fluorocarbon, type V:

Piston rod seal/	
Scraper ring	Fluorocarbon rubber, FPM
Piston complete	Nitrile rubber, NBR/steel

Spare part = new cylinder

Cushioning diagram

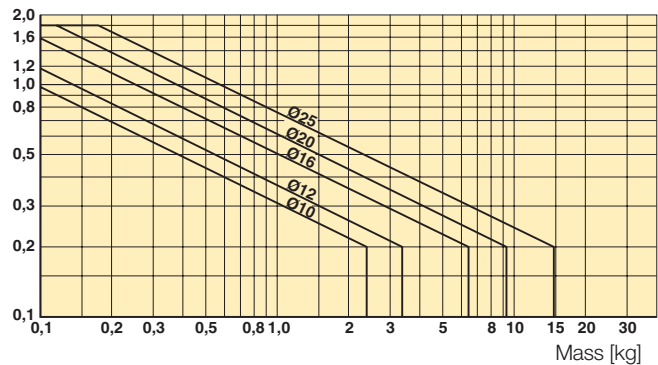
Use the diagram below to determine the necessary size of cylinder to provide the requisite cushioning performance. The maximum cushioning performance, as indicated in the diagram, is based on the following assumptions:

- Low load, i.e. low pressure drop across the piston
- Steady-state piston speed
- Correctly adjusted cushioning screw

The load is the sum of the internal and external friction, together with any gravity forces. At high relative loading it is recommended that, for a given speed, the load should be reduced by a factor of 2.5, or that, for a given mass, the speed should be reduced by a factor of 1.5. These factors apply in relation to the maximum performance as shown in the diagram.

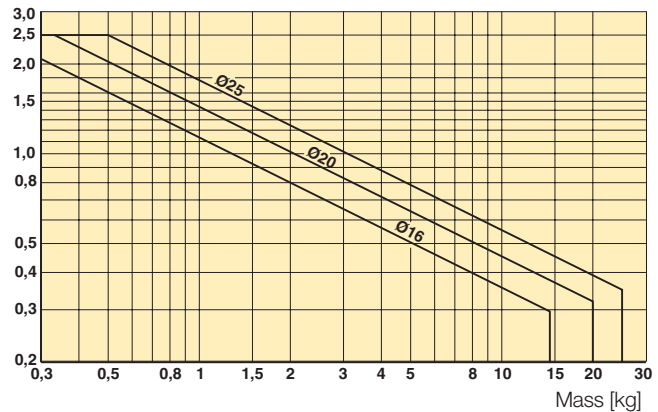
Fixed end-cushioning

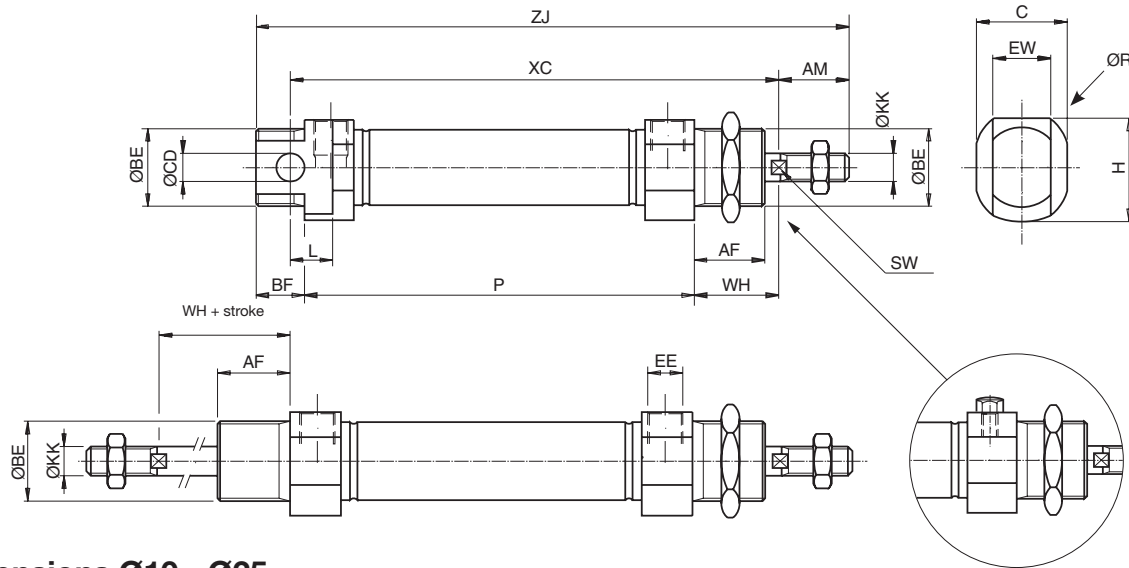
Speed [m/s]



Adjustable pneumatic end-cushioning

Speed [m/s]





Dimensions Ø10 - Ø25

Cylinder bore mm	EE	Ø BE mm	Ø CD H9 mm	BF mm	L mm	AF mm	WH ±1,2 mm	AM 0/-2 mm	Ø KK mm	SW mm	C mm	EW mm	H mm	Ø R mm
10 ¹⁾	M5	M12x1,25	4	10	6	12	16	12	M4	-	13,0	8	13,5	16,0
10 ²⁾	M5	M12x1,25	4	10	6	12	16	12	M4	-	13,0	8	14,0	16,0
12	M5	M16x1,50	6	13	9	18	22	16	M6	5	17,8	12	17,8	20,0
16	M5	M16x1,50	6	13	9	18	22	16	M6	5	17,8	12	17,8	20,0
20	G1/8	M22x1,50	8	14	12	20	24	20	M8	7	23,8	16	23,8	27,0
25	G1/8	M22x1,50	8	14	12	22	28	22	M10x1,25	9	26,8*	16	26,8*	31*

¹⁾ SS / TS single acting ²⁾ DS / MS double acting * For K_, SF, F_ version dimensions are 27,5 | 27,5 | Ø34

Double acting cylinders

Cylinder bore mm	ZJ mm	XC mm	P mm
10	84 + stroke	64 + stroke	46 + stroke
12	99 + stroke	75 + stroke	48 + stroke
16 ²⁾	104 + stroke	82 + stroke	53 + stroke
20 ²⁾	125 + stroke	95 + stroke	67 + stroke
25 ²⁾	132 + stroke	104 + stroke	68 + stroke

Single acting cylinders, spring return type S

Stroke Cyl. bore mm	10 XC	15 XC	25 XC	40 XC	50 XC	80 XC	10 ZJ	15 ZJ	25 ZJ	40 ZJ	50 ZJ	80 ZJ	10 P	15 P	25 P	40 P	50 p	80 P
10	74	79	89	126	136	174	94	99	109	146	156	194	56	61	71	108	118	156
12	85	90	100	132	142	185	109	114	124	156	166	209	58	63	73	105	115	158
16	92	97	107	122	132	184	114	119	129	144	154	206	63	68	78	93	103	155
20	105	110	120	135	145	191	135	140	150	165	175	221	77	82	92	107	117	163
25	114	119	129	144	154	201	142	147	157	172	182	229	78	83	93	108	118	165

Length tolerances ±1mm
Stroke length tolerances +1.5/0 mm

Cylinders are supplied complete with mounting and adjusting nuts. Cylinders with through piston rod are supplied complete with two adjusting nuts and one mounting nut.




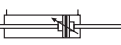



Single acting cylinders, spring extend type T

Stroke Cyl. bore mm	10 XC ³⁾	15 XC ³⁾	25 XC ³⁾	40 XC ³⁾	50 XC ³⁾	80 XC ³⁾	10 ZJ ³⁾	15 ZJ ³⁾	25 ZJ ³⁾	40 ZJ ³⁾	50 ZJ ³⁾	80 ZJ ³⁾	10 P	15 P	25 P	40 P	50 p	80 P
16	107	112	122	137	147	-	129	134	144	159	169	-	78	83	93	108	118	-
20	120	125	135	150	160	195	150	155	165	180	190	225	92	97	107	122	132	167
25	129	134	144	159	169	205	157	162	172	187	197	233	93	98	108	123	133	169

³⁾ With piston rod retracted as shown in the dimension drawing Length tolerances ±1mm Stroke length tolerances +1.5/0 mm

Order key

P1S - S **016** **M** **S** - **0025**

Cylinder bore mm	Cylinder type / function	Stroke in mm	Sealing material
010	M  Double-acting, adjustable cushioning. Ø 20-25 mm. Not for sealing material type F.	E.g. 0025 = 25 mm For standard stroke length and max length, see table below	S Standard, -20 °C to +80 °C. Magnetic piston
012	D  Double-acting, non-adjustable cushioning, Ø10 - 25 mm		F  High temperature, Ø10 to Ø16 -10 to +120°C Ø20 to Ø25 -10 to +150°C Non-magnetic piston
016	F  Double-acting, adjustable cushioning, thru-rod, Ø 20 - 25 mm. Not for sealing material type F.		V External seals of fluorinated rubber. -20 °C to +80 °C. Magnetic piston
020	K  Double-acting, non-adjustable cushioning, thru-rod, Ø10 - 25 mm		
025	S  Single-acting, non-adjustable cushioning, spring return for retract stroke, Ø10 - 25 mm. Not for sealing material type type F & V.		
	T  Single-acting, non-adjustable cushioning, spring return for advance stroke, Ø16 - 25 mm. Not for sealing material type F & V.		

Stroke length

Cylinder designation	Cylinder bore	● Standard stroke length in mm										■ Non standard stroke length									
		10	15	20	25*	30	40	50*	80*	100*	125*	160*	200*	250*	320*	400*	500*				
Double acting with fixed end-cushioning:																					
P1S-S010D	10	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●				
P1S-S012D	12	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●				
P1S-S016D	16	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●				
P1S-S020D	20	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●				
P1S-S025D	25	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●				
Double acting with adjustable end-cushioning:																					
P1S-S020M	20	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●				
P1S-S025M	25	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●				
Single acting, spring return:																					
P1S-S010SS	10	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●				
P1S-S012SS	12	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●				
P1S-S016SS	16	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●				
P1S-S020SS	20	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●				
P1S-S025SS	25	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●				
Single acting, spring-extended:																					
P1S-S016TS	16	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●				
P1S-S020TS	20	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●				
P1S-S025TS	25	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●				

* Standard stroke lengths in mm according to ISO 4393
 ** Max stroke 1000 mm