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Linear Actuators

A complete range of pneumatic actuators

Catalogue PDE2612TCUK. August 2010

Parker

ENGINEERING YOUR SUCCESS.

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Parker Hannifin

Parker Hannifin is one of the world's leading suppliers of products and solutions in Motion and Control.
Using innovative product development and an acquisition strategy to increase our range of pneumatic products and solutions, we now have one of the broadest product offerings available in the market.

Our range now extends from the compressor to the point at which the air is used. This could be supplying power take off on a vehicle, moving a cylinder or gripper to milking cows. The design and manufacture of bespoke integrated solutions for air, gas and fluid control is one of our core specialisation.

The Parker network of distributors is the most comprehensive in the world, which means our products are available from specialist pneumatic distributors wherever you are located.

In the following pages are listed the core first choice products from across Parker which are aimed at the pneumatic market. From valves, actuators and air preparation to push in fittings quick connectors and tubing to customized systems.
In this catalogue you will find products form Pneumatic Division Europe, Legris,Rectus Tema, Fluidconnectors, KV and Fluid Controls, presenting an unrivalled choice of products and solutions to suit virtually any application.

Mini ISO Cylinders 6432 - P1A

- **Mini cylinder according to ISO 6432**
- **Available in 10 to 25 mm bores**
- **Corrosion resistant design and low weight construction**
- **Magnetic piston as standard**
- **End stroke buffers for long service life**

p11

Mini Cylinders - R10 / R25

- **Available in 10 to 25 mm bores**
- **Single acting**
- **Double acting with cushioning**
- **Contactless position sensing**
- **ATEX version**
- **Through piston rod**
- **Non rotating**

p37

All Round Cylinders - R32 / R63

- **Available in 32 to 63 mm bores**
- **Double acting without cushioning**
- **Double acting with adjustable cushioning**
- **Contactless position sensing**
- **Pivot mounting on the front and rear cylinder covers**

p45

ISO Cylinders 6431/VDMA - P1D

- **Available in 32 to 125 mm bores**
- **PUR seals for long service life**
- **Drop-in sensors**
- **Corrosion resistant design**
- **Magnetic piston as standard**
- **Lubricated with food grade grease**

p53

Pneumatic Cylinders ISO 6431 - DZ

- **Available in 125 to 320 mm bores**
- **Double acting with cushioning**
- **Contactless position sensing**
- **ATEX version**
- **To CETOP RP53P**
- **Longer cushion strokes on request**

p145

Pneumatic Cylinders ISO 6431 - AZ

- **Available in 32 to 100 mm bores**
- **Double acting with cushioning**
- **Contactless position sensing**
- **ATEX version**
- **To CETOP RP43P**
- **Viton version for high temperature range (+150^{O}C)**

p155

VDMA 24562 Cylinder - P1E

- **Ø160 - 200mm bore size VDMA standard**
- **Double acting with adjustable end cushioning**
- **Magnetic piston as standard**
- **Non-lube operation**
- **Tie rod construction**
- **Complete range of mountings & accessories**

p179

Short stroke cylinders - C05/C05S

- **Ø8 - 63mm bore size**
- **Short stroke providing high clamping force**
- **Compact dimensions for confined spaces**
- **Single and double acting**
- **Simple installation and mounting**

p197

Short Build Cylinders - P1M

- 4 ported design - optional port configuration
- VDMA mounting centres 32mm to 100mm bore size
- Corrosion resistant design and low weight construction
- Magnetic piston as standard
- End of stroke buffers for long service life

p203

Compact Cylinders - P1J

- Compact and versatile
- Magnetic piston for direct fit with electronic controls
- Fit flush global sensor range with many functions
- Choose from our wide range of double-acting, single-acting and double-acting with guide rod

p235

Compact Cylinders - NZ

- Single acting
- Double acting without cushioning
- Contactless position sensing
- Through piston rod
- Non rotating
- Option of internal or external mounting on piston rod
- High temperature version

p255

Profile Cylinders - P1K

- Ø32 - 125mm bore sizes
- Single and double acting
- Clean line profile design
- Designed for dry piston rod operation
- End stroke buffers for long service life
- Position sensing versions

p277

Compact Cylinders - P5T

- Complete cylinder function with integral guidance
- Stainless steel guide rods
- Wide range of standard strokes, diameter 16-100 mm
- Flexible porting as standard
- End stop cushions as standard

p295

Thrust Cylinders - C0D/C0P

- Thrust cylinders provide large forces
- Compact dimensions
- C0D, diaphragm type
- C0P, piston type
- Available in single and double acting versions

p321

Air Bellows - 9109

- 10 sizes, diameters 70-660 mm
- Strokes from 45 to 375 mm
- Single, double or triple convolutions
- High thrust and frictionless movement
- Maintenance free

p331

Air Bellows - SP

- Single and double convolutions
- Single convolution: maximum stroke length 110mm
- Double convolution: maximum stroke length 240mm
- Special versions available on request

p343

Stainless Steel ISO 6431 - P1S

- **Round cylinder to ISO 6431**
- **All stainless steel**
- **Clean, smooth washdown design**
- **Magnetic piston as standard**
- **Adjustable cushioning for long service life**
- **Complete range of mountings and sensors**

p353

Cartridge Cylinder - P1G

- **Ø6, 10 &16mm bore sizes**
- **Non-lube operation**
- **Corrosion resistant design**
- **Integral mounting threads**
- **Compact construction**
- **Single acting as standard**

p379

Hydraulic Clamp Cylinder - VB

- **Single acting cylinder with built-in hydro-pneumatic intensifier**
- **Compact size with large clamping forces up to 2700 daN**
- **Operated using a compressed air supply, no special installation required**
- **Easy adjustement through a fully threaded body**

p385

Universal Grippers - P5GC

- **Compact design**
- **Double acting, square jaws**
- **Automatic grip retention by mechanical system**
- **Total jaw opening (180°)**
- **High reliability**

p391

Cylinder bore mm	Series		Stroke	Bore mm	Piston rod mm	Area cm2	Max theoretical force in N 1.0 bar	2.0 bar	3.0 bar	4.0 bar	5.0 bar	6.0 bar	7.0 bar	8.0 bar	9.0 bar	10.0 bar
10/4	**P1A**	Double acting	+	10	4	0.8	8	15	23	31	39	**46**	54	62	69	77
	P1S		-	10	4	0.7	6	13	19	26	32	**39**	45	52	58	65
12/5	**C05**	Double acting	+	12	5	1.1	11	22	33	44	55	**67**	78	89	100	111
			-	12	5	0.9	9	18	27	37	46	**55**	64	73	83	92
12/6	**P1A**	Double acting	+	12	6	1.1	11	22	33	44	55	**67**	78	89	100	111
	P1J		-	12	6	0.8	8	17	25	33	42	**50**	58	67	75	83
	P1M															
	P1S															
16/6	**P1A**	Double acting	+	16	6	2.0	20	39	59	79	99	**118**	138	158	178	197
	P1S		-	16	6	1.7	17	34	51	68	85	**102**	119	136	152	169
16/8	**P1M**	Double acting	+	16	8	2.0	20	39	59	79	99	**118**	138	158	177	197
	P5T		-	16	8	1.5	15	30	44	59	74	**89**	103	118	133	148
20/8	**P1A**	Double acting	+	20	8	3.1	31	62	92	123	154	**185**	216	246	277	308
	P1S		-	20	8	2.6	26	52	78	104	129	**155**	181	207	233	259
20/10	**C05**	Double acting	+	20	10	3.1	31	62	92	123	154	**185**	216	247	277	308
	P1J		-	20	10	2.4	23	46	69	92	116	**139**	162	185	208	231
	P1M															
	P5T															
20/10	**NZ6020**	Double acting	+	20	10	3.1	28	56	85	113	141	**169**	198	226	254	282
			-			2.6	24	47	71	95	118	**142**	166	189	213	237
25/10	**P1A**	Double acting	+	25	10	4.9	48	96	144	193	241	**289**	337	385	433	481
	P1J		-	25	10	4.1	40	81	121	162	202	**243**	283	323	364	404
	P1M															
	P1S															
	P5T															
25/10	**NZ6025**	Double acting	+	25	10	4.9	45	89	134	178	223	**268**	312	357	401	446
			-			4.1	37	75	112	149	187	**224**	261	299	336	373
32/12	**C05**	Double acting	+	32	12	8.0	79	158	237	315	394	**473**	552	631	710	789
	P1D		-	32	12	6.9	68	136	203	271	339	**407**	474	542	610	678
	P1J															
	P1M															
	P1S															
32/12	**NZ6032**	Double acting	+	32	12	8.0	73	146	218	291	364	**437**	510	582	655	728
			-			6.9	63	126	188	251	314	**377**	440	502	565	628
32/16	**P5T**	Double acting	+	32	16	8.0	79	158	237	315	394	**473**	552	631	710	789
			-	32	16	6.0	59	118	177	237	296	**355**	414	473	532	1591
40/16	**P1D**	Double acting	+	40	16	12.6	123	246	370	493	616	**739**	862	986	1109	1232
	P1M		-	40	16	10.6	103	207	310	414	517	**621**	724	828	931	1035
40/16	**NZ6040**	Double acting	+	40	16	12.6	115	229	344	459	573	**688**	803	917	1032	1147
			-			10.6	96	193	289	386	482	**579**	675.2	772	868	965
40/12	**P1J**	Double acting	+	40	12	12.6	123	246	370	493	616	**740**	863	986	1109	1233
			-	40	12	11.4	112	224	336	448	561	**673**	785	897	1010	1122
50/16	**C05**	Double acting	+	50	16	19.6	193	385	578	770	963	**1155**	1348	1540	1733	1925
	P1J		-	50	16	17.6	173	346	518	691	864	**1037**	1210	1382	1555	1728
50/20	**P1D**	Double acting	+	50	20	19.6	193	385	578	770	963	**1155**	1348	1540	1733	1925
	P1M		-	50	20	16.5	162	323	485	647	809	**970**	1132	1294	1455	1617
	P1S															
	P5T															

Cylinder bore mm	Series		Stroke	Bore mm	Piston rod mm	Max theoretical force in N Area cm2	1.0 bar	2.0 bar	3.0 bar	4.0 bar	5.0 bar	6.0 bar	7.0 bar	8.0 bar	9.0 bar	10.0 bar
50/20	**NZ6050**	Double acting	+	50	20	19.6	178	357	535	713	892	**1070**	1249	1427	1605	1784
			-			16.5	150	300	450	601	751	**901**	1051	1201	1351	1502
63/16	**C05** **P1J**	Double acting	+	63	16	31.2	306	611	917	1223	1528	**1834**	2140	2445	2751	3056
			-	63	16	29.1	286	572	858	1144	1430	**1716**	2002	2287	2573	2864
63/20	**P1D** **P1M** **P1S** **P5T**	Double acting	+	63	20	31.2	306	611	917	1223	1528	**1834**	2140	2445	2751	3056
			-	63	20	28.0	275	550	825	1099	1374	**1649**	1924	2199	2474	2748
63/20	**NZ6063**	Double acting	+	63	20	31.2	284	568	852	1136	1420	**1704**	1987	2271	2555	2839
			-			28.0	255	510	764	1019.2	1274	**1529**	1784	2038	2293	2548
80/25	**P1D** **P1M** **P1S** **P5T**	Double acting	+	80	25	50.2	493	986	1479	1971	2464	**2957**	3450	3943	4436	4929
			-	80	25	45.3	445	889	1334	1779	2224	**2668**	3113	3558	4003	4447
80/25	**NZ6080**	Double acting	+	80	25	50.0	455	910	1365	1820	2275	**2730**	3185	3640	4095	4550
			-			45.4	413	826	1239	16523	2066	**2479**	2892	3305	3718	4131
84/20	**C0D300**	Double acting	+	84	20	55.4	543	1087	1630	2173	2717	**3260**	3804	4347	4890	5434
			-	84	20	52.2	513	1025	1538	2050	2563	**3075**	3588	4101	4613	5126
100/25	**P1D** **P1M** **P1S** **P5T**	Double acting	+	100	25	78.5	770	1540	2310	3080	3850	**4621**	5391	6161	6931	7701
			-	100	25	73.6	722	1444	2166	2888	3610	**4332**	5054	5776	6498	7220
100/25	**NZ6100**	Double acting	+	100	25	78.0	710	1420	2129	2839	3549	**4259**	4969	5678	6388	7098
			-			73.6	670	1340	2009	2679	3349	**4019**	4688	5358	6028	6698
114/20	**C0D600**	Double acting	+	114	20	102.0	1001	2002	3002	4003	5004	**6005**	7006	8006	9007	10008
			-	114	20	98.9	970	1940	2910	3880	4850	**5820**	6790	7760	8730	9700
125/32	**P1D** **P1S**	Double acting	+	125	32	122.7	1203	2407	3610	4813	6016	**7220**	8423	9626	10829	12033
			-	125	32	114.6	1124	2248	3373	4498	5622	**6746**	7871	8995	10120	11244
125/32	**DZ5125**	Double acting	+	125	32	122.7	1117	2233	3350	4466	5583	**6699**	7816	8933	10049	11166
			-			114.7	1044	2088	3131	4175	5219	**6263**	7306	8350	9394	10438
161/25	**C0D1200**	Double acting	+	161	25	203.5	1996	3992	5988	7985	9981	**11977**	13973	15969	17965	19961
			-	161	25	198.6	1948	3896	5844	7792	9740	**11688**	13636	15584	17532	19480
160/40	**P1E**	Double acting	+	160	40	201.0	1971	3943	5914	7886	9857	**11829**	13800	15771	17743	19714
			-	160	40	188.4	1848	3696	5545	7393	9241	**110891**	12937	14786	16634	18482
160/40	**DZ5160**	Double acting	+	160	40	201.0	1829	3658	5487	7316	9146	**10975**	12804	14632.8	16462	18291
			-			188.5	1715	3431	5146	6861	8577	**10292**	12007	13723	15438	17154
200/40	**P1E**	Double acting	+	200	40	314.0	3080	6161	9241	12321	15402	**18482**	21562	24643	27723	30803
			-	200	40	301.4	2957	5914	8871	11829	14786	**17743**	20700	23657	26614	29571
200/40	**DZ5200**	Double acting	+	200	40	314.1	2858	5717	8575	11433	14292	**17150**	20008	22866	25725	28583
			-			301.5	2744	5487	8231	10975	13718	**16462**	19206	21949	24693	27437
250/28	**C0P2500**	Double acting	+	233	28	426.2	4181	8361	12542	16723	20904	**25084**	29265	33446	37626	41807
			-	233	28	420.0	4120	8241	12361	16481	20602	**24722**	28842	32963	37083	41203
250/50	**DZ5250**	Double acting	+	250	50	491.9	4466	8933	13399	17865	22331	**26798**	31264	35730	40197	44663
			-			471.2	288	8576	12864	17152	21440	**25728**	30015	34303	38591	42879
320/63	**DZ5320**	Double acting	+	320	63	804.0	7316	4633	1949	9266	36582	**43898**	51215	58531	65848	73164
			-			773.0	7034	4069	1103	8137	35172	**42206**	49240	56274	63309	70343

+ = Outward stroke
- = Return stroke

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

The Force Guide is only for double acting cylinders, please look into the technical catalogue for every individual sigle acting cylinder to see the forces.

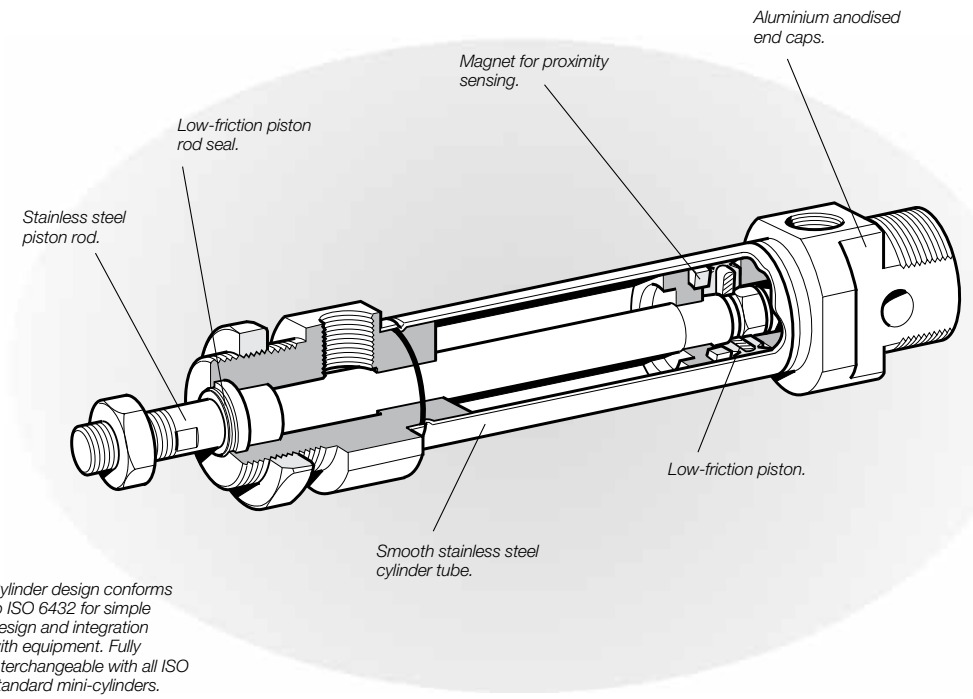
Note! For all single acting cylinders you have to reduce the force in the table with the spring force to get the theoretical force.
The spring force is not calculted to create any work, it is only to take the piston rod into the cylinder

Cylinder Series	Description	Bore in mm	Double acting	Single acting cylinders with spring return for retract stroke (- stroke)	Single acting cylinders with spring return for advance stroke (+ stroke)	Low temp version	High temp version	Thru piston rod	Guided	Magnetic piston	Bumpers	Adjustable cushioning	Flexible porting	Clean	Rod lock	Built on valve
			Max stroke in mm													
P1G	Cartridge cylinder	6, 10, 16		15												
C05	Pancake cylinder	8, 12, 20, 32, 50, 63	25	10												
C0P	Thrust cylinder	59, 81, 233	80	10												
C0D	Thrust cylinder	81, 114, 161	50	50												
P1J	Compact cylinder	12, 20, 25, 32, 40, 50, 63	100	50					■	■						
P1M	Short build cylinder	12, 16, 20, 25, 32, 40, 50, 63, 80, 100	500	25	25		■	■		■	■		■			
P1K	Profile cylinder	32,40,50, 63, 80, 100, 125	2800	■				■			■			■		
P5T	Compact cylinder with guidance	16, 20, 25, 32, 40, 50, 63, 80, 100	200				■	■	■	■	■		■			
P1A	Mini ISO 6432	10, 12, 16, 20, 25	1000	80	80		■	■	■	■	■	■				
P1S	Stainless steel cylinders ISO 6432	10, 12, 16, 20, 25	1000	80	80	■	■	■		■	■	■				
P1S	Stainless steel cylinders ISO 6431	32, 40, 50, 63, 80, 100, 125	1000			■	■	■		■		■				
P1D	ISO/VDMA cylinder	32, 40, 50, 63, 80, 100, 125	2800				■	■		■		■	■	■	■	■
P1E	ISO/VDMA cylinder	160, 200	2500				■	■		■		■				
NZ	Compact cylinder	20, 25	200	25	25			■		■						
NZ	Compact cylinder	32, 40, 50, 63, 80, 100	500	25	25		■	■		■						
DZ	ISO/CETOP cylinder	125, 160, 200, 250, 320	2500				■	■		■		■				

A

Mini Cylinders

P1A Series
According to ISO 6432



Cylinder design conforms to ISO 6432 for simple design and integration with equipment. Fully interchangeable with all ISO standard mini-cylinders.

Cylinders are supplied complete with neck mounting and piston rod nut.

Double and single-acting versions

The P1A range of cylinders is intended for use in a wide range of applications. The cylinders are particularly suitable for lighter duties in the packaging, food and textile industries.

Hygienic design, the use of corrosion-resistant materials and initial lubrication with our food-grade grease makes the cylinders suitable for food industry applications.

Careful design and high quality manufacture throughout ensure long service life and optimum economy.

Mounting dimensions fully in accordance with ISO 6432 and CETOP RP52P greatly simplifies installation and world-wide interchangeability.

The cylinders are available in bores of 10, 12, 16, 20 and 25 mm, with stroke lengths from 10 mm to 320 mm.

Single-acting cylinders with spring return in the retract direction are available in stroke lengths up to 80 mm.

Single-acting cylinders with spring return in the advance direction are available in 16 mm, 20 mm and 25 mm bore sizes and with stroke lengths up to 80 mm.

Double-acting cushioned cylinders

Adjustable pneumatic cushioning permits greater loads and higher operating speeds, making the cylinders suitable for more demanding duties.

These cylinders are available in bores of 16, 20 and 25 mm, with stroke lengths from 20 mm to 500 mm.

Options

In addition to a wide range of standard cylinders, Mini ISO cylinders are available in several standard variants, such as non-standard stroke length, extended piston rods, double piston rods, high temperature versions etc. In addition, a complete range of sensors and mountings are available.

A

Effective cushioning

The Mini ISO range is available with fixed end cushioning or with adjustable pneumatic cushioning, controlled by simple bleed screws for fine adjustment. The adjustable cushioned cylinders can be operated with higher mass loads and at higher speeds than those with fixed end cushioning, reducing overall cycle times.

Smooth external design

There are no recesses or pockets in the end covers that could trap dirt or liquid, making cleaning simple and effective.

Corrosion-resistant

Even the basic versions of the cylinders have good corrosion resistance through appropriate choice of materials and surface treatment, allowing them to be used in demanding environments.

Stainless steel versions

The Mini ISO range is also available in an all-stainless version with piston rod, barrel and end covers of stainless steel for use in particularly severe environments. See separate brochure for cylinder series P1S.

Proximity sensing

A complete range of sensors for proximity sensing is available as accessories: both reed swich and Hall effect sensors are available. They are supplied with either flying lead or cable plug connector.

Complete mounting programme

A complete ISO compatible mounting programme with surface-treated/stainless steel piston rod and cylinder mountings for both pivoted and fixed operationare available.

Variants

In addition to the basic versions, a number of standard variants of Parker Pnematics cylinders are available to meet all demands on function and environmental adaptation:

Non-standard stroke lengths

Extended piston rods

Through piston rods

Single acting cylinder with spring return

(in the retract direction).

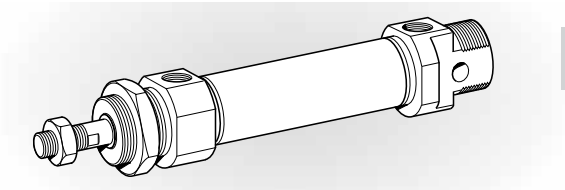
Single acting cylinder with spring return in the advance direction (piston rod in extended position)

External guide, for controlled guidance of the piston rod

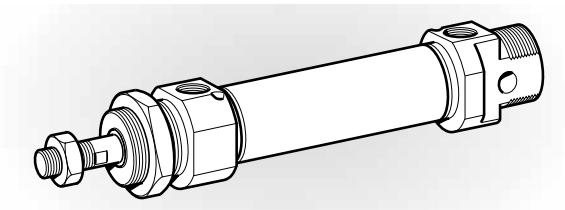
High-temperature cylinder versions for use in ambient temperatures ranging from -10 °C to +150 °C for bores 12, 16, 20 and 25 mm

Cylinders with outer sealings in fluorocarbon rubber FPM

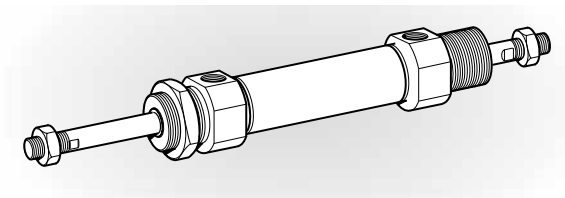
Stainless steel cylinders, see brochure for series P1S



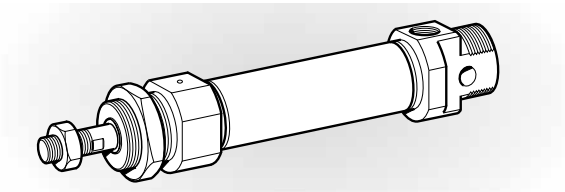
Double-acting, cushioned stroke



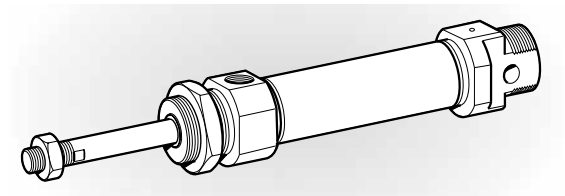
Double-acting, adjustable cushioning



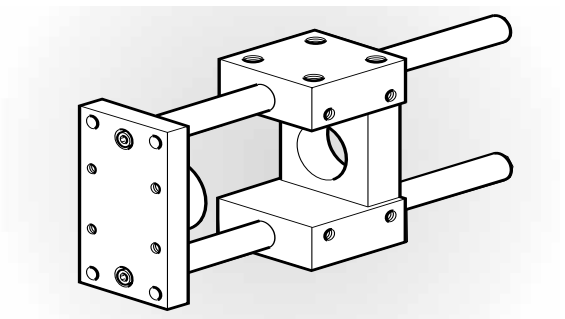
Double-acting, through piston rod



Single-acting, spring return



Single-acting, spring-extended



Double-acting, external guide device

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Cylinder forces, double acting variants

Cyl. bore/ pist. rod mm	Stroke	Pistonarea cm²	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			
			Spring retraction	
	Nmax	Nmin	Nmax	Nmin
Single acting, spring return				
P1A-S010SS-0010	38	36	10	8,5
P1A-S010SS-0015	38	36	10	7,8
P1A-S010SS-0025	39	36	10	6,6
P1A-S010SS-0040	38	34	13	9
P1A-S010SS-0050	39	34	13	8
P1A-S010SS-0080	39	34	12	7
P1A-S012SS-0010	53	51	16	14,4
P1A-S012SS-0015	53	51	16	13,6
P1A-S012SS-0025	55	51	16	12
P1A-S012SS-0040	52	48	19	13,4
P1A-S012SS-0050	53	48	19	12
P1A-S012SS-0080	55	48	21,4	12
P1A-S016SS-0010	102	99	22,3	20,2
P1A-S016SS-0015	103	99	22,3	19
P1A-S016SS-0025	105	99	22,3	17
P1A-S016SS-0040	106	95	22,3	14
P1A-S016SS-0050	108	95	22,3	12
P1A-S016SS-0080	107	95	22,5	12
P1A-S020SS-0010	163	161	30	28
P1A-S020SS-0015	164	161	30	27
P1A-S020SS-0025	167	161	30	25
P1A-S020SS-0040	166	159	30	22
P1A-S020SS-0050	168	159	30	20
P1A-S020SS-0080	170	161	29,4	18
P1A-S025SS-0010	256	253	44,3	41,4
P1A-S025SS-0015	258	253	44,3	40
P1A-S025SS-0025	262	253	44,3	37
P1A-S025SS-0040	261	250	44,3	32
P1A-S025SS-0050	264	250	44,3	30
P1A-S025SS-0080	264	251	44,4	30

Order code	Theoretical piston force at 6 bar			
			Spring retraction	
	Nmax	Nmin	Nmax	Nmin
Single acting, spring-extended				
P1A-S016TS-0010	85	84	22,3	20,2
P1A-S016TS-0015	86	84	22,3	19
P1A-S016TS-0025	88	84	22,3	17
P1A-S016TS-0040	90	84	22,3	14
P1A-S016TS-0050	91	84	22,3	12
P1A-S020TS-0010	132	130	30	28
P1A-S020TS-0015	133	130	30	27
P1A-S020TS-0025	135	130	30	25
P1A-S020TS-0040	138	130	30	22
P1A-S020TS-0050	140	130	30	20
P1A-S020TS-0080	139	108	31	17
P1A-S025TS-0010	205	203	38,5	36
P1A-S025TS-0015	207	203	38,5	34,7
P1A-S025TS-0025	210	203	38,5	32
P1A-S025TS-0040	214	203	38,5	28,5
P1A-S025TS-0050	217	203	38,5	26
P1A-S025TS-0080	223	206	36	21

A

Main data

Cylinder designation	Cylinder bore	area	Piston rod bore	area	thread	Total mass at 0 mm stroke	addition per 10 mm stroke	Air consump-tion	Conn. thread
	mm	cm^2	mm	cm^2		kg	kg	litres	
Double acting, cushioned stroke									
P1A-S010D	10	0,78	4	0,13	M4	0,04	0,003	0,0100 [1)]	M5
P1A-S012D	12	1,13	6	0,28	M6	0,07	0,004	0,0139 [1)]	M5
P1A-S016D	16	2,01	6	0,28	M6	0,09	0,005	0,0262 [1)]	M5
P1A-S020D	20	3,14	8	0,50	M8	0,18	0,007	0,0405 [1)]	G1/8
P1A-S025D	25	4,91	10	0,78	M10x1,25	0,25	0,011	0,0633 [1)]	G1/8
Double acting, adjustable cushioning									
P1A-S016M	16	2,01	6	0,28	M6	0,09	0,005	0,0262 [1)]	M5
P1A-S020M	20	3,14	8	0,50	M8	0,18	0,007	0,0405 [1)]	G1/8
P1A-S025M	25	4,91	10	0,78	M10x1,25	0,25	0,011	0,0633 [1)]	G1/8
Single acting, spring return									
P1A-S010SS	10	0,78	4	0,13	M4	0,04	0,003	0,0055 [1)]	M5
P1A-S012SS	12	1,13	6	0,28	M6	0,08	0,004	0,0079 [1)]	M5
P1A-S016SS	16	2,01	6	0,28	M6	0,10	0,005	0,0141 [1)]	M5
P1A-S020SS	20	3,14	8	0,50	M8	0,18	0,007	0,0220 [1)]	G1/8
P1A-S025SS	25	4,91	10	0,78	M10x1,25	0,26	0,011	0,0344 [1)]	G1/8
Single acting, spring-extended									
P1A-S016TS	16	2,01	6	0,28	M6	0,10	0,005	0,0141 [1)]	M5
P1A-S020TS	20	3,14	8	0,50	M8	0,18	0,007	0,0220 [1)]	G1/8
P1A-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 ºC for indoor operation (a lower dew point should be selected for outdoor operation) and oil concentration 1.0 mg oil/m^3, which is what a standard compressor with a standard filter gives.

ISO 8573-1 quality classes

Quality class	Pollution particle size (µm)	Pollution max con-centration (mg/m^3)	Water max. press. dew point (°C)	Oil max con-centration (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	-

Additional data

Working pressure	max	10 bar
Working temperature	max	+80 °C
	min	–20 °C
High-temperature version	max	+150 °C
(Ø12, 16, 20 and 25 mm)min		–10 °C

Prelubricated, further lubrication is not normally necessary.

If additional lubrication is introduced it must be continued.

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Material specification

Piston rod	Stainless steel, DIN X 10 CrNiS 18 9
Piston rod seal	Nitrile rubber, NBR
Piston rod bearing	Multilayer PTFE/steel
End covers	Anodized aluminium
O-ring, internal	Nitrile rubber, NBR
Cylinder barrel	Stainless steel, DIN X 5 CrNi 18 10
Piston, complete	Nitrile rubber, NBR/steel
Magnet holder	Thermoplastic elastomer
Magnet	Plastic-coated magnetic material
Return spring	Surface-treated steel
Cushioning screw	Stainless steel, DIN X 10 CrNiS 18 9

Variants Mini ISO:

High-temperature version, type F:

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

Cylinders with outer sealings in fluorcarbon, type V:

Piston rod seal/ Scraper ring	Fluorocarbon rubber, FPM

Spare part = new cylinder

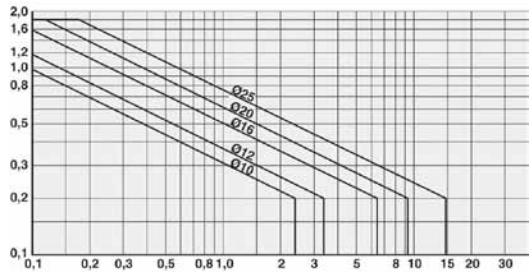
Cushioning diagram

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

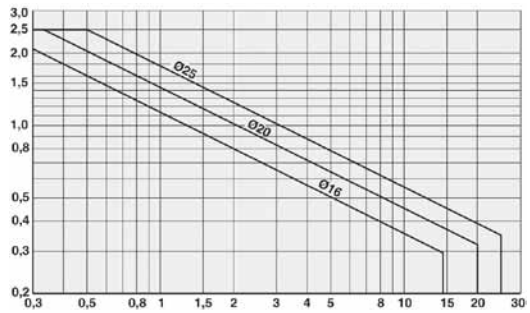
The load is the sum of the internal and external friction, together with any gravity forces. At high relative loading it is recommended that, for a given speed, the load should be reduced by a factor of 2.5, or that, for a given mass, the speed should be reduced by a factor of 1.5. These factors apply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

Fixed end-cushioning
Speed [m/s]



Mass [kg]

Adjustable pneumatic end-cushioning
Speed [m/s]



Mass [kg]

Dimensions

Double and single acting cylinders

CAD drawings on the Internet
Our home page www.parker.com/euro_pneumatic includes the AirCad Drawing Library with 2D and 3D drawings for the main versions.

AirCad™ Drawing Library

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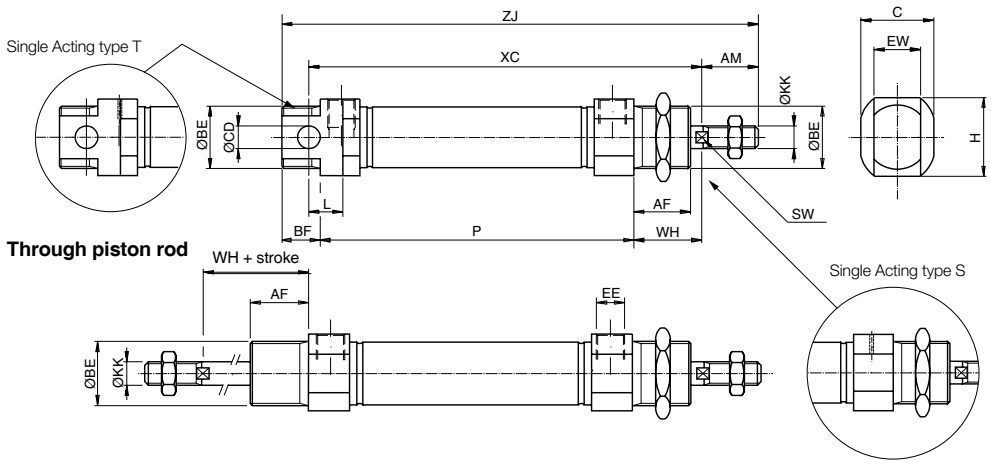


Cylinder bore mm	AM 0/-2 mm	BE	AF mm	BF mm	C mm	CDH9 mm	EE	EW mm	H mm	KK	L mm	SW mm	WH±1,2 mm
10	12	M12x1,25	12	10	13,0	4	M5	8	13,0	M4	6	–	16
12	16	M16x1,5	18	13	17,8	6	M5	12	17,8	M6	9	5	22
16[1)]	16	M16x1,5	18	13	17,8	6	M5	12	17,8	M6	9	5	22
16[2)]	16	M16x1,5	18	13	23,8	6	M5	12	23,8	M6	9	5	22
20	20	M22x1,5	20	14	23,8	8	G1/8	16	23,8	M8	12	7	24
25	22	M22x1,5	22	14	26,8	8	G1/8	16	26,8	M10x1,25	12	9	28

1) P1A-S016DS/SS/TS
2) P1A-S016MS

Double acting cylinders

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

Single-acting, spring return, type SS

Stroke/ Cylinder bore mm	10 XC mm	15 XC mm	25 XC mm	40 XC mm	50 XC mm	80 XC mm	10 ZJ mm	15 ZJ mm	25 ZJ mm	40 ZJ mm	50 ZJ mm	80 ZJ mm	10 P mm	15 P mm	25 P mm	40 P mm	50 P mm	80 P mm
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

Single-acting, spring-extended, type TS

Stroke/ Cylinder bore mm	10 XC[3)] mm	15 XC[3)] mm	25 XC[3)] mm	40 XC[3)] mm	50 XC[3)] mm	80 XC[3)] mm	10 ZJ[3)] mm	15 ZJ[3)] mm	25 ZJ[3)] mm	40 ZJ[3)] mm	50 ZJ[3)] mm	80 ZJ[3)] mm	10 P mm	15 P mm	25 P mm	40 P mm	50 P mm	80 P mm
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 ±1 mm

Stroke length tolerances +1,5/0 mm

A

Guide for selecting suitable tubing

The selection of the correct size of tubing is often based on experience, with no great thought to optimizing energy efficiency and cylinder velocity. This is usually acceptable, but making a rough calculation can result in worthwhile economic gains.

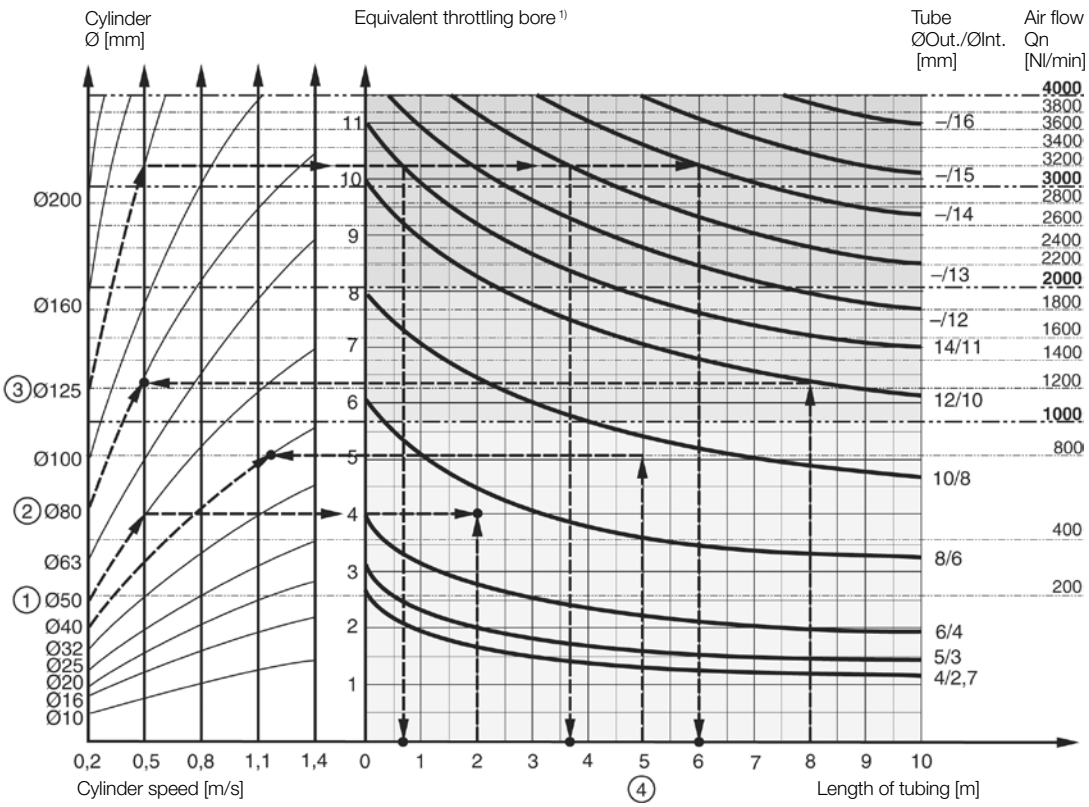
The following is the basic principle:

1. The primary line to the working valve could be over sized (this does not cause any extra air consumption and consequently does not create any extra costs in operation).
2. The tubes between the valve and the cylinder should, however, be optimized according to the principle that an insufficient bore throttles the flow and thus limits the cylinder speed, while an oversized pipe creates a dead volume which increases the air consumption and filling time.

The chart below is intended to help when selecting the correct size of tube to use between the valve and the cylinder.

The following prerequisites apply:

The *cylinder load should be about 50%* of the theoretical force (= normal load). A lower load gives a higher velocity and vice versa. The tube size is selected as a function of the *cylinder bore*, the desired *cylinder velocity* and the *tube length* between the valve and the cylinder.
If you want to use the capacity of the valve to its maximum, and obtain maximum speed, the tubing should be chosen so that they at least correspond with the equivalent restriction diameter (see description below), so that the tubing does not restrict the total flow. This means that a short tubing must have at least the equivalent restriction diameter. If the tubing is longer, choose it from the table below. Straight fittings should be chosen for highest flow rates. (Elbow and banjo fittings cause restriction.)



1) The "equivalent throttling bore" is a long throttle (for example a tube) or a series of throttles (for example, through a valve) converted to a short throttle which gives a corresponding flow rate. This should not be confused with the "orifice" which is sometimes specified for valves. The value for the orifice does not normally take account of the fact that the valve contains a number of throttles.

2) Qn is a measure of the valve flow capacity, with flow measured in litre per minute (l/min) at 6 bar(e) supply pressure and 1 bar pressure drop across the valve.

Example ①: Which tube diameter should be used?

A 50 mm bore cylinder is to be operated at 0.5 m/s. The tube length between the valve and cylinder is 2 m. In the diagram we follow the line from 50 mm bore to 0.5 m/s and get an "equivalent throttling bore" of approximately 4 mm. We continue out to the right in the chart and intersect the line for a 2 m tube between the curves for 4 mm (6/4 tube) and 6 mm(8/6 tube). This means that a 6/4 tube throttles the velocity somewhat, while an 8/6 tube is a little too large. We select the 8/6 tube to obtain full cylinder velocity.

Example ②: What cylinder velocity will be obtained?

A 80 mm bore cylinder will be used, connected by 8 m 12/10 tube to a P2L-B valve. What cylinder velocity will we get? We refer to the diagram and follow the line from 8 mm tube length up to the curve for 12/10 tube. From there, we go horizontally to the curve for the Ø80 cylinder. We find that the velocity will be about 0.5 m/s.

Example ③: What is the minimum inner diameter and maximum lenght of tube?

For a application a 125 mm bore cylinder will be used. Maximum velocity of piston rod is 0.5 m/s. The cylinder will be controlled by a P2L-D valve. What diameter of tube can be used and what is maximum lenght of tube.

We refer to the diagram. We start at the left side of the diagram cylinder Ø125. We follow the line until the intersection with the velocity line of 0.5 m/s. From here we draw a horizontal line in the diagram. This line shows us we need an equivalent throttling bore of approximately 10 mm. Following this line horizontally we cross a few intersections. These intersections shows us the minimum inner diameter (rightside diagram) in combination with the maximum length of tube (bottomside diagram).

For example:
Intersection one: When a tube (14/11) will be used, the maximum length of tube is 0.7 meter.
Intersection two: When a tube (—/13) will be used, the maximum length of tube is 3.7 meter.
Intersection three: When a tube (—/14) will be used, the maximum length of tube is 6 meter.

Example 4 : Determining tube size and cylinder velocity with a particular cylinder and valve?

For an application using a 40 mm bore cylinder with a valve with Qn=800 Nl/min. The distance between the cylinder and valve has been set to 5 m.
Tube dimension: What tube bore should be selected to obtain the maximum cylinder velocity? Start at pipe length 5 m, follow the line up to the intersection with 800 Nl/min. Select the next largest tube diameter, in this case Ø10/8 mm.
Cylinder velocity: What maximum cylinder velocity will be obtained? Follow the line for 800 Nl/min to the left until it intersects with the line for the Ø40 mm cylinder. In this example, the speed is just above 1.1 m/s.

Valve series with respective flows in Nl/minute

Valve series	Qn in Nl/Min
Valvetronic Solstar	33
Interface PS1	100
Adex A05	173
Moduflex size 1, (2 x 3/2)	220
Valvetronic PVL-B 5/3 closed centre, 6 mm push in	290
Moduflex size 1, (4/2)	320
B43 Manual and mechanical	340
Valvetronic PVL-B 2 x 2/3, 6 mm push in	350
Valvetronic PVL-B 5/3 closed centre, G1/8	370
Compact Isomax DX02	385
Valvetronic PVL-B 2 x 3/2 G1/8	440
Valvetronic PVL-B 5/2, 6 mm push in	450
Valvetronic PVL-B 5/3 vented centre, 6 mm push in	450
Moduflex size 2, (2 x 3/2)	450
Flowstar P2V-A	520
Valvetronic PVL-B 5/3 vented centre, G1/8	540
Valvetronic PVL-B 5/2, G1/8	540
Valvetronic PVL-C 2 x 3/2, 8 mm push in	540
Adex A12	560
Valvetronic PVL-C 2 x 3/2 G1/8	570
Compact Isomax DX01	585
VIKING Xtreme P2LAX	660
Valvetronic PVL-C 5/3 closed centre, 8 mm push in	700
Valvetronic PVL-C 5/3 vented centre, G1/4	700
B3-Series	780
Valvetronic PVL-C 5/3 closed centre, G1/4	780
Moduflex size 2, (4/2)	800
Valvetronic PVL-C 5/2, 8 mm push in	840
Valvetronic PVL-C 5/3 vented centre, 8 mm push in	840
Valvetronic PVL-C 5/2, G1/4	840
Flowstar P2V-B	1090
ISOMAX DX1	1150
B53 Manual and mechanical	1160
B4-Series	1170
VIKING Xtreme P2LBX	1290
B5-Series, G1/4	1440
Airline Isolator Valve VE22/23	1470
ISOMAX DX2	2330
VIKING Xtreme P2LCX, G3/8	2460
VIKING Xtreme P2LDX, G1/2	2660
ISOMAX DX3	4050
Airline Isolator Valve VE42/43	5520
Airline Isolator Valve VE82/83	13680

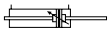
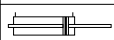
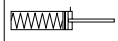
A

Order key

P1A – S 016 M S – 0025

Cylinder bore mm

010
012
016
020
025

	Cylinder type / function	
M		Double-acting, adjustable cushioning. Ø16-25 mm. Not for sealingmaterial type F and L
D		Double-acting, non-adjustable cushioning, Ø10 - Ø25
F		Double-acting, adjustable cushioning, thru-rod, Ø16-25 mm. Not for sealing material type F
K		Double-acting, non-adjustable cushioning, thru-rod, Ø10 - Ø25
S		Single-acting, non-adjustable cushioning, spring return for retract stroke, Ø10-25 mm
T		Single-acting, non-adjustable cushioning, spring return for advance stroke, Ø16-25 mm

Stroke length, mm

E.g. 0025 = 25 mm
For standard stroke length and max length see table below.

	Sealing material	
S		Standard, -20 °C to +80 °C. Magnetic piston
F		High temperature, Ø12, 16, 20 and 25 mm -10 °C to +150 °C. Non-magnetic piston
V		External seals of fluorinated rubber. -20 °C to +80 °C. Magnetic piston

Stroke length

Cylinder designation	Cylinder bore	● Standard stroke length in mm: 10	15	20	25*	30	40	50*	80*	100*	Non standard stroke length: 125*	160*	200*	250*	320*	400*	500*
Double acting with fixed end-cushioning:																	
P1A-S010D	10	●	●	●	●	●	●	●	●	●	●						
P1A-S012D	12	●	●	●	●	●	●	●	●	●	●	●	●				
P1A-S016D	16	●	●	●	●	●	●	●	●	●	●	●	●				
P1A-S020D	20	●	●	●	●	●	●	●	●	●	●	●	●	●	●		**
P1A-S025D	25	●	●	●	●	●	●	●	●	●	●	●	●	●	●		**
Double acting with adjustable end-cushioning:																	
P1A-S016M	16			●	●	●	●	●	●	●	●	●	●	●	●	●	
P1A-S020M	20			●	●	●	●	●	●	●	●	●	●	●	●	●	**
P1A-S025M	25			●	●	●	●	●	●	●	●	●	●	●	●	●	**
Single acting, spring return:																	
P1A-S010SS	10	●	●		●		●	●	●								
P1A-S012SS	12	●	●		●		●	●	●								
P1A-S016SS	16	●	●		●		●	●	●								
P1A-S020SS	20	●	●		●		●	●	●								
P1A-S025SS	25	●	●		●		●	●	●								
Single acting, spring-extended:																	
P1A-S016TS	16	●	●		●		●	●									
P1A-S020TS	20	●	●		●		●	●	●								
P1A-S025TS	25	●	●		●		●	●	●								

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

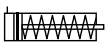
A

Data

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

Single-acting spring return

Fixed end cushioning



Cyl.bore mm	Stroke mm	Order code
10 Conn. M5	10	**P1A-S010SS-0010**
	15	**P1A-S010SS-0015**
	25	**P1A-S010SS-0025**
	40	**P1A-S010SS-0040**
	50	**P1A-S010SS-0050**
	80	**P1A-S010SS-0080**
12 Conn. M5	10	**P1A-S012SS-0010**
	15	**P1A-S012SS-0015**
	25	**P1A-S012SS-0025**
	40	**P1A-S012SS-0040**
	50	**P1A-S012SS-0050**
	80	**P1A-S012SS-0080**
16 Conn. M5	10	**P1A-S016SS-0010**
	15	**P1A-S016SS-0015**
	25	**P1A-S016SS-0025**
	40	**P1A-S016SS-0040**
	50	**P1A-S016SS-0050**
	80	**P1A-S016SS-0080**
20 Conn. G1/8	10	**P1A-S020SS-0010**
	15	**P1A-S020SS-0015**
	25	**P1A-S020SS-0025**
	40	**P1A-S020SS-0040**
	50	**P1A-S020SS-0050**
	80	**P1A-S020SS-0080**
25 Conn. G1/8	10	**P1A-S025SS-0010**
	15	**P1A-S025SS-0015**
	25	**P1A-S025SS-0025**
	40	**P1A-S025SS-0040**
	50	**P1A-S025SS-0050**
	80	**P1A-S025SS-0080**

Cylinders are supplied complete with neck mounting and piston rod nuts.

Single-acting spring-extended

Fixed end cushioning

Cyl.bore mm	Stroke mm	Order code
16 Conn. M5	10	**P1A-S016TS-0010**
	15	**P1A-S016TS-0015**
	25	**P1A-S016TS-0025**
	40	**P1A-S016TS-0040**
	50	**P1A-S016TS-0050**
20 Conn. G1/8	10	**P1A-S020TS-0010**
	15	**P1A-S020TS-0015**
	25	**P1A-S020TS-0025**
	40	**P1A-S020TS-0040**
	50	**P1A-S020TS-0050**
	80	**P1A-S020TS-0080**
25 Conn. G1/8	10	**P1A-S025TS-0010**
	15	**P1A-S025TS-0015**
	25	**P1A-S025TS-0025**
	40	**P1A-S025TS-0040**
	50	**P1A-S025TS-0050**
	80	**P1A-S025TS-0080**

Cylinders are supplied complete with neck mounting and piston rod nuts.

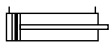
A

Data

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

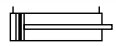
Double-acting

Fixed end cushioning



Cyl.bore mm	Stroke mm	Order code
10 Conn. M5	10	**P1A-S010DS-0010**
	15	**P1A-S010DS-0015**
	20	**P1A-S010DS-0020**
	25	**P1A-S010DS-0025**
	30	**P1A-S010DS-0030**
	40	**P1A-S010DS-0040**
	50	**P1A-S010DS-0050**
	80	**P1A-S010DS-0080**
	100	**P1A-S010DS-0100**
Max stroke 500 mm	125	**P1A-S010DS-0125**
12 Conn. M5	10	**P1A-S012DS-0010**
	15	**P1A-S012DS-0015**
	20	**P1A-S012DS-0020**
	25	**P1A-S012DS-0025**
	30	**P1A-S012DS-0030**
	40	**P1A-S012DS-0040**
	50	**P1A-S012DS-0050**
	80	**P1A-S012DS-0080**
	100	**P1A-S012DS-0100**
	125	**P1A-S012DS-0125**
	160	**P1A-S012DS-0160**
Max stroke 500 mm	200	**P1A-S012DS-0200**
16 Conn. M5	10	**P1A-S016DS-0010**
	15	**P1A-S016DS-0015**
	20	**P1A-S016DS-0020**
	25	**P1A-S016DS-0025**
	30	**P1A-S016DS-0030**
	40	**P1A-S016DS-0040**
	50	**P1A-S016DS-0050**
	80	**P1A-S016DS-0080**
	100	**P1A-S016DS-0100**
	125	**P1A-S016DS-0125**
	160	**P1A-S016DS-0160**
Max stroke 500 mm	200	**P1A-S016DS-0200**

Fixed end cushioning



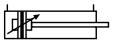
Cyl.bore mm	Stroke mm	Order code
20 Conn. G1/8	10	**P1A-S020DS-0010**
	15	**P1A-S020DS-0015**
	20	**P1A-S020DS-0020**
	25	**P1A-S020DS-0025**
	30	**P1A-S020DS-0030**
	40	**P1A-S020DS-0040**
	50	**P1A-S020DS-0050**
	80	**P1A-S020DS-0080**
	100	**P1A-S020DS-0100**
	125	**P1A-S020DS-0125**
	160	**P1A-S020DS-0160**
	200	**P1A-S020DS-0200**
	250	**P1A-S020DS-0250**
Max stroke 1000 mm	320	**P1A-S020DS-0320**
25 Conn. G1/8	10	**P1A-S025DS-0010**
	15	**P1A-S025DS-0015**
	20	**P1A-S025DS-0020**
	25	**P1A-S025DS-0025**
	30	**P1A-S025DS-0030**
	40	**P1A-S025DS-0040**
	50	**P1A-S025DS-0050**
	80	**P1A-S025DS-0080**
	100	**P1A-S025DS-0100**
	125	**P1A-S025DS-0125**
	160	**P1A-S025DS-0160**
	200	**P1A-S025DS-0200**
	250	**P1A-S025DS-0250**
Max stroke 1000 mm	320	**P1A-S025DS-0320**

Cylinders are supplied complete with neck mounting and piston rod nuts.
Cylinders with Through piston rods are supplied with two piston rod nuts and one neck mounting nut.

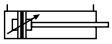
Data

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

Double-acting
Adjustable cushioning



Cyl.bore mm	Stroke mm	Order code
16	20	**P1A-S016MS-0020**
Conn. M5	25	**P1A-S016MS-0025**
	30	**P1A-S016MS-0030**
	40	**P1A-S016MS-0040**
	50	**P1A-S016MS-0050**
	80	**P1A-S016MS-0080**
	100	**P1A-S016MS-0100**
	125	**P1A-S016MS-0125**
	160	**P1A-S016MS-0160**
	200	**P1A-S016MS-0200**
	250	**P1A-S016MS-0250**
	320	**P1A-S016MS-0320**
	400	**P1A-S016MS-0400**
Max stroke 500 mm	500	**P1A-S016MS-0500**
20	20	**P1A-S020MS-0020**
Conn. G1/8	25	**P1A-S020MS-0025**
	30	**P1A-S020MS-0030**
	40	**P1A-S020MS-0040**
	50	**P1A-S020MS-0050**
	80	**P1A-S020MS-0080**
	100	**P1A-S020MS-0100**
	125	**P1A-S020MS-0125**
	160	**P1A-S020MS-0160**
	200	**P1A-S020MS-0200**
	250	**P1A-S020MS-0250**
	320	**P1A-S020MS-0320**
	400	**P1A-S020MS-0400**
Max stroke 1000 mm	500	**P1A-S020MS-0500**

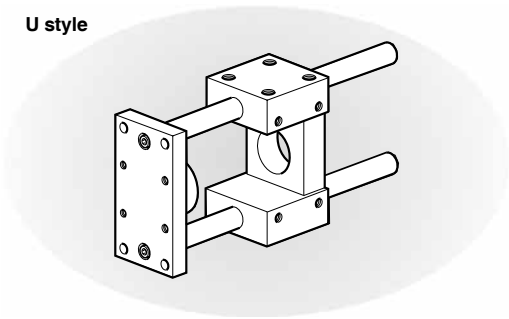


Cyl.bore mm	Stroke mm	Order code
25	20	**P1A-S025MS-0020**
Conn. G1/8	25	**P1A-S025MS-0025**
	30	**P1A-S025MS-0030**
	40	**P1A-S025MS-0040**
	50	**P1A-S025MS-0050**
	80	**P1A-S025MS-0080**
	100	**P1A-S025MS-0100**
	125	**P1A-S025MS-0125**
	160	**P1A-S025MS-0160**
	200	**P1A-S025MS-0200**
	250	**P1A-S025MS-0250**
	320	**P1A-S025MS-0320**
	400	**P1A-S025MS-0400**
Max stroke 1000 mm	500	**P1A-S025MS-0500**

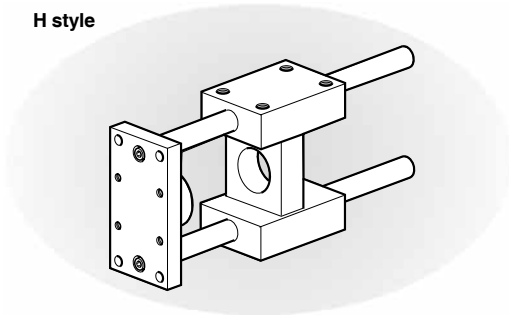
Cylinders are supplied complete with neck mounting and piston rod nuts.

Cylinders with Through piston rods are supplied with two piston rod nuts and one neck mounting nut.

U style



H style



P1A with rod guidance modules

The P1A series cylinders can be equipped with an external guiding device to prevent the piston rod from turning. When fitted the guide provides a guided piston movement enabling the cylinder to resist turning moments on the piston rod, as well as greater transverse forces. Rod guides are available with plain bearings as U style or linear ball bearings as H style.

The bracket, which has pre-drilled mounting holes, is connected to the piston rod by means of a flexocoupling, which prevents the build-up of stress in the cylinder.

P1A cylinders with guiding device are available with bores from 12 to 25 mm, and stroke lengths up to 250 mm. Separate guiding device kits can be supplied on request according to the order key below.

Technical data

Working pressure	max 10 bar
Working temperature	–20 °C to +80 °C

Material specifications, guidance modules

Body	Anodised aluminium
Guide bars, H style	Hardened stainless steel
Front plate	Anodised aluminium
Guide bars, U style	Stainless steel
Front plate	Zinc-plated steel
Plain bearings	Bronze

Other data as standard cylinder.

Order key

P1A - 4DRH - XXXX

Cylinder version	
A	Mini ISO cylinders

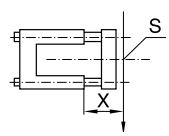
	Bore size mm
D	12, 16
H	20
J	25

	Guide module type
H	H style, ball bearings
K	U style, plain bearings

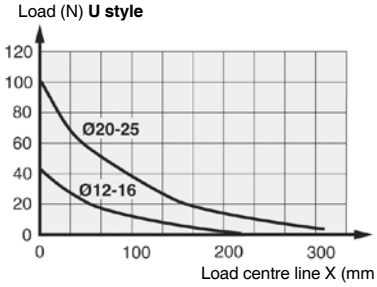
Stroke length (mm)
Same as for the cylinder

Transverse force as a function of load distance

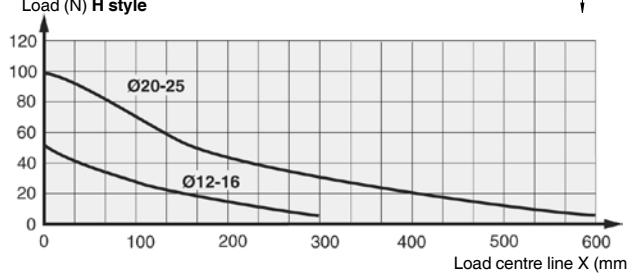
S = Load centre line
X = Load distance (mm)



Load (N) **U style**

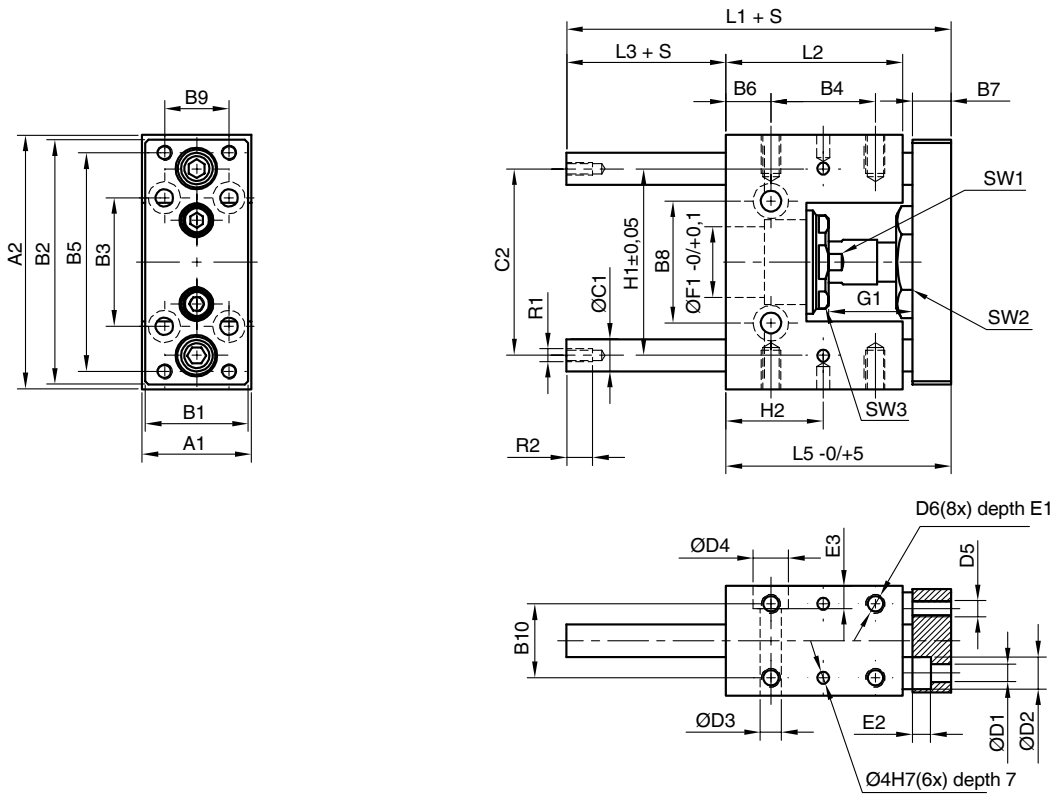


Load (N) **H style**



A

Dimensions, U style guidance modules, plain bearings



Cyl. bore	A1	A2	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	C1	C2	D1	D2	D3	D4
12/16	30	65	27	63	32	25,0	54	7,5	10	24	15	22	8	46	4,5	8,0	5,5	-
20	34	79	32	76	40	32,5	68	14,0	12	38	20	23	10	58	5,5	10,5	6,5	11
25	34	79	32	76	40	32,5	68	14,0	12	38	20	23	10	58	5,5	10,5	6,5	11

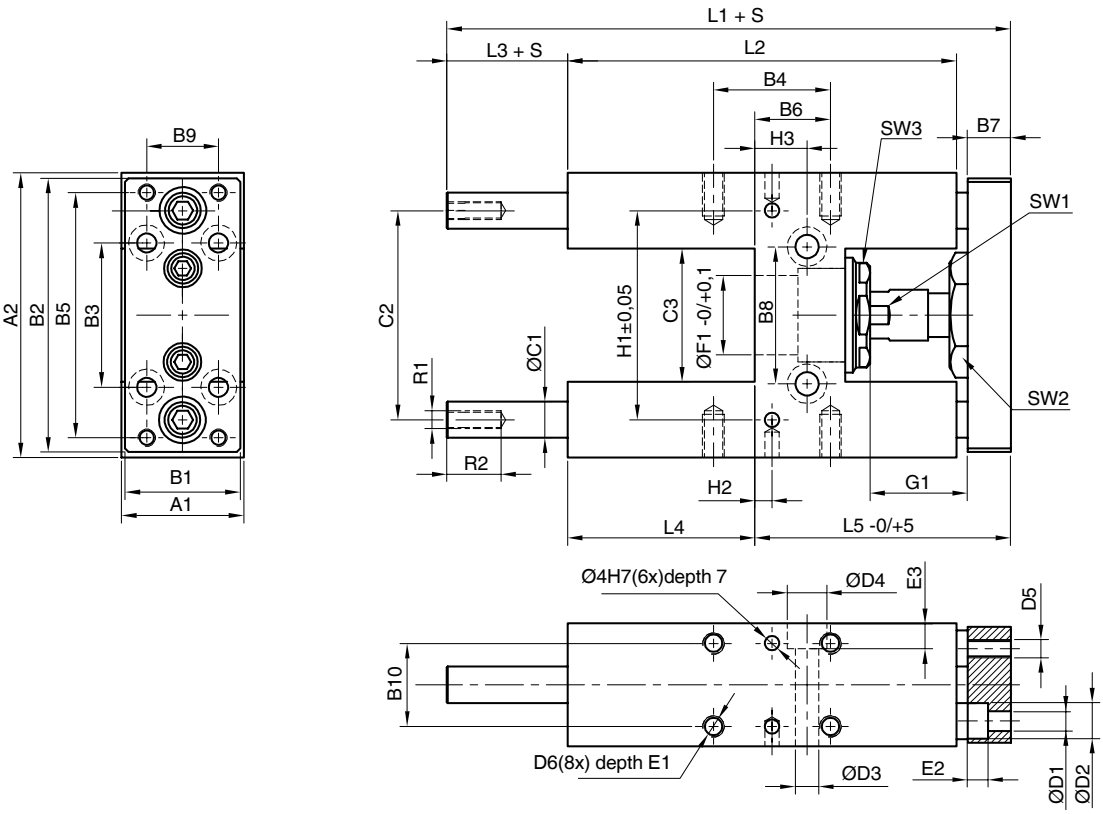
Cyl. bore	D5	D6	E1	E2	E3	F1	G1	L1	L2	L3	L5	SW1	SW2	SW3	R1	R2	H1	H2
12/16	M4	M4	8	4,6	-	16	16	69	39	17	52	22	8	19	M4	8	46	20
20	M5	M6	12	5,6	7	22	30	85	55	15	70	30	13	27	M6	11	58	30
25	M5	M6	12	5,6	7	22	23	85	55	15	70	30	13	27	M6	11	58	30

Cyl. bore	Weight stroke 0 mm kg	Additional weight per 10 mm stroke kg
12/16	0,26	0,0078
20	0,47	0,1233
25	0,47	0,1233

S = Stroke

A

Dimensions, H style guidance modules, ball bearings



Cyl. bore	A1	A2	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	C1	C2	C3	D1	D2	D3
12/16	30	65	27	63	32	32,5	54	13	10	24	15	22	8	46	27	4,5	8,0	5,5
20	34	79	32	76	40	32,5	68	21	12	38	20	23	10	58	37	5,5	10,5	6,5
25	34	79	32	76	40	32,5	68	21	12	38	20	23	10	58	37	5,5	10,5	6,5

Cyl. bore	D4	D5	D6	E1	E2	E3	F1	G1	L1	L2	L3	L4	L5	SW1	SW2	SW3	R1	R2
12/16	9	M4	M4	8	4,6	6	16	16	130	75	44	35	51	22	8	19	M4	8
20	11	M5	M6	12	5,6	7	22	30	160	108	43	52	65	30	13	27	M6	11
25	11	M5	M6	12	5,6	7	22	23	160	108	43	52	65	30	13	27	M6	11

Cyl. bore	H1	H2	H3
12/16	46	-3,25	8,5
20	58	4,75	15,0
25	58	4,75	15,0

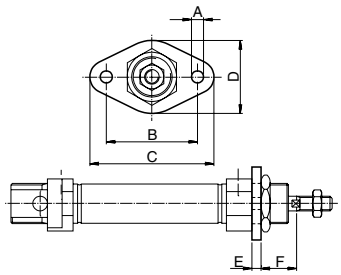
Cyl. bore	Weight stroke 0 mm kg	Additional weight per 10 mm stroke kg
12/16	0,43	0,0078
20	0,77	0,1233
25	0,77	0,1233

S = Stroke

A

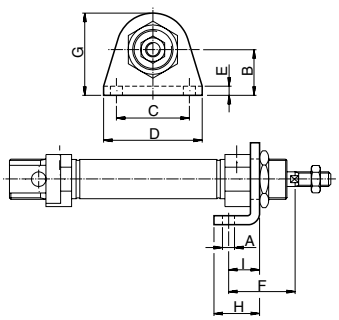
Cylinder mountings

Type	Description	Cyl. bore Ø mm	Weight kg	Order code
Flange-MF8 	Intended for fixed attachment of the cylinder. The flange is designed for mounting on the front or rear end-covers. Material: Surface-treated steel	10 12-16 20-25	0,012 0,025 0,045	**P1A-4CMB** **P1A-4DMB** **P1A-4HMB**
Stainless Flange-MF8 	Intended for fixed attachment of the cylinder. The flange is designed for mounting on the front or rear end-covers. Material: Stainless steel, DIN X 10 CrNiS 18 9	10 12-16 20-25	0,012 0,025 0,045	**P1S-4CMB** **P1S-4DMB** **P1S-4HMB**



Cylinder Ø mm	A mm	B mm	C mm	D mm	E mm	F mm
10	4,5	30	40	22	3	13
12-16	5,5	40	52	30	4	18
20	6,6	50	66	40	5	19
25	6,6	50	66	40	5	23

Foot-MS3 	Intended for fixed attachement of the cylinder. The bracket is designed for mounting on the front or rear end-covers. Material: Surface-treated steel	10 12-16 20-25	0,020 0,040 0,080	**P1A-4CMF** **P1A-4DMF** **P1A-4HMF**
Stainless Foot-MS3 	Intended for fixed attachement of the cylinder. The bracket is designed for mounting on the front or rear end-covers. Material: Stainless steel, DIN X 10 CrNiS 18 9	10 12-16 20-25	0,020 0,040 0,080	**P1S-4CMF** **P1S-4DMF** **P1S-4HMF**



Cylinder Ø mm	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	I mm
10	4,5	16	25	35	3	24	26,0	16	11
12-16	5,5	20	32	42	4	32	32,5	20	14
20	6,5	25	40	54	5	36	45,0	25	17
25	6,5	25	40	54	5	40	45,0	25	17

A

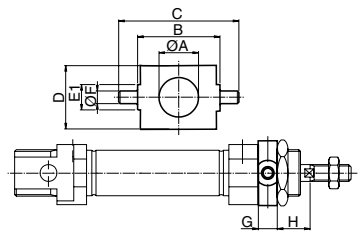
Cylinder mountings

Cover trunnion

Intended for articulated mounting of the cylinder. The flange is designed for mounting on the front or rear end-covers.

Material:
Surface-treated steel

Type	Cyl. bore Ø mm	Weight kg	Order code
	10	0,014	**P1A-4CMJZ**
	12-16	0,033	**P1A-4DMJZ**
	20-25	0,037	**P1A-4HMJZ**



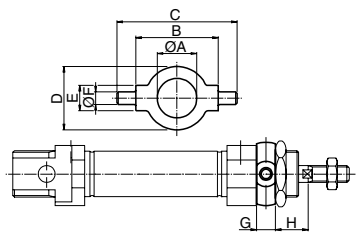
Cylinder Ø mm	A mm	B h14 mm	C mm	D mm	E1 mm	F e9 mm	G mm	H mm
10	12,5	26	38	20	9	4	6	10
12-16	16,5	38	58	25	13	6	8	14
20	22,5	46	66	30	13	6	8	16
25	22,5	46	66	30	13	6	8	20

Cover trunnion
Stainless steel

Intended for articulated mounting of the cylinder.
The flange is designed for mounting on the front or rear end covers.

Material:
Stainless steel, DIN X 10 CrNiS 18 9

Type	Cyl. bore Ø mm	Weight kg	Order code
	10	0,014	**P1A-4CMJ**
	12-16	0,033	**P1A-4DMJ**
	20-25	0,037	**P1A-4HMJ**



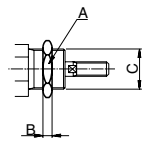
Cylinder Ø mm	A mm	B h14 mm	C mm	D mm	E mm	F e9 mm	G mm	H mm
10	12,5	26	38	20	8	4	6	10
12-16	16,5	38	58	25	10	6	8	14
20	22,5	46	66	30	10	6	8	16
25	22,5	46	66	30	10	6	8	20

Stainless Mounting nut

Intended for fixed mounting of the cylinder.
Cylinders are supplied complete with one mounting nut.

Material:
Stainless steel, DIN X 5 CrNi 18 10

Type	Cyl. bore Ø mm	Weight kg	Order code
	10	0,009	**9126725405**
	12-16	0,018	**9126725406**
	20-25	0,042	**9126725407**



Cylinder Ø mm	A mm	B mm	C
10	19	6	M12x1,25
12-16	24	8	M16x1,50
20-25	32	11	M22x1,50

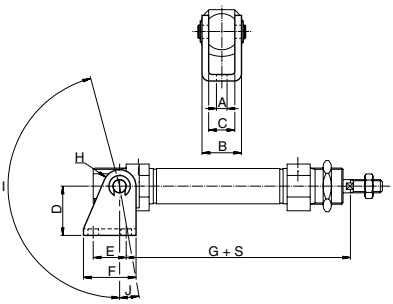
A

Cylinder mountings

Type	Description	Cyl. bore Ø mm	Weight kg	Order code
Clevis bracket 	Intended for articulated mounting of the cylinder. Supplied with shaft for mounting on the rear end cover. Material: Bracket: surface-treated steel, black Pin: surface hardened steel Circlips: according to DIN 471: Stainless steel	10 12-16 20-25	0,020 0,040 0,080	**P1A-4CMT** **P1A-4DMT** **P1A-4HMT**
Clevis bracket 	Intended for articulated mounting of the cylinder. Supplied with shaft for mounting on the rear end cover. Material: Bracket: stainless steel, DIN X 5 CrNi 18 10 Pin: tempered stainless steel, DIN X 20 Cr 13 Locking rings: stainless steel, DIN X 5 CrNi 18 10	10 12-16 20-25	0,020 0,040 0,080	**P1S-4CMT** **P1S-4DMT** **P1S-4HMT**

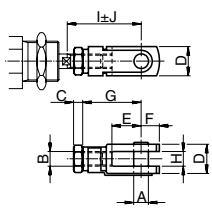
Cylinder Ø mm	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	I °	J °
10	4,5	13	8	24	12,5	20	65,3	5	160	17
12	5,5	18	12	27	15,0	25	73,0	7	170	15
16	5,5	18	12	27	15,0	25	80,0	7	170	15
20	6,5	24	16	30	20,0	32	91,0	10	165	10
25	6,5	24	16	30	20,0	32	100,0	10	165	10

S=stroke



Type	Description	Cyl. bore Ø mm	Weight kg	Order code
Clevis 	According to ISO 8140 Intended for articulated mounting of the cylinder. This mounting is adjustable in the axial direction. Supplied complete with pin. Material: Galvanized steel	10 12-16 20 25	0,007 0,022 0,045 0,095	**P1A-4CRC** **P1A-4DRC** **P1A-4HRC** **P1A-4JRC**
Stainless Clevis 	According to ISO 8140 Intended for articulated mounting of the cylinder. This mounting is adjustable in the axial direction. Supplied complete with pin. Material: Stainless steel, DIN X 5 CrNi 18 10	10 12-16 20 25	0,007 0,022 0,045 0,095	**P1S-4CRC** **P1S-4DRC** **P1S-4HRC** **P1S-4JRC**

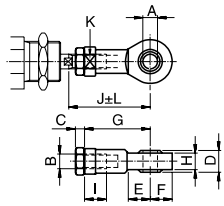
Cylinder Ø mm	A mm	B	C mm	D mm	E mm	F mm	G mm	H mm	I mm	J mm
10	4	M4	2,2	8	8	5	16	4	22,0	2,0
12-16	6	M6	3,2	12	12	7	24	6	31,0	3,0
20	8	M8	4,0	16	16	10	32	8	40,5	3,5
25	10	M10x1,25	5,0	20	20	12	40	10	49,0	3,0



A

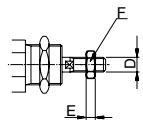
Cylinder mountings

Type	Description	Cyl. bore Ø mm	Weight kg	Order code
Swivel rod eye 	According to ISO 8139 Intended for articulated mounting of the cylinder. This mounting is adjustable in the axial direction. Material: Swivel rod eye: Galvanized steel Ball: hardened steel	10 12-16 20 25	0,017 0,025 0,045 0,085	**P1A-4CRS** **P1A-4DRS** **P1A-4HRS** **P1A-4JRS**
Stainless Swivel rod eye 	According to ISO 8139 Intended for articulated mounting of the cylinder. This mounting is adjustable in the axial direction. Material: Swivel rod eye: stainless steel, DIN X 5 CrNi 18 10 Ball: hardened stainless steel, DIN X 5 CrNi 18 10	10 12-16 20 25	0,017 0,025 0,045 0,085	**P1S-4CRT** **P1S-4DRT** **P1S-4HRT** **P1S-4JRT**



Cylinder Ø mm	A mm	B	C mm	D mm	E mm	F mm	G mm	H mm	I mm	J mm	K mm	L mm
10	5	M4	2,2	8	10	9	27	6,0	8	33,0	9	2,0
12-16	6	M6	3,2	9	10	10	30	6,8	9	38,5	11	1,5
20	8	M8	4,0	12	12	12	36	9,0	12	46,0	14	2,0
25	10	M10x1,25	5,0	14	14	14	43	10,5	15	52,5	17	2,5

Type	Description	Cyl. bore Ø mm	Weight kg	Order code
Stainless Rod nut 	Intended for fixed mounting on the piston rod. Cylinders are supplied complete with one rod nut. (cylinders with through piston rod are supplied with two rod nuts.) Material: Stainless steel, DIN X 5 CrNi 18 10	10 12-16 20 25	0,001 0,002 0,005 0,007	**9127385121** **9127385122** **9127385123** **9126725404**



Cylinder Ø mm	D	F mm	E mm
10	M4	7	2,2
12-16	M6	10	3,2
20	M8	13	4,0
25	M10x1,25	17	5,0

Our global series of sensors

This series of sensors is already being used or will be used in all future ranges in our global product programme involving cylinders/actuators. The sensors have small installation dimensions and either fit into the groove in the case profile or, as shown here, are fastened to the cylinder using a special attachment.

You can choose from electronic or reed sensors with a range of cable lengths fitted with 8 mm or M12 terminals.

Electronic sensors

The new electronic sensors are "Solid State", i.e. they have no moving parts at all. They are provided with short-circuit protection and transient protection as standard. The built-in electronics make the sensors suitable for applications with high on and off switching frequency, and where very long service life is required.

Technical data

Design	GMR (Giant Magnetic Resistance) magneto-resistive function
Installation	Sensor mounting P8S-TMC01
Outputs	PNP, normally open (also available in NPN design, normally closed, on request)
Voltage range	10-30 VDC
	10-18 V DC, ATEX sensor
Ripple	max 10%
Voltage drop	max 2,5 V
Load current	max 100 mA
Internal consumption	max 10 mA
Actuating distance	min 9 mm
Hysteresis	max 1,5 mm
Repeatability accuracy	max 0,2 mm
On/off switching frequency	max 5 kHz
On switching time	max 2 ms
Off switching time	max 2 ms
Encapsulation	IP 67 (EN 60529)
Temperature range	–25 °C to +75 °C
	–20 °C to +45 °C, ATEX sensor
Indication	LED, yellow
Material housing	PA 12
Material screw	Stainless steel
Cable	PVC or PUR 3x0.25 mm^2 see order code respectively

Reed sensors

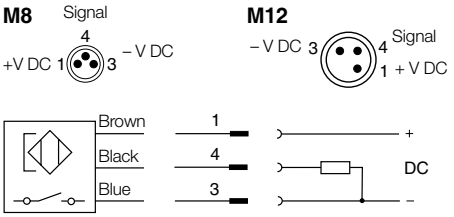
The sensors are based on proven reed switches, which offer reliable function in many applications. Simple installation, a protected position on the cylinder and clear LED indication are important advantages of this range of sensors.

Technical data

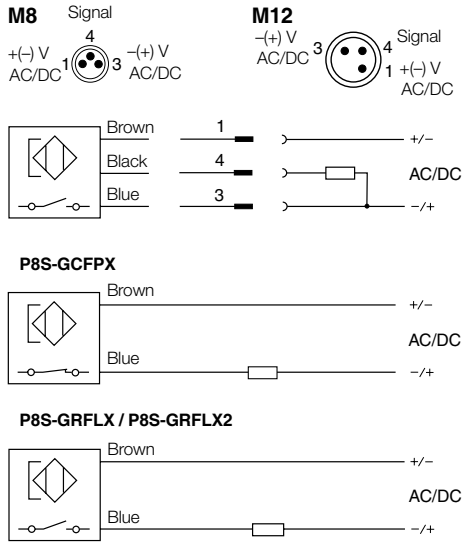
Design	Reed element
Mounting	Sensor mounting P8S-TMC01
Output	Normally open , or normally closed
Voltage range	10-30 V AC/DC or 10-120 V AC/DC
	24-230 V AC/DC
Load current	max 500 mA for 10-30 V or max 100 mA for 10-120 V
	max 30 mA for 24-230 V
Breaking power (resistive)	max 6 W/VA
Actuating distance	min 9 mm
Hysteresis	max 1,5 mm
Repeatability accuracy	0,2 mm
On/off switching frequency	max 400 Hz
On switching time	max 1,5 ms
Off switching time	max 0,5 ms
Encapsulation	IP 67 (EN 60529)
Temperature range	–25 °C to +75 °C
Indication	LED, yellow
Material housing	PA12
Material screw	Stainless steel
Cable	PVC or PUR 3x0.14 mm^2 see order code respectively

A

Electronic sensors

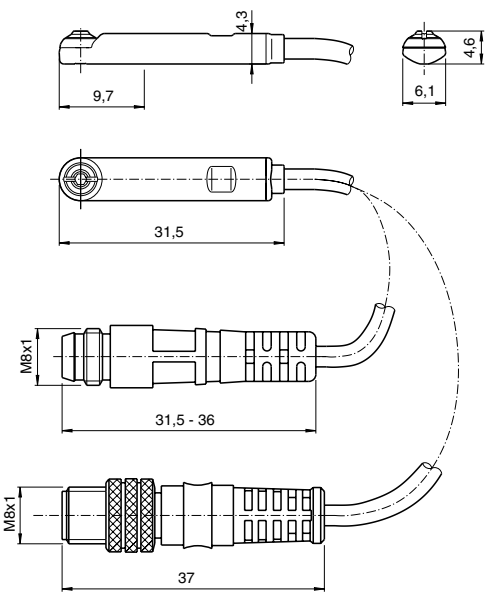


Reed sensors

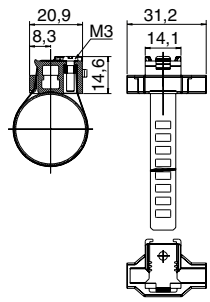


Dimensions

Sensors



Sensor mounting P8S-TMC01



A

Ordering data

Output/function	Cable/connector	Weight kg	Order code
Electronic sensors , 10-30 V DC			
PNP type, normally open	0,27 m PUR-cable and 8 mm snap-in male connector	0,007	**P8S-GPSHX**
PNP type, normally open	1,0 m PUR-cable and 8 mm snap-in male connector	0,013	**P8S-GPSCX**
PNP type, normally open	1,0 m PUR-cable and M8 screw male connector	0,013	**P8S-GPCCX**
PNP type, normally open	0,27 m PUR-cable and M12 screw male connector	0,015	**P8S-GPMHX**
PNP type, normally open	3 m PVC-cable without connector	0,030	**P8S-GPFLX**
PNP type, normally open	10 m PVC-cable without connector	0,110	**P8S-GPFTX**
Electronic sensor 18-30 V DC ATEX-certified			
CE Ex **II3G EEx nA II T4X II3D 135 °C IP67**			
Type PNP , normally open	3 m PVC-cable without connector	0,030	**P8S-GPFLX/EX**
Reed sensors , 10-30 V AC/DC			
Normally open	0,27 m PUR-cable and 8 mm snap-in male connector	0,007	**P8S-GSSHX**
Normally open	1,0 m PUR-cable and 8 mm snap-in male connector	0,013	**P8S-GSSCX**
Normally open	1,0 m PUR-cable and M8 male connector	0,013	**P8S-GSCCX**
Normally open	0,27 m PUR-cable and M12 screw male connector	0,015	**P8S-GSMHX**
Normally open	1,0 m PUR-cable and M12 screw male connector	0,023	**P8S-GSMCX**
Normally open	3 m PVC-cable without connector	0,030	**P8S-GSFLX**
Normally open	10 m PVC-cable without connector	0,110	**P8S-GSFTX**
Normally closed	5m PVC-cable without connector [1]	0,050	**P8S-GCFPX**
Reed sensors, 10-120 V AC/DC			
Normally open	3 m PVC-cable without connector	0,030	**P8S-GRFLX**
Reed sensorer, 24-230 V AC/DC			
Normally open	3 m PVC-cable without connector	0,030	**P8S-GRFLX2**

1) Without LED

Sensor mounting

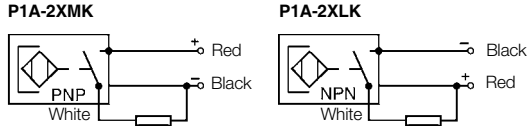
Description	Weight kg	Order code
Sensor mounting for cylinder P1A cylinder bore Ø10 to Ø25 mm	0,07	**P8S-TMC01**

A

Sensors for special applications

Sensors for applications where the short installation length and the 90 degree cable outlet are important factors. This type of sensor is an good alternative if a cylinder has a short stroke or tight installation, and installation is easier than our global series of sensors.

Electronic sensor symbol

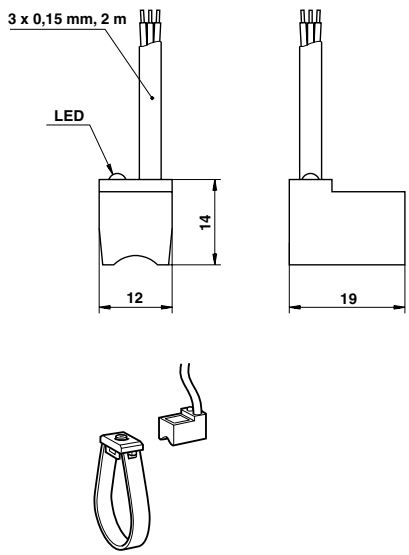


Technical data

Design	Hall element
Output	PNP resp. NPN, N.O.
Voltage range	10-30 VDC
Max permissible ripple	10%
Max voltage drop	≤0,5 V at 100 mA
Max load current, P1A-2XMK, LK	150 mA
P1A-2XHK, EK, JH, FH	100 mA
Max breaking power (resistive)	6 W
Internal consumption	<30 mA at 30 V
Min actuating distance	5 mm
Hysteresis	1,1 - 1,3 mm
Repeatability accuracy	±0,1 mm
Max on/off switching frequency	1 kHz
Max on/off switching time	0,8/3,0 µs
Encapsulation, P1A-2XJH, FH	IP 65
Encapsulation, P1A-2XHK, EK, MK, LK	IP 67
Temperature range	–10 °C to +60 °C
Indication	LED
Shock resistance	40 g
Material, housing	Polyamid 11
Material, mould	Epoxy
Cable	PVC 3x0,15 mm²
Cable incl. female part connector	PVC 3x0,15 mm²
Connector	Diam. 8 mm snap on
Mounting	Mounting yoke
Material, mounting	Acetal/Stainless steel
Material, screw	Stainless steel

Dimensions

P1A-2XMK and P1A-2XLK



Ordering data

Output	Cable length	Weight kg	Order code
Electronic sensors			
PNP, N.O.	2 m	0,040	**P1A-2XMK**
NPN, N.O.	2 m	0,040	**P1A-2XLK**
Mountngs for sensors			
For cylinder Ø10		0,005	**P1A-2CCC**
For cylinder Ø12		0,005	**P1A-2DCC**
For cylinder Ø16		0,008	**P1A-2FCC**
For cylinder Ø20		0,008	**P1A-2HCC**
For cylinder Ø25		0,010	**P1A-2JCC**

A

Connecting cables with one connector

The cables have an integral snap-in female connector.

Type of cable	Cable/connector	Weight kg	Order code
Cables for sensors, complete with one female connector			
Cable, Flex PVC	3 m, 8 mm Snap-in connector	0,07	**9126344341**
Cable, Flex PVC	10 m, 8 mm Snap-in connector	0,21	**9126344342**
Cable, Super Flex PVC	3 m, 8 mm Snap-in connector	0,07	**9126344343**
Cable, Super Flex PVC	10 m, 8 mm Snap-in connector	0,21	**9126344344**
Cable, Polyurethane	3 m, 8 mm Snap-in connector	0,01	**9126344345**
Cable, Polyurethane	10 m, 8 mm Snap-in connector	0,20	**9126344346**
Cable, Polyurethane	5 m, M12 screw connector	0,07	**9126344348**
Cable, Polyurethane	10 m, M12 screw connector	0,20	**9126344349**

Male connectors for connecting cables

Cable connectors for producing your own connecting cables. The connectors can be quickly attached to the cable without special tools. Only the outer sheath of the cable is removed. The connectors are available for M8 and M12 screw connectors and meet protection class IP 65.

Connector	Weight kg	Order code
M8 screw connector	0,017	**P8SCS0803J**
M12 screw connector	0,022	**P8SCS1204J**

A

Connection block Valvetronic 110

The Valvetronic 110 is a connection block that can be used for collecting signals from sensors at various points on a machine and connecting them to the control system via a multicore cable. Valvetronic 110 can also be used for central connection of the multi-core cable to the outputs of a control system, and can be laid to a machine where the output signals can be connected. The connection block has ten 8 mm snap-in circular connectors and a multi-core cable which is available in lengths of 3 or 10 m. The connections on the block are numbered from 1 to 10. Blanking plugs are available for unused connections, as labels for marking the connections of each block.

Technical data

Connections:

Ten 3-pole numbered 8 mm round snap-in female contacts

Input block	
Pin 1	Common, +24 VDC
Pin 2	Input signal
Pin 3	Common, 0V

Output block	
Pin 1	Common, GND
Pin 2	Output signal
Pin 3	Common, 0V

Electrical data:

Voltage	24 VDC (max. 60 V AC/75 V DC)
Insulation group	according to DIN 0110 class C
Load	max. 1 A per connection total max. 3 A

Cable:

Length	3 m or 10 m
Type of cable LifYY11Y	
Conductor	12
Area	0.34 mm²
Colour marking	According to DIN 47 100

Mechanical data

Enclosure	IP 67, DIN 40050 with fitted contacts and/or blanking plugs.
Temperature	–20 °C to +70 °C

Material

Body	PA 6,6 VD according to UL 94
Contact holder	PBTP
Snap-in ring	LDPE
Moulding mass	Epoxy
Seal	NBR
Screws	Plated steel

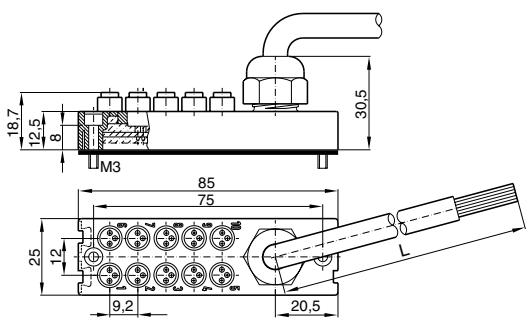
Industrial durability

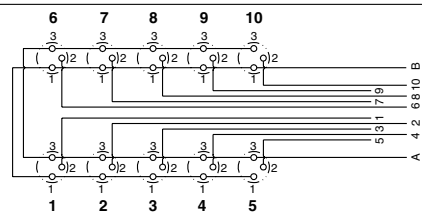
Good chemical and oil resistance. Tests should be performed in aggressive environments.

Ordering data

	Designation	Weight kg	Order code
	Connection block Valvetronic 110 with 3 m cable Connection block Valvetronic 110 with 10 m cable	0,32 0,95	**9121719001** **9121719002**
	Blanking plugs (pack of 10) Use blanking plugs to close unused connections.	0,02	**9121719003**
	Labels (pack of 10) White labels to insert in grooves on the side of the connection	0,02	**9121719004**

Dimensions and wiring diagrams





Conductor	Colour	Input	Output
1	Pink	Signal 1	Signal 1
2	Grey	Signal 2	Signal 2
3	Yellow	Signal 3	Signal 3
4	Green	Signal 4	Signal 4
5	White	Signal 5	Signal 5
6	Red	Signal 6	Signal 6
7	Black	Signal 7	Signal 7
8	Violet	Signal 8	Signal 8
9	Grey-Pink	Signal 9	Signal 9
10	Red-Blue	Signal 10	Signal 10
A	Blue	0 V	0 V
B	Brown	+24 V	PE

B

Mini Cylinders

R10 - R25 Series

B

Round cylinder Ø 10-25 mm

to ISO 6432
CETOP RP 52P

Series R....

System:
– single acting
– double acting without cushioning
– double acting with cushioning
– for contactless position sensing
– ATEX-Version ⟨Ex⟩
– with through piston rod
– non-rotating

Universal cylinder mountable to the front and rear cylinder end caps by means of a thread. Pivot mounted on the rear cylinder covers.

The delivery includes:
1 Cylinder
1 Hexagon nut for piston rod thread and cylinder mounting

Versions without contactless position sensing on request

Characteristics

Characteristics	Symbol	Unit	Description					
General Features								
Type			Basic cylinder					
Series			R.... , RDU...., RDV....					
System								
R3....			Single acting without cushioning					
R6....			Double acting without cushioning					
R1...., R5....			Double acting with cushioning					
RDU6...			With through piston rod Double acting without cushioning					
RDV5...			Non-rotating Double acting with cushioning					
Ambient temperature range	T_{min} T_{max}	°C °C	-10 +70	Note: When using below freezing point (°C), please contact us for advice				
Medium temperature range	T_{max}	°C	+70					
Weight (mass)		kg	See table					
Medium			Filtered and lubricated or filtered unlubricated compressed air					
Lubrication			Oil mist lubrication compatible with Buna N					
Material								
Cylinder barrel			Steel, high-alloy					
Front/rear end caps			Aluminium					
Piston rod			Steel, high-alloy					
Pneumatic Characteristics								
Nominal pressure	p_n	bar	6					
Series			R...., RDU					RDV
Piston diameter		mm	10	12	16	20	25	25
Operating pressure range	p_{min} p_{max}	bar bar	1,5 10	1 10				1 10
Port size			M5	M5	M5	G1/8	G1/8	G1/8
Piston rod diameter		mm	4	6	6	8	10	6
Stroke length		mm	For standard stroke lengths see order instructions, max. 50 (R 3...), max. 500 (R 5..., R 6...) longer strokes on request					
Cushioned stroke		mm	–	–	–	17	17	17
Piston force and air consumption			see page 9					
Compression force at 6 bar		N						265
Tensile force at 6 bar		N						235

B

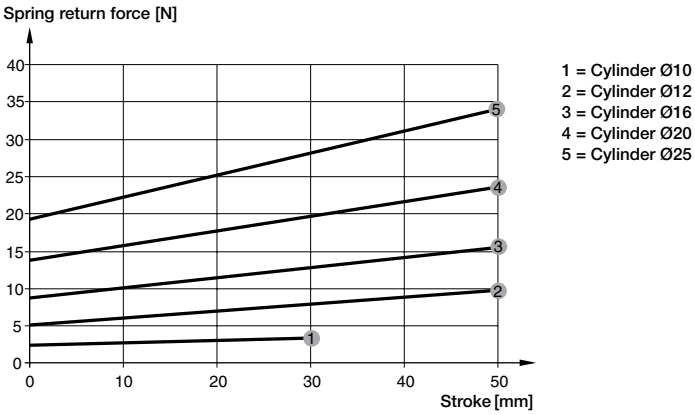
Weight (mass) kg

Mounting	Cylinder diameter									
	Ø10		Ø12		Ø16		Ø20		Ø25	
	1*	2*	1*	2*	1*	2*	1*	2*	1*	2*
Basic cylinder Type R....	0.065	0.025	0.120	0.040	0.135	0.050	0.260	0.070	0.350	0.080
With through piston rod Type RDU....	0.100	0.045	0.155	0.060	0.170	0.070	0.330	0.110	0.460	0.170
Non-rotating Type RDV....	–	–	–	–	–	–	–	–	0.460	0.110

Mounting	Cylinder diameter				
	Ø10	Ø12	Ø16	Ø20	Ø25
RA (1 bracket)	0.022	0.043	0.043	0.100	0.100
RC	0.013	0.028	0.028	0.050	0.050
RB	0.023	0.036	0.036	0.080	0.080

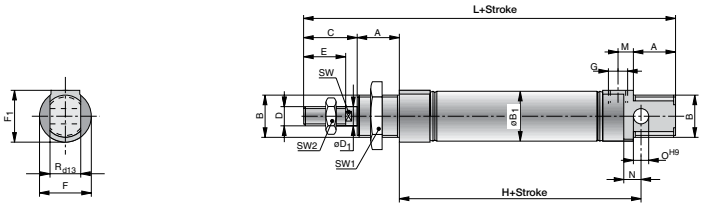
* 1 = Weight for cylinder with 100 mm stroke
2 = Weight for every additional 100 mm stroke length

Theoretical Spring Return Forces in relation to Stroke Length
Series R3..., R5..., R6...

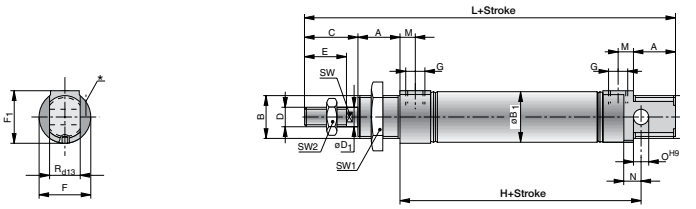


B

Dimensions – Basic Cylinder, Single Acting, Ø 10 – 25 mm
Series R3...

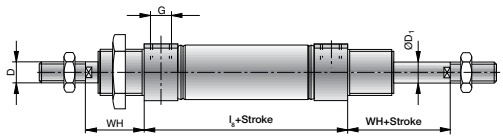


Dimensions – Basic Cylinder, Double Acting, Ø 10 – 25 mm
Series R5..., R6..., R1...



*From the connection side: adjustable end cushioning only for types R 5016, R 5020, R 5025

Dimensions – Basic Cylinder, Double Acting with through piston rod
Series RDU6...



for further dimensions see Series R5....

Dimension Table (mm) for Basic Cylinder, Series R...., RDU....

Cyl.Ø	A	B	ØB$_1$	C	D	ØD$_1$	E	F	F$_1$	G	H + Stroke	l$_8$ +Stroke
10	12	M12x1.25	11.3	16	M4	4	12	15	15	M5	48	44.5
12	17	M16x1.5	13.3	21	M6	6	16	20	20	M5	53	46
16	17	M16x1.5	17.3	21	M6	6	16	20*	20*	M5	60	56
20	20	M22x1.5	21.3	24	M8	8	20	27	27	G1/8	71	66
25	22	M22x1.5	26.5	28	M10x1.25	10	22	27	27	G1/8	76	69

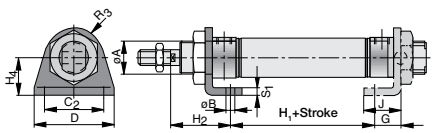
* for Type R5016: F = 22 , F$_1$ = 21

Cyl.Ø	L+ Stroke	M	N	ØO^{H9}	R$_{d13}$	SW	SW$_1$	SW$_2$	WH	WH +Stroke
10	84	5	6	4	8	–	19	7	16	16
12	101	5	9	6	12	5	24	10	22	22
16	111	5	9	6	12	5	24	10	22	22
20	130	8	12	8	16	7	32	13	24	24
25	141	8	12	8	16	9	32	17	28	28

B

Mountings – Series R...., RDU...., Ø 10 – 25 mm

Dimensions Mounting RA

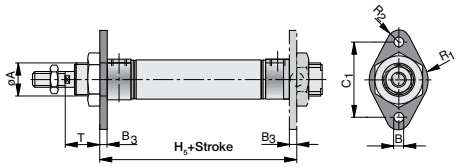


Material: steel, passivated

Dimension Table (mm) for Mounting RA

Cyl.-Ø	ØA	ØB	C_2	D	G	H_1+ stroke	H_2	H_4	J	R_3	S_1
10	12	4.5	25	35	11	30	24	16	16	10	3
12	16	5.5	32	42	14	29	32	20	20	13.5	4
16	16	5.5	32	42	14	36	32	20	20	13.5	4
20	22	6.6	40	54	17	44	36	25	25	18	5
25	22	6.6	40	54	17	45	40	25	25	18	5

Dimensions Mounting RC

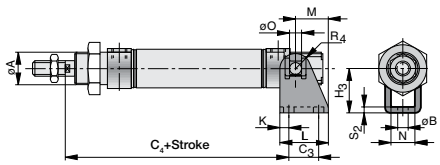


Material: steel, passivated

Dimension Table (mm) for Mounting RC

Cyl.-Ø	ØA	ØB	B_3	C_1	H_5+ Stroke	R_1	R_2	T
10	12	4.5	3	30	52	12.5	5	13
12	16	5.5	4	40	58	15	6	18
16	16	5.5	4	40	64	15	6	18
20	22	6.6	5	50	78	20	8	19
25	22	6.6	5	50	79	20	8	23

Rear Trunnion Mounting RB



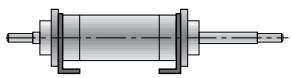
Material: steel, passivated

Dimension Table (mm) – for Mounting RB

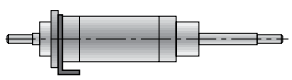
Cyl. Ø	ØB	C_3	C_4+ Stroke	H_3	K	L	M	N	ØO	R_4	S_2
10	4.5	12.5	65	24	6.5	23	18	8.1	4	5	2.5
12	5.5	15	73	27	5	25	18	12.1	6	7	3
16	5.5	15	80	27	5	25	18	12.1	6	7	3
20	6.6	20	91	30	6	32	22	16.1	8	10	4
25	6.6	20	100	30	6	32	22	16.1	8	10	4

Mountings – Series RDU....

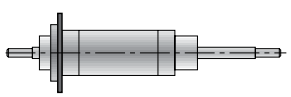
Mounting RA2-.. (2 brackets)



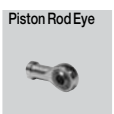
Mounting RA1.. (1 bracket)



Mounting RC-..(1 flange)

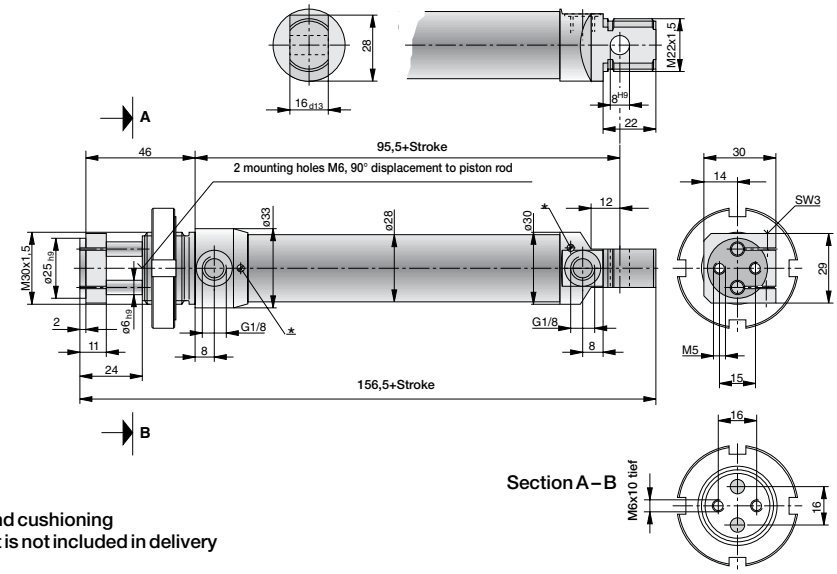


Mounting Accessories



B

Dimensions – Double acting, non-rotating, Ø 25 mm
Series RDV5...

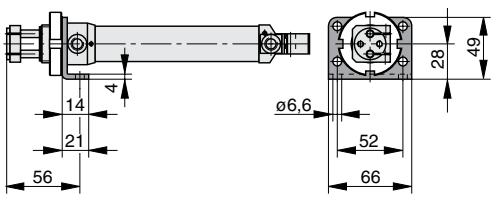


* adjustable end cushioning
Mounting nut is not included in delivery

Mounting instruction:
When mounting the front plate onto the piston rods tighten the screws with a torque $M_a = 4$ N.

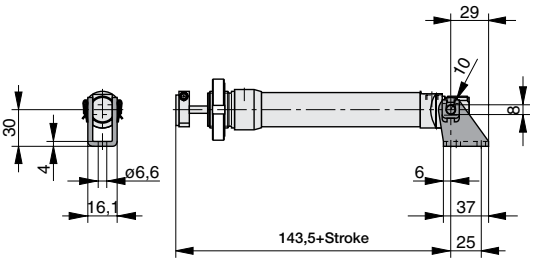
Mountings – Series RDV...., Ø 25 mm

Dimensions (mm) – Mounting RA



Material: steel, passivated

Dimensions (mm) – Mounting RB (counter bearing)

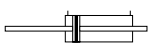


Material: steel, passivated

Mounting Accessories

B

Order Instructions – Basic Cylinder, Series R...., RDU...., RDV....

System	Symbol	Piston-Ø	Stroke Length	Order Instructions Type	Order-No.
Single acting without cushioning		10	max. 25[1)]	R3010/..	PA67410-....
		12	max. 50[2)]	R3012/..	PA67430-....
		16	max. 50[2)]	R3016/..	PA67450-....
		20	max. 50[2)]	R3020/..	PA67470-....
		25	max. 50[2)]	R3025/..	PA67500-....
Double acting without cushioning For contactless position sensing		10	max. 100[3)]	R6010/..	PA67420-....
		12	max. 200[3)]	R6012/..	PA67440-....
		16	max. 200[3)]	R6016/..	PA67460-....
		20	max. 320[3)]	R6020/..	PA67490-....
		25	max. 500[3)]	R6025/..	PA67520-....
Double acting with cushioning		16	max. 200[3)]	R1016/..	PA68400-....
		20	max. 320[3)]	R1020/..	PA67570-....
		25	max. 500[3)]	R1025/..	PA67590-....
Double acting with cushioning For contactless position sensing		16	max. 200[3)]	R5016/..	PA68410-....
		20	max. 320[3)]	R5020/..	PA67480-....
		25	max. 500[3)]	R5025/..	PA67510-....
With through rod piston Double acting without cushioning For contactless position sensing		10	max. 100[3)]	RDU6010/...	PA68420-....
		12	max. 200[3)]	RDU6012/...	PA67690-....
		16	max. 320[3)]	RDU6016/...	PA67700-....
		20	max. 500[3)]	RDU6020/...	PA67710-....
		25	max. 500[3)]	RDU6025/...	PA67720-....
Non-rotating Double acting with cushioning For contactless position sensing		25	max. 500[3)]	RDV5025/...	PA50470-....

Complete type designation and order no. with stroke length (in mm) (4-digit)

Standard stroke length:
[1)] 0010, 0025
[2)] 0010, 0025, 0050
[3)] 0025, 0050, 0080, 0100, 0125, 0160, 0200, 0250, 0320

Mountings – Cylinder mounting parts and Accessories

Description	Order-No. Type	Ø10	Ø12	Ø16	Ø20	Ø25
Foot mounting (1 mounting bracket)	RA1-..	KX9271	KK26302	KK26302	KK28302	KK28302
Foot mounting (standard version)	RA2-..*	PD31522	PD25771	PD25771	PD25772	PD25772
Flange mounting (1 flange)	RC-..	KX9272	KK26305	KK26305	KK28305	KK28305
Rear trunnion mounting	RB-..**	KZ1412	KZ1419	KZ1419	KZ1420	KZ1420
Foot mounting (1 mounting bracket) for series RDV5...	RA1-32					KK29.302
Groove nut for series RDV5...						ZP2125

Complete type designation with piston-Ø

Example: RA1-25 KK28302

* consisting of 2 mounting brackets and 1 hexagonal nut
** consisting of 1 pivot with bolt and circlip

All Round Cylinders

R32 - R63 Series

Round Cylinder Ø 32-63 mm

Series R...., RK....
Series RDU....

Versions:
- **double acting without cushioning**
- **double acting with adjustable cushioning**
- **for contactless position sensing**

Universal cylinder for mounting by a thread on the cylinder covers.
Pivot mounted on the front and rear cylinder covers.

The delivery includes:
1 Cylinder
1 Hexagon nut for piston rod thread and for cylinder mountings

Versions without contact-less position sensing on request.

Characteristics

Characteristics	Symbol	Unit	Description			
General Features						
Type			Round cylinder			
Series			R.... , RK....			
System			Piston rod cylinder			
R6..., RK6....			Double acting without cushioning			
R5....			Double acting with cushioning			
RDU6...			With through piston rod Double acting without cushioning			
Ambient temperature range	T_{min} T_{max}	°C °C	-10 +70	Note: When using below freezing point (°C) please contact as for advice		
Medium temperature range	T_{max}	°C	+70			
Weight (mass)		kg	See table			
Medium			Filtered and lubricated or filtered and unlubricated compressed air			
Lubrication			Oil mist lubrication compatible with NBR and PU			
Material						
Cylinder barrel			Aluminium, anodised			
Front/rear end caps			Aluminium			
Piston rod			Steel, high-alloy			
Pneumatic Characteristics						
Nominal pressure	p_n	bar	6			
Piston diameter		mm	32	40	50	63
Operating pressure range	p_{min} p_{max}	bar bar	1 10			
Port size			G1/8	G1/4	G1/4	G3/8
Piston rod diameter		mm	12	16	20	20
Stroke length		mm	For standard stroke lengths see order instructions, max. 500, longer strokes on request			
Cushioned stroke			At both ends progressively adjustable			
Cushioned stroke		mm	22	27	28	28

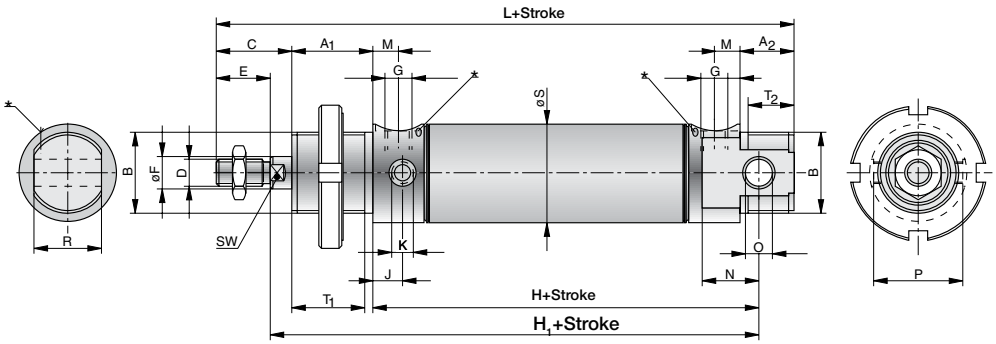
Weight (mass) kg

Cylinder version	Cylinder diameter							
	Ø32		Ø40		Ø50		63	
	1*	2*	1*	2*	1*	2*	1*	2*
Basic cylinder Typ R....	0.550	0.150	0.940	0.250	1.400	0.300	1.900	0.400
With through piston rod Typ RDU....	1.100	0.340	1.480	0.560	2.560	0.850	3.260	0.950

* 1 = Weight for cylinder with 100 mm stroke
  2 = Weight for every additional 100 mm stroke length

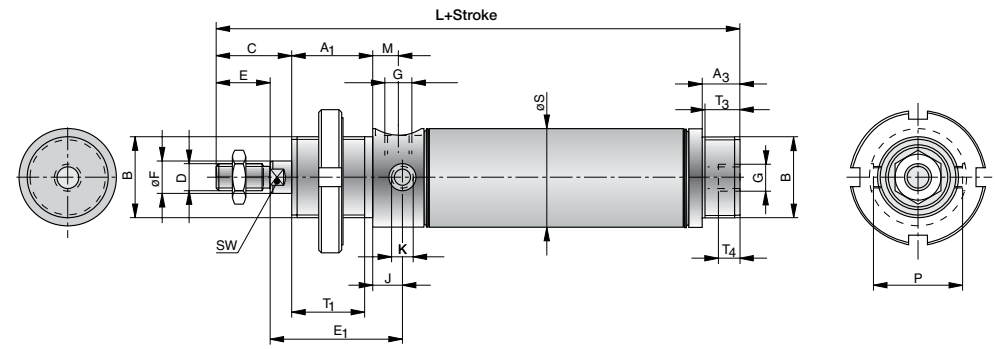
Mounting	Cylinder diameter			
	Ø32	Ø40	Ø50	63
RA (1 bracket)	0.100	0.190	0.290	0.360
RC	0.100	0.190	0.290	0.360
RB	0.170	0.290	0.480	0.700
RE	0.150	0.260	0.380	0.590

Dimensions – Basic Cylinder, Series R...., Ø 32 – 63 mm



* adjustable end cushioning only for series R 5000

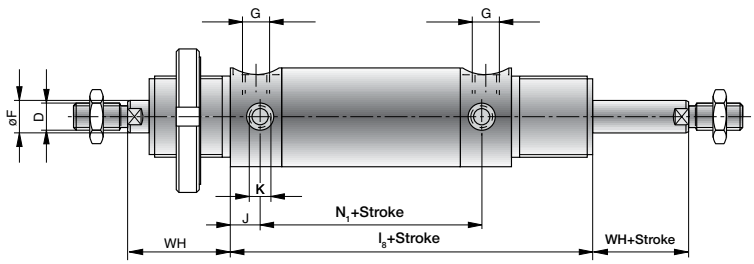
Dimensions – Basic Cylinder, Series RK...., Ø 32 – 63 mm



Dimension Table (mm) – Basic Cylinder, Series R...., RK...., RDU....

Cyl. Ø	A_1	A_2	A_3	B	C	D	E	E_1	ØF	G	H	H_1 +Stroke	J	K	l_8 +Stroke
32	30	19.5	14	M30x1.5	28	M10	20	49	12	G1/8	90.5	128.5	11	M8x1	83.5
40	35	21.5	16	M38x1.5	34	M12	24	57	16	G1/4	99.5	144.5	12	M10x1	89
50	38	25	18	M45x1.5	44	M16	32	63	20	G1/4	109.5	159.5	13	M12x1.5	93.5
63	38	24.5	18	M45x1.5	45	M16	32	64.5	20	G3/8	116.5	167.5	13.5	M14x1.5	101

Dimensions – Basic Cylinder with Through Piston Rod, Series RDU...., Ø 32 – 63 mm



Cyl. Ø	L + Stroke R....	L + Stroke RK....	M	N	N_1 +Stro-ke	O	P	R_{h12}	ØS	T_1	T_2	T_3	T_4	SW	WH	WH + Stroke
32	160.5	138.5	9.5	21	61.5	10	33	25	35	27	16.5	12	8	10	38	38
40	181.5	156.5	11	24	65	12	42	30	43	32	17.5	14	12	14	45	45
50	205.5	179.5	11	27	67.5	14	52	35	54	35	21	16	12	17	50	50
63	215.5	186.5	12.5	28	74	16	62	35	67	35	20.5	16	12	17	51	51

Accessories

Piston Rod Eye

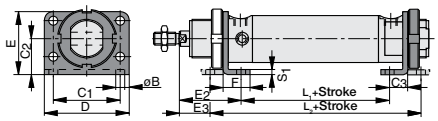
Piston Rod Clevis

Compensating Coupling

Magnetic Switch

Mountings – Series R...., RK...., Ø 32 – 63 mm

Foot Mounting Type RA2-..



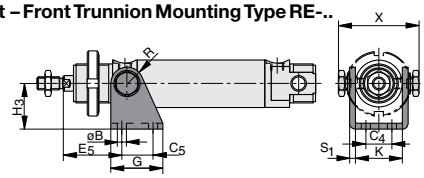
Material: steel, passivated

Dimension Table (mm) – Foot Mounting Type RA2

Cyl. Ø	ØB	C_1	C_2	C_3	D	E	E_2	E_3	F	L_1 +Stroke	L_2 +Stroke	S_1
32	6.6	52	28	14	66	49	48	24	21	63	111	4
										46.5*	94.5*	
40	9	60	33	20	80	58	60	25	30	61	131	5
										41.5*	111.5*	
50	9	70	40	20	90	70	64	30	30	70.5	138.5	6
										51.5*	119.5*	
63	9	76	45	20	96	80	65	31	30	80	148	6
										57.5*	125.5*	

* Dimensions in the grey fields are valid for series RK....

Pivot – Front Trunnion Mounting Type RE-..

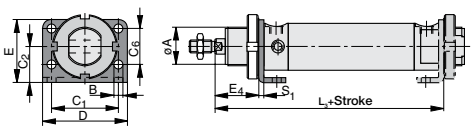


Material: steel, passivated

Dimension Table (mm) – Pivot – Front Trunnion Mounting Type RE

Cyl. Ø	ØB	C_4	C_5	E_5	G	H_3	K	R	S_1	X
32	6.6	20	24	45	40	35	36.1	12	4	60
40	9	28	30	54	50	40	45.1	13	5	75
50	9	36	34	59	54	45	55.1	14	6	89
63	9	42	35	63.5	65	50	70.1	16	6	109

Foot Mounting Type RA1-..
Flange Mounting Type RC-..



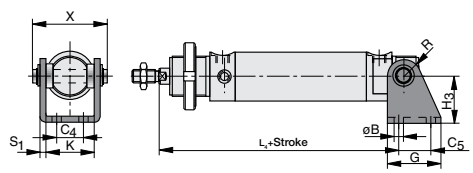
Material: steel, passivated

Dimension Table (mm) – Mounting RA1, RC

Cyl. Ø	ØA	B	C_1	C_2	C_6	D	E	E_4	L_3 +Stroke	S_1
32	30.1	6.6	52	28	28	66	49	34	125	4
									108.5*	
40	38.1	9	60	33	30	80	58	40	141	5
									121.5*	
50	45.1	9	70	40	40	90	70	44	154.5	6
									135.5*	
63	45.1	9	76	45	50	96	80	45	165	6
									142.5*	

* Dimensions are valid for series RK....

Pivot – Rear Trunnion Mounting Type RB-..



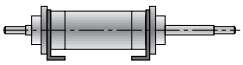
Material: steel, passivated

Dimension Table (mm) – Pivot Rear Trunnion Mounting Type RB

Cyl. Ø	ØB	C_4	C_5	G	H_3	H	K	L_4 +Stroke	R	S_1	X
32	6.6	20	24	40	35	8	36.1	124.5	12	4	58
40	9	28	30	50	40	10	45.1	141.5	13	5	70
50	9	36	34	54	45	10	55.1	155.5	14	6	86
63	9	42	35	65	50	15	70.1	166.5	16	6	100

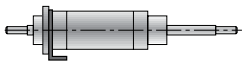
Mountings – Series RDU... (with through piston rod), Ø 32 – 63 mm

Foot mounting
(2 mounting brackets)



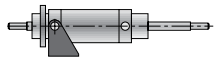
Material: steel, passivated

Foot mounting
(Flange mounting)



steel, passivated

Pivot – Front Trunnion Mounting



steel, passivated

Accessories

Piston Rod Eye

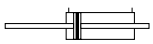
Piston Rod
Clevis

Compensating
Coupling

Magnetic
Switch

B

Order Instructions – Basic Cylinder *

Series	Symbol	Piston-Ø	Order Instructions Type	Order-No.
Double acting with adjustable end cushioning For contactless position sensing		32	R 5032/....*	PD46443-...
		40	R 5040/....	PD46445-....
		50	R 5050/....	PD46447-....
		63	R 5063/....	PD46449-....
Double acting without adjustable end cushioning For contactless position sensing		32	R 6032/....	PD46444-....
			RK 6032/....	PA58220-....
		40	R 6040/....	PD46446-....
			RK 6040/....	PA59140-....
		50	R 6050/....	PD46448-....
			RK 6050/....	PA60210-....
		63	R 6063/....	PD46450-....
			RK 6063/....	PA61150-....
With through piston rod Double acting without adjustable end cushioning For contactless position sensing		32	RDU 6032/....*	PD58270-...
		40	RDU 6040/....	PD59200-....
		50	RDU 6050/....	PD60270-....
		63	RDU 6063/....	PD61200-....

Complete type designation and order no. with stroke length (in mm) (4-digit)

Standard stroke lengths: 0025, 0050, 0080, 0100, 0125, 0160, 0200, 0250, 0320, 0400, 0500 delivered preferably

* Magnetic switch mounting by band

Order Instructions – Mountings - Accessories

Description	Type	Order-No. Ø32	Ø40	Ø50	Ø63
Foot mounting (1 mounting bracket)	RA 1-..	KK 29.302	KK 30.302	KK 31.302	KK 32.302
Foot mounting (standard version)	RA 2-..*	PD 25712	PD 25713	PD 25714	PD 25715
Flange mounting (1 mounting bracket)	RC- ..	KK 29.302	KK 30.302	KK 31.302	KK 32.302
Rear trunnion mounting	RB- ..	PD 40390	PD 40391	PD 40392	PD 40393
Front trunnion mounting	RE-..	PD 40394	PD 40395	PD 40396	PD 40397

Complete type designation with piston-Ø

Ordering example: RA-32 KK 29.302

* consists of 2 mounting brackets and 1 groove nut

C

Pneumatic Cylinders

P1D Series
According to ISO, VDMA and AFNOR

C

ISO cylinder family, P1D

A completely new cylinder range from the ground up, with major investment in research, material and technology, demands long experience and major resources. When we developed our P1D cylinder range, we started from scratch, but not really. Decades of research and learning about what our customers really need world-wide has given us a very stable foundation to start from.

P1D is a cylinder design of the highest possible quality, every detail has been thought through, without making any compromises. It has a large number of innovations which could only be achieved by using the best possible materials and methods. The result is a complete family of ISO/VDMA cylinders, of which we are very proud.

P1D is a high technology cylinder design for just about every conceivable application, both simple and highly complex.

The same high technology platform is used for three main versions:

- **P1D Standard** – the universal, general purpose cylinder with high performance and long life.

- **P1D Clean** – the new product level for ISO/VDMA cylinders of clean design with a system of integrated, adjustable sensors (patent applied for), for stringent hygiene demands.

- **P1D Flexible Porting** – the innovative design which saves space and reduces dimensions by allowing connections to be made in the front or rear end of the cylinder.

- **P1D Tie rod** – based on the same high-tech design, the P1D is also available in a tie rod version. This future-proof cylinder is the perfect choice wherever a tie rod cylinder is required.

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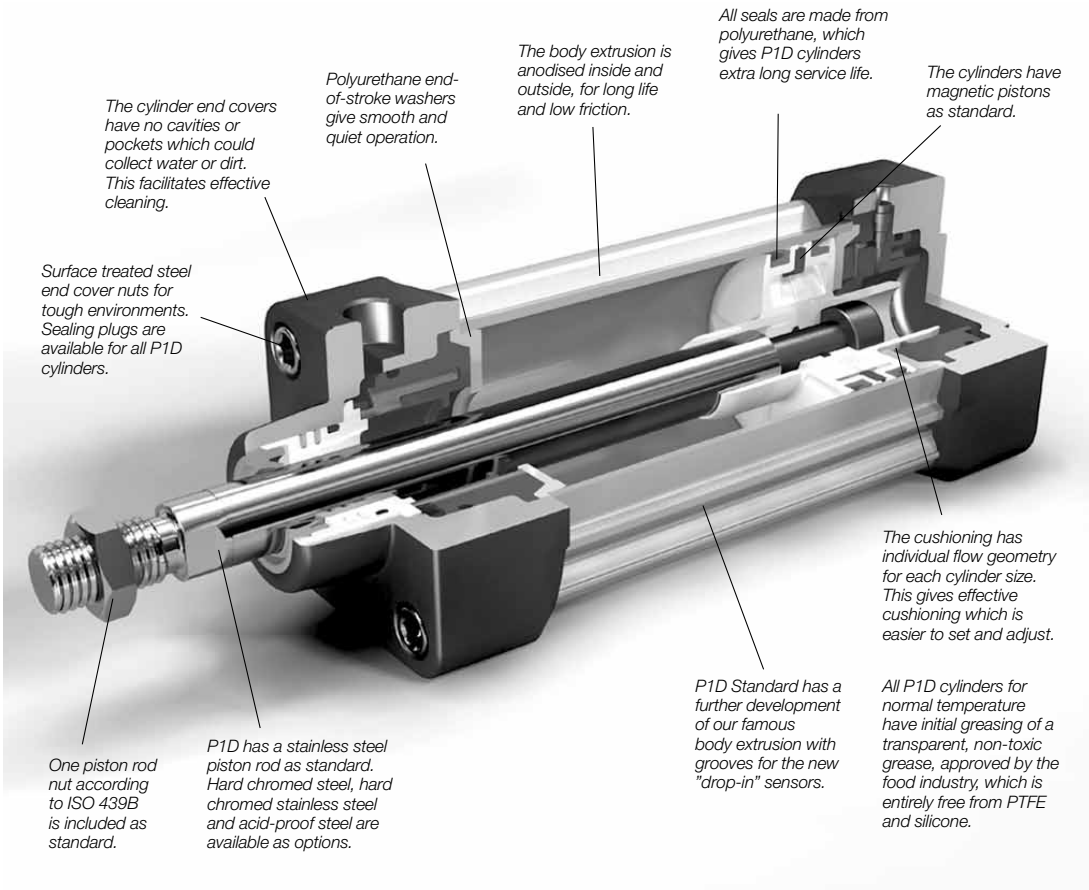


P1D Standard

The innovative P1D is a future-proof generation of ISO/VDMA cylinders. The cylinders are double-acting, with a new design of air cushioning. The light, stiff body extrusion has sensor grooves for simple and protected sensor installation.

Installation dimensions according to international standards

The new P1D complies with the current ISO 6431, ISO 15552, VDMA 24562 and AFNOR installation dimension standards. For customer reassurance world-wide.

High technology design

The best materials, manufacturing methods and design of every detail have been carefully tested, to give the best possible product. The internal components are made of high strength plastics, for quiet operation and long service life. The aluminium end caps and the torsionally stiff aluminium body extrusion make the cylinder robust and suitable for a wide range of applications.

High quality

The P1D has been developed with quality in all phases – requirement specification, design, planning, purchasing, production, distribution and service. We have been certified under the ISO 9001 QA standard for the past ten years. Quality in all our products and services is our watchword.

Even more functions and variants

The P1D is available with all the usual optional designs, such as: Through piston rod, high and low temperature, hydraulic operation, extended piston rod etc.

A new special variant is the unique self-lubricating HDPE scraper ring and piston rod seal, specially designed for operation with a completely dry piston rod (i.e. applications where the film of grease on the piston rod is regularly washed off).

Complete accessory programme

P1D offers a complete ISO, VDMA and AFNOR compatible accessory programme, with a wide range of piston rod and cylinder mountings for both pivoted and fixed operation. Several of these types of mountings are available in stainless steel. The new ”drop-in” sensors are available with both reed and electronic operation, with a wide choice of connector types and cable

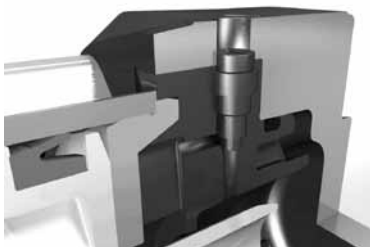
lengths.

New, mechanically protected sensor technology

The body extrusion has recessed sensor grooves on three sides of the cylinder. The new sensors are of the ”drop-in” type, and are quickly and easily installed in the T-groove from the side. Both the cable and the sensor are protected in the groove. Choose a sensor with 3 or 10 m cable, 8 mm connector or the new M12 connector.

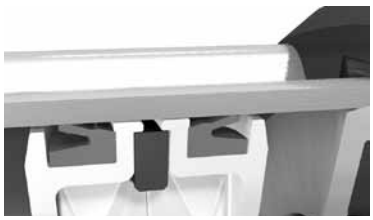
Optimised cushioning

Thanks to the plastic inserts in the end covers, each cylinder bore has been given individual flow geometry. This provides optimised cushioning, which is quicker and easier to set and adjust.



Smooth, quiet operation and long service life

All seals and end-of-stroke washers are made from polyurethane (PUR), the bearings and piston are made from proven engineering plastics with excellent bearing properties and all cylinders are greased at the factory with a transparent, foodstuffs-approved grease. Altogether this gives the P1D very long service life and smooth, quiet operation.



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P1D Clean

P1D Clean is a new version in our ISO cylinder system, completely designed for the foodstuffs industry. Many years' experience of the stringent requirements for hygiene, choice of material and corrosion resistance, from a wide spectrum of foodstuffs applications have guided the development of this cylinder version. Great emphasis has been put on the external design of the cylinder, choice of materials and corrosion protection.

Main dimensions according to international standards

All the main dimensions of the P1D Clean comply with ISO 6431, ISO 15552, VDMA 24562 and AFNOR standards. The exception is the somewhat larger footprint of the end covers and envelope of the body extrusion, due to the so-called positive geometry (hygienic, convex, easy-to-clean geometry) of the cushioning adjustment screw and the components in the integrated sensor system.

Common, high technology design platform

The P1D Clean has the same technical platform as the P1D Standard. The best materials, including the polyurethane (PUR) seals, manufacturing methods and the careful attention to detail design give the P1D Clean smooth, quiet operation and long service life.

Convex shape for optimum hygiene

P1D Clean has a convex body extrusion, which makes the cylinders easy to keep clean. Irrespective of installation position, fluids run off the body extrusion surfaces.

Cushioning screw with positive geometry

To offer the best hygiene properties, the projecting cushioning screw, is sealed with rubber seal against the end cover. This eliminates dirt-collecting cavities and gives the best hygiene, since it is so easy to clean.

Sealing plugs

Four plastic sealing plugs are supplied with every P1D Clean cylinder. These are installed in the end cover screws which are not used for the cylinder installation. To ensure the sealing function, the plugs can be used only once i.e. they can not be re-used. When installed in the end cover screws, they should be tapped lightly with a hammer to securely fix.

Patent applied system for integrated standard sensors

The P1D Clean cylinder has a system of sensors, which are fully integrated into the body extrusion, to give the cylinders a clean external design. Up to four sensors chosen from the range of P1D standard sensors, reed or electronic operation, can be mounted in two dedicated grooves beneath a transparent, sealed moulding. Tightening the stop screw onto the cam shaft, will lock each sensor in the desired position, with great force. The sensor LEDs are always fully visible, which facilitates commissioning, adjustment and trouble-shooting. The entire sensor system has a hose-proof design, equivalent to IP65. P1D Clean can be ordered with factory-fitted sensors in the end positions, which can then easily be moved to any other position along the entire stroke.

Up to four integral sensors

Cylinders for two integral sensors have two undivided camshafts along the entire stroke. Free choice of cable exit, front or rear. There is also a version with divided camshafts for up to four sensors, which are installed two from each end cover, with cable exit front and rear.

Simple sensor adjustment

The sensors are mounted into their grooves through the opening in a transparent, sealed cover. The sensor cables have strain relief and are sealed.

The sensor position is easily adjusted by undoing a set screw and using the cable to move the sensor to the desired position.

Once the sensor has been locked in its new position, the protective cover is installed again.

C

P1D Flexible Porting

Progress leads to smaller components and machinery. In harmony with this trend, and complying with the main dimension requirements in ISO 6431, we have developed P1D Flexible Porting, which offers new, smarter design solutions. Since one end of the cylinder can be placed in restricted, unused spaces, without needing any connections, the space in the application can be used more efficiently, or made more compact.

Main dimensions according to international standards

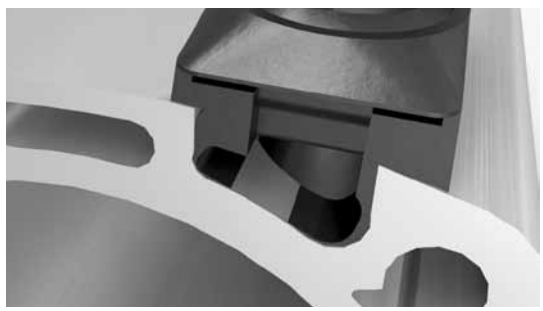
Apart from the projecting connections on sizes Ø32–63 mm P1D Flexible Porting complies with ISO 6431, ISO 15552, VDMA 24562 and AFNOR standards.

Common, high technology design platform

P1D Flexible Porting has the same high technology level as P1D Standard and P1D Clean. The future-proof design gives P1D Flexible Porting high performance and long service life.

Body extrusion with integrated air channels

P1D Flexible Porting has the same body extrusion as the P1D Clean cylinder. Since the air is led through channels built into the body extrusion, both connections can be made to either end of the cylinder. The flow capacity of the air channels is big enough not to restrict the cylinder speed in all normal applications.



Straight or elbow push-in fittings for Ø32-63 mm

For cylinder bore Ø32-63 mm, one connection is located on the body extrusion. The connector from the Moduflex valve range is used for this connection. A matching Prestolok 2 (plastic) fitting is used for the connection at the end cover. Choose between straight or elbow fittings. The other end has a plug installed in the unused cylinder port.

Threaded connections for Ø80-125 mm

Cylinder bore Ø80-125 mm have two threaded connections located in either end cover. The other end has plugs in the cylinder ports. These plugs can be moved to the other end to suit the application.

Mechanically protected ”drop-in” sensors

The body extrusion, which is common to all P1D Clean and P1D Flexible Porting cylinders, has recessed sensor grooves in the side opening. The geometry has at the same time been designed for ”normal” mechanical sensor installation (similar to P1D Standard) and for the built-in sensor system (P1D Clean). Use standard sensors in the usual way.

Combine with P1D Clean

For compact applications with stringent hygiene requirements, P1D Clean can be combined with Flexible Porting. This cylinder version complies with many different requirements and offers new opportunities for creating effective application solutions.

C

P1D Tie-Rod

The P1D is available in a tie-rod version, based on the same high level technology. This future-proof cylinder is the perfect choice wherever a tie-rod cylinder is needed.

Installation dimensions to international standard

The P1D Tie-Rod complies with ISO 6431, ISO 15552, VDMA 24562 and AFNOR installation dimension standards. For customer reassurance world-wide.

Smooth, quiet operation and long service life

All seals and end-of-stroke washers are made from polyurethane (PUR), the bearings and piston are made from proven engineering plastics with excellent bearing properties and the initial greasing at the factory with a transparent, foodstuffs-approved grease. Altogether this gives the P1D very long service life and gentle, quiet operation.

Optimised cushioning

Thanks to the plastic inserts in the end covers, each cylinder bore has been given an individual flow geometry. This gives an optimised cushioning, which is quicker and easier to set and adjust.

Complete accessory programme

P1D offers a complete ISO, VDMA and AFNOR compatible accessory programme, with a wide range of piston rod and cylinder mountings for both pivoted and fixed operation.

”Drop-in” sensor

The P1D Tie-Rod uses ”drop-in” P1D sensors. An ingenious multi-jointed adapter fixes the sensors in any chosen position along the stroke.

Design variants for P1D Standard, P1D Clean, P1D Flexible porting and P1D Tie-Rod

Using P1D cylinders as a platform, a number of different designs can be produced to suit differing requirements. Please refer to the order key on pages 28 - 51 for the designation of each variant.

C

P1D complete working unit

P1D Standard can be ordered with a factory-fitted valve and piping. The valve series is the robust and compact Viking series.

Of course, the entire range of P1D accessories can also be used for the P1D with built-in valve, and cylinders can be ordered with factory-fitted accessories and sensors.

P1D cylinder with piston rod locking

The P1D cylinder is available in a version with piston rod locking, allowing the piston rod to be locked in any position. The lock unit, of the air/spring actuated type, is integrated in the front end piece of the cylinder. The lock unit can be used for braking as well as locking. With no signal pressure, the full force of the lock is applied to the piston rod, and the lock is released at 4 bar signal pressure. Lock units are available for P1D Standard (P1D-L) and P1D Clean (P1D-D) in dimensions Ø32-125 mm. P1D Standard can be ordered with a lock unit and a built-in valve (P1D-4).

P1D-L

P1D-D

P1D cylinder with internal piston rod thread

All P1D cylinders are available with an internal piston rod thread where a short installation length is required

C

Design variants for P1D Standard, P1D Clean, P1D Flexible porting and P1D Tie-Rod

Alternative piston rod materials

All P1D cylinders in all bores, Ø32-125 mm, can be ordered with the following piston rod materials:

– Steel, hard chromed

– Stainless steel, roller polished (standard)

– Acid-proof steel, roller polished

– Stainless steel, hard chromed

Through piston rod

All P1D cylinders in all bores, Ø32-125 mm, are available with a through rod. Cylinders with a through rod can take higher side forces thanks to the double support for the piston rod. In addition, this design makes it easier to install external position sensors.

Low and high ambient temperature

For all bores, Ø32-125 mm, the P1D can be supplied in special high ambient temperature and low ambient temperature versions. The cylinders have seal systems, materials and grease for their particular temperature ranges. The high temperature version does not have magnetic piston (no function at high temperatures). The low temperature cylinders do have magnetic piston, but remember that most sensors are specified to – 25 °C (no function below this temperature). Ambient temperature ranges:

– Low temperature: -40 °C to +40 °C

– High temperature: -10 °C to +150 °C, peaks up to +200 °C

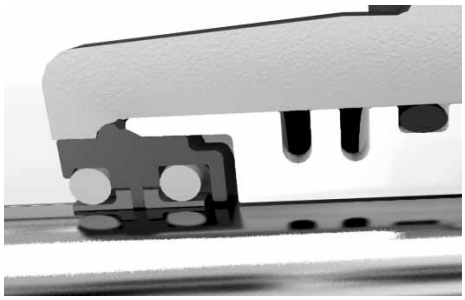
Low pressure hydraulics

The P1D in bores Ø32 - 125 mm can be supplied with special seals for operation with low pressure hydraulics up to 10 bar. Temperature range -20 °C to +80°C.

Design variants for P1D Standard, P1D Clean, P1D Flexible porting and P1D Tie-Rod

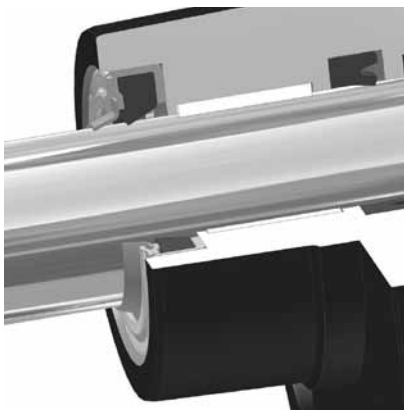
Operation with dry piston rod

In many applications, primarily in the foodstuffs industry, the cylinders are cleaned frequently. This means that the film of grease on the piston rod is washed off, which puts special demands on the materials and the design of the piston rod seal system (scraper ring and piston rod seal). A piston rod seal system specially designed for dry rod operation is available as options for this type of application, for all bores of P1D cylinders. The system has a specially designed L-shaped seal and the material is self-lubricating, high molecular weight plastics (HDPE) – the same system as in our previous P1C cylinders, with proven function.



P1D with metal scraper ring

Standard scraper rings cannot be used in environments where the piston rod may be coated with resin, ice, cement, sugar crystals, dough, etc., primarily in timber handling, refrigerated/ chilled transport, cement industry, chemicals and food and drinks. Hard and dirty coatings damage the standard scraper rings and shorten their service life, introducing dirt into the cylinder. A scraper ring has been specially designed for applications of this kind, as an option for all diameters of P1D-S, P1D-T and P1D-V cylinders. The scraper ring, which requires a hard-chromium plated piston rod, has a stainless steel carrier, a brass outer scraper ring and a nitrile rubber inner scraper ring.



Scraper for high chemical resistance

For use in applications where chemicals may affect the scraper in the front end cover, an option with a scraper in FPM rubber for better chemical resistance must be used

Design variants for P1D Standard, P1D Clean, P1D Flexible porting and P1D Tie-Rod

C

3 and 4 position cylinders

By installing two cylinders with the same or different stroke, it is possible to build a working unit with three or four positions. This type of unit is available as factory-fitted P1D tie-rod cylinders (P1D-T) in all bores, Ø32-125 mm. Other P1D cylinders can be flange mounted back-to-back with a special mounting (see pages 59 and 66).

Tandem version

The P1D is also available as a tandem cylinder, i.e. two cylinders connected in series. This cylinder unit has almost twice the force, which is a great advantage in restricted spaces. Tandem cylinders are available as tie-rod cylinders, P1D-T, in all bores Ø32-125 mm.

Cylinder forces, double acting variants

Cyl. bore/ pist. rod mm	Stroke	Pistonarea cm²	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
32/12	+	8,0	80	161	241	322	402	**483**	563	643	724	804
	-	6,9	69	138	207	276	346	**415**	484	553	622	691
40/16	+	12,6	126	251	377	503	628	**754**	880	1005	1131	1257
	-	10,6	106	212	318	424	530	**636**	742	848	954	1060
50/20	+	19,6	196	393	589	785	982	**1178**	1374	1571	1767	1963
	-	16,5	165	330	495	660	825	**990**	1155	1319	1484	1649
63/20	+	31,2	312	623	935	1247	1559	**1870**	2182	2494	2806	3117
	-	28,0	280	561	841	1121	1402	**1682**	1962	2242	2523	2803
80/25	+	50,3	503	1005	1508	2011	2513	**3016**	3519	4021	4524	5027
	-	45,4	454	907	1361	1814	2268	**2721**	3175	3629	4082	4536
100/25	+	78,5	785	1571	2356	3142	3927	**4712**	5498	6283	7069	7854
	-	73,6	736	1473	2209	2945	3682	**4418**	5154	5890	6627	7363
125/32	+	122,7	1227	2454	3682	4909	6136	**7363**	8590	9817	11045	12272
	-	114,7	1147	2294	3440	4587	5734	**6881**	8027	9174	10321	11468

+ = Outward stroke
- = Return stroke

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

Main data: P1D

Cylinder designation	Cylinder bore mm	Cylinder area cm²	Piston rod dia. mm	Piston rod area cm²	Cushioning thread	Air con-length mm	Connection sump-tion[2] litre	Flexible Porting thread	tubing dimension Push-in mm
P1D-•032••-XXXX[1]	32	8,0	12	1,1	M10x1,25	17	0,105	G1/8	4 or 6
P1D-•040••-XXXX[1]	40	12,6	16	2,0	M12x1,25	19	0,162	G1/4	4 or 6
P1D-•050••-XXXX[1]	50	19,6	20	3,1	M16x1,5	20	0,253	G1/4	8 or 10
P1D-•063••-XXXX[1]	63	31,2	20	3,1	M16x1,5	23	0,414	G3/8	8 or 10
P1D-•080••-XXXX[1]	80	50,3	25	4,9	M20x1,5	23	0,669	G3/8	-
P1D-•100••-XXXX[1]	100	78,5	25	4,9	M20x1,5	27	1,043	G1/2	-
P1D-•125••-XXXX[1]	125	122,7	32	8,0	M27x2	30	1,662	G1/2	

Total mass including moving parts

Cylinder designation	Total mass (kg) at 0 mm stroke Standard	Tie-Rod	Supplement mass (kg) for rod locking Clean/Flex	All variants	Total mass (kg) Supplement per 10 mm stroke Standard	Tie-Rod	Clean/Flex
P1D-•032••-X	0,55	0,54	0,60	0,31	0,023	0,022	0,047
P1D-•040••-X	0,80	0,79	0,88	0,44	0,033	0,030	0,063
P1D-•050••-X	1,20	1,20	1,32	0,61	0,048	0,048	0,094
P1D-•063••-X	1,73	1,73	1,86	1,25	0,051	0,051	0,101
P1D-•080••-X	2,45	2,47	2,63	2,45	0,075	0,079	0,142
P1D-•100••-X	4,00	4,00	4,22	3,72	0,084	0,084	0,168
P1D-•125••-X	6,87	6,73	7,01	6,07	0,138	0,129	0,248

Mass moving parts only (for cushioning calculation)

Cylinder designation	Mass moving parts(kg) at 0 mm stroke All variants	Supplement per 10 mm stroke All variants
P1D-•032••-X	0,13	0,009
P1D-•040••-X	0,24	0,016
P1D-•050••-X	0,42	0,025
P1D-•063••-X	0,50	0,025
P1D-•080••-X	0,90	0,039
P1D-•100••-X	1,10	0,039
P1D-•125••-X	2,34	0,063

1) Stroke

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

Standard stroke

Standard strokes for all P1D cylinders comply with ISO 4393. (* 40 is not an ISO standard stroke)

Special strokes up to 2800 mm.

Minimum stroke for P1D Clean is 25 mm with 0-2 sensors and 100 mm with 3-4 sensors.

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Order no XXXX = Stroke	Cylinder bore (mm)	● = Standard stroke (mm) 25 40 50 80 100 125 160 200 250 320 400 500 600 700 800 2800	= Stroke to special order
Double acting Profile cylinder			
P1D-S032MS-XXXX	32	● ● ● ● ● ● ● ● ● ● ● ● ● //	
P1D-S040MS-XXXX	40	● ● ● ● ● ● ● ● ● ● ● ● ● //	
P1D-S050MS-XXXX	50	● ● ● ● ● ● ● ● ● ● ● ● ● //	
P1D-S063MS-XXXX	63	● ● ● ● ● ● ● ● ● ● ● ● ● //	
P1D-S080MS-XXXX	80	● ● ● ● ● ● ● ● ● ● ● ● ● //	
P1D-S100MS-XXXX	100	● ● ● ● ● ● ● ● ● ● ● ● ● //	
P1D-S125MS-XXXX	125	● ● ● ● ● ● ● ● ● ● ● ● ● //	

Operation data

Working pressure	Max 10 bar	
Working temperature	min	max
Standard	-20 °C	+80 °C
High temp version	-10 °C	+150 °C
Low temp version	-40 °C	+80 °C

Greased for life, does not normally need additional lubrication. If extra lubrication is given, this must always be continued.

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 ºC for indoor operation (a lower dew point should be selected for outdoor operation) and oil concentration 1.0 mg oil/m^3, which is what a standard compressor with a standard filter gives.

ISO 8573-1 quality classes

Quality class	Pollution particle size (µm)	Pollution max concentration (mg/m³)	Water max. press. dew point (°C)	Oil max concentration (mg/m³)
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	-

Bores and strokes

P1D	32 - 125 mm
Standard strokes	25 - 500 mm according to ISO 4393
Max stroke	2800 mm
Min stroke, P1D Clean	25 mm (0-2 sensors) 100 mm (3-4 sensors)

P1D Clean

Protection class	Hose-proof in accordance with IP65
Chemical resistance	Tested for normally used industrial detergents, both acid and alkaline

Low pressure hydraulic

Working pressure	Max 10 bar Min 2 bar

For low pressure hydraulic systems is following oil quality to be used.

Hydraulic oil type HLP (DIN 51524, ISO 11158).
Viscosity by 40 °C: 32 mm^2/s (cSt).

For instance Shell Tellus 32 or equal.

Important!

If the cylinder is used in applications with significant lateral loads on the piston rod, an external guide must be used to achieve maximum service life.

Material specification

Standard design

Body extrusion	Natural colour, anodised aluminium
End cover	Black anodised aluminium
End cover inserts	POM
End cover nuts/screws	Zinc plated steel 8.8
Piston rod nut	Zinc plated steel
Piston rod	Stainless steel, X 10 CrNiS 18 9
Scraper ring	PUR
Piston rod bearing	POM
Piston	POM
Piston bearing	POM
Magnetic ring	Plastic bound magnetic material
Piston bolt	Zinc plated steel
Piston seal	PUR
O-rings	Nitrile rubber, NBR
End-of-stroke washers	PUR
Cushioning seals	PUR
Cushioning screws	LCP

P1D Clean

Transparent moulding	Silicone
Transparent cover	ABS
Screws, sensor system	Stainless steel, A2
Upper seal and lower seal, protective cover	Santopren
Sealing plugs	PA
Piston rod nut	Stainless steel, A2

Cushioning characteristics

The diagram below is used for dimensioning of cylinders related to the cushioning capacity. The maximum cushioning capacity shown in the diagram assumes the following:

- Low load, i.e. low pressure drop across the piston
- Equilibrium speed
- Correctly adjusted cushioning screw
- 6 bar at cylinder port

P1D Flexible Porting

Connection part Ø32-63	POM
Elbow fittings Ø32-63	PA
Straight fittings on body extrusion Ø32-63	PA
Straight fittings in ports	Nickel plated brass
Seal, connection part	Nitrile rubber NBR

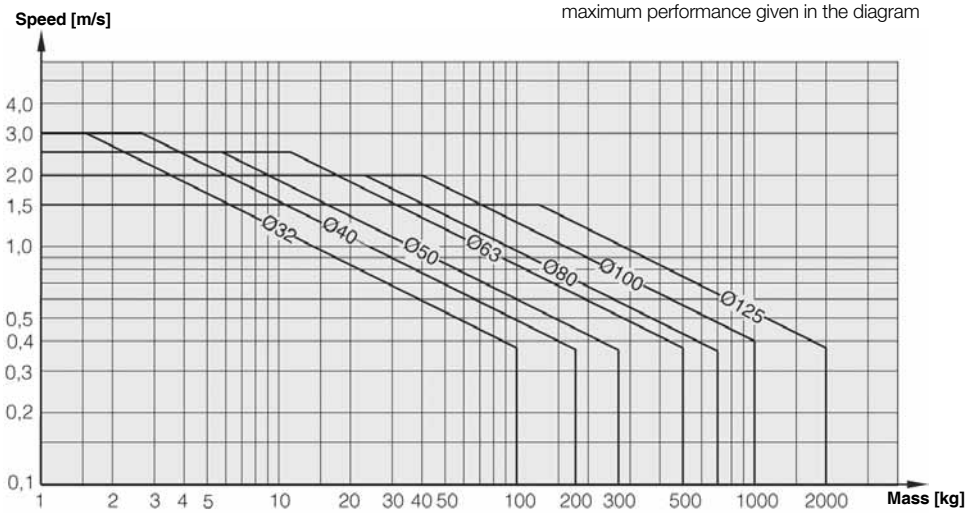
P1D Tie-Rod

Tie-rods	Stainless steel, X 10 CrNiS 18 9

Design variants

Low temperature design	
Seals/scraper ring	Polyurethane PUR/Nitrile rubber NBR
Piston	Anodised aluminium
Piston/piston rod bearing	UHMWPE plastic
High temperature design	
Seals/scraper ring	Fluorocarbon rubber, FPM
Piston	Anodised aluminium
Piston/piston rod bearing	Bronze filled PTFE
Low pressure hydraulics	
Seals/scraper ring	Nitrile rubber, NBR
Piston	Anodised aluminium
Piston/piston rod bearing	UHMWPE plastic
Cylinders for dry rod operation	
Seals/scraper ring	FPM/HDPE
Cylinder with metal scraper ring	
Scraper ring	Stainless steel/brass/NBR
Option	
Piston rod material	Hard-chromium plated steel, Fe 490-2 FN Acid-proof steel, X 5 CrNiMo 17 13 3 Hard-chromium plated stainless steel, X 10 CrNiS 18 9

The load is the sum of internal and external friction, plus any gravitational forces. At high relative load (pressure drop exceeding 1 bar), we recommend that for any given speed, the mass should be reduced by a factor of 2.5, or for a given mass, the speed should be reduced by a factor of 1.5. This is in relation to the maximum performance given in the diagram



Guide for selecting suitable tubing

The selection of the correct size of tubing is often based on experience, with no great thought to optimizing energy efficiency and cylinder velocity. This is usually acceptable, but making a rough calculation can result in worthwhile economic gains.

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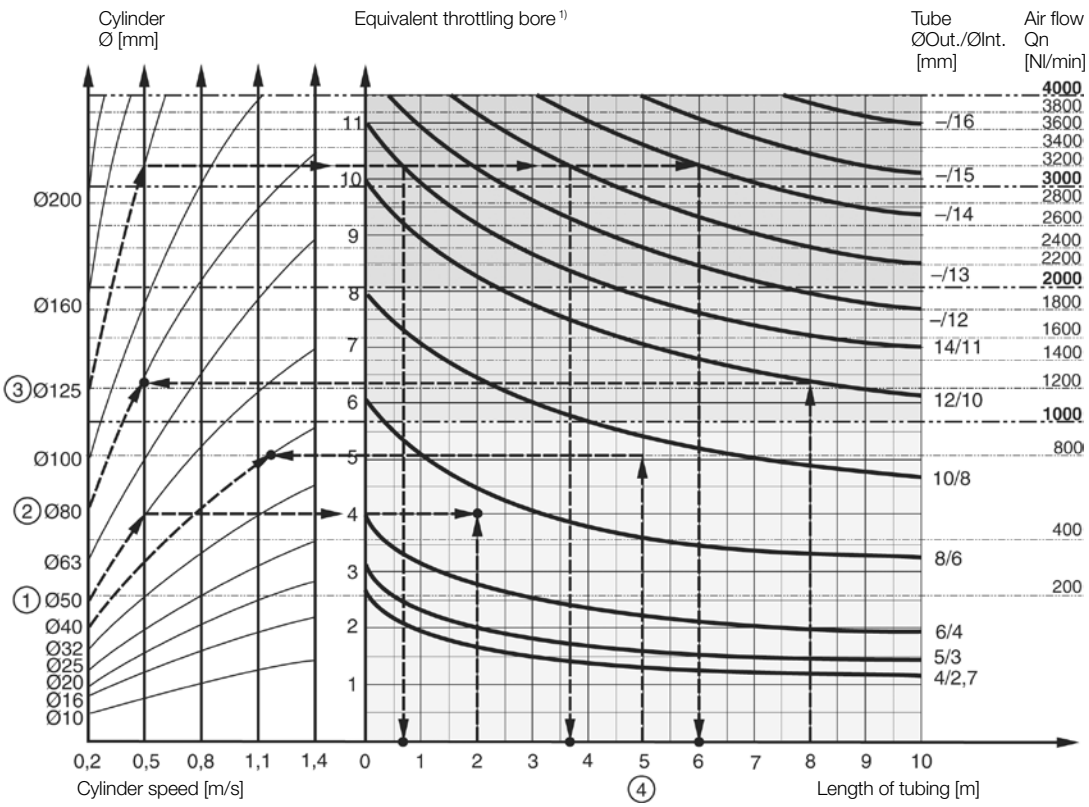
The following is the basic principle:

1. The primary line to the working valve could be over sized (this does not cause any extra air consumption and consequently does not create any extra costs in operation).
2. The tubes between the valve and the cylinder should, however, be optimized according to the principle that an insufficient bore throttles the flow and thus limits the cylinder speed, while an oversized pipe creates a dead volume which increases the air consumption and filling time.

The chart below is intended to help when selecting the correct size of tube to use between the valve and the cylinder.

The following prerequisites apply:

The *cylinder load should be about 50%* of the theoretical force (= normal load). A lower load gives a higher velocity and vice versa. The tube size is selected as a function of the *cylinder bore*, the desired *cylinder velocity* and the *tube length* between the valve and the cylinder.
If you want to use the capacity of the valve to its maximum, and obtain maximum speed, the tubing should be chosen so that they at least correspond with the equivalent restriction diameter (see description below), so that the tubing does not restrict the total flow. This means that a short tubing must have at least the equivalent restriction diameter. If the tubing is longer, choose it from the table below. Straight fittings should be chosen for highest flow rates. (Elbow and banjo fittings cause restriction.)



1) The "equivalent throttling bore" is a long throttle (for example a tube) or a series of throttles (for example, through a valve) converted to a short throttle which gives a corresponding flow rate. This should not be confused with the "orifice" which is sometimes specified for valves. The value for the orifice does not normally take account of the fact that the valve contains a number of throttles.

2) Qn is a measure of the valve flow capacity, with flow measured in litre per minute (l/min) at 6 bar(e) supply pressure and 1 bar pressure drop across the valve.

Example ①: Which tube diameter should be used?

A 50 mm bore cylinder is to be operated at 0.5 m/s. The tube length between the valve and cylinder is 2 m. In the diagram we follow the line from 50 mm bore to 0.5 m/s and get an "equivalent throttling bore" of approximately 4 mm. We continue out to the right in the chart and intersect the line for a 2 m tube between the curves for 4 mm (6/4 tube) and 6 mm(8/6 tube). This means that a 6/4 tube throttles the velocity somewhat, while an 8/6 tube is a little too large. We select the 8/6 tube to obtain full cylinder velocity.

Example ②: What cylinder velocity will be obtained?

A 80 mm bore cylinder will be used, connected by 8 m 12/10 tube to a valve with Qn 1200 Nl/min. What cylinder velocity will we get? We refer to the diagram and follow the line from 8 mm tube length up to the curve for 12/10 tube. From there, we go horizontally to the curve for the Ø80 cylinder. We find that the velocity will be about 0.5 m/s.

Example ③: What is the minimum inner diameter and maximum lenght of tube?

For a application a 125 mm bore cylinder will be used. Maximum velocity of piston rod is 0.5 m/s. The cylinder will be controlled by a valve with Qn 3200 Nl/min. What diameter of tube can be used and what is maximum lenght of tube.

We refer to the diagram. We start at the left side of the diagram cylinder Ø125. We follow the line until the intersection with the velocity line of 0.5 m/s. From here we draw a horizontal line in the diagram. This line shows us we need an equivalent throttling bore of approximately 10 mm. Following this line horizontally we cross a few intersections. These intersections shows us the minimum inner diameter (rightside diagram) in combination with the maximum length of tube (bottomside diagram).

For example:
Intersection one: When a tube (14/11) will be used, the maximum length of tube is 0.7 meter.
Intersection two: When a tube (—/13) will be used, the maximum length of tube is 3.7 meter.
Intersection three: When a tube (—/14) will be used, the maximum length of tube is 6 meter.

Example ④: Determining tube size and cylinder velocity with a particular cylinder and valve?

For an application using a 40 mm bore cylinder with a valve with Qn=800 Nl/min. The distance between the cylinder and valve has been set to 5 m.
Tube dimension: What tube bore should be selected to obtain the maximum cylinder velocity? Start at pipe length 5 m, follow the line up to the intersection with 800 Nl/min. Select the next largest tube diameter, in this case Ø10/8 mm.
Cylinder velocity: What maximum cylinder velocity will be obtained? Follow the line for 800 Nl/min to the left until it intersects with the line for the Ø40 mm cylinder. In this example, the speed is just above 1.1 m/s.

Valve series with respective flows in Nl/minute

Valve series	Qn in Nl/Min
Valvetronic Solstar	33
Interface PS1	100
Adex A05	173
Moduflex size 1, (2 x 3/2)	220
Valvetronic PVL-B 5/3 closed centre, 6 mm push in	290
Moduflex size 1, (4/2)	320
B43 Manual and mechanical	340
Valvetronic PVL-B 2 x 2/3, 6 mm push in	350
Valvetronic PVL-B 5/3 closed centre, G1/8	370
Compact Isomax DX02	385
Valvetronic PVL-B 2 x 3/2 G1/8	440
Valvetronic PVL-B 5/2, 6 mm push in	450
Valvetronic PVL-B 5/3 vented centre, 6 mm push in	450
Moduflex size 2, (2 x 3/2)	450
Flowstar P2V-A	520
Valvetronic PVL-B 5/3 vented centre, G1/8	540
Valvetronic PVL-B 5/2, G1/8	540
Valvetronic PVL-C 2 x 3/2, 8 mm push in	540
Adex A12	560
Valvetronic PVL-C 2 x 3/2 G1/8	570
Compact Isomax DX01	585
VIKING Xtreme P2LAX	660
Valvetronic PVL-C 5/3 closed centre, 8 mm push in	700
Valvetronic PVL-C 5/3 vented centre, G1/4	700
B3-Series	780
Valvetronic PVL-C 5/3 closed centre, G1/4	780
Moduflex size 2, (4/2)	800
Valvetronic PVL-C 5/2, 8 mm push in	840
Valvetronic PVL-C 5/3 vented centre, 8 mm push in	840
Valvetronic PVL-C 5/2, G1/4	840
Flowstar P2V-B	1090
ISOMAX DX1	1150
B53 Manual and mechanical	1160
B4-Series	1170
VIKING Xtreme P2LBX	1290
B5-Series, G1/4	1440
Airline Isolator Valve VE22/23	1470
ISOMAX DX2	2330
VIKING Xtreme P2LCX, G3/8	2460
VIKING Xtreme P2LDX, G1/2	2660
ISOMAX DX3	4050
Airline Isolator Valve VE42/43	5520
Airline Isolator Valve VE82/83	13680

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Introduction to the ATEX directive

Explosive atmospheres

Directive 94/9/EC defines an explosive atmosphere as a mixture of:

a) flammable substances – gases, vapours, mists or dusts

b) with air

c) under specific atmospheric conditions

d) in which, after ignition has occurred, combustion spreads to the entire flammable mixture

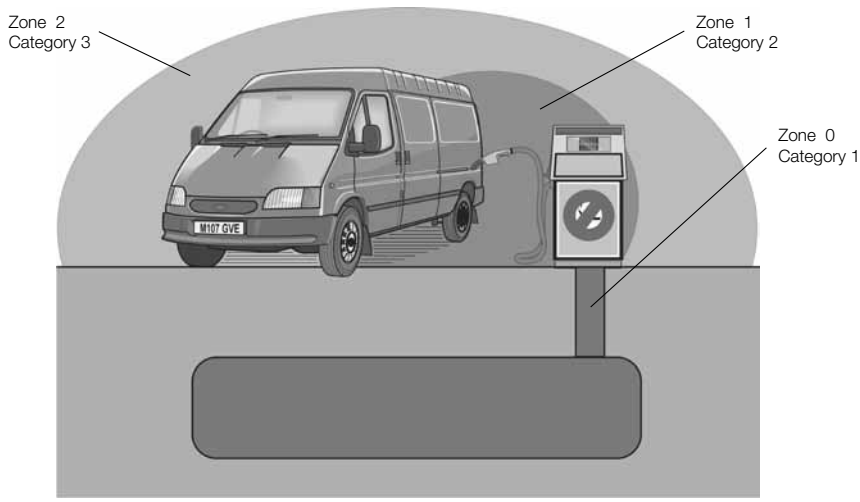
(NB: with regard to dust, it may be that not all dust is combusted after ignition has occurred)

An atmosphere with the potential to become an explosive atmosphere during operating conditions and/or under the influence of the surroundings is defined as a potentially explosive atmosphere. Products covered by directive 94/9/EC are defined as intended for use in potentially explosive atmospheres.

Harmonised European ATEX standard

The European Union has adopted two harmonised directives in the field of health and safety. The directives are known as ATEX 100a and ATEX 137.

Directive ATEX 100a (94/9/EC) lays down minimum safety requirements for products intended for use in potentially explosive atmospheres in European Union member states. Directive ATEX 137 (99/92/EC) defines minimum requirements for health and safety at the workplace, for working conditions and for the handling of products and materials in potentially explosive atmospheres. This directive also divides the workplace into zones and defines criteria by which products are categorised within these zones.
The table below describes the zones in an installation where there is a potential for explosive atmospheres. The owner of the installation must analyse and assess the area in which the explosive gas/dust mixture may occur, and if necessary must divide it into zones. This process of zoning then allows the correct plant and equipment to be selected for use in the area.



Zones Gas G	Zones Dust D	Presence of potentially explosive atmosphere	Type of risk
0	20	Present continuously or for long periods	Permanent
1	21	Likely to occur in normal operation occasionally	Potential
2	22	Not likely to occur in normal operation but, if it does occur, will persist for a short period only	Minimal

The ATEX directive has been in force throughout the European Union since 1 July 2003, replacing the existing divergent national and European legislation relating to explosive atmospheres.
Please note that for the first time, the directive covers mechanical, hydraulic and pneumatic equipment and not just electrical equipment as before.

With regard to the Machinery directive 98/37/EC, note that a number of external requirements in 94/9/EC refer to hazards arising from potentially explosive atmospheres, where the Machinery directive only contains general requirements relating to explosion safety (Annex I 1.5.7).
As a result, directive 94/9/EC (ATEX 100a) takes precedence over the Machinery directive with regard to explosion protection in potentially explosive atmospheres. The requirements in the Machinery directive are applicable to all other risks relating to machinery.

Levels of protection for the various equipment categories

The various equipment categories must be capable of operating in accordance with the manufacturer's operating specifications at defined levels of protection.

Definition of groups (EN 1127-1)

Level of protection	Category Group I	Category Group II	Type of protection	Operating specifications
Very high	M1		Two independent means of protection or safety, ensuring that the equipment remains functional even in the event of two faults occurring independently of each other	The equipment remains energised and and functional even with an explosive atmosphere present
Very high		1	Two independent means of protection or safety, ensuring that the equipment remains functional even in the event of two faults occurring independently of each other	The equipment remains energised and functional in zones 0, 1, 2 (G) and/or zones 20, 21, 22 (D)
High	M2		Protection suitable for normal operation and severe operating conditions	The equipment is de-energised in the event of an explosive atmosphere
High		2	Protection suitable for normal operation and frequent faults, or equipment in which faults normally have to be taken into account	The equipment remains energised and functional in zones 1, 2 (G) and/or zones 21, 22 (D)
Normal		3	Protection suitable for normal operation	The equipment remains energised and functional in zones 2 (G) and/or zones 22 (D)

Group I Equipment intended for use in underground parts of mines as well as those parts of surface installations of such mines likely to be endangered by flammable vapours and/or flammable dusts.
Group II Equipment intended for use in other places exposed to explosive atmospheres.
G = gas and D = dust

Group	I mines, combustible vapours		II other potentially explosive atmospheres (gases, dust)					
Category	M1	M2	1		2		3	
Atmosphere*			G	D	G	D	G	D
Zone			0	20	1	21	2	22

Temperature classes

Classification of flammable gases and vapours on the basis of ignition temperature

Temperature class	Ignition temperature °C
T1	Over 450
T2	(300) – 450
T3	(200) – 300
T4	(135) – 200
T5	(100) – 135
T6	(85) - 100

Declaration of conformity

The product catalogues contain copies of the declaration of conformity demonstrating that the product meets the requirements of directive 94/9/EC.
The declaration is only valid in conjunction with the instructions contained in the installation manual relating to the safe use of the product throughout its service life.
The instructions relating to the conditions in the surrounding area are particularly important, as the certificate is invalidated if the instructions are found not to have been adhered to during operation of the product.
If there is any doubt as to the validity of the certificate of conformity, contact Parker Hannifin customer service.

Operation, installation and maintenance

The installation manual of the product contains instructions relating to the safe storage, handling, operation and servicing of the product.
The manual is available in different languages, and can be downloaded from www.parker.com/euro_pneumatic.
This document must be made accessible in a suitable place near where the product is installed. It is used as a reference for all personnel authorised to work with the product throughout its service life.
We, the manufacturer, reserve the right to modify, extend or improve the installation manual in the interests of the users.

For more information about ATEX see EUs homepage: http://europa.eu.int/comm/enterprise/atex/

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Safety instructions for the P1D-S cylinder with accessories

Supplementary safety instructions for P1D-S cylinders installed in Ex-areas

Serious, even fatal, damage or injury may be caused by the hot moving parts of the P1D cylinders in the presence of explosive gas mixtures and concentrations of dust.

All installation, connection, commissioning, servicing and repair work on P1D cylinders must be carried out by qualified personnel taking account of the following

- These instructions
- Markings on the cylinder
- All other planning documents, commissioning instructions and connection diagrams associated with the application.
- Provisions and requirements specific to the application
- National/international regulations (explosion protection, safety and accident prevention)

Real life applications

P1D cylinders are designed to provide linear movement in industrial applications, and should only be used in accordance with the instructions in the technical specifications in the catalogue, and within the operating range indicated on the rating plate. The cylinders meet the applicable standards and requirements of directive 94/9/EC (ATEX)

The cylinders must not be used underground in mines susceptible to firedamp and/or flammable dusts. The cylinders are intended for use in areas in which explosive atmospheres caused by gases, vapours or mists of flammable liquids, or air/dust mixtures may be expected to occur during normal use (infrequently)

Checklist

Before using the cylinders in an Ex-area, you should check the following:
Do the specifications of the P1D-S cylinder match the Ex-classification of the area of use in accordance with directive 94/9/EC (previously ATEX 100a)

- Equipment group
- Ex-equipment category
- Ex-zone
- Temperature class
- Max. surface temperature

1. When installing the P1D-S cylinder, is it certain that there is no potentially explosive atmosphere, oil, acids, gases, vapours or radiation?
2. Is the ambient temperature as specified in the technical data in the catalogue at all times?
3. Is it certain that the P1D-S cylinder is adequately ventilated and that no forbidden additional heat is added?
4. Are all the driven mechanical components ATEX certified?
5. Check that the P1D-S cylinder is safely earthed.
6. Check that the P1D-S cylinder is supplied with compressed air. Explosive gas mixtures must not be used for driving the cylinder.
7. Check that the P1D-S cylinder is not equipped with a metal scraper ring (special version).

Installation requirements in Ex-areas

- The temperature of the supply air must not exceed the ambient temperature.
- The P1D-S cylinder may be installed in any position.
- An air treatment unit must be attached to the inlet of the P1D-S cylinder.
- The P1D-S cylinder must be connected to earth at all times, through its support, a metallic tube or separate conductor.
- The outlet of the P1D-S cylinder must not be open within an Ex-area, but must be connected to the silencer or, preferably, piped and released outside the Ex-area.
- The P1D-S cylinder may only drive units that are ATEX certified.
- Ensure that the P1D-S cylinder is not exposed to forces greater than those permitted in accordance with the catalogue
- The P1D-S cylinder must be supplied with compressed air. Explosive gas mixtures must not be used
- P1D-S cylinders with metal scraper rings must not be used in Ex-areas

Inspecting cylinders during operation

The P1D cylinder must be kept clean on the outside, and a layer of dust/dirt thicker than 1 mm must never be allowed to form.
Strong solvents should not be used for cleaning, because they can cause the seal (material PUR) around the piston rod to swell, potentially increasing the temperature. Inspect and verify that the cylinder, with attachments, compressed air fittings, hoses, tubes, etc. meet the standards of "safe" installation.

Marking of cylinder P1D-S Standard (P1D-S***MS-****)

II 2GD c T4 120 °C

CE on the product shows that Parker Hannifin products meet one or more EU directives.

CE	Ex means that this product is intended for use in potentially explosive atmospheres.
II	Stands for the equipment group (I = mines and II = other hazardous areas).
2GD	Stands for equipment category 2G means the equipment can be used in zones 1 and 2 where there is a risk involving gases, vapours or mists of combustible liquids and 2D in zones 21 and 22 where there is a risk involving dusts. 2GD Means the equipment can be used in zones 1, 2, 21 and 22.
c	Safe design (prEN 13463-5)
T4	If equipment is in temperature class T4, the maximum surface temperature must not exceed 135 °C. (To guarantee this, the product has been tested to ensure that the maximum is 130 °C. This provides a safety margin of 5 °K).
120 °C	Maximum permitted surface temperature on P1D-S cylinder in atmospheres containing potentially explosive dusts.

Supplementary safety instructions for P8S- GPFLX/EX sensors installed in Ex-areas

Serious, even fatal, damage or injury may be caused by the hot moving parts of the P1D cylinders in the presence of explosive gas mixtures and concentrations of dust.

Instructions for use

Safety instructions

- Cylinder sensor ATEX classed for category II3G and II3D
- Ambient temperature Ta = -20 °C to +45 °C
- Temperature class T4, or max. surface temperature of T = 135 °C
- Protection class IP67
- Read installation instructions before startup
- Installation, connection and commissioning must be carried out by trained personnel

Applications

- This sensor is designed for use in the T-groove of cylinders, and detects the magnetic field in potentially explosive areas. The sensor can only be installed in the T-groove of these cylinders.
- The sensor may also be installed on round cylinders by means of the following attachments:

  P8S-TMC01 Suitable for P1S and P1A diameter 10 - 25 mm

  P8S-TMC02 Suitable for P1S diameter 32 - 63 mm

  P8S-TMC03 Suitable for P1S diameter 80 - 125 mm

The following data applies to these attachments:

- Ambient temperature Ta = 0 °C to 45 °C
- Low energy absorption to EN 50 021
- The sensor may also be installed on tie-rod cylinders or profile cylinders by means of this attachment:

  P8S-TMA0X Suitable for P1D-T diameter 32 - 125 mm, P1E-T diameter 160 – 200 mm and C41 diameter 160 – 200 mm

Installation

General: The sensor must be protected from UV radiation. The cable must be installed such that it is protected from external influences, for example it may be necessary to attach an external strain relief to the cable.

Technical data for sensor

Operating voltage Ub = 18 to 30 V DC
Max. load current Ia d" ¡Ü 70 mA
Ambient temperature: -20 °C to 45 °C

Commissioning

When connecting the sensor to a power source, please pay attention to the following
a) the load data (operating voltage, continuous load current)
b) the wiring diagram for the sensor

Maintenance

Our P8S-GPFLX/EX cylinder sensor is maintenance free, but the cable connections should be checked at regular intervals.
The sensor must be protected from UV radiation. The sensor must be kept clean on the outside, and a layer of dirt thicker than 1 mm must never be allowed to form. Strong solvents should not be used for cleaning as they may damage the sensor.

P8S-GPFLX/EX cylinder sensor

II3G EEx nA II T4X
II3D 135 °C IP67

Communitatis Europeanae = EC

CE on the product shows that Parker Hannifin products meet one or more EU directives.

Ex means that this product is intended for use in potentially explosive atmospheres.

II Stands for the equipment group (I = mines and II = other hazardous areas)

3G Stands for the equipment category 3G means the equipment can be used in zone 2 where there is a risk involving gases, vapours or mists of combustible liquids.

EEx EEx means that this is an electrical product intended for use in Ex-areas.

nA IIn Not ignitable to EN50021, A Explosion group tested with acetone, ethanol, toluene and xylene; II Not for use in the mining industry.

T4 X If equipment is in temperature class T4, the maximum surface temperature must not exceed 135 °C. (To guarantee this, the product has been tested to ensure that the maximum is 130 °C. This provides a safety margin of 5 °K.) X Must be installed in accordance with the installation manual.

3D Stands for equipment category 3D in zone 22 where there is a risk involving dusts.

135 °C Maximum permitted surface temperature on the sensor in atmospheres containing potentially explosive dusts.

IP67 Satisfies protection class IP67.

Components such as cylinder attachments, tube fittings, tubes, etc.

Components

Parker Hannifin guarantees that our cylinder attachments, tube fittings, tubes, etc. are not subject to the provisions of the ATEX directive.

A component means any item essential to the safe functioning of equipment and protective systems but with no autonomous function.

Components intended for incorporation into equipment or protective systems which are accompanied by an attestation of conformity with the ATEX directive, including a statement of their characteristics and how they must be incorporated into products, are considered to conform to the applicable provisions of directive 94/9/EC. Ex-components as defined in the European standard EN 50014 are components in the sense of the ATEX directive 94/9/EC as well. Components must not have the CE marking affixed unless otherwise required by other directives.

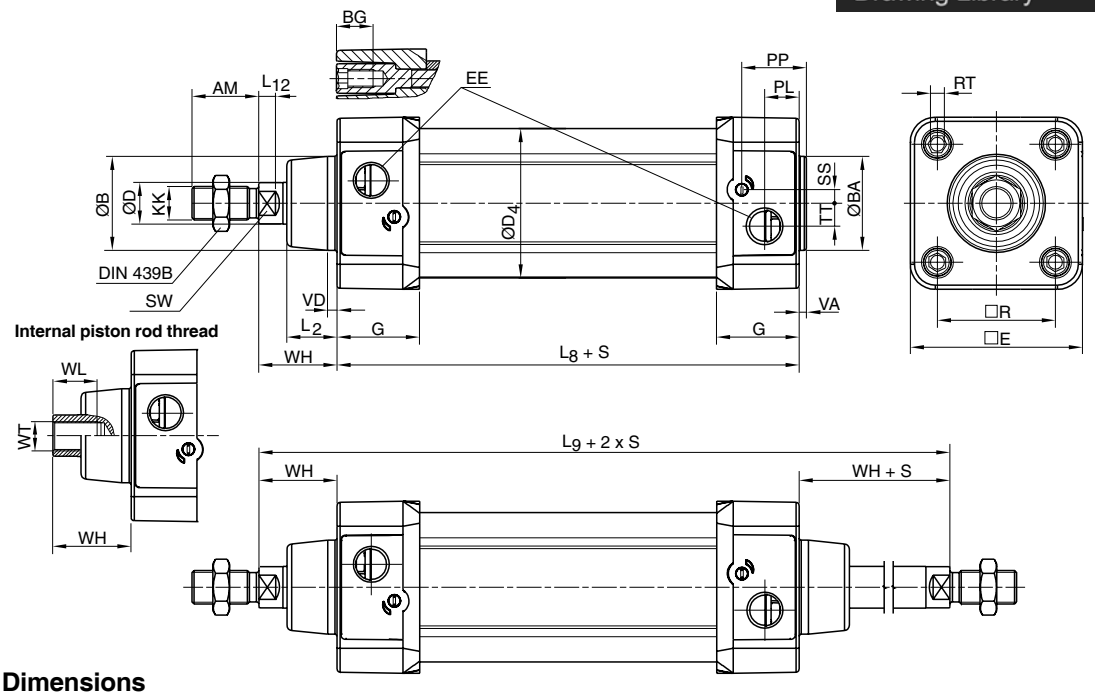
Examples of components:

- terminals
- push buttons assemblies
- relays
- empty flameproof enclosures
- ballasts for fluorescent lamps
- meters (e.g. moving coil)
- encapsulated relays and contactors, with terminals and/or flying leads

P1D Standard

CAD drawings on the Internet
Our home page www.parker.com/euro_pneumatic includes the AirCad Drawing Library with 2D and 3D drawings for the main versions.

AirCad™ Drawing Library



Dimensions

Cylinder bore mm	AM mm	B mm	BA mm	BG mm	D mm	D4 mm	E mm	EE mm	G mm	KK	L2 mm	L8 mm	L9 mm	L12 mm
32	22	30	30	16	12	45,0	50,0	G1/8	28,5	M10x1,25	16,0	94	146	6,0
40	24	35	35	16	16	52,0	57,4	G1/4	33,0	M12x1,25	19,0	105	165	6,5
50	32	40	40	16	20	60,7	69,4	G1/4	33,5	M16x1,5	24,0	106	180	8,0
63	32	45	45	16	20	71,5	82,4	G3/8	39,5	M16x1,5	24,0	121	195	8,0
80	40	45	45	17	25	86,7	99,4	G3/8	39,5	M20x1,5	30,0	128	220	10,0
100	40	55	55	17	25	106,7	116,0	G1/2	44,5	M20x1,5	32,4	138	240	14,0
125	54	60	60	20	32	134,0	139,0	G1/2	51,0	M27x2	45,0	160	290	18,0

Cylinder bore mm	PL mm	PP mm	R mm	RT	SS mm	SW mm	TT mm	VA mm	VD mm	WH mm	WL mm	WT
32	13,0	21,8	32,5	M6	4,0	10	4,5	3,5	4,5	26	21	M8x1
40	14,0	21,9	38,0	M6	8,0	13	5,5	3,5	4,5	30	23	M10x1,25
50	14,0	23,0	46,5	M8	4,0	17	7,5	3,5	5,0	37	31	M14x1,5
63	16,4	27,4	56,5	M8	6,5	17	11,0	3,5	5,0	37	31	M14x1,5
80	16,0	30,5	72,0	M10	0	22	15,0	3,5	4,0	46	39	M18x1,5
100	18,0	35,8	89,0	M10	0	22	20,0	3,5	4,0	51	39	M18x1,5
125	28,0	40,5	110,0	M12	0	27	17,5	5,5	6,0	65	53	M24x2

S=Stroke

Tolerances

Cylinder bore mm	B	BA	L_8 mm	L_9 mm	R mm	Stroke tolerance up to stroke 500 mm	Stroke tolerance for stroke over 500 mm
32	d11	d11	±0,4	±2	±0,5	+0,3/+2,0	+0,3/+3,0
40	d11	d11	±0,7	±2	±0,5	+0,3/+2,0	+0,3/+3,0
50	d11	d11	±0,7	±2	±0,6	+0,3/+2,0	+0,3/+3,0
63	d11	d11	±0,8	±2	±0,7	+0,3/+2,0	+0,3/+3,0
80	d11	d11	±0,8	±3	±0,7	+0,3/+2,0	+0,3/+3,0
100	d11	d11	±1,0	±3	±0,7	+0,3/+2,0	+0,3/+3,0
125	d11	d11	±1,0	±3	±1,1	+0,3/+2,0	+0,3/+3,0

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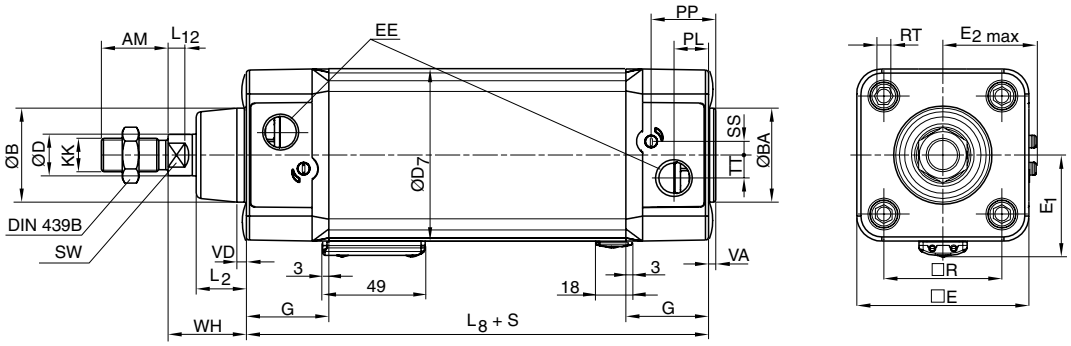
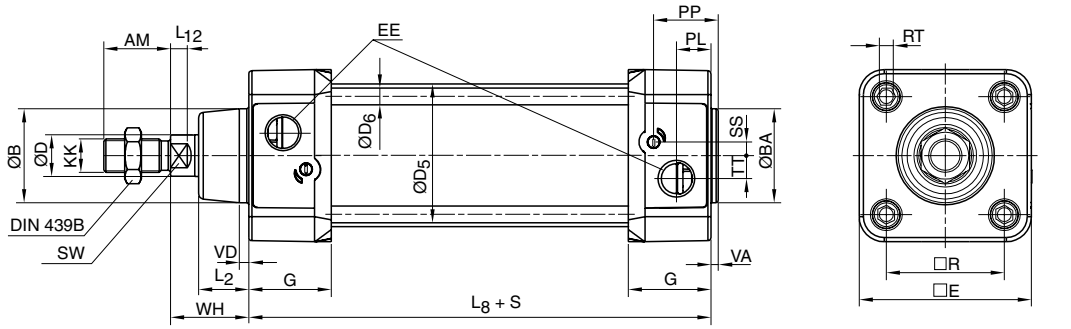
P1D Clean

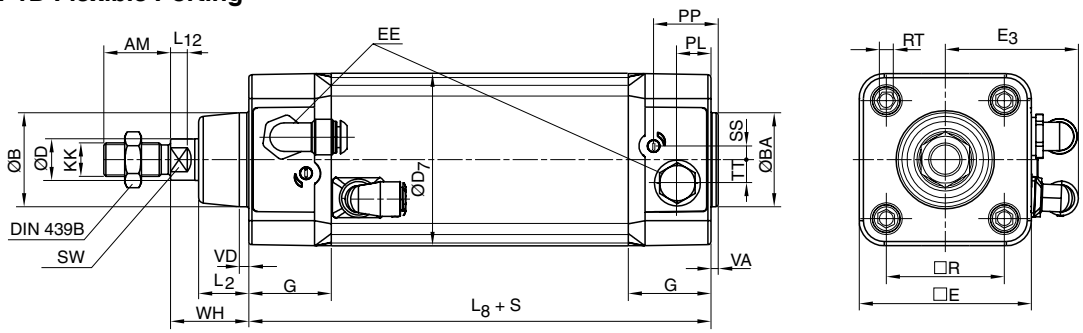
Minimum stroke for P1D Clean is 25 mm with 0-2 sensors and 100 mm with 3-4 sensors.



P1D Tie-Rod



P1D Flexible Porting



Dimensions

Cylinder bore						Elbow fittings, tubing Ømm				Straight fittings, tubing Ømm			
						4	6	8	10	4	6	8	10
	D5	D6	D7	E1	E2max	E3	E3	E3	E3	E3	E3	E3	E3
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
32	36	5,3	49,6	32	30,0	42	44	-	-	38	40	-	-
40	44	5,3	57,3	36	34,7	46	48	-	-	42	44	-	-
50	55	7,1	69,3	42	40,7	-	-	56	76	-	-	48	50
63	68	7,1	82,3	49	46,2	-	-	64	83	-	-	55	75
80	86	8,9	99,3	57	54,7	-	-	-	-	-	-	-	-
100	106	8,9	117,6	68	64,0	-	-	-	-	-	-	-	-
125	132	10,8	142,8	81	75,5	-	-	-	-	-	-	-	-

Other dimensions, see opposite page

P1D Flexible Porting Ø80 - Ø125 can be ordered with threaded ports only or with factory-fitted elbow or straight push-in fittings (see position 20 in the order code key.)

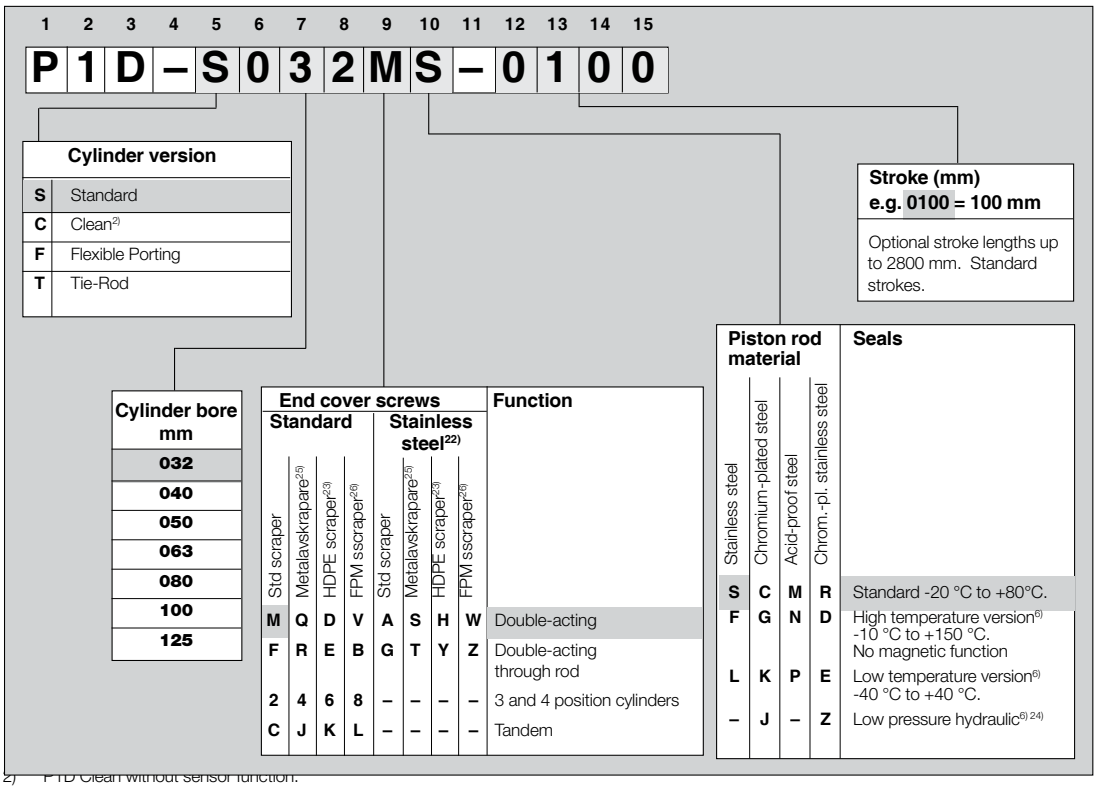
C

The simple and complete order key

The P1D order key is based on the same principles as its predecessors, the P1C and P1E. This makes it easy to identify and order all common cylinder versions. The change-over from our previous cylinder ranges to the equivalent P1D cylinders is logical and simple. As far as possible, the same symbols as for P1C and P1E have been retained for the same functions. Most of the common cylinder types in the P1D-family have a 15-digit order number.

Many of our new cylinder versions, e.g. P1D Clean and P1D Flexible Porting, and complete working units (with factory-fitted cylinder mountings, sensors etc.) are defined by a 20-digit order number. There is only one single order key for P1D, which thus contains the 15-digit order numbers for the most common cylinder types and 20-digit order numbers for cylinders with more functions. Remember that there are always 15 or 20 positions in the order number – never any figure in between.

CE Ex II 2GD c T4 120 °C



2) P1D Clean without sensor function.
6) For P1D-S and P1D-T.
22) If stainless steel end cover screws are selected, the piston rod nuts are also supplied in stainless steel.
23) For dry rod operation.
24) The seal system for low pressure hydraulics demands a hard chromed surface for proper function.
25) The metal scraper ring requires a hard-chromium plated piston rod
26) FPM scraper should be chosen for higher chemical resistance on standard temperature versions only.

Example 1 Standard, double acting cylinder

Standard cylinder with standard scraper ring (PUR), standard piston rod material (stainless steel) and standard temperature range.

P1D	Compare P1C and P1E
P1D-S032MS-0160	P1C-S032MS-0160
P1E-S032MS-0160	
P1D-S100MS-0400	P1C-S100MS-0400
	P1E-S100MS-0400

Example 2 Tie-Rod design, double acting cylinder

Tie-rod cylinder with standard scraper ring (PUR), hard chromed steel piston rod and standard temperature range.

P1D	Compare P1E
P1D-T040MC-0125	P1E-T040MC-0125

P1D Standard

The order numbers on this page refer to P1D Standard without sensors. The cylinders can be ordered with sensors, fittings, piston rod and cylinder mountings, speed controls etc. for efficient logistics. Please refer to the order key to select cylinders with factory-fitted accessories.

CE Ex II 2GD c T4 120 °C

C

P1D Standard

Double-acting

Cyl. bore mm	Stroke mm	Order code
32 Conn. G1/8	25	**P1D-S032MS-0025**
	40	**P1D-S032MS-0040**
	50	**P1D-S032MS-0050**
	80	**P1D-S032MS-0080**
	100	**P1D-S032MS-0100**
	125	**P1D-S032MS-0125**
	160	**P1D-S032MS-0160**
	200	**P1D-S032MS-0200**
	250	**P1D-S032MS-0250**
	320	**P1D-S032MS-0320**
	400	**P1D-S032MS-0400**
	500	**P1D-S032MS-0500**
40 Conn. G1/4	25	**P1D-S040MS-0025**
	40	**P1D-S040MS-0040**
	50	**P1D-S040MS-0050**
	80	**P1D-S040MS-0080**
	100	**P1D-S040MS-0100**
	125	**P1D-S040MS-0125**
	160	**P1D-S040MS-0160**
	200	**P1D-S040MS-0200**
	250	**P1D-S040MS-0250**
	320	**P1D-S040MS-0320**
	400	**P1D-S040MS-0400**
	500	**P1D-S040MS-0500**
50 Conn. G1/4	25	**P1D-S050MS-0025**
	40	**P1D-S050MS-0040**
	50	**P1D-S050MS-0050**
	80	**P1D-S050MS-0080**
	100	**P1D-S050MS-0100**
	125	**P1D-S050MS-0125**
	160	**P1D-S050MS-0160**
	200	**P1D-S050MS-0200**
	250	**P1D-S050MS-0250**
	320	**P1D-S050MS-0320**
	400	**P1D-S050MS-0400**
	500	**P1D-S050MS-0500**
63 Conn. G3/8	25	**P1D-S063MS-0025**
	40	**P1D-S063MS-0040**
	50	**P1D-S063MS-0050**
	80	**P1D-S063MS-0080**
	100	**P1D-S063MS-0100**
	125	**P1D-S063MS-0125**
	160	**P1D-S063MS-0160**
	200	**P1D-S063MS-0200**
	250	**P1D-S063MS-0250**
	320	**P1D-S063MS-0320**
	400	**P1D-S063MS-0400**
	500	**P1D-S063MS-0500**

P1D Standard

Double-acting

Cyl. bore mm	Stroke mm	Order code
80 Conn. G3/8	25	**P1D-S080MS-0025**
	40	**P1D-S080MS-0040**
	50	**P1D-S080MS-0050**
	80	**P1D-S080MS-0080**
	100	**P1D-S080MS-0100**
	125	**P1D-S080MS-0125**
	160	**P1D-S080MS-0160**
	200	**P1D-S080MS-0200**
	250	**P1D-S080MS-0250**
	320	**P1D-S080MS-0320**
	400	**P1D-S080MS-0400**
	500	**P1D-S080MS-0500**
100 Conn. G1/2	25	**P1D-S100MS-0025**
	40	**P1D-S100MS-0040**
	50	**P1D-S100MS-0050**
	80	**P1D-S100MS-0080**
	100	**P1D-S100MS-0100**
	125	**P1D-S100MS-0125**
	160	**P1D-S100MS-0160**
	200	**P1D-S100MS-0200**
	250	**P1D-S100MS-0250**
	320	**P1D-S100MS-0320**
	400	**P1D-S100MS-0400**
	500	**P1D-S100MS-0500**
125 Conn. G1/2	25	**P1D-S125MS-0025**
	40	**P1D-S125MS-0040**
	50	**P1D-S125MS-0050**
	80	**P1D-S125MS-0080**
	100	**P1D-S125MS-0100**
	125	**P1D-S125MS-0125**
	160	**P1D-S125MS-0160**
	200	**P1D-S125MS-0200**
	250	**P1D-S125MS-0250**
	320	**P1D-S125MS-0320**
	400	**P1D-S125MS-0400**
	500	**P1D-S125MS-0500**

The cylinders are supplied complete with one zinc plated steel piston rod nut.

P1D cylinders with piston rod mountings and end cover screw sealing plugs

Using the 20-digit order number, it is possible to order complete working units with factory installed piston rods and cylinder mountings, sensors etc.

Piston rod mountings and sealing plugs for the cylinder end cover screws are specified in position 16 in accordance with the order key below.

Please note that an order code with sealing plugs must be combined with selecting a cylinder mounting in position 17. The sealing plugs are installed in the end cover screws which are not used.

C

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
P	1	D	–	S	0	4	0	M	S	–	0	3	2	0	C	N	N	N	N

Factory-fitted piston rod mountings and sealing plugs

No plugs	With plugs[8]	
S	A	Swivel rod eye, zinc-plated steel
T	1	Swivel rod eye, stainless steel[10]
V	E	Swivel rod eye, zinc-plated steel and clevis bracket GA
W	2	Swivel rod eye, stainless steel and clevis bracket GA[10]
C	B	Clevis, zinc-plated steel
D	3	Clevis, stainless steel[10]
F	G	Flexo coupling, zinc-plated steel
X	P	One additional piston rod nut[9]
Y	4	Piston rod nut in stainless steel[10]
Z	5	Piston rod nut in acid-proof steel
6	7	Without piston rod nut
H	L	Rod guidance module, H style, ball bearings[18]
J	M	Rod guidance module, H style, plain bearings[18]
K	Q	Rod guidance module, U style, plain bearings[18]
N	R	None

8) Valid only for cylinders with factory-fitted cylinder mountings. P1D Clean cylinders are always delivered with 4 sealing plugs.
9) P1D cylinders are always delivered with one piston rod nut in zinc-plated steel, except P1D Clean which is delivered with the piston rod nut in stainless steel. Codes X and P mean that the cylinder is delivered with one additional nut of the same type.
10) The piston rod nut in zinc-plated steel is replaced by a nut in stainless steel (P1D Clean is always delivered with one piston rod nut in stainless steel).
18) Only for bore 32-100 mm

Example of piston rod fittings and end cover screw sealing plugs

P1D-S040MS-0320CNNNN P1D Standard with a zinc plated clevis on the piston rod and without sealing plugs in the end cover screws

P1D-S080MS-0250ATNNN P1D Standard with swivel rod eye on the piston rod, clevis bracket MP2 installed on rear end cover and sealing plugs in the cylinder end cover screws in the front end.

P1D cylinders with centre trunnion and cylinder mountings

There are three different types of centre trunnion in the P1D family. A centre trunnion for the P1D Standard and one for the P1D Tie-Rod placed in the centre or an optional location of the cylinder, or a flange mounted centre trunnion on the front or rear end cover that fits all P1D cylinders.

For the P1D, the centre trunnion is available among the cylinder mountings in position 17. If G or 7 appears in position 17, the position of the centre trunnion should be specified as a three-digit measurement in positions 18-20. For P1D-S, 000 indicates a loose centre trunnion. If D or 6 appears in position 17, the centre trunnion is always centred on the cylinder (no measurement specified in positions 18-20). For some of our previous cylinder series, the centre trunnion is selected back in position 5, e.g. P1C-C. Remember that C in position 5 for P1D means the Clean cylinder version and nothing else!

It is possible to equip the cylinders with factory installed piston rod mountings, sensors, fittings etc. in the usual way. For the version with optional location of the centre trunnion or loose centre trunnion, no choices can be made for positions 18-20 since they are used for the XV dimension.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
P	1	D	–	T	0	4	0	M	S	–	0	3	2	0	N	D	N	N	N

Cylinder version

S	Standard
C	Clean[2]
F	Flexible Porting
T	Tie-Rod

Cylinder mountings

90°	0°	90° = shaft square to, 0° = shaft in line with ports[5]
1	**3**	Flange MF1/MF2 in front end
B	**4**	Flange MF1/MF2 in rear end
2	**K**	Flange MF1/MF2 in both ends
F	**–**	Foot brackets MS1 (both ends)
C	**U**	Clevis bracket GA
E	**V**	Clevis bracket MP4
S	**W**	Swivel eye bracket
T	**Y**	Clevis bracket MP2
L	**Z**	Clevis bracket MP2+MP4
X	**5**	Clevis bracket MP2+pivot bracket with rigid bearing
Q	**0**	Clevis bracket GA + pivot bracket with swivel bearing
M	**A**	Clevis bracket GA +swivel eye bracket
D	**6**	Centre trunnion MT4, mid position[6]
G	**7**	Trunnion MT4, optional pos. (XV-meas. pos 18-20) [7]
H	**P**	Trunnion flange in front end
J	**8**	Trunnion flange in rear end
N		None

2) P1D Clean without sensor function.
5) Shaft or pivots square to or in line with the cylinder ports.
6) For versions P1D-S and P1D-T
7) For P1D-S and P1D-T, XV-measure (from the piston rod thread according to ISO to the centre of the pivots) stated in mm in positions 18-20 (max 999, or 000 if loose centre trunnion specified).

Examples of centre trunnion

P1D-S050MS-0250NDNNN	P1D Standard rod cylinder with centre trunnion installed in centre of cylinder.
P1D-T050MS-0250NG205	P1D Tie rod cylinder with centre trunnion installed on XV dimension specified in positions 18,19 and 20.
P1D-S032MS-0160NHNNN	P1D Standard cylinder with trunnion flange mounted on front end cover.
P1D-S032MS-0160NJNNN	P1D Standard cylinder with trunnion flange mounted on rear end cover.

Examples of other combinations

P1D-C050MS-02501HQN6	P1D Clean cylinder with trunnion flange mounted on front end cover, two reed sensors, 8 mm connector (1 m cable), cable connection on rear end cover, factory installed stainless steel swivel rod eye, push-in fittings (Prestolok, nickel plated brass) low elbow type for 6 mm tube, sealing plugs installed in unused end cover screws (code 1 for stainless swivel rod eye).
P1D-F080MSJ0400XJFN0	P1D Flexible Porting cylinder with trunnion flange mounted on rear end cover, two threaded connections in rear end cover, extra zinc plated steel piston rod nut (i.e. a total of two zinc plated steel nuts), two factory installed electronic sensors, 24 VDC, PNP type, 3 m cable, factory installed push-in fittings (Prestolok, nickel plated brass) low elbow type for 10 mm tube.

Factory-fitted sensors

All P1D cylinders can be supplied with up to four factory installed sensors (standard reed or electronic sensors) in specially designed grooves. Both cable and sensor are protected in the groove. Choose a sensor with 3 or 10 m cable or with 8 mm connector.

C

P1D Clean has a system of sensors fully integrated in the body extrusion, in specially designed grooves underneath a transparent, sealed moulding. The factory installed sensors are installed at the end positions and can then easily be moved anywhere along the entire stroke during commissioning. The sensors can be ordered with cable exit in the front end cover, rear end cover or at both end covers.

For cylinders with 3 sensors, 2 sensors are installed in the rear end position and one sensor in the front end position. Cylinders with 4 sensors are supplied with 2 sensors in each end position.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
P	1	D	–	S	0	5	0	M	S	–	0	3	2	0	N	N	C	N	N

Factory-fitted sensors

Front end or left[11]	Rear end or right[11]	Front and rear end	Cable exit
F	R	–	2 sensors 24 VDC pnp, 3 m cable
G	H	–	2 sensors 24 VDC pnp, 10 m cable
C	S	–	2 sensors 24 VDC pnp, 8 mm connector[21]
K	L	–	2 sensors Reed type, 3 m cable
T	V	–	2 sensors Reed type, 10 m cable
M	Q	–	2 sensors Reed type, 8 mm connector[21]
–	–	3	3 sensors 24 VDC pnp, 8 mm connector[21]
–	–	Z	3 sensors Reed type, 8 mm connector[21]
–	–	4	4 sensors 24 VDC pnp, 8 mm connector[21]
–	–	W	4 sensors Reed type, 8 mm connector[21]
6[12]	7[13]	8[14]	No factory-fitted sensors P1D Clean
N			No sensors P1D (excl. P1D Clean)

11) Left and right valid for P1D Standard and P1D Tie-Rod seen from behind with the ports on top. The sensors can only be mounted on the left for P1D Flexible Porting.

12) No factory-fitted sensors, but prepared for cable exit in the front end (max. 2 sensors).

13) No factory-fitted sensors, but prepared for cable exit in the rear end (max. 2 sensors).

14) No factory-fitted sensors, but prepared for cable exit in both ends (max. 4 sensors).

21) The standard cable length is 0.27 m. However, P1D Clean is supplied with 1 m cable length. Depending on the location of the sensors, the cable length (1 m) may limit the stroke of the P1D Clean cylinder

Example of sensors

P1D-S050MS-0320NNCNN P1D Standard with two factory installed sensors 24 VDC PNP, 8 mm connector

P1D-C063MS-0250NNLNN P1D Clean with two factory installed Reed sensors, 3 m cable and cable connection at rear end cover on left side

P1D-F080MS-0400NNMNN P1D Flexible Porting with two factory installed Reed sensors, 8 mm connector

Pre-assembled fittings or speed controls

All P1D cylinders can be delivered with elbow or straight push-in fittings in nickel-plated brass (Prestolok) or speed controls in brass (series PTF). P1D Clean cylinders are factory-fitted nickel-plated versions of the PTF speed controls. Please see page 42 for the order code key for P1D Flexible Porting with pre-assembled fittings.

C

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
P	1	D	–	S	0	5	0	M	S	–	0	3	2	0	N	N	N	N	8

Speed controls or fittings for tube dimension	
Speed controls[17] Series PTF 4PB[16]	
X	in both ends for tube 4 mm
Y	in both ends for tube 6 mm
Z	in both ends for tube 8 mm
P	in both ends for tube 10 mm
R	in both ends for tube 12 mm
Push-in fitting, elbow type for:	
4	Tube dimension 4 mm
6	Tube dimension 6 mm
8	Tube dimension 8 mm
0	Tube dimension 10 mm
2	Tube dimension 12 mm
Push-in fitting, straight type for:	
1	Tube dimension 4 mm
3	Tube dimension 6 mm
5	Tube dimension 8 mm
7	Tube dimension 10 mm
9	Tube dimension 12 mm
N	None

Available fittings and speed controls for P1D Standard

Cyl.	Speed controls bore for tube	Elbow fitting for tube	Straight fitting for tube
32	4, 6, 8	4, 6, 8	4, 6, 8
40, 50	6, 8	4, 6, 8, 10, 12	4, 6, 8, 10, 12
63, 80	8, 10, 12	8, 10, 12	8, 10, 12
100, 125	12	12	10, 12

16) P1D Clean cylinders have factory fitted nickel plated versions of the PTF series.

17) Not available for P1D Flexible Porting bore 32-63 mm.

Example P1D Standard with factory-fitted fittings or speed controls

P1D-S050MS-0320NNNN8 P1D Standard cylinder with two push-in fittings, elbow type for 8 mm tube.

P1D-S125MS-0400NNNNR P1D Standard cylinder with two speed controls for 12 mm tube.

Extended piston rod

All cylinders in the P1D family can be ordered with extended piston rod, for all piston rod materials. To make it possible to combine piston rod extension with all the functions and properties in the P1D system, the three positions which normally specify cylinder bore are used to specify both bore and extension. When ordering a P1D cylinder with extended piston rod, specify this as below.

Example of an extended piston rod

C

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
P	1	D	–	S	K	R	5	M	S	–	0	3	2	0

Cylinder bore mm

K	32
L	40
M	50
N	63
P	80
Q	100
R	125

Piston rod extension

E.g. KR5 = Cylinder bore 32 mm with piston rod extension = 255 mm

01-99	1-99	**N0-N9**	220-229
A0-A9	100-109	**P0-P9**	230-239
B0-B9	110-119	**Q0-Q9**	240-249
C0-C9	120-129	**R0-R9**	250-259
D0-D9	130-139	**S0-S9**	260-269
E0-E9	140-149	**T0-T9**	270-279
F0-F9	150-159	**U0-U9**	280-289
G0-G9	160-169	**V0-V9**	290-299
H0-H9	170-179	**W0-W9**	300-309
J0-J9	180-189	**X0-X9**	310-319
K0-K9	190-199	**Y0-Y9**	320-329
L0-L9	200-209	**Z0-Z9**	330-339
M0-M9	210-219		

The maximum extended piston rod length that can be specified by the order key is 339 mm. If a longer extended piston rod is needed please contact us and we will organise a special part number.

By changing from 032 to KR5, the cylinder has been given a 255 mm extended piston rod. At the same time, the cylinder can be specified with all functions and properties in the other positions.

P1D-SK45MS-0200 P1D Standard cylinder, bore 32 mm, with a 45 mm extended piston rod.

P1D-TPD2MS-0500 P1D Tie-Rod cylinder, bore 80 mm, with 132 mm extended piston rod.

Piston rod in alternative materials

P1D has a polished stainless steel piston rod as standard. If you want a different material and/or surface treatment, please order this in combination with seal material in position 10.

Piston rod nuts are supplied in zinc plated steel as standard, but stainless steel piston rod nuts are always supplied for P1D Clean. If an alternative material is used, the piston rod nut is always supplied in the same material.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
P	1	D	–	S	0	3	2	M	S	–	0	1	0	0

Piston rod material				Seals
Stainless steel	Chromium-plated steel	Acid-proof steel	Chrom.-pl. stainless steel	
S	**C**	**M**	**R**	Standard -20 °C to +80 °C.
F	**G**	**N**	**D**	High temperature version [6] -10 °C to +150 °C. No magnetic function
L	**K**	**P**	**E**	Low temperature version -40 °C to +40°C. [6]
–	**J**	**–**	**Z**	Low pressure hydraulic [6] [24]

6) For P1D-S and P1D-T.

24) The seal system for low pressure hydraulics demands a hard chromed surface for proper function.

Example of piston rod material

P1D-S032MS-0100 P1D Standard cylinder, bore 32 mm, with stainless steel piston rod (standard)

P1D-T040MC-0160 P1D Tie-Rod cylinder, bore 40 mm, with hard chromed steel piston rod

C

High and low temperature and low pressure hydraulics

The new P1D system contains cylinder versions for high and low temperature and low pressure hydraulics. These versions have material and sealing systems specially designed for their particular temperature ranges. End covers and pistons are made entirely from metal, to give optimum function at high or low temperature in combination with seals made from specially tested materials and special grease. These variants are available with the P1D-S and P1D-T models. The low temperature version has a magnetic ring in the piston for proximity sensing (but please note that the sensors are normally specified for full performance down to –25 °C only), whereas the high temperature version does not have a magnetic ring in the piston.

The high temperature version is chosen by the letter F in position 10 (or G, D, N for other piston rod materials, see the table).

The low temperature version is chosen by the letter L in position 10 (or K, E, P for other piston rod materials, see the table).

Order cylinders for low pressure hydraulics by specifying the letter J (hard chromed steel piston rod) or Z (hard chromed stainless steel piston rod) in position 10 in the table below. Please note that this version requires a piston rod with hard chromed surface.

Certain restrictions apply to choosing sensors, piston rod mountings, cylinder mountings and fittings due to the temperature range. However, the high temperature cylinders can not be supplied with sensors, i.e. always code N in position 18.

6) For P1D-S and P1D-T.

24) The seal system for low pressure hydraulics demands a hard chromed surface for proper function.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
P	1	D	–	S	0	6	3	M	F	–	0	3	2	0

Cylinder version

S	Standard
C	Clean
F	Flexible Porting
T	Tie-Rod

Piston rod material				Seals
Stainless steel	Chromium-plated steel	Acid-proof steel	Chrom.-pl. stainless steel	
S	**C**	**M**	**R**	Standard -20 °C to +80 °C.
F	**G**	**N**	**D**	High temperature version[6] -10 °C to +150 °C. No magnetic function.
L	**K**	**P**	**E**	Low temperature version[6] -40 °C to +40 °C.
–	**J**	**–**	**Z**	Low pressure hydraulic[24] [24]

Examples of high and low temperature, and low pressure hydraulics

P1D-S032MF-0125	P1D cylinder, version S, high temperature design, no magnetic function.
P1D-S050ML-0250	P1D cylinder, version S, low temperature design, built-in magnetic ring (but the sensors have normally acceptable function to –25 °C only).
P1D-S063MF-0320S1NNN	P1D cylinder, version S, high temperature design, no magnetic function, zinc plated steel swivel rod eye, flange on front end cover.
P1D-S050MJ-0200	P1D cylinder, version S, low pressure hydraulic version, hard chromed piston rod, magnetic ring built in.

Through piston rod

All P1D cylinders can be ordered with a through piston rod.

Order this design in position 9 in combination with the scraper ring system as below.

C

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
P	1	D	–	S	0	3	2	F	S	–	0	1	0	0

End cover screws								Function
Standard				Stainless steel[22]				
Std scraper	Metalavskrapare[25]	HDPE scraper[23]	FPM sscraper[26]	Std scraper	Metalavskrapare[25]	HDPE scraper[23]	FPM sscraper[26]	
M	Q	D	V	A	S	H	W	Double-acting
F	R	E	B	G	T	Y	Z	Double-acting through rod

22) If stainless steel end cover screws are selected, the piston rod nuts are also supplied in stainless steel.
23) For dry rod operation.
25) The metal scraper ring requires a hard-chromium plated piston rod
26) FPM scraper should be chosen for higher chemical resistance on standard temperature versions only.

Example of through piston rod

P1D-S032FS-0100 P1D Standard cylinder, bore 32 mm, with through piston rod

P1D-T050FS-0125 P1D Tie-Rod cylinder, bore 50 mm, with through piston rod

3 and 4 position cylinders

Factory-fitted 3 and 4 position cylinders can be ordered in tie-rod design P1D-T. Through going tie-rods fix the two cylinders into a compact unit.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
P	1	D	–	T	0	8	0	2	S	–	0	2	0	0	N	0	2	5	0

Cylinder version	
S	Standard
C	Clean
F	Flexible Porting
T	Tie-Rod

End cover screws								Function
Standard				Stainless steel[22]				
Std scraper	Metalavskrapare[25]	HDPE scraper[23]	FPM sscraper[26]	Std scraper	Metalavskrapare[25]	HDPE scraper[23]	FPM sscraper[26]	
M	Q	D	V	A	S	H	W	Double-acting
F	R	E	B	G	T	Y	Z	Double-acting through rod
2	4	6	8	–	–	–	–	3 and 4 position cylinders
C	J	K	L	–	–	–	–	Tandem

22) If stainless steel end cover screws are selected, the piston rod nuts are also supplied in stainless steel.
23) For dry rod operation.
25) The metal scraper ring requires a hard-chromium plated piston rod
26) FPM scraper should be chosen for higher chemical resistance on standard temperature versions only.

Equal stroke – 3 position cylinder

Specify letter T in position 5 (P1D-T) and figure 2 in position 9 (standard scraper ring)

Unequal stroke – 4 position cylinder

Specify letter T in position 5 (P1D-T) and figure 2 in position 9 (standard scraper ring)

Specify the shortest stroke in the ordinary positions 12, 13, 14, 15 and the longest stroke in positions 17, 18, 19, 20.

Example of 3 and 4 position cylinders

P1D-T0322S-0200SNNN4	P1D Tie-Rod cylinder with 3 position design, swivel rod eye in zinc plated steel, factory installed plug-in fittings (Prestolok, nickel plated brass) for 4 mm tube.
P1D-T0632S-0160	P1D Tie-Rod cylinder with 3 position design
P1D-T0802S-0200N0250	P1D Tie-Rod cylinder with 4 position design with stroke 200 mm and 250 mm.

Tandem cylinders

The P1D-T is available in tandem design i.e. two cylinders in series, for almost double force. Order with the letter C in position 9.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
P	1	D	–	T	0	4	0	C	S	–	0	3	2	0

End cover screws								Function
Standard				Stainless steel[22]				
Std scraper	Metalavskrapare[25]	HDPE scraper[23]	FPM sscraper[26]	Std scraper	Metalavskrapare[25]	HDPE scraper[23]	FPM sscraper[26]	
M	Q	D	V	A	S	H	W	Double-acting
F	R	E	B	G	T	Y	Z	Double-acting through rod
2	4	6	8	–	–	–	–	3 and 4 position cylinders
C	J	K	L	–	–	–	–	Tandem

22) If stainless steel end cover screws are selected, the piston rod nuts are also supplied in stainless steel.
23) For dry rod operation.
25) The metal scraper ring requires a hard-chromium plated piston rod
26) FPM scraper should be chosen for higher chemical resistance on standard temperature versions only.

Operation with a dry piston rod

The seal system for operation with a dry piston rod (HDPE scraper) is available as an option for all P1D cylinders except high and low temperature version and the hydraulic model.

Order this function by specifying letter D in position 9 (double acting cylinder) or E (double acting cylinder with through piston rod). Specify the code for the seal system in either the 15 or 20 digit part number.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
P	1	D	–	S	0	8	0	D	S	–	0	2	0	0

Cylinder version	
S	Standard
C	Clean
F	Flexible Porting
T	Tie-Rod

End cover screws								Function
Standard				Stainless steel[22]				
Std scraper	Metalavskrapare[25]	HDPE scraper[23]	FPM sscraper[26]	Std scraper	Metalavskrapare[25]	HDPE scraper[23]	FPM sscraper[26]	
M	Q	D	V	A	S	H	W	Double-acting
F	R	E	B	G	T	Y	Z	Double-acting through rod
2	4	6	8	–	–	–	–	3 and 4 position cylinders
C	J	K	L	–	–	–	–	Tandem

22) If stainless steel end cover screws are selected, the piston rod nuts are also supplied in stainless steel.
23) For dry rod operation.
25) The metal scraper ring requires a hard-chromium plated piston rod
26) FPM scraper should be chosen for higher chemical resistance on standard temperature versions only.

Example of seal system for dry rod

P1D-S040DS-0200 P1D Standard cylinder with seal system for dry operation.

P1D-C050DS-0250TERN6 P1D Clean cylinder with seal system for dry operation, stainless steel swivel rod eye, clevis bracket MP4, two factory-fitted electronic sensors, 24 VDC, PNP type, 3 m cable, cable exit at rear end cover, factory-fitted push-in fittings (Prestolok, nickel plated brass) of low elbow type for 6 mm tube. Four sealing plugs for unused end cover screws are enclosed.

P1D-C063DSC0320DMSN6 P1D Clean cylinder with seal system for dry operation, two push-in low elbow fittings placed at rear end cover for 6 mm tube, stainless steel clevis, combination of clevis bracket GA + swivel eye bracket installed on rear end cover, two factory-fitted electronic sensors, 24 VDC, PNP type, 8 mm connector (1 m cable), cable exit at rear end cover. Four sealing plugs for unused end cover screws are enclosed.

P1D Clean with built-in sensor

The entirely new P1D Clean with built-in sensors has a 20-digit part number to define all functions. Cylinder version P1D Clean is selected by putting the letter C in position 5 and the sensors are selected in position 18. These two positions determine the design of each P1D Clean cylinder. If required, the piston rod and cylinder mountings, piston rod thread and fittings or speed controls can be selected in positions 16, 17,19 and 20 to obtain a complete working unit. You can also specify the code for none of these options. But please remember that a code must be specified in all positions 16 – 20.

C

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
P	1	D	–	C	0	5	0	M	S	–	0	3	2	0	N	N	C	N	N

Cylinder version

S	Standard
C	Clean[2]
F	Flexible Porting
T	Tie-Rod

Factory-fitted sensors, P1D Clean

Front end or left[11]	Rear end or right[11]	Front and rear end	Cable exit
F	R	–	2 sensors 24 VDC PNP, 3 m cable
G	H	–	2 sensors 24 VDC PNP, 10 m cable
C	S	–	2 sensors 24 VDC PNP, 8 mm connector, 1 m cable[21]
K	L	–	2 sensors Reed type, 3 m cable
T	V	–	2 sensors Reed type, 10 m cable
M	Q	–	2 sensors Reed type, 8 mm connector, 1 m cable[21]
–	–	3	3 sensors 24 VDC PNP, 8 mm connector, 1 m cable[21]
–	–	Z	3 sensors Reed type, 8 mm connector, 1 m cable[21]
–	–	4	4 sensors 24 VDC PNP, 8 mm connector, 1 m cable[21]
–	–	W	4 sensors Reed type, 8 mm connector, 1 m cable[21]
6[12]	7[13]	8[14]	No factory-fitted sensors P1D Clean
N			No sensors P1D (excl. P1D Clean)

2) P1D Clean without sensor function, see page 41.

11) Left and right valid for P1D Standard and P1D Tie-Rod seen from behind with the ports on top. The sensors can only be mounted on the left for P1D Flexible Porting.

12) No factory-fitted sensors, but prepared for cable exit in the front end (max. 2 sensors).

13) No factory-fitted sensors, but prepared for cable exit in the rear end (max. 2 sensors).

14) No factory-fitted sensors, but prepared for cable exit in both ends (max. 4 sensors).

21) Due to the sensor positions, the cable length (1 m) could limit the stroke of the P1D Clean cylinders.

Example of P1D Clean

P1D-C032MS-0200NNCNN P1D Clean cylinder with two electronic sensors, PNP type, with 8 mm connector, cable exit at front end cover, 4 sealing plugs for end cover screws are enclosed.

P1D-C050MS-0160TNHNN P1D Clean cylinder with two electronic sensors, PNP type, with 10 m cable, cable exit at rear end cover, swivel rod eye in stainless steel, 4 sealing plugs for end cover screws are enclosed.

P1D-C080MS-0250-3BMNN P1D Clean cylinder with two reed sensors, with 8 mm connector, cable connection at front end cover, stainless steel clevis, flange on rear end cover, sealing plugs installed in unused end cover screws.

P1D-C125MS-04004T3NN P1D Clean cylinder with three electronic sensors, PNP type, with 8 mm connector, cable exit at both front and rear end cover (1 cable front, 2 cables rear – can be moved to inverted configuration), extra stainless steel piston rod nut, clevis bracket MP2 on rear end cover, plugs installed in unused end cover screws.

P1D-C040MS-0320RHWNN P1D Clean cylinder with four electronic sensors, PNP type, with 8 mm connector, cable exit at both front and rear end cover (2 cables in each end cover), flange mounted trunnion on front end cover, sealing plugs installed in unused end cover screws.

P1D Clean

The order numbers on this page refer to P1D Clean with two built-in electronic sensors, factory-fitted in the cylinder end positions, with cable exit at the front end cover. See the order code key to select other sensors and other location of the cable exit.

C

P1D Clean with electronic sensors 24 VDC, PNP, 1 m cable with 8 mm connector

Double acting

Cyl. bore mm	Stroke mm	Order code
32 Conn. G1/8	25	**P1D-C032MS-0025NNCNN**
	40	**P1D-C032MS-0040NNCNN**
	50	**P1D-C032MS-0050NNCNN**
	80	**P1D-C032MS-0080NNCNN**
	100	**P1D-C032MS-0100NNCNN**
	125	**P1D-C032MS-0125NNCNN**
	160	**P1D-C032MS-0160NNCNN**
	200	**P1D-C032MS-0200NNCNN**
	250	**P1D-C032MS-0250NNCNN**
	320	**P1D-C032MS-0320NNCNN**
	400	**P1D-C032MS-0400NNCNN**
	500	**P1D-C032MS-0500NNCNN**
40 Conn. G1/4	25	**P1D-C040MS-0025NNCNN**
	40	**P1D-C040MS-0040NNCNN**
	50	**P1D-C040MS-0050NNCNN**
	80	**P1D-C040MS-0080NNCNN**
	100	**P1D-C040MS-0100NNCNN**
	125	**P1D-C040MS-0125NNCNN**
	160	**P1D-C040MS-0160NNCNN**
	200	**P1D-C040MS-0200NNCNN**
	250	**P1D-C040MS-0250NNCNN**
	320	**P1D-C040MS-0320NNCNN**
	400	**P1D-C040MS-0400NNCNN**
	500	**P1D-C040MS-0500NNCNN**
50 Conn. G1/4	25	**P1D-C050MS-0025NNCNN**
	40	**P1D-C050MS-0040NNCNN**
	50	**P1D-C050MS-0050NNCNN**
	80	**P1D-C050MS-0080NNCNN**
	100	**P1D-C050MS-0100NNCNN**
	125	**P1D-C050MS-0125NNCNN**
	160	**P1D-C050MS-0160NNCNN**
	200	**P1D-C050MS-0200NNCNN**
	250	**P1D-C050MS-0250NNCNN**
	320	**P1D-C050MS-0320NNCNN**
	400	**P1D-C050MS-0400NNCNN**
	500	**P1D-C050MS-0500NNCNN**
63 Conn. G3/8	25	**P1D-C063MS-0025NNCNN**
	40	**P1D-C063MS-0040NNCNN**
	50	**P1D-C063MS-0050NNCNN**
	80	**P1D-C063MS-0080NNCNN**
	100	**P1D-C063MS-0100NNCNN**
	125	**P1D-C063MS-0125NNCNN**
	160	**P1D-C063MS-0160NNCNN**
	200	**P1D-C063MS-0200NNCNN**
	250	**P1D-C063MS-0250NNCNN**
	320	**P1D-C063MS-0320NNCNN**
	400	**P1D-C063MS-0400NNCNN**
	500	**P1D-C063MS-0500NNCNN**

Cyl. bore mm mm	Stroke	Order code
80 Conn. G3/8	25	**P1D-S080MS-0025NNCNN**
	40	**P1D-C080MS-0040NNCNN**
	50	**P1D-C080MS-0050NNCNN**
	80	**P1D-C080MS-0080NNCNN**
	100	**P1D-C080MS-0100NNCNN**
	125	**P1D-C080MS-0125NNCNN**
	160	**P1D-C080MS-0160NNCNN**
	200	**P1D-C080MS-0200NNCNN**
	250	**P1D-C080MS-0250NNCNN**
	320	**P1D-C080MS-0320NNCNN**
	400	**P1D-C080MS-0400NNCNN**
	500	**P1D-C080MS-0500NNCNN**
100 Conn. G1/2	25	**P1D-C100MS-0025NNCNN**
	40	**P1D-C100MS-0040NNCNN**
	50	**P1D-C100MS-0050NNCNN**
	80	**P1D-C100MS-0080NNCNN**
	100	**P1D-C100MS-0100NNCNN**
	125	**P1D-C100MS-0125NNCNN**
	160	**P1D-C100MS-0160NNCNN**
	200	**P1D-C100MS-0200NNCNN**
	250	**P1D-C100MS-0250NNCNN**
	320	**P1D-C100MS-0320NNCNN**
	400	**P1D-C100MS-0400NNCNN**
	500	**P1D-C100MS-0500NNCNN**
125 Conn. G1/2	25	**P1D-C125MS-0025NNCNN**
	40	**P1D-C125MS-0040NNCNN**
	50	**P1D-C125MS-0050NNCNN**
	80	**P1D-C125MS-0080NNCNN**
	100	**P1D-C125MS-0100NNCNN**
	125	**P1D-C125MS-0125NNCNN**
	160	**P1D-C125MS-0160NNCNN**
	200	**P1D-C125MS-0200NNCNN**
	250	**P1D-C125MS-0250NNCNN**
	320	**P1D-C125MS-0320NNCNN**
	400	**P1D-C125MS-0400NNCNN**
	500	**P1D-C125MS-0500NNCNN**

The cylinders are supplied complete with one stainless steel piston rod nut and 4 sealing plugs to be used in the unused end cover screws.

P1D Clean

The order numbers on this page refer to P1D Clean with two built-in reed sensors, factory-fitted in the cylinder end positions, with cable exit at the front end cover. See the order code key to select other sensors and other location of the cable exit.

C

P1D Clean with Reed sensors, 1 m cable with 8 mm connector

Double acting

Cyl. bore mm	Stroke mm	Order code
32 Conn. G1/8	25	**P1D-C032MS-0025NNMNN**
	40	**P1D-C032MS-0040NNMNN**
	50	**P1D-C032MS-0050NNMNN**
	80	**P1D-C032MS-0080NNMNN**
	100	**P1D-C032MS-0100NNMNN**
	125	**P1D-C032MS-0125NNMNN**
	160	**P1D-C032MS-0160NNMNN**
	200	**P1D-C032MS-0200NNMNN**
	250	**P1D-C032MS-0250NNMNN**
	320	**P1D-C032MS-0320NNMNN**
	400	**P1D-C032MS-0400NNMNN**
	500	**P1D-C032MS-0500NNMNN**
40 Conn. G1/4	25	**P1D-C040MS-0025NNMNN**
	40	**P1D-C040MS-0040NNMNN**
	50	**P1D-C040MS-0050NNMNN**
	80	**P1D-C040MS-0080NNMNN**
	100	**P1D-C040MS-0100NNMNN**
	125	**P1D-C040MS-0125NNMNN**
	160	**P1D-C040MS-0160NNMNN**
	200	**P1D-C040MS-0200NNMNN**
	250	**P1D-C040MS-0250NNMNN**
	320	**P1D-C040MS-0320NNMNN**
	400	**P1D-C040MS-0400NNMNN**
	500	**P1D-C040MS-0500NNMNN**
50 Conn. G1/4	25	**P1D-C050MS-0025NNMNN**
	40	**P1D-C050MS-0040NNMNN**
	50	**P1D-C050MS-0050NNMNN**
	80	**P1D-C050MS-0080NNMNN**
	100	**P1D-C050MS-0100NNMNN**
	125	**P1D-C050MS-0125NNMNN**
	160	**P1D-C050MS-0160NNMNN**
	200	**P1D-C050MS-0200NNMNN**
	250	**P1D-C050MS-0250NNMNN**
	320	**P1D-C050MS-0320NNMNN**
	400	**P1D-C050MS-0400NNMNN**
	500	**P1D-C050MS-0500NNMNN**
63 Conn. G3/8	25	**P1D-C063MS-0025NNMNN**
	40	**P1D-C063MS-0040NNMNN**
	50	**P1D-C063MS-0050NNMNN**
	80	**P1D-C063MS-0080NNMNN**
	100	**P1D-C063MS-0100NNMNN**
	125	**P1D-C063MS-0125NNMNN**
	160	**P1D-C063MS-0160NNMNN**
	200	**P1D-C063MS-0200NNMNN**
	250	**P1D-C063MS-0250NNMNN**
	320	**P1D-C063MS-0320NNMNN**
	400	**P1D-C063MS-0400NNMNN**
	500	**P1D-C063MS-0500NNMNN**

Cyl. bore mm	Stroke mm	Order code
80 Conn. G3/8	25	**P1D-S080MS-0025NNMNN**
	40	**P1D-C080MS-0040NNMNN**
	50	**P1D-C080MS-0050NNMNN**
	80	**P1D-C080MS-0080NNMNN**
	100	**P1D-C080MS-0100NNMNN**
	125	**P1D-C080MS-0125NNMNN**
	160	**P1D-C080MS-0160NNMNN**
	200	**P1D-C080MS-0200NNMNN**
	250	**P1D-C080MS-0250NNMNN**
	320	**P1D-C080MS-0320NNMNN**
	400	**P1D-C080MS-0400NNMNN**
	500	**P1D-C080MS-0500NNMNN**
100 Conn. G1/2	25	**P1D-C100MS-0025NNMNN**
	40	**P1D-C100MS-0040NNMNN**
	50	**P1D-C100MS-0050NNMNN**
	80	**P1D-C100MS-0080NNMNN**
	100	**P1D-C100MS-0100NNMNN**
	125	**P1D-C100MS-0125NNMNN**
	160	**P1D-C100MS-0160NNMNN**
	200	**P1D-C100MS-0200NNMNN**
	250	**P1D-C100MS-0250NNMNN**
	320	**P1D-C100MS-0320NNMNN**
	400	**P1D-C100MS-0400NNMNN**
	500	**P1D-C100MS-0500NNMNN**
125 Conn. G1/2	25	**P1D-C125MS-0025NNMNN**
	40	**P1D-C125MS-0040NNMNN**
	50	**P1D-C125MS-0050NNMNN**
	80	**P1D-C125MS-0080NNMNN**
	100	**P1D-C125MS-0100NNMNN**
	125	**P1D-C125MS-0125NNMNN**
	160	**P1D-C125MS-0160NNMNN**
	200	**P1D-C125MS-0200NNMNN**
	250	**P1D-C125MS-0250NNMNN**
	320	**P1D-C125MS-0320NNMNN**
	400	**P1D-C125MS-0400NNMNN**
	500	**P1D-C125MS-0500NNMNN**

The cylinders are supplied complete with one stainless steel piston rod nut and 4 sealing plugs to be used in the unused end cover screws.

P1D Clean without sensor function

The only exception from the 20-digit part number is one version of P1D Clean which has a 15-digit order number. This version is a permanently sealed P1D Clean with no facility for installing sensors. The exterior of this cylinder is characterised by not having the big transparent cover, it has instead two short covers with a transparent moulding between. The cylinder has a very clean design and is intended for applications where no sensors are used.

The P1D without the sensor function can of course be combined with other equipment and functions by using a 20-digit order number. But please note that the letter N must always be used in position 18.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
P	1	D	–	C	0	4	0	M	S	–	0	2	5	0

Cylinder version	
S	Standard
C	Clean
F	Flexible Porting
T	Tie-Rod

P1D Clean without sensor function is defined by the letter C in position 5 and the 15-digit order number

Double acting

Cyl. bore mm	Stroke mm	Order code
32 Conn. G1/8	25	**P1D-C032MS-0025**
	40	**P1D-C032MS-0040**
	50	**P1D-C032MS-0050**
	80	**P1D-C032MS-0080**
	100	**P1D-C032MS-0100**
	125	**P1D-C032MS-0125**
	160	**P1D-C032MS-0160**
	200	**P1D-C032MS-0200**
	250	**P1D-C032MS-0250**
	320	**P1D-C032MS-0320**
	400	**P1D-C032MS-0400**
	500	**P1D-C032MS-0500**
40 Conn. G1/4	25	**P1D-C040MS-0025**
	40	**P1D-C040MS-0040**
	50	**P1D-C040MS-0050**
	80	**P1D-C040MS-0080**
	100	**P1D-C040MS-0100**
	125	**P1D-C040MS-0125**
	160	**P1D-C040MS-0160**
	200	**P1D-C040MS-0200**
	250	**P1D-C040MS-0250**
	320	**P1D-C040MS-0320**
	400	**P1D-C040MS-0400**
	500	**P1D-C040MS-0500**
50 Conn. G1/4	25	**P1D-C050MS-0025**
	40	**P1D-C050MS-0040**
	50	**P1D-C050MS-0050**
	80	**P1D-C050MS-0080**
	100	**P1D-C050MS-0100**
	125	**P1D-C050MS-0125**
	160	**P1D-C050MS-0160**
	200	**P1D-C050MS-0200**
	250	**P1D-C050MS-0250**
	320	**P1D-C050MS-0320**
	400	**P1D-C050MS-0400**
	500	**P1D-C050MS-0500**

Cyl. bore mm	Stroke mm	Order code
63 Conn. G3/8	25	**P1D-C063MS-0025**
	40	**P1D-C063MS-0040**
	50	**P1D-C063MS-0050**
	80	**P1D-C063MS-0080**
	100	**P1D-C063MS-0100**
	125	**P1D-C063MS-0125**
	160	**P1D-C063MS-0160**
	200	**P1D-C063MS-0200**
	250	**P1D-C063MS-0250**
	320	**P1D-C063MS-0320**
	400	**P1D-C063MS-0400**
	500	**P1D-C063MS-0500**
80 Conn. G3/8	25	**P1D-C080MS-0025**
	40	**P1D-C080MS-0040**
	50	**P1D-C080MS-0050**
	80	**P1D-C080MS-0080**
	100	**P1D-C080MS-0100**
	125	**P1D-C080MS-0125**
	160	**P1D-C080MS-0160**
	200	**P1D-C080MS-0200**
	250	**P1D-C080MS-0250**
	320	**P1D-C080MS-0320**
	400	**P1D-C080MS-0400**
	500	**P1D-C080MS-0500**
100 Conn. G1/2	25	**P1D-C100MS-0025**
	40	**P1D-C100MS-0040**
	50	**P1D-C100MS-0050**
	80	**P1D-C100MS-0080**
	100	**P1D-C100MS-0100**
	125	**P1D-C100MS-0125**
	160	**P1D-C100MS-0160**
	200	**P1D-C100MS-0200**
	250	**P1D-C100MS-0250**
	320	**P1D-C100MS-0320**
	400	**P1D-C100MS-0400**
	500	**P1D-C100MS-0500**

Cyl. bore mm	Stroke mm	Order code
125 Conn. G1/2	25	**P1D-C125MS-0025**
	40	**P1D-C125MS-0040**
	50	**P1D-C125MS-0050**
	80	**P1D-C125MS-0080**
	100	**P1D-C125MS-0100**
	125	**P1D-C125MS-0125**
	160	**P1D-C125MS-0160**
	200	**P1D-C125MS-0200**
	250	**P1D-C125MS-0250**
	320	**P1D-C125MS-0320**
	400	**P1D-C125MS-0400**
	500	**P1D-C125MS-0500**

The cylinders are supplied complete with one stainless steel piston rod nut and 4 sealing plugs to be used in the unused end cover screws.

C

P1D Flexible Porting

The P1D Flexible Porting with both cylinder ports in one end cover has a 20-digit part number. Position 11 is used to select the position of the cylinder ports (all cylinders with one connection in each end cover have a dash in this position). Please note that cylinder bores 32-63 mm only have the push-in fitting design and 80-125 mm is only available with threaded connections. Position 20 is used to specify the type of push-in fittings (low elbow or straight fitting) and tube dimension (4 or 6 mm for Ø32 and 40, and 8 or 10 mm for Ø50 and 63). For cylinder bores Ø32-63 mm, the fittings are made of plastics material for Flexible Porting cylinders (nickel plated brass on all other P1D cylinders). These four smallest bores can not be equipped with speed controls. For cylinder bores Ø80-125 mm, position 20 is used to select the speed controls, fittings (Prestolok, nickel plated brass) or none (code N).

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
P	1	D	–	F	0	6	3	M	S	B	0	3	2	0	N	N	N	N	0

Cylinder version

S	Standard
C	Clean
F	Flexible Porting
T	Tie-Rod

Cylinder ports

Front & rear	Both front	Both rear	Port location
—	H[3]	J[3]	G threads, BSPP (Ø80-125 mm)
–	B[4]	C[4]	Push-in , metric (Ø32-63 mm)

Speed controls or fittings for tube dimension

Speed controls[17] Series PTF4PB[16]	
X	in both ends for tube 4 mm
Y	in both ends for tube 6 mm
Z	in both ends for tube 8 mm
P	in both ends for tube 10 mm
R	in both ends for tube 12 mm
Push-in fitting, elbow type for:	
4	Tube dimension 4 mm
6	Tube dimension 6 mm
8	Tube dimension 8 mm
0	Tube dimension 10 mm
2	Tube dimension 12 mm
Push-in fitting, straight type for:	
1	Tube dimension 4 mm
3	Tube dimension 6 mm
5	Tube dimension 8 mm
7	Tube dimension 10 mm
9	Tube dimension 12 mm
N	None

3) Only for P1D-F bore 80-125 mm. Select optional fittings in position 20.
4) Only for P1D-F bore 32-63 mm. Select fittings in position 20.
16) P1D Clean cylinders have factory installed nickel plated versions of the PTF series.
17) Not available for P1D Flexible Porting bore 32-63 mm.

Available fittings and speed controls for P1D Flexible Porting

Cyl. bore	Speed controls for tube	Elbow fitting for tube	Straight fitting for tube
32, 40	not available	4, 6	4, 6
50, 63	not available	8, 10	8, 10
80	8, 10, 12	8, 10, 12	8, 10, 12
100, 125	12	12	10, 12

Examples of P1D Flexible Porting

P1D-F050MSB0160SMKN8 Flexible Porting cylinder with two plug-in low elbow fittings for 8 mm tube, placed at front end cover, zinc plated steel swivel rod eye, combination clevis bracket GA and swivel eye bracket installed on rear end cover, two factory-fitted reed sensors with 3 m cable.

P1D-F080MSH0500BFCN Flexible Porting cylinder with two threaded connections in front end cover, zinc plated steel clevis, foot brackets, two factory-fitted electronic sensors, PNP type, with 8 mm connector (0.3 m cable), sealing plugs installed in unused end cover screws.

P1D-F032MSB0250NNNN6 Flexible Porting cylinder with two push-in elbow fittings for 6 mm tube, placed at front end cover.

P1D-F063MSC0400NNNN7 Flexible Porting cylinder with two straight push-in fittings for 10 mm tube, placed at rear end cover (only possible to choose 8 or 10 mm for cylinder bore 50 and 63 mm).

P1D-F125MSJ0600NNNNN Flexible Porting cylinder with two threaded connections in rear end cover.

P1D Flexible Porting

The order codes on this page refer to P1D Flexible Porting with both cylinder ports in the front end cover and with factory-fitted push-in elbow fittings. For Ø32-63 mm, the fittings are made of plastic, whereas Ø80-125 mm can be ordered with threaded ports only or with push-in Prestolok nickel plated brass fittings. See the order key to select fittings.

C

P1D Flexible Porting

Double acting

Cyl. bore mm	Stroke mm	Order code
32 Push-in elbow 6 mm	25	**P1D-F032MSB0025NNNN6**
	40	**P1D-F032MSB0040NNNN6**
	50	**P1D-F032MSB0050NNNN6**
	80	**P1D-F032MSB0080NNNN6**
	100	**P1D-F032MSB0100NNNN6**
	125	**P1D-F032MSB0125NNNN6**
	160	**P1D-F032MSB0160NNNN6**
	200	**P1D-F032MSB0200NNNN6**
	250	**P1D-F032MSB0250NNNN6**
	320	**P1D-F032MSB0320NNNN6**
	400	**P1D-F032MSB0400NNNN6**
	500	**P1D-F032MSB0500NNNN6**
40 Push-in elbow 6 mm	25	**P1D-F040MSB0025NNNN6**
	40	**P1D-F040MSB0040NNNN6**
	50	**P1D-F040MSB0050NNNN6**
	80	**P1D-F040MSB0080NNNN6**
	100	**P1D-F040MSB0100NNNN6**
	125	**P1D-F040MSB0125NNNN6**
	160	**P1D-F040MSB0160NNNN6**
	200	**P1D-F040MSB0200NNNN6**
	250	**P1D-F040MSB0250NNNN6**
	320	**P1D-F040MSB0320NNNN6**
	400	**P1D-F040MSB0400NNNN6**
	500	**P1D-F040MSB0500NNNN6**
50 Push-in elbow 10 mm	25	**P1D-F050MSB0025NNNN0**
	40	**P1D-F050MSB0040NNNN0**
	50	**P1D-F050MSB0050NNNN0**
	80	**P1D-F050MSB0080NNNN0**
	100	**P1D-F050MSB0100NNNN0**
	125	**P1D-F050MSB0125NNNN0**
	160	**P1D-F050MSB0160NNNN0**
	200	**P1D-F050MSB0200NNNN0**
	250	**P1D-F050MSB0250NNNN0**
	320	**P1D-F050MSB0320NNNN0**
	400	**P1D-F050MSB0400NNNN0**
	500	**P1D-F050MSB0500NNNN0**
63 Push-in elbow 10 mm	25	**P1D-F063MSB0025NNNN0**
	40	**P1D-F063MSB0040NNNN0**
	50	**P1D-F063MSB0050NNNN0**
	80	**P1D-F063MSB0080NNNN0**
	100	**P1D-F063MSB0100NNNN0**
	125	**P1D-F063MSB0125NNNN0**
	160	**P1D-F063MSB0160NNNN0**
	200	**P1D-F063MSB0200NNNN0**
	250	**P1D-F063MSB0250NNNN0**
	320	**P1D-F063MSB0320NNNN0**
	400	**P1D-F063MSB0400NNNN0**
	500	**P1D-F063MSB0500NNNN0**

P1D Flexible Porting

Double acting

Cyl. bore mm	Stroke mm	Order code
80 Push-in elbow 10 mm	25	**P1D-S080MSH0025NNNN0**
	40	**P1D-F080MSH0040NNNN0**
	50	**P1D-F080MSH0050NNNN0**
	80	**P1D-F080MSH0080NNNN0**
	100	**P1D-F080MSH0100NNNN0**
	125	**P1D-F080MSH0125NNNN0**
	160	**P1D-F080MSH0160NNNN0**
	200	**P1D-F080MSH0200NNNN0**
	250	**P1D-F080MSH0250NNNN0**
	320	**P1D-F080MSH0320NNNN0**
	400	**P1D-F080MSH0400NNNN0**
	500	**P1D-F080MSH0500NNNN0**
100 Push-in elbow 12 mm	25	**P1D-F100MSH0025NNNN2**
	40	**P1D-F100MSH0040NNNN2**
	50	**P1D-F100MSH0050NNNN2**
	80	**P1D-F100MSH0080NNNN2**
	100	**P1D-F100MSH0100NNNN2**
	125	**P1D-F100MSH0125NNNN2**
	160	**P1D-F100MSH0160NNNN2**
	200	**P1D-F100MSH0200NNNN2**
	250	**P1D-F100MSH0250NNNN2**
	320	**P1D-F100MSH0320NNNN2**
	400	**P1D-F100MSH0400NNNN2**
	500	**P1D-F100MSH0500NNNN2**
125 Push-in elbow 12 mm	25	**P1D-F125MSH0025NNNN2**
	40	**P1D-F125MSH0040NNNN2**
	50	**P1D-F125MSH0050NNNN2**
	80	**P1D-F125MSH0080NNNN2**
	100	**P1D-F125MSH0100NNNN2**
	125	**P1D-F125MSH0125NNNN2**
	160	**P1D-F125MSH0160NNNN2**
	200	**P1D-F125MSH0200NNNN2**
	250	**P1D-F125MSH0250NNNN2**
	320	**P1D-F125MSH0320NNNN2**
	400	**P1D-F125MSH0400NNNN2**
	500	**P1D-F125MSH0500NNNN2**

The cylinders are supplied complete with one zinc plated steel piston rod nut.

Combine P1D Clean and P1D Flexible Porting

All Clean cylinders can be combined with the connections in the front or rear end cover in accordance with the Flexible Porting design. Specify cylinder version C in position 5, position of connection ports in position 11 (codes H, J, B or C), choice of built-in sensors in position 18 and type of fitting and tube dimension in position 20. Naturally, the cylinder can be equipped with piston rod fittings and cylinder mountings in positions 16 and 17 if required. As with all clean cylinders a set of 4 sealing plugs is enclosed for installation in unused end cover screws.

2) P1D Clean without sensor function, see page 41.

C

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
P	1	D	–	C	0	5	0	M	S	B	0	3	2	0	N	N	C	N	8

Cylinder version

S	Standard
C	Clean [2]
F	Flexible Porting
T	Tie-Rod

Cylinder ports

Front & rear	Both front	Both rear	Port location
—	H[3]	J[3]	G threads, BSPP (Ø80-125 mm)
–	B[4]	C[4]	Push-in , metric (Ø32-63 mm)

Factory-fitted sensors

Front end or left[11]	Rear end or right[11]	Front and rear end	Cable exit
F	R	–	2 sensors 24 VDC PNP, 3 m cable
G	H	–	2 sensors 24 VDC PNP, 10 m cable
C	S	–	2 sensors 24 VDC PNP, 8 mm connector, 1 m cable[21]
K	L	–	2 sensors Reed type, 3 m cable
T	V	–	2 sensors Reed type, 10 m cable
M	Q	–	2 sensors Reed type, 8 mm connector, 1 m cable[21]
–	–	3	3 sensors 24 VDC PNP, 8 mm connector, 1 m cable[21]
–	–	Z	3 sensors Reed type, 8 mm connector, 1 m cable[21]
–	–	4	4 sensors 24 VDC PNP, 8 mm connector, 1 m cable[21]
–	–	W	4 sensors Reed type, 8 mm connector, 1 m cable[21]
6[12]	7[13]	8[14]	No factory-fitted sensors P1D Clean
	N		No sensors P1D (excl. P1D Clean)

Speed controls or fittings for tube dimension

Speed controls[17] Series PTF 4/8PB[16]	
X	in both ends for tube 4 mm[15]
Y	in both ends for tube 6 mm[15]
Z	in both ends for tube 8 mm[15]
P	in both ends for tube 10 mm[15]
R	in both ends for tube 12 mm[15]
Push-in fitting, elbow type for:	
4	Tube dimension 4 mm[15]
6	Tube dimension 6 mm[15]
8	Tube dimension 8 mm[15]
0	Tube dimension 10 mm[15]
2	Tube dimension 12 mm[15]
Push-in fitting, straight type for:	
1	Tube dimension 4 mm[15]
3	Tube dimension 6 mm[15]
5	Tube dimension 8 mm[15]
7	Tube dimension 10 mm[15]
9	Tube dimension 12 mm[15]
N	None

3) Only for P1D-F bore 80-125 mm. Select optional fittings in position 20.

4) Only for P1D-F bore 32-63 mm. Select fittings in position 20.

11) Left and right valid for P1D Standard and P1D Tie-Rod seen from behind with the ports on top. The sensors can only be mounted on the left for P1D Flexible Porting.

12) No factory-fitted sensors, but prepared for cable exit in the front end (max. 2 sensors).

13) No factory-fitted sensors, but prepared for cable exit in the rear end (max. 2 sensors).

14) No factory-fitted sensors, but prepared for cable exit in both ends (max. 4 sensors).

15) To choose speed control and couplings, please refer to page 42.

16) P1D Clean cylinders have factory fitted nickel plated versions of the PTF series.

17) Not available with P1D Flexible Porting bore 32-63 mm.

21) Due to the sensor positions, the cable length (1 m) could limit the stroke of the P1D Clean cylinders.

Examples of P1D Clean in combination with Flexible Porting

P1D-C032MSC0200NNSN6 P1D Clean cylinder with two push-in elbow fittings for 6 mm tube, placed at front end cover, two factory-fitted electronic sensors, PNP type, with 8 mm connector, cable exit at rear end cover, 4 sealing plugs for end cover screws are enclosed.

P1D-C080MSJ0500AN3N0 P1D Clean cylinder with two threaded connections in rear end cover, factory-fitted push-in elbow fittings (Prestolok, nickel plated brass) for 10 mm tube in both connections, three factory-fitted electronic sensors, PNP type, with 8 mm connector, cable exit in both front and rear end covers, zinc plated steel swivel rod eye, 4 sealing plugs are installed in unused end cover screws.

C

P1D complete working unit

P1D Standard can be ordered with a factory-fitted valve and tubing. The valve series is the robust and compact Viking series, with product code P2L-A (for cylinder bores 32-63), P2L-B (for cylinder bores 80-100) and P2L-D (for cylinder bore 125). This valve series was specially designed for harsh environments and a long service life. The valve is securely fitted to a fixing plate bolted onto the cylinder barrel. The unit is delivered complete with valve, Prestolok push-in connection in nickel plated brass, and hosing. The valve has built-in silencers (Siflow for speed regulation), and electrically-operated versions have solenoid valves (P2E with spring-loaded manual override) and a cable head with LED and spark dispersion. The supply voltage is 24V for AC as well as DC versions. This UC (Universal Current) is possible because of a built-in rectifier in the cable head, allowing the use of direct current and alternating current for actuation. Of course, the entire range of P1D accessories can also be used for the P1D with built-in valve, and cylinders can be ordered with factory-fitted accessories and sensors.

Fast response

The large flow capacity of the valve and the short distance between the valve and the cylinder ports mean that the working unit operates quickly (short actuation time and with minimal flow restriction).

No maintenance and easy to service

The working unit is built from standard components. The cylinders and the valves are designed to be used without supplementary lubrication.

Wide range of applications

The complete working unit can be used in silo applications, for operating flaps and valves, in sawmills and in many similar installations in which the cylinders are scattered or the fast actuation is important. The unit with the valve installed is compact, so it can also be used in small spaces.

Range of solenoid valve voltages

The solenoid valves are available in the standard voltages, for example;

24 V UC (24 V AC/DC, Universal Current)

115 V/50 Hz, 120 V/60 Hz

230 V/50 Hz, 240 V/60 Hz

C

Technical data

Working pressure	max 10 bar
Working media	dry filtered compressed air.
Working temperature:	–20 °C to +70 °C
	(–15 °C to +60 °C with solenoid valve)
Flow, P2L-A, acc. to ISO 6358	Qn = 760 Nl/min
Flow, P2L-B, acc. to ISO 6358	Qn = 1020 Nl/min
Flow, P2L-D, acc. to ISO 6358	Qn = 2880 Nl/min

Solenoid power consumption	Pull	Hold
P2E-KV32C1, 24 V DC	1,2 W	1,2 W
P2E-KV31C1, 24 VAC	3,5 VA	1,6 VA

Material specification

Housing and ends	Anodised aluminium
Solenoid valves	
Housing	Polyamide
Magnet coil	Epoxy coated
Fixing plate	Anodised aluminium
Fixing screws for plate	Stainless steel
Fixing screws for valve	Zinc-coated steel
Angle connections	Nickel-coated brass
Plastic tubes	PUR

Accessories

Name	Order code
Siflow silencer for P2L-A valve, G1/8	**9301050901**
Sintered plastic silencer for P2L-A valve, G1/8	**P6M-PAB1**
Siflow silencer for P2L-B valve, G1/4	**9301050902**
Sintered plastic silencer for P2L-B valve, G1/4	**P6M-PAB2**
Siflow silencer for P2L-D valve, G1/2	**9301050904**
Sintered plastic silencer for P2L-D valve, G1/2	**P6M-PAB4**
Fixing plate for Ø32 - Ø63, valve P2L-A, -B	**9121742111**
Fixing plate for Ø80, Ø100, valve P2L-A, -B, -D	**9121742112**
Fixing plate for Ø125, valve P2L-A, -B, -D	**9121742113**

Factory Fitted Valve

A 20-character order number is used to order the P1D Standard with factory fitted valve. Position 5 indicates the cylinder version, with the actuation type in position 11 and the valve type in position 20. Note that cylinder diameters 32-63 use valve P2L-A (1/8"), diameters 80-100 use P2L-B (1/4"), and diameter 125 uses P2L-D (1/2"). This version of the cylinder can of course be combined with factory-fitted cylinder accessories, piston rod accessories and sensors. Fixing plates for different valve sizes may be ordered separately.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
P	1	D	–	V	0	5	0	M	S	1	0	3	2	0	N	N	N	N	H

Cylinder version

V	Standard with factory fitted valve
4	Standard with lock unit and factory fitted valve

Factory fitted valve type

0	Air actuated
1	Electrically actuated 24 V UC, LED+VDR (AC/DC Universal Current) Complete with rectifier
4	Electrically actuated 24 V UC, LED+VDR with 5 m integral cable (AC/DC Universal Current) Complete with rectifier
7	Electrically actuated 24 V UC, LED+VDR with 10 m integral cable (AC/DC Universal Current) Complete with rectifier
2	Electrically actuated 115 V/50 Hz, 120 V/60 Hz, LED+VDR
3	Electrically actuated 230 V/50 Hz, 240 V/60 Hz, LED+VDR

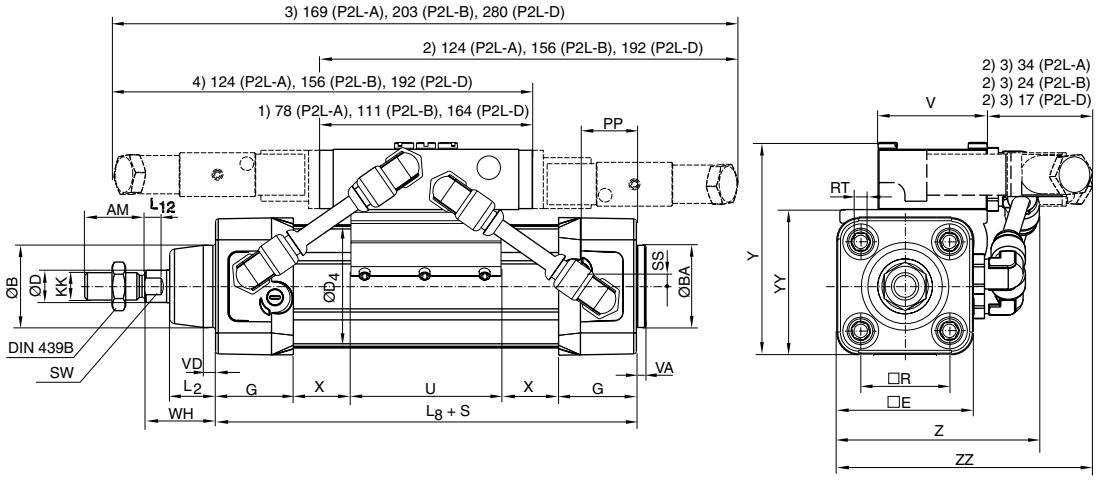
Valve function

Air actuated	
A	Air-Air, 5/2
B	Air-Spring, 5/2
C	Air-Air, 5/3, closed centre position
D	Air-Air, 5/3, vented centre
E	Air-Air, 5/3, pressurised centre
Electrically actuated internal supply	
F	Elec-Elec, 5/2
H	Elec-Spring, 5/2
K	Spring-Elec*, 5/2
M	Elec-Elec, 5/3, closed centre position
Q	Elec-Elec, 5/3, vented centre
S	Elec-Elec, 5/3, pressurised centre
Electrically actuated external supply	
G	Elec-Elec, 5/2
J	Elec-Spring, 5/2
L	Spring-Elec*, 5/2

* Piston rod in extended position with unactuated valve

CAD drawings on the Internet
Our home page www.parker.com/euro_pneumatic includes the AirCad Drawing Library with 2D and 3D drawings for the main versions.

AirCad™ Drawing Library



Dimensions

Cylinder bore mm	AM mm	B mm	BA mm	BG mm	D mm	D4 mm	E mm	G mm	KK	L2 mm	L8 mm	L12 mm
32	22	30	30	16	12	45,0	50,0	28,5	M10x1,25	16,0	94	6,0
40	24	35	35	16	16	52,0	57,4	33,0	M12x1,25	19,0	105	6,5
50	32	40	40	16	20	60,7	69,4	33,5	M16x1,5	24,0	106	8,0
63	32	45	45	16	20	71,5	82,4	39,5	M16x1,5	24,0	121	8,0
80	40	45	45	17	25	86,7	99,4	39,5	M20x1,5	30,0	128	10,0
100	40	55	55	17	25	106,7	116,0	44,5	M20x1,5	32,4	138	14,0
125	54	60	60	20	32	134,0	139,0	51,0	M27x2	45,0	160	18,0

Cylinder bore mm	PP mm	R mm	RT	SS mm	SW mm	VA mm	VD mm	WH mm	U mm	V mm	X mm
32	21,8	32,5	M6	4,0	10	3,5	4,5	26	55	40	-9+S/2
40	21,9	38,0	M6	8,0	13	3,5	4,5	30	55	40	-8+S/2
50	23,0	46,5	M8	4,0	17	3,5	5,0	37	55	40	-8+S/2
63	27,4	56,5	M8	6,5	17	3,5	5,0	37	55	40	-6,5+S/2
80	30,5	72,0	M10	0	22	3,5	4,0	46	55	54	-2,5+S/2
100	35,8	89,0	M10	0	22	3,5	4,0	51	55	54	-2,5+S/2
125	40,5	110,0	M12	0	27	5,5	6,0	65	55	65	2+S/2

Cylinder bore mm	Y mm	YY mm	Z mm	ZZ mm
32	80	56	80	90
40	88	64	87	96
50	102	78	96	105
63	109	85	107	116
80	136	102	132	125
100	151	117	148	140
125	185	146	183	159

S=Stroke

1) Air actuated 5/2 and 5/3

2) Electrically actuated 5/2 with spring return

3) Electrically actuated 5/2 and 5/3 (2 solenoid valves)

4) Electrically actuated 5/2 with spring return(reverse function)

C

P1D-L

P1D-D

P1D cylinder with piston rod locking

The P1D cylinder is available in a version with piston rod locking, allowing the piston rod to be locked in any position. The lock unit, of the air/spring actuated type, is integrated in the front end piece of the cylinder. With no signal pressure, the full force of the lock is applied to the piston rod, and the lock is released at 4 bar signal pressure. Lock units are available for P1D Standard (P1D-L) and P1D Clean (P1D-D) in bores 32-125 mm. P1D Standard can be ordered with a lock unit and a built-in valve (P1D-4). Of course, the entire range of P1D accessories can also be used for the locking cylinder, which can be ordered with factory fitted accessories, sensors and valves. However, the lock unit increases the overall length of the cylinder. Compare the dimensional diagrams on pages 26 and 51. The overall dimensions specified in the catalogue for built-in cylinder fittings, pages 56 - 64, are only correct for P1D standard versions without lock unit.

Clean and compact design

The front end piece and lock unit form an integrated block, keeping the length of the structure short. The design is easy to clean, sealed and waterproof. The exhaust air from the lock unit can be removed by replacing the filter unit with a connector and hose. This is an advantage in terms of cleaning or when environmental factors are important.

Locking and braking.

The static locking force corresponds to 7 bar pressure. Under certain circumstances, the lock can also be used as a brake for positioning or similar applications. The maximum values set out in the graph on page 49 must not be exceeded.

Function on pressure loss

The piston rod lock can be used in all material handling systems where controlled fastening or positioning is required. The piston rod lock is also suitable for use as a pressure-loss brake for cylinders with suspended loads, for example. See lock forces.

The signal air to the lock unit can be connected directly to the air system or to the supply air for the valve controlling the cylinder in question. For controlled on/off operation of the lock unit, a separate valve, with large exhaust flow capacity, is used.

Technical data

Working pressure	max 10 bar
Working media	dry filtered compressed air
Working temperature	–20 °C to +80 °C
Release pressure[1)]	min 4 bar ±10%

1) Signal pressure to inlet port of lock unit.

Static lock forces

Lock forces at 0 bar signal pressure to lock unit

Cylinder dia. mm	Lock force N
32	550
40	860
50	1345
63	2140
80	3450
100	5390
125	8425

Material specification, piston rod locking

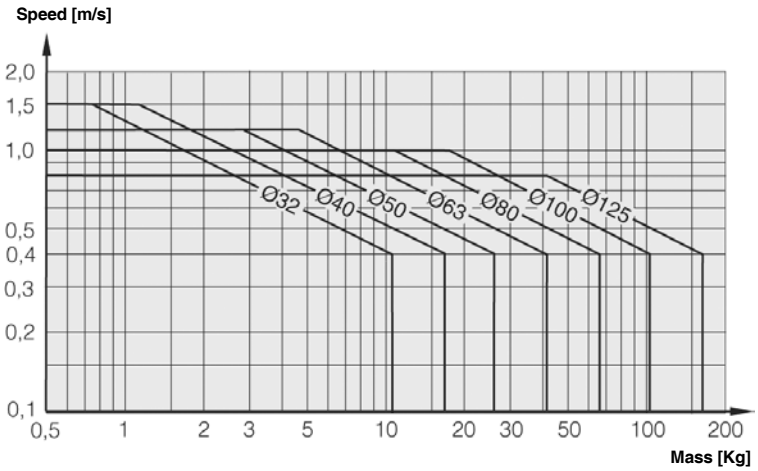
Housing/end piece	Black anodised aluminium
Lock collar/piston	Hardened steel
Springs	Stainless steel
Piston rod seal Dim 32-40	UHMWPE plastic
Piston rod seal Dim 50-125	Polyurethane
O-rings	Nitrile rubber, NBR
Scraper ring	Polyurethane
Air filter	Brass/sintered bronze

Other data as for relevant base cylinder.

The cylinders are supplied with a hard chrome plated piston rod.

NOTE!

If rod guidense module is to be fitted, the piston rod must be extended to provide the same WH dimensions as for the P1D base cylinder.



Use as a brake

The table shows the maximum values for speed and braking mass if the cylinder is used as a brake. The cylinder should not be exposed to additional compressive forces as this significantly reduces the external mass that can be braked.

We recommend system solutions as shown at the top of page 46 (Fastening in position) or similar, in which the cylinder does not act as a motor during braking. Heat is generated if the brake is used frequently, and this must be taken into account to ensure that the maximum temperature is not exceeded.

Piston rod locking

To order a cylinder with piston rod locking, position 5 should contain L (P1D Standard with lock unit), D (P1D Clean cylinder with lock unit) or 4 (P1D with factory fitted valve and lock unit). Note that the P1D with piston rod locking requires a chrome plated piston rod or chrome plated stainless steel piston rod because of the high surface pressure. For factory-fitted cylinder accessories, sensors, etc.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
P	1	D	–	L	0	8	0	M	C	–	0	2	0	0

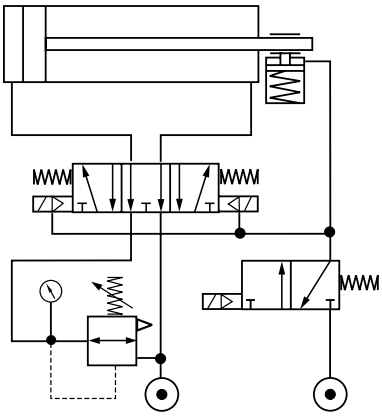
Cylinder version

L	Standard with lock unit
D	Clean with lock unit
4	Standard with lock unit and factory fitted valve

Material Piston rod		Seals
Hard chrome plated steel	Hard chr. pl. stainless steel	
C	**R**	Standard -20 °C to +80 °C.

C

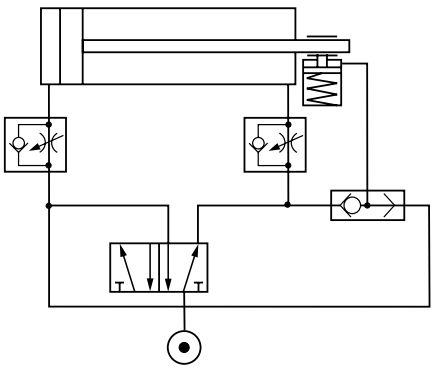
Fastening in position



This is the optimum solution for straightforward fastening in any position, while preserving the maximum expected service life of the lock. The cylinder is supplied with compressed air via a 5/3 valve with vented centre. The valve is supplied with full pressure in port 3, port 2 is connected to the minus port on the cylinder, port 5 is supplied with a reduced pressure and port 4 is connected to the plus port on the cylinder. The reduced pressure to the cylinder plus port is to equalise the force, so that no forces can act on the lock when it in the locked position. The solenoid valves of the 5/3 valve are supplied with compressed air from a 3/2 valve, which also supplies compressed air to release the lock. To cause the cylinder to move in either direction, the 3/2 must be actuated in order to release the lock and supply the solenoid valves with signal air, after which they can be actuated. This means that as soon as the 3/2 valve is deactuated, the lock is applied and no signal air is supplied to the solenoid valves, causing the 5/3 valve to switch to the centre position. The cylinder is now supplied by the two different pressure sources, is fully vented and no force is applied to the lock.

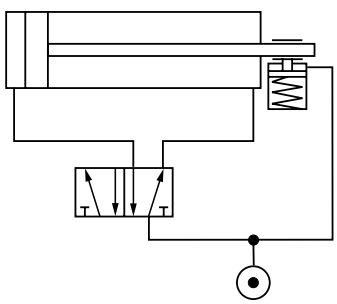
This arrangement helps to secure the piston rod if there is a

Function on hose rupture



pressure loss due to hose rupture. The cylinder is supplied by a 5/2 valve and the cylinder speed is controlled using flow control valves with by-pass fitted near the cylinder. A TEE piece is fitted in the pipe between the working valve and the cylinder, going to a changeover valve with air passing to the lock. In the event of a pressure loss, the pressure to the 5/2 valve ceases, as does the pressure via the changeover valve to the lock. The lock is then applied.

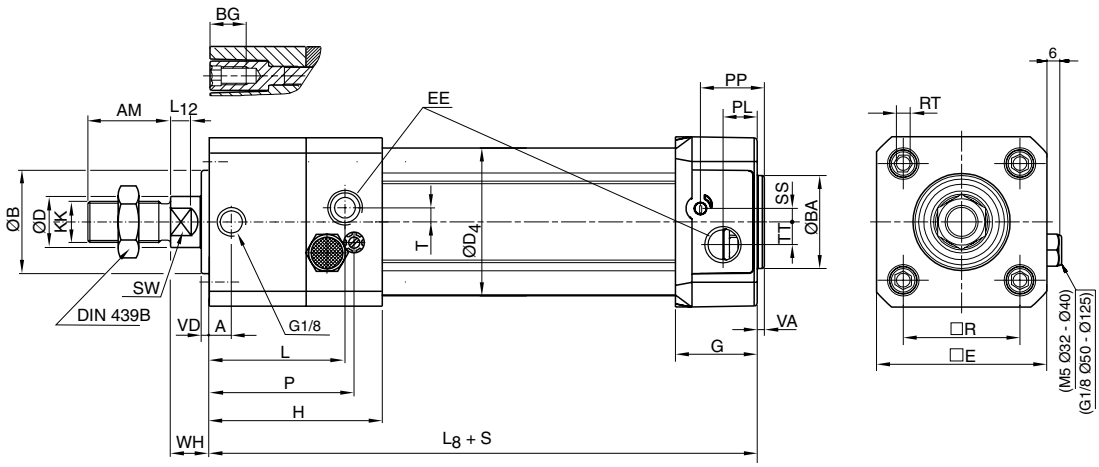
Function on pressure loss



This solution is used to lock the cylinder in the event of a pressure loss in the system. A TEE piece is fitted in the pipe feeding the working valve for the cylinder. The lock on the cylinder is supplied from this TEE piece. In the event of a pressure loss, the lock is vented immediately and is applied.

CAD drawings on the Internet
Our home page www.parker.com/euro_pneumatic includes the AirCad Drawing Library with 2D and 3D drawings for the main versions.

AirCad™ Drawing Library



Dimensions

Cylinder bore mm	A mm	AM mm	B mm	BA mm	BG mm	D mm	D4 mm	E mm	EE mm	G mm	H mm	KK mm	L mm
32	18,5	22	30	30	16	12	45,0	50,0	G1/8	28,5	71,0	M10x1,25	53,0
40	20,0	24	35	35	16	16	52,0	57,4	G1/4	33,0	76,5	M12x1,25	56,0
50	21,0	32	40	40	16	20	60,7	69,4	G1/4	33,5	80,0	M16x1,5	65,0
63	30,0	32	45	45	16	20	71,5	82,4	G3/8	39,5	96,0	M16x1,5	76,5
80	35,0	40	45	45	17	25	86,7	99,4	G3/8	39,5	110,0	M20x1,5	89,0
100	54,0	40	55	55	17	25	106,7	116,0	G1/2	44,5	132,0	M20x1,5	112,0
125	65,5	54	60	60	20	32	134,0	139,0	G1/2	51,0	144,5	M27x2	124,5

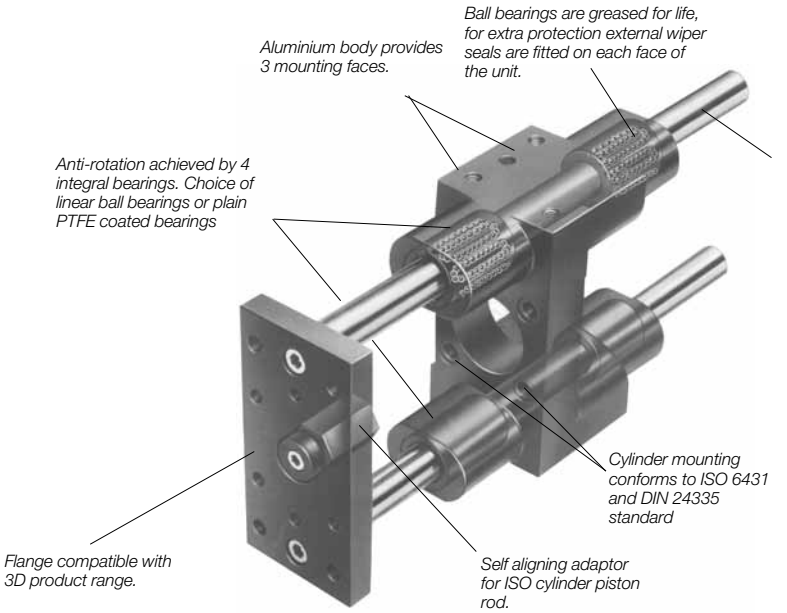
Cylinder bore mm	L8 mm	L12 mm	P mm	PL mm	PP mm	R mm	RT	SS mm	SW mm	T mm	TT mm	VA mm	VD mm	WH mm
32	137	6,0	63,0	13,0	21,8	32,5	M6	4,0	10	4,5	4,5	3,5	4,5	15
40	149	6,5	67,5	14,0	21,9	38,0	M6	8,0	13	3,0	5,5	3,5	4,5	16
50	153	8,0	71,0	14,0	23,0	46,5	M8	4,0	17	5,5	7,5	3,5	5,0	17
63	178	8,0	87,0	16,4	27,4	56,5	M8	6,5	17	3,0	11,0	3,5	5,0	17
80	199	10,0	101,0	16,0	30,5	72,0	M10	0	22	6,0	15,0	3,5	4,0	20
100	226	14,0	122,0	18,0	35,8	89,0	M10	0	22	6,0	20,0	3,5	4,0	20
125	254	18,0	134,5	28,0	40,5	110,0	M12	0	27	6,0	17,5	5,5	6,0	27

S=Stroke

Tolerances

Cylinder bore mm	B	BA mm	L_8 mm	L_9 mm	R mm	Stroke tolerance up to stroke 500 mm	Stroke tolerance for stroke over 500 mm
32	d11	d11	±0,4	±2	±0,5	+0,3/+2,0	+0,3/+3,0
40	d11	d11	±0,7	±2	±0,5	+0,3/+2,0	+0,3/+3,0
50	d11	d11	±0,7	±2	±0,6	+0,3/+2,0	+0,3/+3,0
63	d11	d11	±0,8	±2	±0,7	+0,3/+2,0	+0,3/+3,0
80	d11	d11	±0,8	±3	±0,7	+0,3/+2,0	+0,3/+3,0
100	d11	d11	±1,0	±3	±0,7	+0,3/+2,0	+0,3/+3,0
125	d11	d11	±1,0	±3	±1,1	+0,3/+2,0	+0,3/+3,0

C



Installation on P1D with lock unit
If rotary control is to be retrofitted to a P1D with lock unit, the piston rod must be extended to provide the same WH dimensions as for the P1D base cylinder, as shown in the table below.

Cyl. dim mm	Piston rod extension on P1D with lock unit mm
32	11
40	14
50	20
63	20
80	26
100	31

P1D with rod guidance modules

The P1D series cylinders can be equipped with an external guiding device to prevent the piston rod from turning. The factory fitted guide gives a guided piston movement and enables the cylinder to take up turning moments on the piston rod, as well as greater transverse forces. The rod guidance is available with plain bearings or linear ball bearings and with H or U style. The bracket, which has pre-drilled mounting holes, is connected to the piston rod by means of a flexofitting, which prevents the build-up of stresses in the cylinder. P1D cylinders with guiding device are available with bores from 32 to 100 mm, and standard stroke lengths from 25 to 250 mm. Special stroke lengths up to 500 mm can also be obtained. Factory-fitting of the guiding device can be specified according to the order key on page 30. Separate guiding device kits can be supplied on request according to the order key below.

Technical data

Working medium	Dry, filtered compressed air
Working temperature	–20 °C to +80 °C

Material specifications, guidance modules

Body	Anodised aluminium
Guide bars, H style	Stainless steel for ball bearing
	chrome plated for plain bearing
Front plate	Anodised aluminium
Guide bars, U style	Stainless steel
Front plate	Zinc-plated steel
Bearings	Plain bearings
	Linear ball bearings

Order key for separate guidance module

P 1 E - 4 K R H - 0 1 0 0

	Cylinder version
E	ISO 6431/ VDMA cylinders

	Bore size mm
K	32
L	40
M	50
N	63
P	80
Q	100

	Guide module type
H	H style, ball bearings
J	H style, plain bearings
K	U style, plain bearings

Stroke length (mm)
Same as for the cylinder e.g. **0100** = 100 mm.

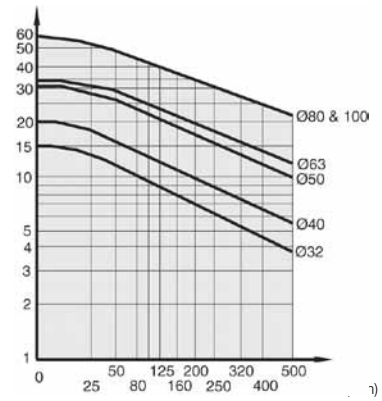
C

Technical information 'H style'

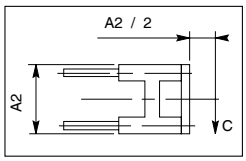
Rod guide with ball bearings

Maximum load carried

Load (kg)

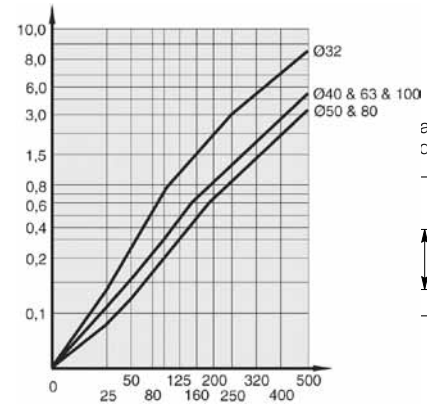


Graphs established at mid point of stroke

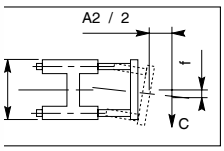


Maximum deflection/max load

Deflection (mm)

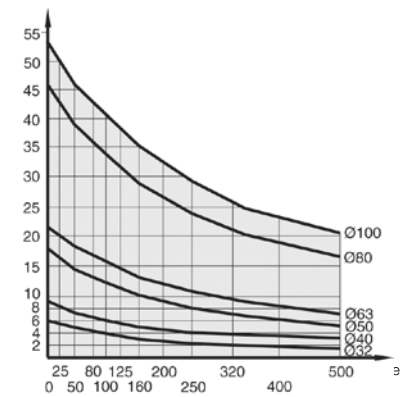


aphs established at
d point of stroke



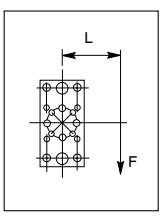
Maximum permissible torque (Nm)

Torque (Nm)



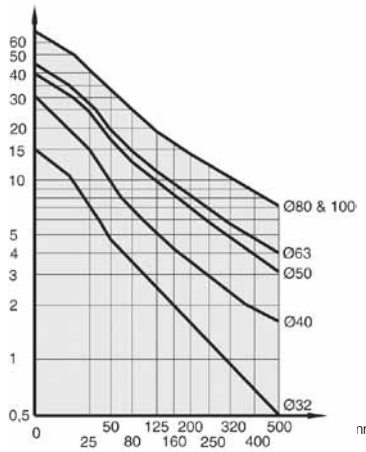
Formula:

C(Nm) = F(N) x L(m)



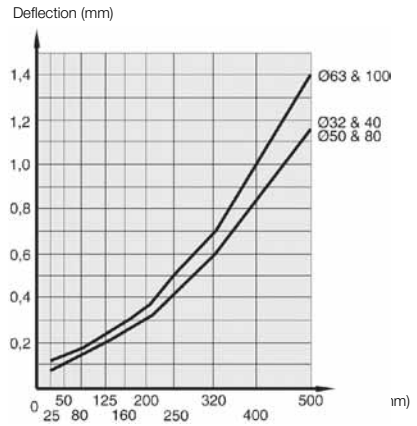
Rod guide with plain bearings

Maximum load carried



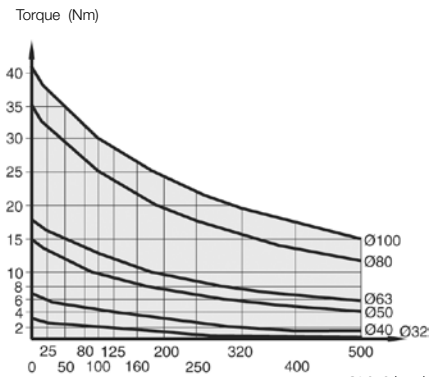
Maximum deflection/max load

Deflection (mm)

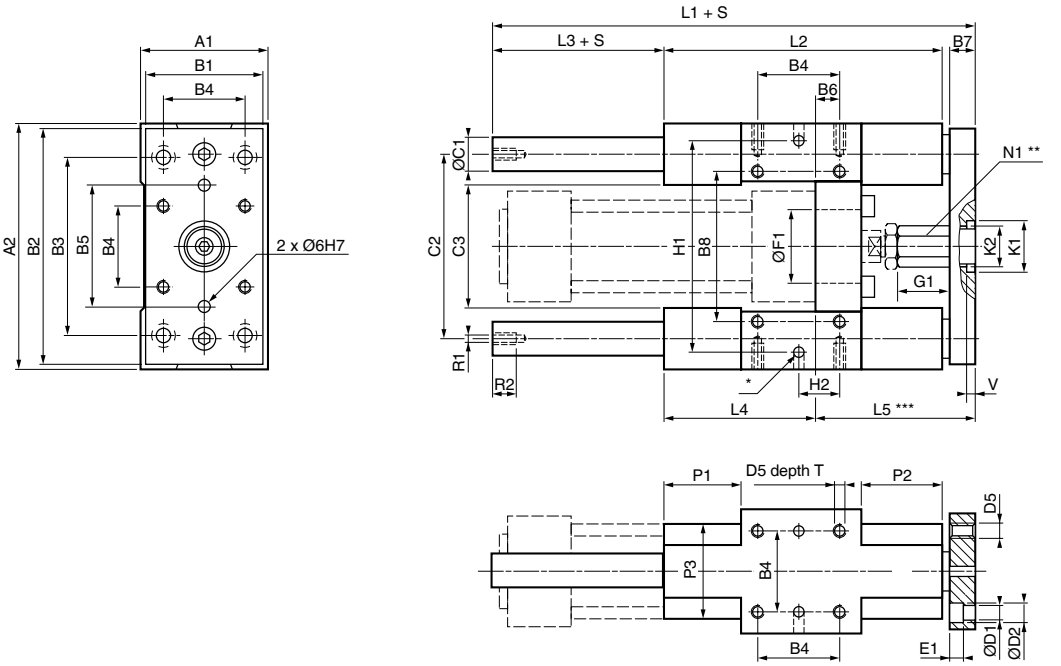


Maximum permissible torque (Nm)

Torque (Nm)



C



Dimensions, H style guidance modules

Cyl. bore mm	A_1 mm	A_2 mm	B_1 mm	B_2 mm	B_3 mm	B_4 mm	B_5 mm	B_6 mm	B_7 mm	B_8 mm	$ØC_1$ mm	C_2 mm	C_3 mm	$ØD_1$ mm	$ØD_2$ mm	D_5
32	50	97	45	90	78	32,5	50	4,0	12	61	12	73,5	50	6,6	11	M6
40	58	115	54	110	84	38,0	54	11,0	12	69	16	86,5	58	6,6	11	M6
50	70	137	63	130	100	46,5	72	19,0	15	85	20	103,5	70	9,0	14	M8
63	85	152	80	145	105	56,5	82	15,0	15	100	20	118,5	85	9,0	14	M8
80	105	189	100	180	130	72,0	106	21,0	20	130	25	147,0	105	11,0	17	M10
100	130	213	120	200	150	89,0	131	24,5	20	150	25	171,5	130	11,0	17	M10

Cyl. bore mm	E_1 mm	Ø $F_1^{+0,1/0}$ G_1 mm	L_1 mm	L_2 mm	L_3 mm	L_4 mm	L_5 mm	N_1 mm	$P_1^{\pm1}$ mm	$P_2^{\pm1}$ mm	P_3 mm	R_1 mm	R_2 mm	W mm	mm
32	7	30	17	150	120	15	71	64	17	36	31	40	M6	11	5
40	7	35	24	170	130	25	71	74	17	36	36	44	M6	11	6
50	9	40	27	192	150	24	79	89	24	42	44	50	M8	16	8
63	9	45	27	222	180	24	109	89	24	58	44	60	M8	16	8
80	11	45	32	247	200	24	113	110	30	50	52	70	M10	16	10
100	11	55	32	267	220	24	128	115	30	49	51	70	M10	16	10

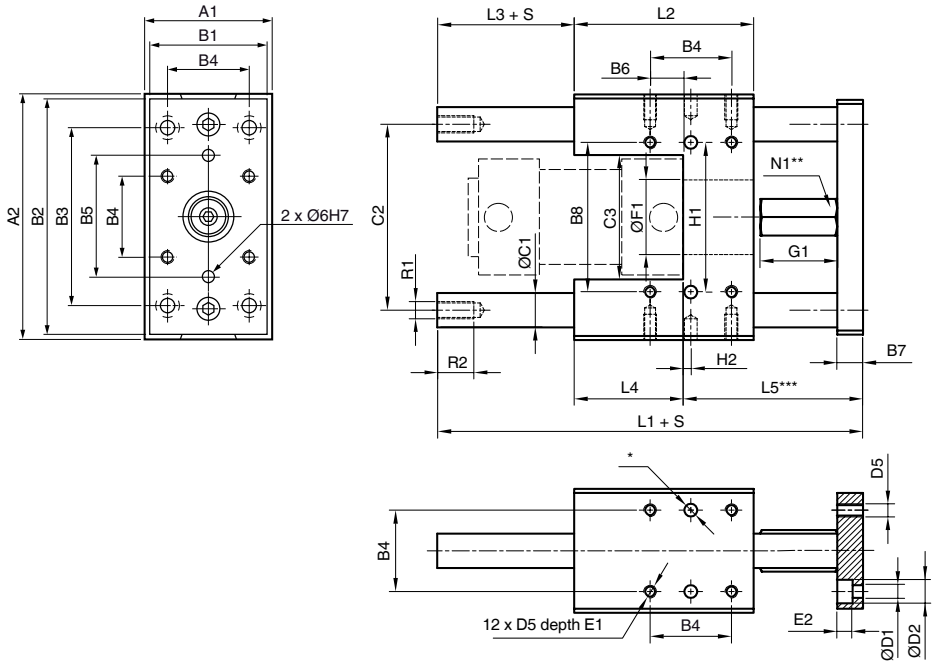
Cyl. bore mm	$H_1^{\pm0,05}$ mm	H_2 mm	K_1^{H8} mm	K_2 mm	T mm	$V^{+0,3/0}$ mm	Weight at 0 mm stroke kg	Supplement weight per 10 mm stroke kg
32	81	11,7	24	19	12	4	0,970	0,018
40	99	8,0	24	19	12	4	1,550	0,315
50	119	4,2	38	26	16	4	2,560	0,493
63	132	13,0	38	26	16	4	3,570	0,493
80	166	15,0	46	32	20	4	6,530	0,770
100	190	20,5	46	32	20	4	8,760	0,770

S = Stroke length

* 6 hole Ø6 ^{H7}, depth $10^{+1/0}$

** Hexagon profile

*** Min adjustment=0, max.=W



Dimensions, U style guidance modules

Cyl. bore. mm	A_1 mm	A_2 mm	B_1 mm	B_2 mm	B_3 mm	B_4 mm	B_5 mm	B_6 mm	B_7 mm	B_8 mm	C_1 mm	C_2 mm	C_3 mm	D_1 mm	D_2 mm	D_5
32	50	97	45	90	78	32,5	50	18,0	12	61	12	73,5	50	6,6	11	M6
40	58	115	54	110	84	38,0	54	15,5	12	70	16	86,5	58	6,6	11	M6
50	70	137	63	130	100	46,5	72	19,5	15	85	20	103,5	70	9,0	14	M8
63	85	152	80	145	105	56,5	82	29,5	15	100	20	118,5	85	9,0	14	M8
80	105	189	100	180	130	72,0	106	39,0	20	130	25	147,0	105	11,0	17	M10
100	130	213	120	200	150	89,0	131	53,0	20	150	25	171,5	130	11,0	17	M10

Cyl. bore mm	E_1 mm	E_2 mm	Ø $F_1^{+0,1/0}$ mm	G_1	L_1 mm	L_2 mm	L_3 mm	L_4 mm	L_5 mm	N_1 mm	R_1 mm	R_2	$H_1^{\pm 0,05}$ mm	H_2 mm	W mm
32	12	7	30		30	134	72	15,0	44	75,0	17	M6	61	1,75	2
40	12	7	35		36	150	84	13,0	51	86,0	17	M8	70	3,50	2
50	16	9	40		42	175	100	12,0	60	103,0	24	M8	85	3,75	4
63	16	9	45		42	190	115	12,0	75	103,0	24	M8	100	1,25	4
80	16	11	45		49	238	160	1,0	111	126,0	30	M10	130	3,25	6
100	16	11	55		49	249	165	7,5	110	131,5	30	M10	150	8,50	6

Cyl. bore mm	Weight at 0 mm stroke kg	Supplement weight per 10 mm stroke kg
32	0,970	0,018
40	1,550	0,315
50	2,560	0,493
63	3,570	0,493
80	6,530	0,770
100	8,760	0,770

S = Stroke length

* 6 hole Ø6 ^{H7}, depth $10^{+1/0}$

** Hexagon profile

*** Min adjustment=0, max.=W

C

Cylinder mountings

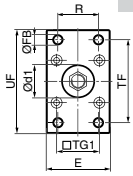
Flange MF1/MF2

Intended for fixed mounting of cylinder. Flange can be fitted to front or rear end cover of cylinder.

Materials
Flange: Surface-treated steel, black
Mounting screws acc. to DIN 6912: Zinc-plated steel 8.8

Supplied complete with mounting screws for attachment to cylinder.

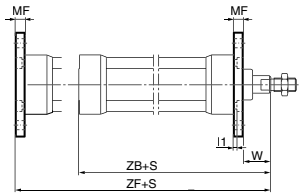
Type	Cyl. bore Ø mm	Weight kg	Order code
Flange MF1/MF2	32	0,23	P1C-4KMB
	40	0,28	P1C-4LMB
	50	0,53	P1C-4MMB
	63	0,71	P1C-4NMB
	80	1,59	P1C-4PMB
	100	2,19	P1C-4QMB
	125	3,78	P1C-4RMB



According to ISO MF1/MF2, VDMA 24 562, AFNOR

Cyl. bore	d1 H11	FB H13	TG1	E	R JS14	MF JS14	TF JS14	UF	l1 -0,5	W*	ZF*	ZB*
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
32	30	7	32,5	45	32	10	64	80	5,0	16	130	123,5
40	35	9	38,0	52	36	10	72	90	5,0	20	145	138,5
50	40	9	46,5	65	45	12	90	110	6,5	25	155	146,5
63	45	9	56,5	75	50	12	100	120	6,5	25	170	161,5
80	45	12	72,0	95	63	16	126	150	8,0	30	190	177,5
100	55	14	89,0	115	75	16	150	170	8,0	35	205	192,5
125	60	16	110,0	140	90	20	180	205	10,5	45	245	230,5

S = Stroke length * Does not apply to cylinders with lock unit



Foot bracket MS1

Intended for fixed mounting of cylinder. Foot bracket can be fitted to front and rear end covers of cylinder.

Materials
Foot bracket: Surface-treated steel, black
Mounting screws acc. to DIN 912: Zinc-plated steel 8.8

Supplied in pairs with mounting screws for attachment to cylinder.

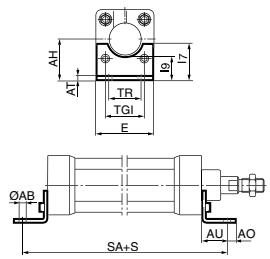
Foot bracket MS1	32	0,06**	P1C-4KMF
	40	0,08**	P1C-4LMF
	50	0,16**	P1C-4MMF
	63	0,25**	P1C-4NMF
	80	0,50**	P1C-4PMF
	100	0,85**	P1C-4QMF
	125	1,48**	P1C-4RMF

** Weight per item

According to ISO MS1, VDMA 24 562, AFNOR

Cyl. bore	AB H14	TG1	E	TR JS14	AO	AU	AH JS15	l7	AT	l9 JS14	SA*
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
32	7	32,5	45	32	10	24	32	30	4,5	17,0	142
40	9	38,0	52	36	8	28	36	30	4,5	18,5	161
50	9	46,5	65	45	13	32	45	36	5,5	25,0	170
63	9	56,5	75	50	13	32	50	35	5,5	27,5	185
80	12	72,0	95	63	14	41	63	49	6,5	40,5	210
100	14	89,0	115	75	15	41	71	54	6,5	43,5	220
125	16	110,0	140	90	22	45	90	71	8,0	60,0	250

S = Stroke length * Does not apply to cylinders with lock unit.



Pivot bracket with rigid bearing

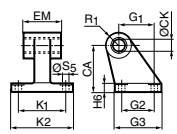
Intended for flexible mounting of cylinder. The pivot bracket can be combined with clevis bracket MP2.

Materials
Pivot bracket: Surface-treated aluminium, black
Bearing: Sintered oil-bronze bushing

Pivot bracket with rigid bearing	32	0,06	P1C-4KMD
	40	0,08	P1C-4LMD
	50	0,15	P1C-4MMD
	63	0,20	P1C-4NMD
	80	0,33	P1C-4PMD
	100	0,49	P1C-4QMD
	125	1,02	P1C-4RMD

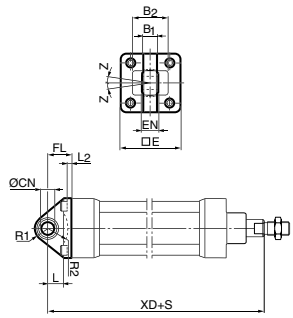
According to CETOP RP 107 P, VDMA 24 562, AFNOR

Cyl. bore	CK H9	S5 H13	K1 JS14	K2	G1 JS14	G2 JS14	EM	G3	CA JS15	H6	R1
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
32	10	6,6	38	51	21	18	25,5	31	32	8	10,0
40	12	6,6	41	54	24	22	27,0	35	36	10	11,0
50	12	9,0	50	65	33	30	31,0	45	45	12	13,0
63	16	9,0	52	67	37	35	39,0	50	50	12	15,0
80	16	11,0	66	86	47	40	49,0	60	63	14	15,0
100	20	11,0	76	96	55	50	59,0	70	71	15	19,0
125	25	14,0	94	124	70	60	69,0	90	90	20	22,5



Cylinder mountings

Type	Description	Cyl. bore Ø mm	Weight kg	Order code
Swivel eye bracket	Intended for use together with clevis bracket GA	32	0,08	**P1C-4KMSA**
		40	0,11	**P1C-4LMSA**
	Material	50	0,20	**P1C-4MMSA**
	Bracket: Surface-treated aluminium, black	63	0,27	**P1C-4NMSA**
	Swivel bearing acc. to DIN 648K: Hardened steel	80	0,52	**P1C-4PMSA**
		100	0,72	**P1C-4QMSA**
	Supplied complete with mounting screws for attachment to cylinder.	125	1,53	**P1C-4RMSA**

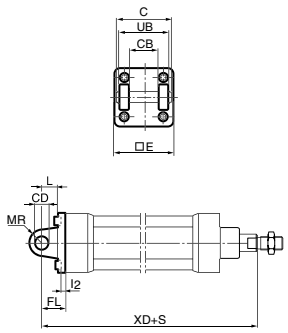


According to VDMA 24 562, AFNOR

Cyl. bore mm	E mm	B1 mm	B2 mm	EN mm	R1 mm	R2 mm	FL mm	l2 mm	L mm	CN H7 mm	XD* mm	Z
32	45	10,5	-	14	16	-	22	5,5	12	10	142	4°
40	52	12,0	-	16	18	-	25	5,5	15	12	160	4°
50	65	15,0	51	21	21	19	27	6,5	15	16	170	4°
63	75	15,0	-	21	23	-	32	6,5	20	16	190	4°
80	95	18,0	-	25	29	-	36	10,0	20	20	210	4°
100	115	18,0	-	25	31	-	41	10,0	25	20	230	4°
125	140	25,0	-	37	40	-	50	10,0	30	30	275	4°

S = Stroke length * Does not apply to cylinders with lock unit.

Type	Description	Cyl. bore Ø mm	Weight kg	Order code
Clevis bracket MP2	Intended for flexible mounting of cylinder. Clevis bracket MP2 can be combined with clevis bracket MP4.	32	0,08	**P1C-4KMT**
		40	0,11	**P1C-4LMT**
	Materials	50	0,14	**P1C-4MMT**
	Clevis bracket: Surface-treated aluminium, black	63	0,29	**P1C-4NMT**
	Pin: Surface hardened steel	80	0,36	**P1C-4PMT**
	Circlips according to DIN 471: Spring steel	100	0,64	**P1C-4QMT**
	Mounting screws acc. to DIN 912: Zinc-plated steel 8.8	125	1,17	**P1C-4RMT**
	Supplied complete with mounting screws for attachment to cylinder.			



According to ISO MP2, VDMA 24 562, AFNOR

Cyl. bore mm	C mm	E mm	UB h14 mm	CB H14 mm	FL ±0,2 mm	L mm	l2 mm	CD H9 mm	MR mm	XD* mm
32	53	45	45	26	22	13	5,5	10	10	142
40	60	52	52	28	25	16	5,5	12	12	160
50	68	65	60	32	27	16	6,5	12	12	170
63	78	75	70	40	32	21	6,5	16	16	190
80	98	95	90	50	36	22	10,0	16	16	210
100	118	115	110	60	41	27	10,0	20	20	230
125	139	140	130	70	50	30	10,0	25	25	275

S = Stroke length * Does not apply to cylinders with lock unit.

C

Cylinder mountings

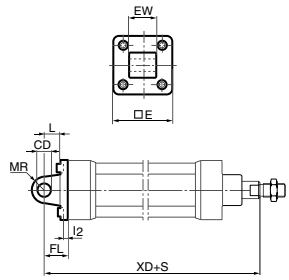
Clevis bracket MP4

Intended for flexible mounting of cylinder. Clevis bracket MP4 can be combined with clevis bracket MP2.

Materials
Clevis bracket: Surface-treated aluminium, black
Mounting screws acc. to DIN 912: Zinc-plated steel 8.8

Supplied complete with mounting screws for attachment to cylinder.

Cyl. bore Ø mm	Weight kg	Order code
32	0,09	**P1C-4KME**
40	0,13	**P1C-4LME**
50	0,17	**P1C-4MME**
63	0,36	**P1C-4NME**
80	0,46	**P1C-4PME**
100	0,83	**P1C-4QME**
125	1,53	**P1C-4RME**



According to ISO MP4, VDMA 24 562, AFNOR

Cyl. bore mm	E mm	EW mm	FL mm	L ±0,2 mm	l2 mm	CD mm	MR H9 mm	XD* mm
32	45	26	22	13	5,5	10	10	142
40	52	28	25	16	5,5	12	12	160
50	65	32	27	16	6,5	12	12	170
63	75	40	32	21	6,5	16	16	190
80	95	50	36	22	10,0	16	16	210
100	115	60	41	27	10,0	20	20	230
125	140	70	50	30	10,0	25	25	275

S = Stroke length * Does not apply to cylinders with lock unit, please refer to page 48

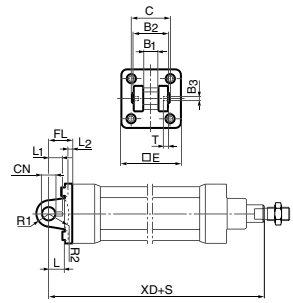
Clevis bracket GA

Intended for flexible mounting of cylinder. Clevis bracket GA can be combined with pivot bracket with swivel bearing, swivel eye bracket and swivel rod eye.

Materials
Clevis bracket: Surface-treated aluminium
Pin: Surface hardened steel
Locking pin: Spring steel
Circlips according to DIN 471: Spring steel
Mounting screws acc. to DIN 912: Zinc-plated steel 8.8

Supplied complete with mounting screws for attachment to cylinder.

Cyl. bore Ø mm	Weight kg	Order code
32	0,09	**P1C-4KMCA**
40	0,13	**P1C-4LMCA**
50	0,17	**P1C-4MMCA**
63	0,36	**P1C-4NMCA**
80	0,58	**P1C-4PMCA**
100	0,89	**P1C-4QMCA**
125	1,75	**P1C-4RMCA**



According to VDMA 24 562, AFNOR

Cyl. bore mm	C mm	E mm	B2 d12 mm	B1 H14 mm	T mm	B3 mm	R2 mm	L1 mm	FL ±0,2 mm	l2 mm	L mm	CN F7 mm	R1 mm	XD* mm
32	41	45	34	14	3	3,3	17	11,5	22	5,5	12	10	11	142
40	48	52	40	16	4	4,3	20	12,0	25	5,5	15	12	13	160
50	54	65	45	21	4	4,3	22	14,0	27	6,5	17	16	18	170
63	60	75	51	21	4	4,3	25	14,0	32	6,5	20	16	18	190
80	75	95	65	25	4	4,3	30	16,0	36	10,0	20	20	22	210
100	85	115	75	25	4	4,3	32	16,0	41	10,0	25	20	22	230
125	110	140	97	37	6	6,3	42	24,0	50	10,0	30	30	30	275

S = Stroke length * Does not apply to cylinders with lock unit, please refer to page 48

Stainless steel Pin Set GA
Materials
Pin: Stainless steel
Locking pin: Stainless steel
Circlips according to DIN 471: Stainless steel

32	0,05	**9301054311**
40	0,06	**9301054312**
50	0,07	**9301054313**
63	0,07	**9301054314**
80	0,17	**9301054315**
100	0,31	**9301054316**
125	0,54	**9301054317**

Cylinder mountings

Pivot bracket with swivel bearing

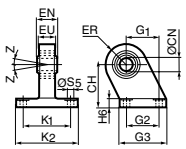
Intended for use together with clevis bracket GA.

Material
Pivot bracket: Surface-treated steel, black
Swivel bearing acc. to DIN 648K: Hardened steel

Cyl. bore Ø mm	Weight kg	Order code
32	0,18	**P1C-4KMA**
40	0,25	**P1C-4LMA**
50	0,47	**P1C-4MMA**
63	0,57	**P1C-4NMA**
80	1,05	**P1C-4PMA**
100	1,42	**P1C-4QMA**
125	3,10	**P1C-4RMA**

According to VDMA 24 562, AFNOR

Cyl. bore mm	CN H7 mm	S5 H13 mm	K1 JS14 mm	K2 mm	EU mm	G1 JS14 mm	G2 JS14 mm	EN mm	G3 mm	CH JS15 mm	H6 mm	ER mm	Z
32	10	6,6	38	51	10,5	21	18	14	31	32	10	16	4°
40	12	6,6	41	54	12,0	24	22	16	35	36	10	18	4°
50	16	9,0	50	65	15,0	33	30	21	45	45	12	21	4°
63	16	9,0	52	67	15,0	37	35	21	50	50	12	23	4°
80	20	11,0	66	86	18,0	47	40	25	60	63	14	28	4°
100	20	11,0	76	96	18,0	55	50	25	70	71	15	30	4°
125	30	14,0	94	124	25,0	70	60	37	90	90	20	40	4°



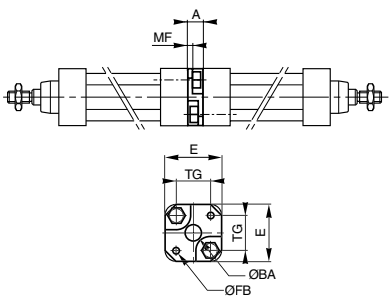
Mounting kit

Mounting kit for back to back mounted cylinders, 3 and 4 position cylinders.

Material:
Mounting: Aluminium
Mounting screws: Zinc-plated steel 8.8

Cyl. bore mm	E mm	TG mm	ØFB mm	MF mm	A mm	ØBA mm
32	50	32,5	6,5	5	16	30
40	60	38,0	6,5	5	16	35
50	66	46,5	8,5	6	20	40
63	80	56,5	8,5	6	20	45
80	100	72,0	10,5	8	25	45
100	118	89,0	10,5	8	25	55

Cyl. bore Ø mm	Weight kg	Order code
32	0,060	**P1E-6KB0**
40	0,078	**P1E-6LB0**
50	0,162	**P1E-6MB0**
63	0,194	**P1E-6NB0**
80	0,450	**P1E-6PB0**
100	0,672	**P1E-6QB0**



Pivot bracket for MT4

Intended for use together with centre trunnion MT4.

Material
Pivot bracket: Surface-treated aluminium
Bearing acc. to DIN 1850 C: Sintered oil-bronze bushing

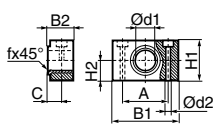
Supplied in pairs.

Cyl. bore Ø mm	Weight kg	Order code
32	0,04*	**9301054261**
40	0,07*	**9301054262**
50	0,07*	**9301054262**
63	0,12*	**9301054264**
80	0,12*	**9301054264**
100	0,21*	**9301054266**
125	0,21*	**9301054266**

* Weight per item.

According to ISO, VDMA 24 562, AFNOR

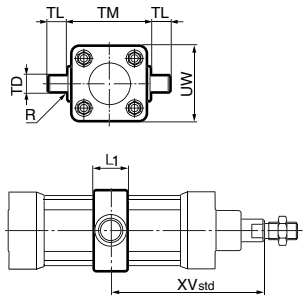
Cyl. bore mm	B1 mm	B2 mm	A mm	C mm	d1 mm	d2 H13 mm	H1 mm	H2 mm	fx45° min mm
32	46	18,0	32	10,5	12	6,6	30	15	1,0
40	55	21,0	36	12,0	16	9,0	36	18	1,6
50	55	21,0	36	12,0	16	9,0	36	18	1,6
63	65	23,0	42	13,0	20	11,0	40	20	1,6
80	65	23,0	42	13,0	20	11,0	40	20	1,6
100	75	28,5	50	16,0	25	14,0	50	25	2,0
125	75	28,5	50	16,0	25	14,0	50	25	2,0



C

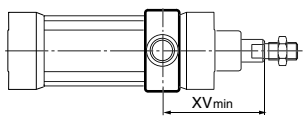
Cylinder mountings

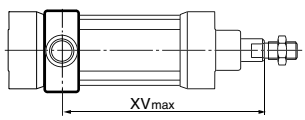
Type	Description	Cyl. bore Ø mm	Weight kg	Order code
Centre trunnion MT4 for P1D-S 	Intended for articulated mounting of cylinder. This mounting is available for the P1D Standard and for the tie-rod design of P1D. The trunnion is factory-fitted in the centre of the cylinder or at an optional location specified by the XV-measure – see the order code key. Combined with pivot bracket for MT4. Material: Trunnion: zinc plated steel	32 40 50 63 80 100 125	0,13 0,31 0,37 0,69 0,89 1,58 2,60	
Centre trunnion MT4 for P1D-T 	**Trunnion centred** The centre trunnion for the P1D-S and P1D-T is ordered with letter D in position 17 (no dimension specified in positions 18-20). See the order code key at pages 31. **Trunnion with optional location** The centre trunnion for the P1D-S and P1D-T is ordered with letter G in position 17 and desired XV-measure (3-digit measure in mm) in positions 18-20. See the order code key at page 31. **Trunnion loose** P1D-S can also be ordered with the centre trunnion loosely fitted to the cylinder (not fixed in position). This allows the position to be established at the time of installation. Ordered with letter G in position 17 and 000 in positions 18-20. Please refer to the order code key on page 31.			



According to ISO MT4, VDMA 24 562, AFNOR

Cyl. bore	TM	TL	TD	R	UW	UW	L1	L1	X1*	XV_{min}	XV_{min}	XV_{min}	X2	X2	X2
	h14	h14	e9		**P1D-S**	**P1D-T**	**P1D-S**	**P1D-T**		**P1D-S**	**P1D-T**	**P1D-L**	**P1D-S**	**P1D-T**	**P1D-L**
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
32	50	12	12	1,0	52	46	18	15	73,0	89	62	121	57	84	88
40	63	16	16	1,6	59	59	20	20	82,5	95	73	125	70	92	99
50	75	16	16	1,6	71	69	20	20	90,0	113	81	140	67	99	93
63	90	20	20	1,6	84	84	26	25	97,5	118	89	155	78	106	114
80	110	20	20	1,6	105	102	26	25	110,0	132	98	177	88	122	132
100	132	25	25	2,0	129	125	32	30	120,0	140	111	197	100	129	156
125	160	25	25	2,0	159	155	33	32	145,0	168	132	224	122	158	177





XVstd = X1 + Stroke length/2, XVmax = X2 + Stroke length 8

Flange mounted trunnion

Intended for articulated mounting of cylinder. This trunnion can be flange mounted on the front or rear end cover of all P1D cylinders. At your choice, you can order a complete cylinder with factory-fitted flange mounted trunnion – see the order code key at pages 31 and 80-82.
Individual trunnions have order code as shown to the right.

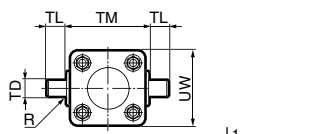
Material:
Trunnion: zinc plated steel
Screws: zinc plated steel, 8.8

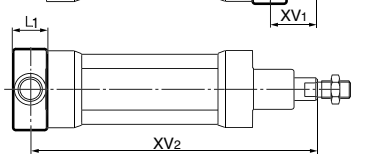
Delivered complete with mounting screws for attachment to the cylinder

Cyl. bore Ø mm	Weight kg	Order code
32	0,17	**P1D-4KMYF**
40	0,43	**P1D-4LMYF**
50	0,55	**P1D-4MMYF**
63	1,10	**P1D-4NMYF**
80	1,66	**P1D-4PMYF**
100	3,00	**P1D-4QMYF**

According to ISO MT4, VDMA 24 562, AFNOR

Cyl. bore	TM	TL	TD	R	UW	L1	XV_1*	X*	Y
	h14	h14	e9						
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
32	50	12	12	1,0	46	14	19,5	126,5	11
40	63	16	16	1,6	59	19	21,0	144,0	14
50	75	16	16	1,6	69	19	28,0	152,0	20
63	90	20	20	1,6	84	24	25,5	169,5	20
80	110	20	20	1,6	102	24	34,5	185,5	26
100	132	25	25	2,0	125	29	37,0	203,0	31





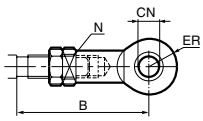
XV_2 = X +Stroke length * Does not apply to cylinders with lock unit, please refer to page 48

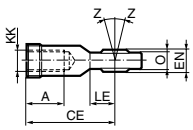
To fit a flange mounted trunnion at the front end cover of a P1D cylinder with lock unit, the piston rod must be extended. This is in order to provide the same WH dimensions as for the P1D base cylinder with dimension Y.

C

Piston rod mountings

Type	Description	Cyl. bore Ø mm	Weight kg	Order code
Swivel rod eye 	Swivel rod eye for articulated mounting of cylinder. Swivel rod eye can be combined with clevis bracket GA. Maintenance-free. Materials Swivel rod eye: Zinc-plated steel Swivel bearing according to DIN 648K: Hardened steel	32	0,08	**P1C-4KRS**
		40	0,12	**P1C-4LRS**
		50	0,25	**P1C-4MRS**
		63	0,25	**P1C-4MRS**
		80	0,46	**P1C-4PRS**
		100	0,46	**P1C-4PRS**
		125	1,28	**P1C-4RRS**
Stainless steel swivel rod eye 	Stainless-steel swivel rod eye for articulated mounting of cylinder. Swivel rod eye can be combined with clevis bracket GA. Maintenance-free. Materials Swivel rod eye: Stainless steel Swivel bearing according to DIN 648K: Stainless steel Use stainless steel nut (see page 62) with stainless steel swivel rod eye.	32	0,08	**P1S-4JRT**
		40	0,12	**P1S-4LRT**
		50	0,25	**P1S-4MRT**
		63	0,25	**P1S-4MRT**
		80	0,46	**P1S-4PRT**
		100	0,46	**P1S-4PRT**
		125	1,28	**P1S-4RRT**

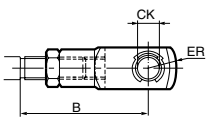


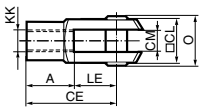


According to ISO 8139

Cyl. bore mm	A mm	B min mm	B max mm	CE mm	CN H9 mm	EN h12 mm	ER mm	KK	LE min mm	N mm	O mm	Z
32	20	48,0	55	43	10	14	14	M10x1,25	15	17	10,5	12°
40	22	56,0	62	50	12	16	16	M12x1,25	17	19	12,0	12°
50	28	72,0	80	64	16	21	21	M16x1,5	22	22	15,0	15°
63	28	72,0	80	64	16	21	21	M16x1,5	22	22	15,0	15°
80	33	87,0	97	77	20	25	25	M20x1,5	26	32	18,0	15°
100	33	87,0	97	77	20	25	25	M20x1,5	26	32	18,0	15°
125	51	123,5	137	110	30	37	35	M27x2	36	41	25,0	15°

Type	Description	Cyl. bore Ø mm	Weight kg	Order code
Clevis 	Clevis for articulated mounting of cylinder. Material Clevis, clip: Galvanized steel Pin: Hardened steel	32	0,09	**P1C-4KRC**
		40	0,15	**P1C-4LRC**
		50	0,35	**P1C-4MRC**
		63	0,35	**P1C-4MRC**
		80	0,75	**P1C-4PRC**
		100	0,75	**P1C-4PRC**
		125	2,10	**P1C-4RRC**
Stainless steel clevis 	Stainless-steel clevis for articulated mounting of cylinder. Material Clevis: Stainless steel Pin: Stainless steel Circlips according to DIN 471: Stainless steel Use stainless steel nut (see page 62) with stainless steel swivel rod eye.	32	0,09	**P1S-4JRD**
		40	0,15	**P1S-4LRD**
		50	0,35	**P1S-4MRD**
		63	0,35	**P1S-4MRD**
		80	0,75	**P1S-4PRD**
		100	0,75	**P1S-4PRD**
		125	2,10	**P1S-4RRD**



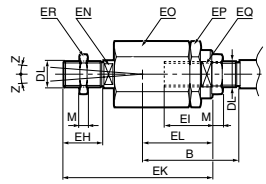


According to ISO 8140

Cyl. bore mm	A mm	B min mm	B max mm	CE mm	CK h11/E9 mm	CL mm	CM mm	ER mm	KK	LE mm	O mm
32	20	45,0	52	40	10	20	10	16	M10x1,25	20	28,0
40	24	54,0	60	48	12	24	12	19	M12x1,25	24	32,0
50	32	72,0	80	64	16	32	16	25	M16x1,5	32	41,5
63	32	72,0	80	64	16	32	16	25	M16x1,5	32	41,5
80	40	90,0	100	80	20	40	20	32	M20x1,5	40	50,0
100	40	90,0	100	80	20	40	20	32	M20x1,5	40	50,0
125	56	123,5	137	110	30	55	30	45	M27x2	54	72,0

Piston rod mountings

Type	Description	Cyl. bore Ø mm	Weight kg	Order code
Flexo coupling	Flexo coupling for articulated mounting of piston rod. Flexo fitting is intended to take up axial angle errors within a range of ±4°. Material Flexo coupling, nut: Zinc-plated steel Socket: Hardened steel Supplied complete with galvanized adjustment nut.	32	0,21	**P1C-4KRF**
		40	0,22	**P1C-4LRF**
		50	0,67	**P1C-4MRF**
		63	0,67	**P1C-4MRF**
		80	0,72	**P1C-4PRF**
		100	0,72	**P1C-4PRF**
		125	1,80	**P1C-4RRF**

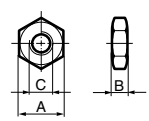


Cyl. bore mm	B min mm	B max mm	DL	EH mm	EI mm	EK mm	EL mm	EN mm	EO mm	EP mm	EQ mm	ER mm	M mm	Z
32	36,0	43	M10x1,25	20	23	70	31	12	30	30	19	30	5,0	4°
40	37,0	43	M12x1,25	23	23	67	31	12	30	30	19	30	6,0	4°
50	53,0	61	M16x1,5	40	32	112	45	19	41	41	30	41	8,0	4°
63	53,0	61	M16x1,5	40	32	112	45	19	41	41	30	41	8,0	4°
80	57,0	67	M20x1,5	39	42	122	56	19	41	41	30	41	10,0	4°
100	57,0	67	M20x1,5	39	42	122	56	19	41	41	30	41	10,0	4°
125	75,5	89	M27x2	48	48	145	60	24	55	55	32	55	13,5	4°

Nut	Intended for fixed mounting of accessories to the piston rod. Material: Zinc-plated steel All P1D cylinders are delivred with a zinc-plated steel piston rod nut, except P1D Clean, which is delivered with a stainless steel piston rod nut instead.	32	0,007	**9128985601**
		40	0,010	**0261109910**
		50	0,021	**9128985603**
		63	0,021	**9128985603**
		80	0,040	**0261109911**
		100	0,040	**0261109911**
		125	0,100	**0261109912**
Stainless steel nut	Intended for fixed mounting of accessories to the piston rod. Material: Stainless steel A2 All P1D cylinders are delivred with a zinc-plated steel piston rod nut, except P1D Clean, which is delivered with a stainless steel piston rod nut instead.	32	0,007	**9126725404**
		40	0,010	**9126725405**
		50	0,021	**9126725406**
		63	0,021	**9126725406**
		80	0,040	**0261109921**
		100	0,040	**0261109921**
		125	0,100	**0261109922**
Acid-proof nut	Intended for fixed mounting of accessories to the piston rod. Material: Acid-proof steel A4 Cylinders with acid-proof piston rod are supplied with nut of acid-proof steel	32	0,007	**0261109919**
		40	0,010	**0261109920**
		50	0,021	**0261109917**
		63	0,021	**0261109917**
		80	0,040	**0261109916**
		100	0,040	**0261109916**
		125	0,100	**0261109918**

According toDIN 439 B

Cyl. bore mm	A mm	B mm	C
32	17	5,0	M10x1,25
40	19	6,0	M12x1,25
50	24	8,0	M16x1,5
63	24	8,0	M16x1,5
80	30	10,0	M20x1,5
100	30	10,0	M20x1,5
125	41	13,5	M27x2



C

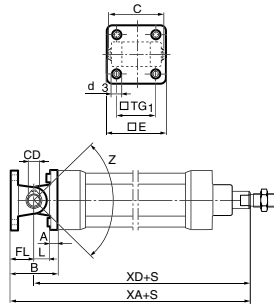
Combinations

Type	Description		Cyl. bore Ø mm	Weight kg	Order code
Clevis bracket MP4	**Clevis bracket MP2**	In this combination the clevis bracket MP4 is attached to the cylinder.	32	0,17	**P1C-4KML**
			40	0,24	**P1C-4LML**
			50	0,31	**P1C-4MML**
			63	0,65	**P1C-4NML**
			80	0,82	**P1C-4PML**
			100	1,47	**P1C-4QML**
			125	2,70	**P1C-4RML**
		Same as above but with screws and pin in stainless steel.	32	0,13	**P1C-4KMG**
			40	0,23	**P1C-4LMG**
			50	0,35	**P1C-4MMG**
			63	0,61	**P1C-4NMG**
			80	0,66	**P1C-4PMG**
			100	1,53	**P1C-4QMG**
			125	2,83	**P1C-4RMG**

Delivered as individual mountings, not mounted together, and complete with mounting screws for attachment to cylinder.

Cyl. bore mm	A mm	B mm	C mm	CD H9 mm	d3 H13 mm	E mm	FL ±0,2 mm	L mm	TG1 mm	XA* mm	XD* mm	Z
32	9	44	53	10	6,6	45	22	13	32,5	164	142	112°
40	9	50	60	12	6,6	52	25	16	38,0	185	160	122°
50	11	54	68	12	9,0	65	27	16	46,5	197	170	94°
63	11	64	78	16	9,0	75	32	21	56,5	222	190	112°
80	14	72	98	16	11,0	95	36	22	72,0	246	210	82°
100	14	82	118	20	11,0	115	41	27	89,0	271	230	90°
125	20	100	139	25	13,5	140	50	30	110,0	325	275	94°

S = Stroke length * Does not apply to cylinders with lock unit.

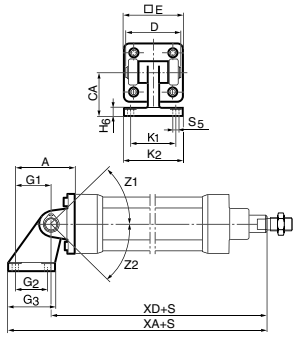


Type	Description		Cyl. bore Ø mm	Weight kg	Order code
Clevis bracket MP2	**Pivot bracket with rigid bearing**	In this combination the clevis bracket MP2 is attached to the cylinder.	32	0,14	**P1C-4KMP**
			40	0,19	**P1C-4LMP**
			50	0,29	**P1C-4MMP**
			63	0,49	**P1C-4NMP**
			80	0,69	**P1C-4PMP**
			100	1,13	**P1C-4QMP**
			125	2,83	**P1C-4RMP**
		Same as above but with screws and pin in stainless steel.	32	0,10	**P1C-4KMK**
			40	0,18	**P1C-4LMK**
			50	0,33	**P1C-4MMK**
			63	0,45	**P1C-4NMK**
			80	0,93	**P1C-4PMK**
			100	1,19	**P1C-4QMK**
			125	2,32	**P1C-4RMK**

Delivered as individual mountings, not mounted together, and complete with mounting screws for attachment to cylinder.

Cyl. bore mm	A mm	CA JS15 mm	D mm	E mm	G1 JS14 mm	G2 JS14 mm	G3 mm	H6 mm	k1 JS14 mm	k2 mm	S5 H13 mm	XA* mm	XD* mm	Z1	Z2
32	43	32	53	45	21	18	31	8	38	51	6,6	169,5	142	150°	18°
40	49	36	60	52	24	22	35	10	41	54	6,6	190,5	160	155°	18°
50	60	45	68	65	33	30	45	12	50	65	9,0	210,5	170	145°	18°
63	69	50	78	75	37	35	50	12	52	67	9,0	234,5	190	155°	20°
80	83	63	98	95	47	40	60	14	66	86	11,0	267,0	210	150°	20°
100	96	71	118	115	55	50	70	15	76	96	11,0	295,0	230	150°	15°
125	120	90	139	140	70	60	90	20	94	124	14,0	360,0	275	145°	18°

S = Stroke length * Does not apply to cylinders with lock unit.



C

Combinations

Clevis bracket GA — **Pivot bracket with swivel bearing**

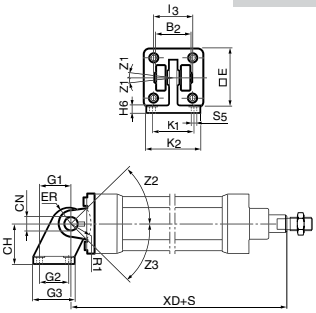
In this combination the clevis bracket GA is attached to the cylinder.

Delivered as individual mountings, not mounted together, and complete with mounting screws for attachment to cylinder.

Cyl. bore mm	CH JS15 mm	E mm	ER mm	G1 JS14 mm	G2 JS14 mm	G3 mm	H6 mm	k1 JS14 mm	k2 mm	l3 mm	S5 H13 mm	XD* mm	Z1	Z2	Z3
32	32	45	16	21	18	31	10	38	51	41	6,6	142	4°	130°	10°
40	36	52	18	24	22	35	10	41	54	48	6,6	160	4°	140°	15°
50	45	65	21	33	30	45	12	50	65	54	9,0	170	4°	130°	8°
63	50	75	23	37	35	50	12	52	67	60	9,0	190	4°	140°	20°
80	63	95	28	47	40	60	14	66	86	75	11,0	210	4°	125°	4°
100	71	115	30	55	50	70	15	76	96	85	11,0	230	4°	130°	4°
125	90	140	40	70	60	90	20	94	124	110	14,0	275	4°	120°	3°

S = Stroke length * Does not apply to cylinders with lock unit.

Cyl. bore mm	Order code
32	**P1C-4KMQA**
40	**P1C-4LMQA**
50	**P1C-4MMQA**
63	**P1C-4NMQA**
80	**P1C-4PMQA**
100	**P1C-4QMQA**
125	**P1C-4RMQA**



Clevis bracket GA — **Swivel eye bracket**

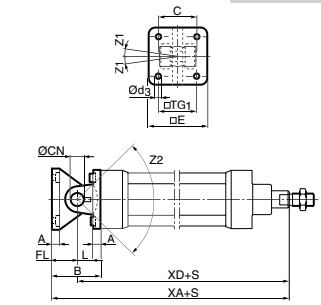
In this combination the clevis bracket GA or the Swivel eye bracket can be attached to the cylinder.

Delivered as individual mountings, not mounted together, and complete with mounting screws for attachment to cylinder.

Cyl. bore mm	A mm	B mm	C mm	CN h9 mm	d3 H13 mm	E mm	FL ±0,2 mm	L mm	TG1 mm	XA* mm	XD* mm	Z1	Z2
32	10	44	41	10	6,6	45	22	12	32,5	164	142	4°	105°
40	10	50	48	12	6,6	52	25	15	38,0	185	160	4°	122°
50	10	54	54	16	9,0	65	27	17	46,5	197	170	4°	84°
63	12	64	60	16	9,0	75	32	20	56,5	222	190	4°	116°
80	16	72	75	20	11,0	95	36	20	72,0	246	210	4°	84°
100	16	82	85	20	11,0	115	41	25	89,0	271	230	4°	90°

S = Stroke length * Does not apply to cylinders with lock unit.

Cyl. bore mm	Order code
32	**P1C-4KMMA**
40	**P1C-4LMMA**
50	**P1C-4MMMA**
63	**P1C-4NMMA**
80	**P1C-4PMMA**
100	**P1C-4QMMA**
125	**P1C-4RMMA**



Swivel rod eye — **Clevis bracket GA**

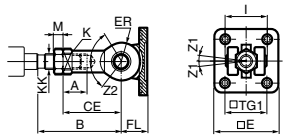
In this combination the swivel rod eye is attached to the cylinder.

Same as above but with Swivel rod eye, screws and pin in stainless steel.

Delivered as individual mountings, not mounted together, and complete with mounting screws for attachment to cylinder.

Cyl. mm	A mm	B_{min} mm	B_{max} mm	CE mm	E mm	ER mm	FL mm	k mm	kk	M mm	l mm	TG1 mm	Z1	Z2
32	20	48,0	55	43	45	14	22	17	M10x1,25	5,0	41	32,5	4°	208°
40	22	56,0	62	50	52	16	25	19	M12x1,25	6,0	48	38,0	4°	214°
50	28	72,0	80	64	65	21	27	22	M16x1,5	8,0	54	46,5	4°	206°
63	28	72,0	80	64	75	21	32	22	M16x1,5	8,0	60	56,5	4°	214°
80	33	87,0	97	77	95	25	36	32	M20x1,5	10,0	75	72,0	4°	198°
100	33	87,0	97	77	115	25	41	32	M20x1,5	10,0	85	89,0	4°	208°
125	51	123,5	137	110	140	35	50	41	M27x2	13,5	110	110,0	4°	200°

Cyl. bore mm	Order code
32	**P1C-4KRVA**
40	**P1C-4LRVA**
50	**P1C-4MRVA**
63	**P1C-4NRVA**
80	**P1C-4PRVA**
100	**P1C-4QRVA**
125	**P1C-4RRVA**
32	**P1C-4KRWA**
40	**P1C-4LRWA**
50	**P1C-4MRWA**
63	**P1C-4NRWA**
80	**P1C-4PRWA**
100	**P1C-4QRWA**
125	**P1C-4RRWA**



Accessories

Type	Description	Cyl. bore Ø mm	Weight kg	Order code
Stainless steel screw set MP2, MP4, MS1 and GA 	Set of stainless steel screws for fitting clevis brackets MP2, MP4 and GA onto the cylinder. The screws have an internal hexagonal head and are used in special environments, e.g. the food industry, or where there are extra demands for protection against corrosion. Material: According to DIN 912, Stainless steel, A2 4 pcs per pack.	32 40 50 63 80 100 125	0,02 0,02 0,05 0,05 0,09 0,09 0,15	**9301054321** **9301054321** **9301054322** **9301054322** **9301054323** **9301054323** **9301054324**
Stainless steel screw set for MF1/MF2 	Set of stainless steel screws for fitting flanges MF1/MF2 onto the cylinder. The screws have an internal hexagonal head and are used in special environments, e.g. the food industry, or where there are extra demands for protection against corrosion. Material: According to DIN 6912, Stainless steel, A2 4 pcs per pack	32 40 50 63 80 100 125	0,02 0,02 0,04 0,04 0,07 0,07 0,12	**9301054331** **9301054331** **9301054332** **9301054332** **9301054333** **9301054333** **9301054334**
Sealing plugs 	Set of sealing plugs to be fitted in unused end covers. The plugs can be used for all P1D cylinders to avoid collecting dirt and fluids in the end cover screw recesses. Material: Polyamid PA 4 pcs per pack	32 40 50 63 80 100 125	0,01 0,01 0,02 0,02 0,02 0,02 0,03	**9121742201** **9121742201** **9121742202** **9121742202** **9121742203** **9121742203** **9121742204**

C

Combinations
Type and description

C

Cylinders complete with mountings, sensors, speed regulation, fittings etc.

Order a complete working unit on a single order code instead of a lot of separate numbers. Save time in all phases, such as purchasing, goods reception and installation.

A factory installed complete cylinder makes your work more efficient!

Configure functions and equipment in the order key.

3 and 4 position cylinders

This type of cylinder function consists of two cylinders installed back to back. Two cylinders with the same stroke give a 3 position cylinder with a symmetrical centre position, whereas different strokes give a 4 position cylinder where the two central positions can be calculated from the different stroke lengths.

3 and 4 position cylinders can be ordered in two ways.

Factory-fitted P1D-T

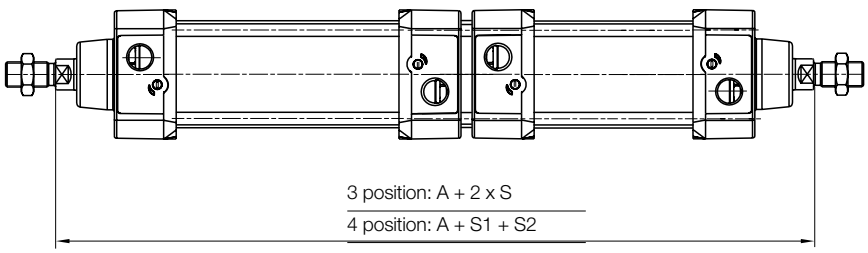
Tie-rod P1D cylinders are completed at the factory and are joined together as one unit by special tie-rods, see position 9 in the order key. See pages 36 and 80-82.

Installation kit for all designs

There is an installation kit for cylinder bores 32 – 100 mm which makes it possible to join any two P1D cylinders together at any time, to make a 3 or 4 position cylinder.

Cylinder bore. mm	A, P1D-T mm	A, P1D-S mm
32	247	256
40	277	286
50	293	306
63	323	336
80	355	373
100	385	403
125	461	–

S=Stroke



New drop-in sensors

The completely new "drop-in" P1D sensors can easily be installed from the side in the sensor groove, at any position along the piston stroke. The sensors are completely recessed and thus mechanically protected. Choose between electronic or reed sensors and several cable lengths and 8 mm and M12 connectors. The same standard sensors are used for all P1D versions, i.e. even for P1D Clean with the patent applied system of integrated sensors. Please note that the sensors with 8 mm and M12 connector should have cable lengths 1 m for P1D Clean to allow flexible positioning of the sensors, including longer stroke lengths. There is a double jointed adapter for the tie-rod version, which offers simple and flexible use of standard sensors.

Electronic sensors

The new electronic sensors are "Solid State", i.e. they have no moving parts at all. They are provided with short-circuit protection and transient protection as standard. The built-in electronics make the sensors suitable for applications with high on and off switching frequency, and where very long service life is required.

Technical data

Design	GMR (Giant Magnetic Resistance) magneto-resistive function
Installation	From side, down into the sensor groove, so-called drop-in
Outputs	PNP, normally open (also available in NPN design, normally closed, on request)
Voltage range	10-30 VDC
	10-18 V DC, ATEX sensor
Ripple	max 10%
Voltage drop	max 2,5 V
Load current	max 100 mA
Internal consumption	max 10 mA
Actuating distance	min 9 mm
Hysteresis	max 1,5 mm
Repeatability accuracy	max 0,2 mm
On/off switching frequency	max 5 kHz
On switching time	max 2 ms
Off switching time	max 2 ms
Encapsulation	IP 67 (EN 60529)
Temperature range	–25 °C to +75 °C
	–20 °C to +45 °C, ATEX sensor
Indication	LED, yellow
Material housing	PA 12
Material screw	Stainless steel
Cable	PVC or PUR 3x0.25 mm^2 see order code respectively

Reed sensors

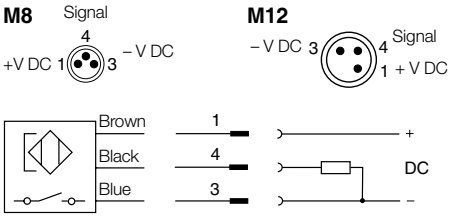
The sensors are based on proven reed switches, which offer reliable function in many applications. Simple installation, a protected position on the cylinder and clear LED indication are important advantages of this range of sensors.

Technical data

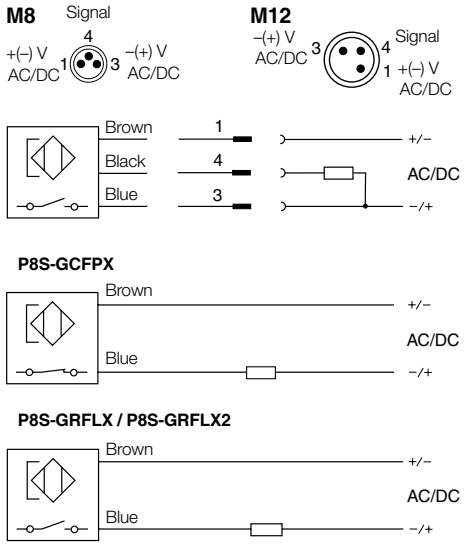
Design	Reed element
Mounting	From side, down into the sensor groove, so-called drop-in
Output	Normally open , or normally closed
Voltage range	10-30 V AC/DC or 10-120 V AC/DC
	24-230 V AC/DC
Load current	max 500 mA for 10-30 V or max 100 mA for 10-120 V
	max 30 mA for 24-230 V
Breaking power (resistive)	max 6 W/VA
Actuating distance	min 9 mm
Hysteresis	max 1,5 mm
Repeatability accuracy	0,2 mm
On/off switching frequency	max 400 Hz
On switching time	max 1,5 ms
Off switching time	max 0,5 ms
Encapsulation	IP 67 (EN 60529)
Temperature range	–25 °C to +75 °C
Indication	LED, yellow
Material housing	PA12
Material screw	Stainless steel
Cable	PVC or PUR 3x0.14 mm^2 see order code respectively

C

Electronic sensors

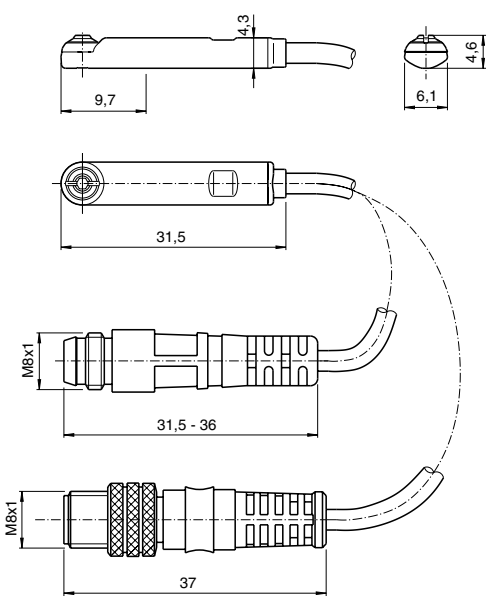


Reed sensors

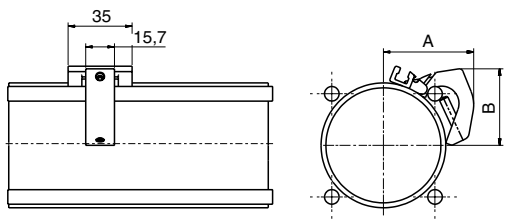


Dimensions

Sensors



Adapter for P1D-T



Cyl. bore mm	A mm	B mm
32	35	26
40	39	30
50	44	30
63	50	42
80	54	52
100	62	60
125	74	69

C

Ordering data

Output/function	Cable/connector	Weight kg	Order code
Electronic sensors , 10-30 V DC			
PNP type, normally open	0,27 m PUR-cable and 8 mm snap-in male connector [1]	0,007	**P8S-GPSHX**
PNP type, normally open	1,0 m PUR-cable and 8 mm snap-in male connector	0,013	**P8S-GPSCX**
PNP type, normally open	1,0 m PUR-cable and M8 screw male connector	0,013	**P8S-GPCCX**
PNP type, normally open	0,27 m PUR-cable and M12 screw male connector [1]	0,015	**P8S-GPMHX**
PNP type, normally open	3 m PVC-cable without connector	0,030	**P8S-GPFLX**
PNP type, normally open	10 m PVC-cable without connector	0,110	**P8S-GPFTX**
Electronic sensor 18-30 V DC			
ATEX-certified			
CE Ex **II3G EEx nA II T4X II3D 135 °C IP67**			
Type PNP , normally open	3 m PVC-cable without connector	0,030	**P8S-GPFLX/EX**
Reed sensors , 10-30 V AC/DC			
Normally open	0,27 m PUR-cable and 8 mm snap-in male connector [1]	0,007	**P8S-GSSHX**
Normally open	1,0 m PUR-cable and 8 mm snap-in male connector	0,013	**P8S-GSSCX**
Normally open	1,0 m PUR-cable and M8 male connector	0,013	**P8S-GSCCX**
Normally open	0,27 m PUR-cable and M12 screw male connector[1]	0,015	**P8S-GSMHX**
Normally open	1,0 m PUR-cable and M12 screw male connector	0,023	**P8S-GSMCX**
Normally open	3 m PVC-cable without connector	0,030	**P8S-GSFLX**
Normally open	10 m PVC-cable without connector	0,110	**P8S-GSFTX**
Normally closed	5m PVC-cable without connector [2]	0,050	**P8S-GCFPX**
Reed sensors, 10-120 V AC/DC			
Normally open	3 m PVC-cable without connector	0,030	**P8S-GRFLX**
Reed sensorer, 24-230 V AC/DC			
Normalt öppen	3 m PVC-kabel utan kontakt	0,030	**P8S-GRFLX2**

1) Not in combination with P1D Clean (too short cable)

2) Without LED

Adapter for tie-rod design

Description	Weight kg	Order code
Double jointed adapter for cylinder P1D-T cylinder bore Ø32 to Ø125 mm	0,07	**P8S-TMA0X**

C

Connecting cables with one connector

The cables have an integral snap-in female connector.

Type of cable	Cable/connector	Weight kg	Order code
Cables for sensors, complete with one female connector			
Cable, Flex PVC	3 m, 8 mm Snap-in connector	0,07	**9126344341**
Cable, Flex PVC	10 m, 8 mm Snap-in connector	0,21	**9126344342**
Cable, Super Flex PVC	3 m, 8 mm Snap-in connector	0,07	**9126344343**
Cable, Super Flex PVC	10 m, 8 mm Snap-in connector	0,21	**9126344344**
Cable, Polyurethane	3 m, 8 mm Snap-in connector	0,01	**9126344345**
Cable, Polyurethane	10 m, 8 mm Snap-in connector	0,20	**9126344346**
Cable, Polyurethane	5 m, M12 screw connector	0,07	**9126344348**
Cable, Polyurethane	10 m, M12 screw connector	0,20	**9126344349**

Male connectors for connecting cables

Cable connectors for producing your own connecting cables. The connectors can be quickly attached to the cable without special tools. Only the outer sheath of the cable is removed. The connectors are available for M8 and M12 screw connectors and meet protection class IP 65.

Connector	Weight kg	Order code
M8 screw connector	0,017	**P8SCS0803J**
M12 screw connector	0,022	**P8SCS1204J**

Connection block Valvetronic 110

The Valvetronic 110 is a connection block that can be used for collecting signals from sensors at various points on a machine and connecting them to the control system via a multicore cable. Valvetronic 110 can also be used for central connection of the multi-core cable to the outputs of a control system, and can be laid to a machine where the output signals can be connected. The connection block has ten 8 mm snap-in circular connectors and a multi-core cable which is available in lengths of 3 or 10 m. The connections on the block are numbered from 1 to 10. Blanking plugs are available for unused connections, as labels for marking the connections of each block.

C

Technical data

Connections:

Ten 3-pole numbered 8 mm round snap-in female contacts

Input block	
Pin 1	Common, +24 VDC
Pin 2	Input signal
Pin 3	Common, 0V

Output block	
Pin 1	Common, GND
Pin 2	Output signal
Pin 3	Common, 0V

Electrical data:

Voltage	24 VDC (max. 60 V AC/75 V DC)
Insulation group	according to DIN 0110 class C
Load	max. 1 A per connection total max. 3 A

Cable:

Length	3 m or 10 m
Type of cable LifYY11Y	
Conductor	12
Area	0.34 mm^2
Colour marking	According to DIN 47 100

Mechanical data

Enclosure	IP 67, DIN 40050 with fitted contacts and/or blanking plugs.
Temperature	–20 °C to +70 °C

Material

Body	PA 6,6 VD according to UL 94
Contact holder	PBTP
Snap-in ring	LDPE
Moulding mass	Epoxy
Seal	NBR
Screws	Plated steel

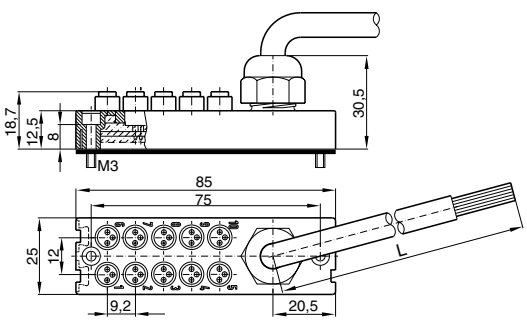
Industrial durability

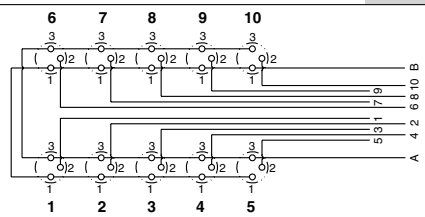
Good chemical and oil resistance. Tests should be performed in aggressive environments.

Ordering data

	Designation	Weight kg	Order code
	Connection block Valvetronic 110 with 3 m cable Connection block Valvetronic 110 with 10 m cable	0,32 0,95	**9121719001** **9121719002**
	Blanking plugs (pack of 10) Use blanking plugs to close unused connections.	0,02	**9121719003**
	Labels (pack of 10) White labels to insert in grooves on the side of the connection	0,02	**9121719004**

Dimensions and wiring diagrams





Conductor	Colour	Input	Output
1	Pink	Signal 1	Signal 1
2	Grey	Signal 2	Signal 2
3	Yellow	Signal 3	Signal 3
4	Green	Signal 4	Signal 4
5	White	Signal 5	Signal 5
6	Red	Signal 6	Signal 6
7	Black	Signal 7	Signal 7
8	Violet	Signal 8	Signal 8
9	Grey-Pink	Signal 9	Signal 9
10	Red-Blue	Signal 10	Signal 10
A	Blue	0 V	0 V
B	Brown	+24 V	PE

C

Pneumatic cylinder sensor for P1D-T

An ideal solution where a direct pneumatic signal is wanted from a cylinder sensor to a pneumatic control system, for example. This could be a machine or device in which only compressed air is available, and an electricity supply to normal cylinder sensors would involve serious problems or considerable expense.

Function:

Non-contacting sensing of a pneumatic cylinder, triggering an output signal (conn. 2) from the integrated 3/2 NC valve, which is activated by a magnetic field or iron core and has a return spring.

If more than one sensor is used with a cylinder there must be a distance of at least 20 mm between sensors to prevent them influencing each other.

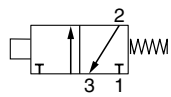
To avoid interference, there must be a minimum spacing of 15 mm to steel details.

The outlet (conn. 3) must not be blocked or restricted as this can impair the function of the sensor.

The sensor is fastened to the cylinder using the special sensor fixing.

Technical data:

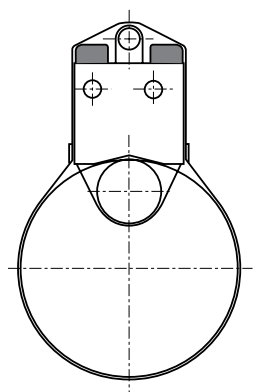
Working pressure:	min 2 to max 6 bar
Temperature:	-15 to +60 °C
Air quality:	3.4.3 to ISO 8573-1 (must be oil free)
Function:	3/2 NC valve
Flow:	40 Nl per minute
Connection:	for plastic pipe with 2,5-3 mm internal diameter
Activation distance:	for magnet: min 9 mm
Activation distance:	for Fe: approx. 2 mm
Repetition accuracy:	+/- 0.2 mm
Cylinder velocity:	max 1 m/s (depends on magnetic field, interference from steel in environment, signal length requirement from control system….)
Distance between sensors:	min 20 mm
Distance from sensor to steel details:	min 15 mm
Fixing:	with sensor fixing or with an M4 thread in case
Sensing:	non-contacting (also through a wall of non-magnetic material)



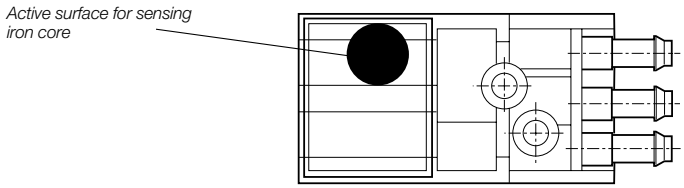
Order codes

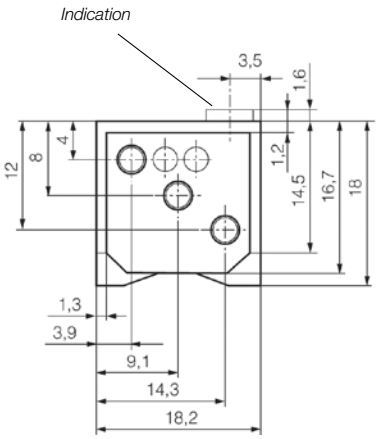
Name	Weight kg	Order code
Pneumatic sensor	0,02	**P8S-A34X**
Cylinder fixing	0,01	**P8S-AMA1**

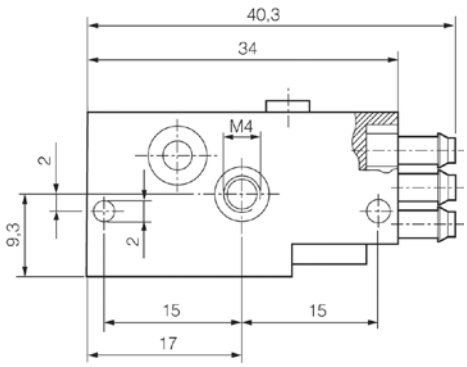
Cylinder fixing



Dimensions







C

Magnetic Switches pneumatic

with output indicator

Series DZPV

C

The magnetic switches are mounted on the cylinder tube profile.
One or more switches can be fitted, depending on the stroke length.
For cylinders for contactless position sensing see Series AZ, AZV.

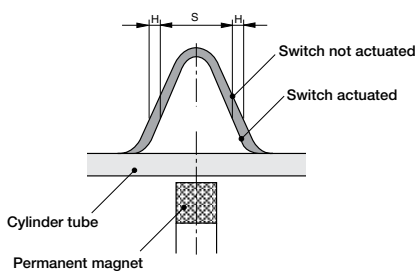
Characteristics

Characteristics	Symbol	Unit	Description
Installation			In any position
Material			Housing: Macrolon
Ambient temperature range *)	T_{min} T_{max}	°C °C	-10 +60
Service life			10 x 10^6 switching cycles
Switching point accuracy		mm	± 0,2
Max. impulse acceleration		m/s^2	50 g
Nominal diameter		mm	2
Medium			Filtered compressed air
Filter fineness	max.	µm	40
Lubrication			None required
Nominal pressure		bar	6
Operating pressure range	p_{min} p_{max}	bar bar	2 6
Nominal flow		l/min	40
Switching frequency		Hz	40 (without switching volume)
Connection			Push-on nipples for NW3 tubing
Weight (mass)		kg	0.014 Magnet switch 0.020 Magnet switch with mounting

*) For the temperature range of the magnetic switches, the surface temperature and own heat generation of the cylinder must be taken into account.

Switching Characteristics

H = Hysteresis
S = Response range



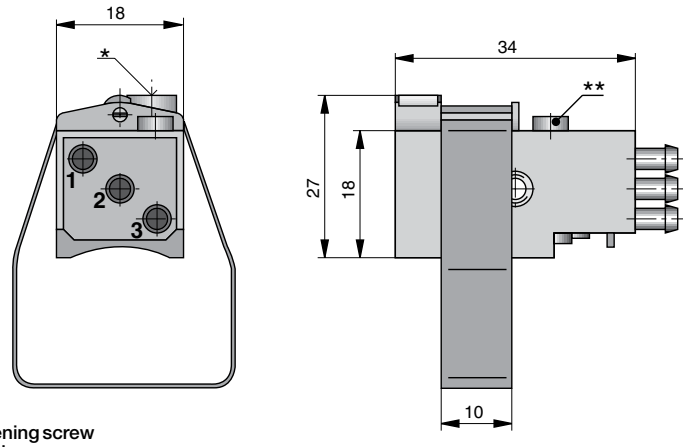
Response Range, Overrun Speed

Cylinder Ø (mm)	Response range s	Overrun speed $V_{max.}$
32	12	$V_{max.} = \frac{s}{ta}$ ta = response time of following device
40	12	
50	12	
63	13	
80	13	
100	13	

*** Contact Technical Sales**

C

Dimensions (mm) – for Tube Connection NW3

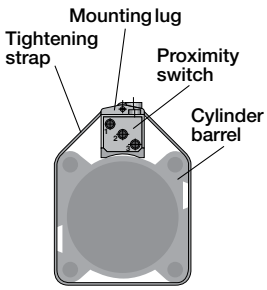


* Tightening screw
** Indicator

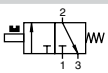
Assembly Instructions

- The mounting is designed only for AZ cylinders. The switch must be mounted on a radiused side of the cylinder barrel (not on a side with a dovetail groove).
- When fitting the DZPV, ensure that the tightening screw between strap and switch is tightened with a torque not exceeding 1.5 Nm.
- To avoid interference from other magnetic fields, pneu matic cylinders installed close together should be at least 20 mm apart.
- To avoid interference from other ferromagnetic components with the function of the DZPV, a minimum spacing of 15 mm should be maintained.
- When fitting the DZPV, ensure that port 3 (exhaust) is never closed.

The DZPV pneumatic proxi-mity switch requires the fol-lowing operating conditions:
- filtered and moderately lubricated compressed air
- compressed air without aggressive constituents
- operating pressure from 2 to 8 bar



Order Instructions

Version	Symbol	for Cylinder Ø	Order Instructions	
			Type	Order-No.
Switch			DZPV	KZ 2364
Mounting element		32-100	KLAZ 32	KC 8255

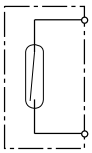
*** Contact Technical Sales**

Magnetic Switches electronic

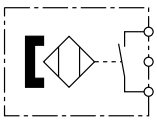
CE

C

Series RS



Series ES



Magnetic switches are used for electrical sensing of the position of the piston, e.g. at its end positions. They can also be used for sensing of intermediate positions.

Sensing is contactless, based on magnets which are built-in as standard. A yellow LED indicates operating status.

The magnetic switches are fitted in the dovetail slot in the profiles of AZ-, SZ-, NZ- and NZK-cylinders or with a strap mounting on R-type cylinders.

Characteristics

Characteristics	Symbol	Unit	Description	
Electrical Characteristics			Type RS	Type ES
Switching output			Reed	PNP/NPN
Operating voltage	U_B	V	(5 DC) 10-240 AC/DC (NO) (5 DC) 10-150 AC/DC (NC) (5 DC) 10-70 AC/DC plug	10-30 DC
Voltage drop		V	≤ 3	≤ 2
Connection technology			2-wire	3-wire
Switching function			Normally open/closed	Normally open
Permanent current	I_{Dmax}	mA	< 200	
Breaking capacity		W	< 100	
Power consumption		mA	–	< 20
Function indicator			LED, yellow	
Response time		ms	< 2	< 2 (on)
Sensitivity		mT	2...4	2...4
Switch-off delay		ms	None	25
Short circuit proof			No	Yes
Pole reversal proof			No	Yes
Switchable capacity		µF	0.1 at 100 Ω, 24 VDC	
Switching point accuracy		mm	± 0.2 *	
Hysteresis		mm	1.5 for series OSP < 8 *)	≤ 3 *)
EMC		EN	to 60947	
Service life			≥ 10 x 10^8 switching cycles	Theoretically unlimited
Mechanical Characteristics				
Housing			Macrolon, smoke colour	
Cable diameter		mm^2	2 x 0.14	3 x 0.14
Cable type			PVC highly flexible/PUR highly flexible	
Cable length			2.5 at 5.0 m, connector on 10 cm cable	
Bending radius		mm	Fixed ≥ 20, moving ≥ 70	
Weight		g	45 (RS-K, cable 2.5m) 80 (RS-K, cable 5.0m) 15 (RS-S)	
Degree of protection		IP	67 to EN 60529	
Ambient temperature range **)		°C	-25 to +80	
Shock resistance		G	< 50 at 50 Hz and 1mm stroke	

*) These values depend on the type and diameter of cylinder used – please consult us,
**) For the temperature range of the magnetic switches, the surface temperature and own heat generation of the cylinder must be taken into account.

*** Contact Technical Sales**

Magnetic Switches RS and ES

Electrical Service Life Protective Measures

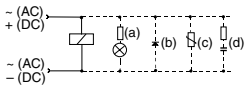
Magnetic switches are sensitive to excessive currents and inductions. With high switching frequencies and inductive loads such as relays, solenoid valves or lifting magnets, service life will be greatly reduced.

With resistive and capacitative loads with high switch-on current, such as light bulbs, a protective resistor should be fitted. This also applies to long cable lengths and voltages over 100 V.

In the switching of inductive loads such as relays, solenoid valves and lifting magnets, voltage peaks (transients) are generated which must be suppressed by protective diodes, RC loops or varistors.

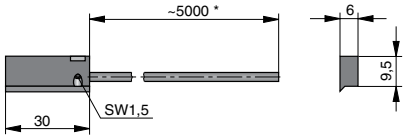
Connection Examples:

Load with protective circuits
(a) Protective resistor for light bulb
(b) Freewheel diode on inductivity
(c) Varistor on inductivity
(d) RC element on inductivity



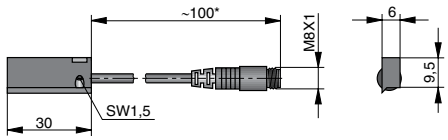
For the type ES, external protective circuits are not normally needed.

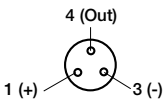
Dimensions (mm) – Type RS-K



* Length with possible minus tolerance, see chart below

Dimensions (mm) – Type ES-S / RS-S**





PIN assignment
(view of pins) according to DIN EN 50044

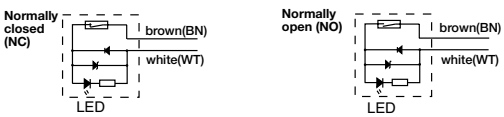
* Length with possible minus tolerance, see chart below
** Operating voltage max. 70 V

Length of connection cable with length tolerance

Sensor Order-No.	Nominal cable length	Length tolerance
KL3043, KL3055, KL3059	2500 mm	–50 mm
KL3045, KL3048, KL3056	5000 mm	–50 mm
KL3054	100 mm	–20 mm
KL3060	145 mm	±5 mm

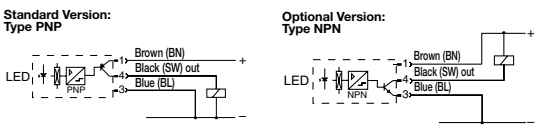
Type RS
In the type RS contact is made by a mechanical reed switch encapsulated in glass.

Electrical Connection, Type RS



Type ES
In the type ES contact is made by an electronic switch – without bounce or wear and protected from pole reversal. The output is short circuit proof and insensitive to shocks and vibrations.

Electrical Connection, Type ES



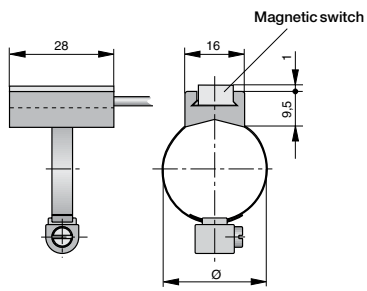
*** Contact Technical Sales**

C

Order Instructions

Version	Imprint	Order Instructions	
		Type	Order-No.
Magnetic switch, reed contact, normally open, screw connector M8, Pin 3 neutral (ES-S compatible connector; preferred type)	1+ 4 max. 70 V / 0,2 A	RS-S	KL3047
Magnetic switch, reed contact, normally closed, screw connector M8, Pin 3 neutral	1+ 4 max. 70 V / 0,2 A	RS-S	KL3087
Magnetic switch, reed contact, normally closed with 5.0 m cable	bn+ max. 150 V / 0,2 A	RS-K	KL3048
Magnetic switch, reed contact, normally open with 2.5 m cable	bn+ max. 240 V / 0,2 A	RS-K	KL3043
Magnetic switch, reed contact, normally open with 5.0 m cable	bn+ max. 240 V / 0,2 A	RS-K	KL3045
Magnetic switch, electronic, PNP-Switching with screw connector M8	PNP	ES-S	KL3054
Magnetic switch, electronic, NPN-Switching with screw connector M8	NPN	ES-S	KL3060
Magnetic switch, electronic, PNP-Switching with 2.5 m cable	PNP	ES-K	KL3055
Magnetic switch, electronic, NPN-Switching with 2.5 m cable	NPN	ES-K	KL3059
Magnetic switch, electronic, PNP-Switching with 5.0 m cable	PNP	ES-K	KL3056
Cable set 2.5 m and connector M8 with union nut		KSG25	KC3102
Cable set 5.0 m and connector M8 with union nut		KSG50	KC3104
Connector M8 without cable for custom made cables		STG8	KC3152

Strap mounting for Magnetic Switch for Series R, Ø10-63mm



Dimension Table and Order Instructions – Mounting

Cyl. Ø	Order Instructions	
	Type	Order-No.
10,12,16	HMSR 010, 012, 016	KL9196
20, 25	HMSR 020, 025	KL9197
32	HMSR 032	KL9198
40	HMSR 040	KL9199
50	HMSR 050	KL9284
63	HMSR 063	KL9285

*** Contact Technical Sales**

Magnetic Switches electronic

CE

Series RST
Series EST

Magnetic switches are used for electrical sensing of the position of the piston, e.g. at its end positions. They can also be used for sensing of intermediate positions.

Sensing is contactless, based on magnets which are built-in as standard. A yellow LED indicates operating status.

The magnetic switches are mounted directly in the T-slot of NZ, AZ and FZ cylinders or, with the adapter, in the dovetail slot in the profiles of SZ- and NZK cylinders. For R-type cylinders a special strap mounting is used.

[1] For the temperature range of the magnetic switches, the surface temperature and own heat generation of the cylinder must be taken into account.

Characteristics

Characteristics	Symbol	Unit	Description	
Electrical Characteristics			Type RST	Type EST
Switching output			Reed	PNP
Operating voltage	U_B	V	10-30 AC/DC	10-30 DC
Ripple	U_b		–	≤10%
Voltage drop		V	≤3	≤2
Electrical configuration			2-wire	3-wire
Output function			Normally open/closed	Normally open
Permanent current	I_{Dmax}	mA	≤ 100	≤ 100
Breaking capacity		W	≤ 6 peak	–
Power consumption, at U_B=24V, switched on, without load		mA	–	≤ 10
Function indicator			LED, yellow (not for normally closed)	
Response time		ms	≤2	≤0,5
Sensitivity		mT	2 – 4	2 – 4
Time delay before availability		ms	–	≤2
Reverse polarity protection			yes	yes
Short-circuit protection			no	yes (pulsed)
Switchable capacity load		µF	0.1 at 100 Ω, 24 VDC	
Switching frequency		Hz	≤400	≤5 k
Repeatability		mm	≤0.2*)	≤0.2*)
Hysteresis		mm	≤1.5*)	≤1.5*)
EMC		EN	60947-5-2	
Lifetime			≥35 Mio. cycles with PLC load	unlimited
Power-up pulse suppression			–	yes
Protection for inductive load			–	yes
Mechanical Characteristics				
Housing			Plastic / PA66 + PA6I red	
Cable cross section		mm^2	2 x 0.14	3 x 0.14
Cable type			PUR, black	PUR, black
Bending radius		mm	≥36	≥30
Weight		kg	ca. 0.030 RST-K ca. 0.010 RST-S	ca. 0.030 EST-K ca. 0.010 EST-S
Degree of protection		IP	67 to EN 60529	
Ambient temperature range [1]		°C	-25 to +80	-25 to +75 at U_B=10-30 V -25 to +80 at U_B=10-28 V
– with adapter		°C	-25 to +60	
Adapter tightening torque		Nm	0.15 (tightening torque for screwing adapter onto magnetic switch)	
Shock resistance				
Vibration to EN 60068-2-6		G	15, 11ms, 10 to 55 Hz, 1 mm	
Shock to EN 60068-2-27		G	50, 11 ms	
Bump to EN 60068-2-29		G	30, 11 ms, 1000 bumps each axis	

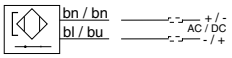
*) These values depend on the type and diameter of cylinder used – please consult us.

*** Contact Technical Sales**

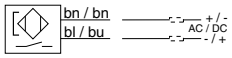
C

Electrical Connection Type RST-K

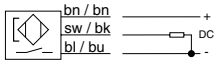
Normally closed



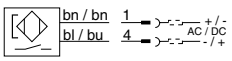
Normally open



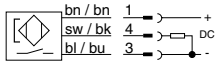
Electrical Connection Type EST-K



Electrical Connection Type RST-S



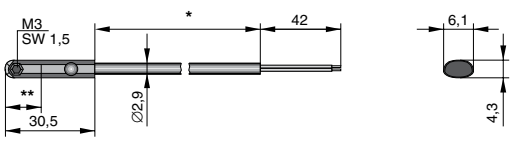
Electrical Connection Type EST-S



Type RST
In the type RST contact is made by a mechanical reed switch encapsulated in glass.

Type EST
In the type EST contact is made by an electronic switch – without bounce or wear and protected from pole reversal. The output is short circuit proof and insensitive to shocks and vibrations. Connection is by 3-pole connector for easy disconnection.Fitted with connection cable 100 mm long with connector.
A 5 m cable with connector and open end can be ordered separately, or use the Order No. for the complete Type ES with 5 m cable.

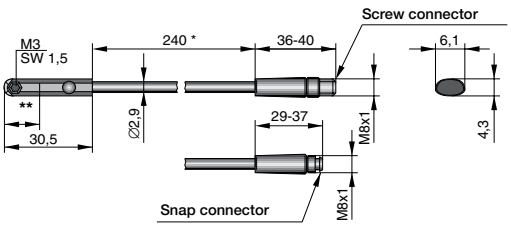
Dimensions (mm) – Type RST-K, EST-K



* Cable lengths available: 5000 mm ± 75 mm
2000 mm ± 40 mm

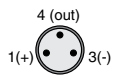
** Switching point: Type RST-K Normally closed 14 mm
Type RST-K Normally open 12.3 mm
Type EST-K Normally open 8.1 mm

Dimensions (mm) – Type RST-S, EST-S



* ± 6 mm

** Switching point: Type RST-K Normally closed 14 mm
Type RST-K Normally open 12.3 mm
Type EST-K Normally open 8.1 mm



PIN assignment
(view of pins) to DIN EN 50044

Magnetic Switches Series RST , EST

Electrical Service Life Protective Measures

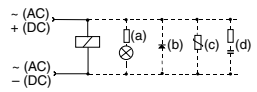
Magnetic switches are sensitive to excessive currents and inductions. With high switching frequencies and inductive loads such as relays, solenoid valves or lifting magnets, service life will be greatly reduced.

With resistive and capacitative loads with high switch-on current, such as light bulbs, a protective resistor should be fitted. This also applies to long cable lengths.

In the switching of inductive loads such as relays, solenoid valves and lifting magnets, voltage peaks (transients) are generated which must be suppressed by protective diodes, RC loops or varistors.

Connection Examples:

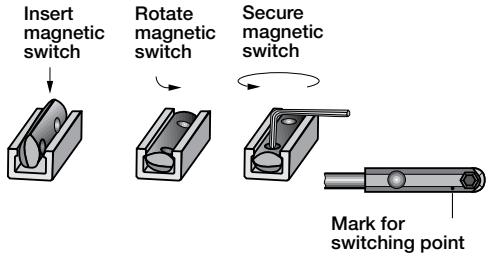
Load with protective circuits
(a) Protective resistor for light bulb
(b) Freewheel diode on inductivity
(c) Varistor on inductivity
(d) RC element on inductivity

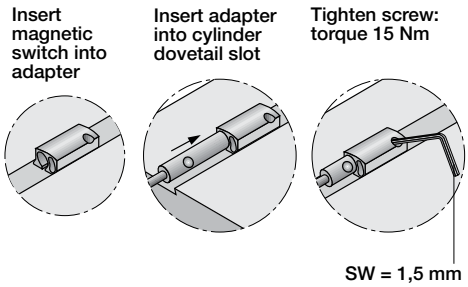


For the type EST, external protective circuits are not normally needed.

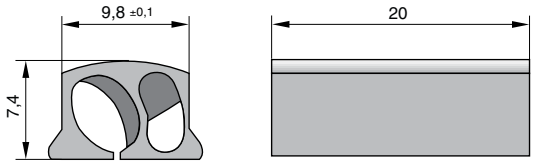
*** Contact Technical Sales**

Installation

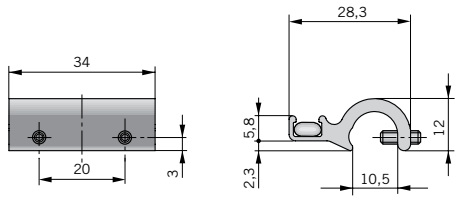




Dimensions of Adapter for Magnetic Switch

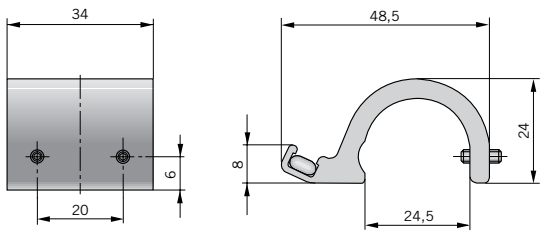


Mounting for T-slot switch for Cylinder Series AZZ Ø32–100 mm



Order-No. PD48955

Mounting for T-slot switch for Cylinder Series DZ Ø125–320 mm

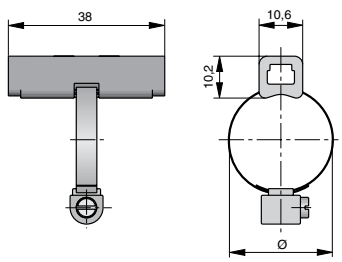


Order-No. PD48956

Order Instructions – Mounting for T-slot switch

Cylinder Series	for Cyl. Ø	Order Instructions	
		Type	Order-No.
R.... Ø10-63mm	10/12/16	HMTR 010/012/016	KL9190
	20/25	HMTR 020/025	KL9191
	32	HMTR 032	KL9192
	40	HMTR 040	KL9193
	50	HMTR 050	KL9194
	63	HMTR 063	KL9195

Mounting for T-slot switch for Cylinder Series R Ø10–63 mm



*** Contact Technical Sales**

C

Order Instructions – Magnetic Switches

Version	Voltage	Order Instructions Type	Order-No.
Magnetic switch, reed contact, normally open, LED indicator, cable 2 m	10-30 V AC / DC	RST-K	KL 3301
Magnetic switch, reed contact, normally open, LED indicator, cable 5 m	10-30 V AC / DC	RST-K	KL 3300
Magnetic switch, reed contact, normally open, snap connector M8, LED indicator cable 0.24 m	10-30 V AC / DC	RST-S	KL 3302
Magnetic switch, reed contact, normally open, screw connector M8, LED indicator, cable 0.24 m	10-30 V AC / DC	RST-S	KL 3303
Magnetic switch, reed contact, normally closed, cable 5 m	10-30 V AC / DC	RST-K	KL 3305
Magnetic switch, electronic, PNP, LED indicator, cable 2 m	10-30 V DC	EST-K	KL 3308
Magnetic switch, electronic, PNP, LED indicator, cable 5 m	10-30 V DC	EST-K	KL 3309
Magnetic switch, electronic, PNP snap connector M8, LED indicator	10-30 V DC	EST-S	KL 3312
Magnetic switch, electronic, PNP screw connector M8, LED indicator	10-30 V DC	EST-S	KL 3306

Included in delivery: 1 magnetic switch
1 adapter for dovetail slot mounting

Order Instructions – Accessories

Description	Order Instructions Type	Order-No.
Cable M8; 2.5 m – without lock nut	KS 25	KY 3240
Cable M8; 5.0 m – without lock nut	KS 50	KY 3241
Cable M8; 10.0 m – without lock nut	KS 100	KC 3140
Cable M8; 2.5 m – with lock nut	KSG 25	KC 3102
Cable M8; 5.0 m – with lock nut	KSG 50	KC 3104
Adapter for dovetail slot (pack of 10)		KL 3333
Mounting for T-slot switch – for Cylinder Series AZZ Ø 32-100 mm		PD48955
Mounting for T-slot switch – for Cylinder Series DZ Ø 125-320 mm		PD48956
Mounting for T-slot switch – for Cylinder Series R Ø 10-63 mm	HMTR ...	see page 154

*** Contact Technical Sales**

Components for EX-Areas

Magnetic Switches electronic

CE

Series RS-K..ATEX
Series ES-K..ATEX

For electrical sensing of the carrier position, e.g. at the end positions, magnetic switches may be fitted. They can also be used for sensing of intermediate positions.

Position sensing is contactless and is based on magnets
fitted as standard to the carrier. A yellow LED indicates operating status.

The magnetic switches are fitted directly with an adapter in the dovetail slot of the cylinder.

Characteristics

Characteristics	Symbol	Unit	Description	
Electrical Characteristics			Type RS-K ATEX	Type ES-K ATEX
ATEX Certification			yes	yes
Category Type: RS-K			Ⓔx II 3GD EEX nC IIC T3 146°C	
Category Type: ES-K			Ⓔx II 2GD EEX ib IIC T5 100°C	
Switching output			Reed	Namur
Operating voltage	U_B	V	10-240 AC/DC	7-9 DC
Voltage drop		V	≤ 3	–
Electrical configuration			Two wire	Two wire
Output function			Normally open	Normally open
Permanent current	I_{Dmax}	mA	≤ 200	≤ 3
Power consumption		W/VA	≤ 10/10 Spitze	
Peak current		mA	≤ 500	–
Power consumption, without load		mA	–	≤ 1
Function indicator			LED, yellow	
Response time On/Out		ms	≤ 2	≤ 0.5
Sensitivity		mT	2 – 4	2 – 4
Reverse polarity prot			yes	yes
Short-circuit protection			no	yes
Repeatability		mm	≤ 0.2 *)	≤ 0.2 *)
Hysteresis		mm	≤ 1.5 *)	≤ 1.5 *)
EMC		EN	60947-5-2	
Lifetime			≥ 10 Mio. Cycles with PLC load	
Mechanical Characteristics				
Housing			Makrolon, smoke color	
Cable cross section		mm^2	2 x 0.14	2 x 0.14
Cable type			PVC, blue	PVC, blue
Weight		kg	ca. 0.075	
Degree of protection		IP	67 nach EN 60529	
Ambient temperature range **)		°C °C	-25 +80	-20 +75
Surface temperature		°C	The maximum surface temperature T=146 °C is referred to the max. ambiente temperature of 80 °C	–
Shock resistance				
Vibration and Shock			50G at 50Hz and 1mm	

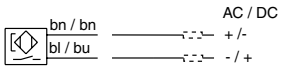
*) These values depend on the type and diameter of cylinder used – please consult us.
**) For the temperature range of the magnetic switches, the surface temperature and own heat generation of the cylinder must be taken into account.

*** Contact Technical Sales**

C

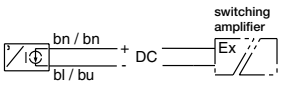
Electrical Connection – Type RS-K ATEX

Make contact (Reed)

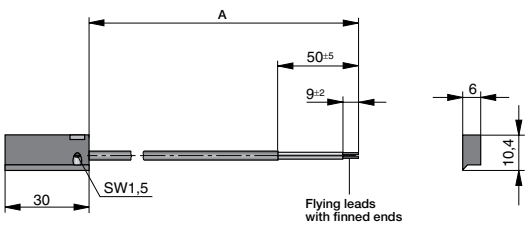


Electrical Connection – Type ES-K ATEX

Make contact (Namur)



Dimensions (mm)



Dimension Table (mm)

Magnetic switch Order-No.	Nominal cable length A	Lenghts tolerance
KL3240	5000	- 50
KL3241	10000	- 50
KL3250	5000	- 50
KL3251	10000	- 50

Magnetic Switches Type RS-K ATEX-Version

In the type RS contact is made by a mechanical reed switch encapsulated in glass.

ATEX-Version Type: RS-K
Ⓔx II 3GD EEX nC IIC T3 146°C

Magnetic Switches Type ES-K ATEX-Version

In the type ES contact is made by an electronic switch – without bounce or wear and protected from pole reversal. The output is short circuit proof and insensitive to shocks and vibrations.

ATEX-Version Type: ES-K
Ⓔx II 2GD EEX ib IIC T5 100°C

Caution!

The connection of the magnetic switch Type ES-K ATEX must be realised my means of an EEX i switching amplifier (see Accessories).

Magnetic Switches Series RST, EST

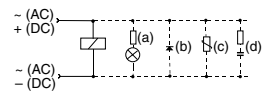
Electrical Service Life Protective Measures

Magnetic switches are sensitive to excessive currents and inductions. With high switching frequencies and inductive loads such as relays, solenoid valves or lifting magnets, service life will be greatly reduced.

With resistive and capacitative loads with high switch-on current, such as light bulbs, a protective resistor should be fitted. This also applies to long cable lengths.

In the switching of inductive loads such as relays, solenoid valves and lifting magnets, voltage peaks (transients) are generated which must be suppressed by protective diodes, RC loops or varistors.

Connection Examples:
Load with protective circuits
(a) Protective resistor for light bulb
(b) Freewheel diode on inductivity
(c) Varistor on inductivity
(d) RC element on inductivity



*** Contact Technical Sales**

Order Instructions – Magnetic switches

Version	Voltage	Order Instructions	
		Type	Order-No.
Magnetic switch, reed contact, normally open LED indicator, cable 5 m	10-240 V AC/DC	RS-K ATEX	KL3240
Magnetic switch, reed contact, normally open, LED indicator, cable 10 m	10-240 V AC/DC	RS-K ATEX	KL3241
Magnetic switch, electronic, NAMUR, normally open, LED indicator, cable 5 m	7-9 V DC	ES-K ATEX	KL3250
Magnetic switch, electronic, NAMUR, normally open, LED indicator, cable 10 m	7-9 V DC	ES-K ATEX	KL3251

Order Instructions – Accessories

Description	for magnetic switch	Order-No.
2 channel switching amplifier 24 V DC	ES-K ATEX	2876
2 channel switching amplifier 220 V AC	ES-K ATEX	1546

Note: 2 magnetic switches can be connected to each switching amplifier.

*** Contact Technical Sales**

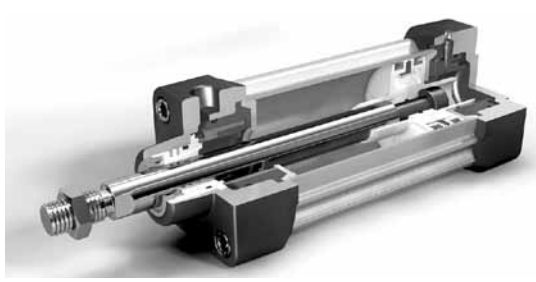
P1D Seal kits

Complete seal kits consisting of:

Piston seals

Cushioning seals
Piston rod bearing
Combined piston rod seal and scraper ring
O-rings

C



Order codes

Cyl.bore mm	P1D cylinder version			
	Standard P1D-S, P1D-T, P1D-C, P1D-F	High Temp P1D-S	Low Temp P1D-S	Hydraulic P1D-S
32	**P1D-6KRN**	**P1D-6KRF**	**P1D-6KRL**	**P1D-6KRH**
40	**P1D-6LRN**	**P1D-6LRF**	**P1D-6LRL**	**P1D-6LRH**
50	**P1D-6MRN**	**P1D-6MRF**	**P1D-6MRL**	**P1D-6MRH**
63	**P1D-6NRN**	**P1D-6NRF**	**P1D-6NRL**	**P1D-6NRH**
80	**P1D-6PRN**	**P1D-6PRF**	**P1D-6PRL**	**P1D-6PRH**
100	**P1D-6QRN**	**P1D-6QRF**	**P1D-6QRL**	**P1D-6QRH**
125	**P1D-6RRN**	**P1D-6RRF**	**P1D-6RRL**	**P1D-6RRH**

Cyl.bore mm	P1D cylinder version			
	Standard temperature with FPM scraper ring P1D-S, P1D-T, P1D-C, P1D-F	**Standard temperature Dry piston rod with HDPE scraper ring** P1D-S, P1D-T, P1D-C, P1D-F	**Standard temperature with metal scraper ring** P1D-S, P1D-T, P1D-C, P1D-F	**Standard temperature with piston rod locking** P1D-L, P1D-D, P1D-4
32	**P1D-6KRV**	**P1D-6KRD**	**P1D-6KRQ**	**P1D-6KRNL**
40	**P1D-6LRV**	**P1D-6LRD**	**P1D-6LRQ**	**P1D-6LRNL**
50	**P1D-6MRV**	**P1D-6MRD**	**P1D-6MRQ**	**P1D-6MRNL**
63	**P1D-6NRV**	**P1D-6NRD**	**P1D-6NRQ**	**P1D-6NRNL**
80	**P1D-6PRV**	**P1D-6PRD**	**P1D-6PRQ**	**P1D-6PRNL**
100	**P1D-6QRV**	**P1D-6QRD**	**P1D-6QRQ**	**P1D-6QRNL**
125	**P1D-6RRV**	**P1D-6RRD**	**P1D-6RRQ**	**P1D-6RRNL**

Cyl.bore mm	P1D optional cylinder versions Through rod Standard temperature P1D-S, P1D-T, P1D-C, P1D-F
32	**P1D-6KRNF**
40	**P1D-6LRNF**
50	**P1D-6MRNF**
63	**P1D-6NRNF**
80	**P1D-6PRNF**
100	**P1D-6QRNF**
125	**P1D-6RRNF**

For other design variants with through rods, order double seal kits as above.

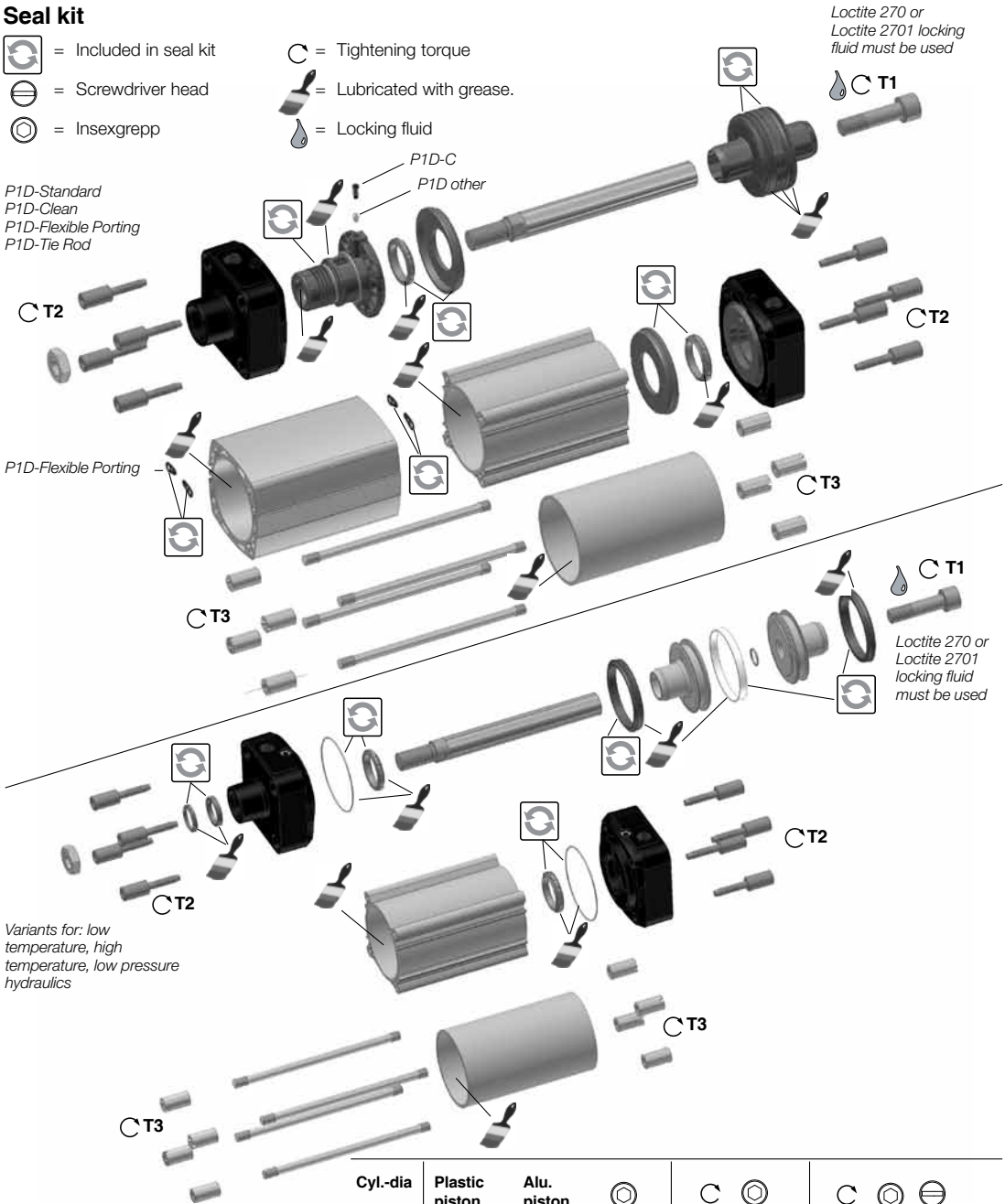
Example: For a P1D-S Ø63 with through rod, high temperature version, order 2 x P1D-6NRF

Grease for P1D

Standard	30g	**9127394541**
High temperature	30g	**9127394521**
Low temperature	30g	**9127394541**

Seal kit

= Included in seal kit
= Screwdriver head
= Insexgrepp
= Tightening torque
= Lubricated with grease.
= Locking fluid



Cyl.-dia mm	Plastic piston T1 Nm	Alu. piston T1 Nm	NV mm	T2 Nm	NV mm	T3 Nm	NV mm	NV mm
32	4,5	15	6	8	6	6	6	
40	11	30	8	8	6	6	6	
50	20	40	10	20	8	11	8	
63	20	40	10	20	8	11	8	
80	40	120	14	20	6	20		3x16
100	120	120	14	20	6	20		3x16
125	120	120	14	70	8	40		4x18

C

Order key, spare parts

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
P	1	D	–	8	0	3	2	D	G	–	0	1	0	0

8	Spare parts

Cylinder dia. mm
032
040
050
063
080
100
125

Piston rod	
D	Double-acting
F	Piston rod locking, only chromium-plated rod
G	Internal thread
H	Through rod
L	Through rod + piston rod locking
Cylinder barrel*	
A	Profile cylinder
B	Cylindrical (for tie rod)
Tie rods	
T	Tie rods (order 4 for a cylinder)

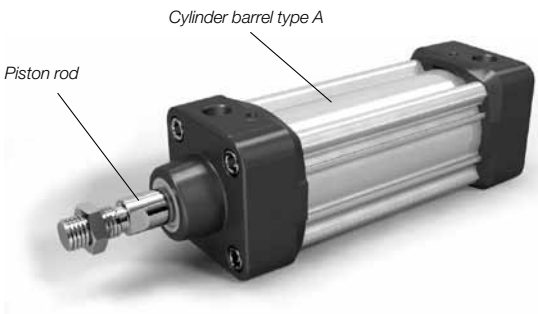
* Cylinder barrel for P1D Clean and P1D Flexport cannot be ordered with this order key. Contact customer service

Piston rod	
G	Stainless steel
H	Hard-chromium plated
J	Acid-resistant steel
K	Chromium plated stainless
Cylinder barrel*	
A	Aluminium
Tie rods	
V	Stainless steel (order 4 for a cylinder)

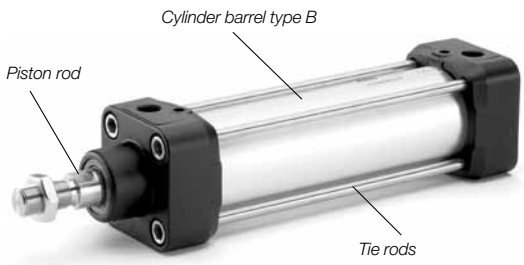
Stroke** (mm) e.g. 0100 = 100 mm
Any stroke up to max. 2800 mm.

** When ordering piston rods for cylinders with extended piston rod, add together the stroke and the extension in the order key. For example, a cylinder with stroke 100 mm and a piston rod extension of 25 mm is ordered with 0125 in the order number.

P1D with profile cylinder



P1D with tie rods



Complete working units – ready for installation

Now you can save time and money when choosing, ordering, receiving and installing, by ordering a complete cylinder rather than having to order up to ten separate items.

Everything under one part number

The P1D range means more than major technical advances: we have made it incredibly simple to order P1D cylinders as completely equipped working units with all accessories fitted, ready to plug in. Everything under one part number, which you create with the help of the order code key.

The right quality

The new system saves a lot of time at every stage, from ordering to commissioning. You can also be sure of getting exactly the same configuration every time. All accessories are guaranteed correctly fitted, with the correct tightening torque. Other examples from the wide range are a swivel eye bracket combined with clevis bracket GA and guidance modules (plain or ball-bearing type).

C

Piston rod mountings

Order P1D with swivel eye bracket or clevis bracket of zinc-plated or stainless steel – or possibly a Flexo Coupling. Other examples from the wide range are a swivel eye bracket combined with clevis bracket GA and rod guidance modules (plain or ball-bearing type).

Fittings or speed control

The cylinders are available with factory-fitted elbow or straight push-in fittings from the Prestolok range (nickel-plated brass). Banjo speed control valves from the Parker PTF range are available as an alternative.

Factory-fitted sensors

P1D Clean can be ordered with factory-fitted sensors. This is often an advantage for other cylinder versions as well. These cylinders come with the sensors mounted in the end positions. If needed, the sensors are easy to adjust when installing the cylinders. Choose from a wide range of sensors – electronic or reed type, 3 or 10 metres of cable, 8 mm or M12 connectors.

Cylinder mountings

A mounting is almost always needed when installing a cylinder. Take advantage of the opportunity to have factory-fitted mountings such as foot bracket, flange, clevis bracket MP2/MP4, clevis bracket GA, swivel eye bracket or combinations of these. Sealing plugs can be fitted at the factory in unused end cover holes.

Save time and costs

															16	17	18	19	20
P	1	D	–	C	0	4	0	M	S	B	0	1	2	5	A	L	C	N	6

Piston rod mountings
Cylinder mountings
Factory-fitted sensors
Piston rod thread according to ISO
Speed controls or fittings

There is a P1D cylinder for every application

C

P1D Standard

The basic platform in the P1D family offers high performance, thanks to its very durable and user-friendly design.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
P	1	D	–	S	0	3	2	M	S	–	0	1	0	0

P1D Clean with integrated sensors

The obvious choice for stringent hygiene requirements, specially designed for demanding applications The perfect fit for the food processing industry. Built-in sensors are selected in position 18.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
P	1	D	–	C	0	5	0	M	S	–	0	3	2	0	N	N	C	N	N

P1D Clean without sensor function

The clean cylinder for applications which do not require sensors. This is the only P1D Clean cylinder which is ordered with a 15-digit order code.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
P	1	D	–	C	0	5	0	M	S	–	0	2	5	0

Flexible Porting

The P1D Flexible Porting cylinder is available with both connections in one end of the end covers. This cylinder always has a 20-digit order code, where the position of the cylinder ports is defined in position 11 and the type of fitting and tube dimension is chosen in position 20.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
P	1	D	–	F	0	5	0	M	S	B	0	3	2	0	N	N	N	N	0

C

P1D Clean with Flexible Porting

Combine P1D Clean with having both connections in one end, by using the Flexible Porting option.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
P	1	D	–	C	0	5	0	M	S	B	0	3	2	0	N	N	C	N	8

P1D Tie-Rod

The same basic high technology design as all other P1D cylinder versions, but with a tie-rod design. Follows the same order code principles as our previous P1E range.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
P	1	D	–	T	0	5	0	M	S	–	0	1	2	5

P1D cylinder with piston rod locking

The P1D cylinder is available in a version with piston rod locking, allowing the piston rod to be locked in any position. The lock unit, of the air/spring actuated type, is integrated in the front end piece of the cylinder.

P1D Standard with piston rod locking

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
P	1	D	–	L	0	5	0	M	C	–	0	2	5	0

P1D Clean with piston rod locking

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
P	1	D	–	D	0	5	0	M	C	–	0	2	5	0

P1D complete working unit

P1D Standard can be ordered with a factory-fitted valve and hosing. The valve series is the robust and compact Viking series, with product code P2L-A (for cylinder bores 32-63), P2L-B (for cylinder bores 80-100) and P2L-D (for cylinder bore 125).

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
P	1	D	–	V	0	5	0	M	S	1	0	3	2	0	N	N	N	N	H

C

15-digit order code

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
P	1	D	–	S	0	4	0	M	S	–	0	3	2	0

5 Cylinder version

S	Standard
C	Clean[2]
F	Flexible Porting
T	Tie-Rod
V	Standard with factory fitted valve
L	Standard with lock unit[19]
D	Clean with lock unit[19]
4	Standard with lock unit and factory fitted valve[19]

CE Ex II 2GD c T4 120 °C

6-7-8 Cylinder bore mm

032
040
050
063
080
100
125

6 Cylinder bore mm (Rod extension only)

K	32
L	40
M	50
N	63
P	80
Q	100
R	125

7-8 Piston rod extension

E.g. KR5 = Cylinder bore 32 mm with piston rod extension = 255 mm

01-99	1-99	**N0-N9**	220-229
A0-A9	100-109	**P0-P9**	230-239
B0-B9	110-119	**Q0-Q9**	240-249
C0-C9	120-129	**R0-R9**	250-259
D0-D9	130-139	**S0-S9**	260-269
E0-E9	140-149	**T0-T9**	270-279
F0-F9	150-159	**U0-U9**	280-289
G0-G9	160-169	**V0-V9**	290-299
H0-H9	170-179	**W0-W9**	300-309
J0-J9	180-189	**X0-X9**	310-319
K0-K9	190-199	**Y0-Y9**	320-329
L0-L9	200-209	**Z0-Z9**	330-339
M0-M9	210-219		

12-13-14-15 Stroke length

see next page

11 Cylinder ports Flexible porting

Both front	Both rear	Port location
H[3]	**J**[3]	G threads, BSPP (Ø 80-125)
B[4]	**C**[4]	Push-in , metric (Ø 32-80)

Cylinder ports Other

—	G threads, BSPP rear and front

Factory fitted valve type

0	air actuated
1	Electrically actuated 24 V UC, LED+VDR (AC/DC Universal Current) Complete with rectifier
4	Electrically actuated 24 V UC, LED+VDR med with 5 m integral cable (AC/DC Universal Current) Complete with rectifier
7	Electrically actuated 24 V UC, LED+VDR med with 10 m integral cable (AC/DC Universal Current) Complete with rectifier
2	115 V/50 Hz, 120 V/60 Hz, LED+VDR
3	230 V/50 Hz, 240 V/60 Hz, LED+VDR

10 Piston rod material / Seals

Stainless steel	Chromium-plated steel	Acid-proof steel	Chrom.-pl. stainless steel	
S	**C**	**M**	**R**	Standard -20 °C to +80 °C.
F	**G**	**N**	**D**	High temperature version[6] -10 °C to +150 °C. No magnetic function
L	**K**	**P**	**E**	Low temperature version[6] -40 °C to +40 °C.
–	**J**	**–**	**Z**	Low pressure hydraulic[6] [24].

9 End cover screws / Function

End cover screws Standard				End cover screws Stainless steel[22]				Function
Std scraper	Metalavskrapare[25]	HDPE scraper[23]	FPM sscraper[26]	Std scraper	Metalavskrapare[25]	HDPE scraper[23]	FPM sscraper[26]	
M	**Q**	**D**	**V**	**A**	**S**	**H**	**W**	Double-acting
F	**R**	**E**	**B**	**G**	**T**	**Y**	**Z**	Double-acting through rod
2	**4**	**6**	**8**	–	–	–	–	3 and 4 position cylinders
C	**J**	**K**	**L**	–	–	–	–	Tandem

16 Factory-fitted piston rod mountings and sealing plugs

No plugs	With plugs[8]	
S	**A**	Swivel rod eye, zinc-plated steel
T	**1**	Swivel rod eye, stainless steel
V	**E**	Swivel rod eye, zinc-plated steel and clevis bracket GA
W	**2**	Swivel rod eye, stainless steel and clevis bracket GA
C	**B**	Clevis, zinc-plated steel
D	**3**	Clevis, stainless steel
F	**G**	Flexo coupling, zinc-plated steel
X	**P**	One additional piston rod nut[9]
Y	**4**	Piston rod nut in stainless steel[10]
Z	**5**	Piston rod nut in acid-proof steel
6	**7**	Without piston rod nut
H	**L**	Rod guidance, H, ball bearings[18]
J	**M**	Rod guidance, H, plain bearings[18]
K	**Q**	Rod guidance, U, plain bearings[18]
N	**R**	None

20-digit order code

16	17	18	19	20
S	N	N	N[1)]	N

12-13-14-15

Stroke (mm) e.g. 0100 = 100 mm
Optional stroke lengths up to 2800 mm.

C

17

Cylinder mountings		
90°	0°	90° = shaft square to, 0° = shaft in line with ports[5)]
1	**3**	Flange MF1/MF2 in front end
B	**4**	Flange MF1/MF2 in rear end
2	**K**	Flange MF1/MF2 in both ends
F	**–**	Foot brackets MS1 (both ends)
C	**U**	Clevis bracket GA
E	**V**	Clevis bracket MP4
S	**W**	Swivel eye bracket
T	**Y**	Clevis bracket MP2
L	**Z**	Clevis bracket MP2+MP4
X	**5**	Clevis bracket MP2+pivot bracket with rigid bearing
Q	**0**	Clevis bracket GA + pivot bracket with swivel bearing
M	**A**	Clevis bracket GA +swivel eye bracket
D	**6**	Centre trunnion MT4, mid position[6)]
G	**7**	Trunnion MT4, optional pos. (XV-meas. pos 18-20)[7)]
H	**P**	Trunnion flange in front end
J	**8**	Trunnion flange in rear end
N		None

20

Speed controls or fittings for tube dimension		Valve function	
Speed controls[17)], Series PTF4PB[16)]		Air actuated	
X	in both ends for tube 4 mm[15)]	**A**	Air-Air, 5/2
Y	in both ends for tube 6 mm[15)]	**B**	Air-Spring, 5/2
Z	in both ends for tube 8 mm[15)]	**C**	Air-Air, 5/3, closed centre position
P	in both ends for tube 10 mm[15)]	**D**	Air-Air, 5/3, vented centre
R	in both ends for tube 12 mm[15)]	**E**	Air-Air, 5/3, pressurised centre
Push-in fitting, elbow type for:		Electrically actuated internal supply	
4	Tube dimension 4 mm[15)]	**F**	Elec-Elec, 5/2
6	Tube dimension 6 mm[15)]	**H**	Elec-Spring, 5/2
8	Tube dimension 8 mm[15)]	**K**	Spring-Elec, 5/2 [20)]
0	Tube dimension 10 mm[15)]	**M**	Elec-Elec, 5/3, closed centre position
2	Tube dimension 12 mm[15)]	**Q**	Elec-Elec, 5/3, vented centre
Push-in fitting, straight type for:		**S**	Elec-Elec, 5/3, pressurised centre
1	Tube dimension 4 mm[15)]	Electrically actuated external supply	
3	Tube dimension 6 mm[15)]	**G**	Elec-Elec, 5/2
5	Tube dimension 8 mm[15)]	**J**	Elec-Spring, 5/2
7	Tube dimension 10 mm[15)]	**L**	Spring-Elec, 5/2 [20)]
9	Tube dimension 12 mm[15)]		
N	None		

18

Factory-fitted sensors			
Front end or left[11)]	Rear end or right[11)]	Front and rear end	**Cable exit**
F	**R**	**–**	2 sensors 24 VDC pnp, 3 m cable
G	**H**	**–**	2 sensors 24 VDC pnp, 10 m cable
C	**S**	**–**	2 sensors 24 VDC pnp, 8 mm connector, 1 m cable[21)]
K	**L**	**–**	2 sensors Reed type, 3 m cable
T	**V**	**–**	2 sensors Reed type, 10 m cable
M	**Q**	**–**	2 sensors Reed type, 8 mm connector, 1 m cable[21)]
–	**–**	**3**	3 sensors 24 VDC pnp, 8 mm connector, 1 m cable[21)]
–	**–**	**Z**	3 sensors Reed type, 8 mm connector, 1 m cable[21)]
–	**–**	**4**	4 sensors 24 VDC pnp, 8 mm connector, 1 m cable[21)]
–	**–**	**W**	4 sensors Reed type, 8 mm connector, 1 m cable[21)]
6[12)]	**7**[13)]	**8**[14)]	No factory-fitted sensors P1D Clean
N			No sensors P1D (excl. P1D Clean)

19

Piston rod thread	
N	According to ISO-standard[1)]
6	Internal piston rod thread

17-18-19-20 **4-position cylinders only**

Stroke (mm) e.g. 0100 = 100 mm
The longest stroke in a 4 position cylinder. Total stroke length up to max 2800 mm.

Information notes

1) Code N for piston rod thread according to the ISO-standard. Other threads on request.

2) P1D Clean without sensor function.

3) Only for P1D-F bore 80-125 mm. Select optional fittings in position 20.

4) Only for P1D-F (Flexible Porting) bore 32-63 mm. Select fittings in position 20.

5) Shaft or pivots square to or in line with the cylinder ports.

6) For versions P1D-S and P1D-T.

7) Only for P1D-T and P1D-S, XV-measure (from the piston rod thread according to ISO to the centre of the pivots) stated in mm in positions 18-20 (max 999).

8) Valid only for cylinders with factory-fitted cylinder mountings. P1D Clean cylinders are always delivered with 4 sealing plugs.

9) P1D cylinders are always delivered with one piston rod nut in zinc-plated steel, except P1D Clean which is delivered with the piston rod nut in stainless steel. Codes X and P mean that the cylinder is delivered with one additional nut of the same type.

10) The piston rod nut in zinc-plated steel is replaced by a nut in stainless steel (P1D Clean is always delivered with one piston rod nut in stainless steel).

11) Left and right valid for P1D Standard and P1D Tie-Rod seen from behind with the ports on top. The sensors can only be mounted on the left for P1D Flexible Porting.

12) No factory-fitted sensors, but prepared for cable exit in the front end (max. 2 sensors).

13) No factory-fitted sensors, but prepared for cable exit in the rear end (max. 2 sensors).

14) No factory-fitted sensors, but prepared for cable exit in both ends (max. 4 sensors).

15) To choose speed control and fittings.

16) P1D Clean cylinders have factory installed nickel plated versions of the PTF series.

17) Not available with P1D Flexible Porting bore 32-63 mm.

18) Valid for bore 32-100 mm.

19) Only for piston rod material type C and R.

20) Piston in extended position with unactuated valve.

21) The standard cable length is 0.277 m. However, P1D Clean is supplied with 1 m cable length.

22) If stainless steel end cover screws are selected, the piston rod nuts are also supplied in stainless steel.

23) For operation with dry piston rod. Intended for variants P1D-S, P1D-C, P1D-F, P1D-T and P1D-V

24) The seal system for low pressure hydraulics demands a hard chromed surface for proper function.

25) The metal scraper ring requires a hard-chromium plated piston rod. Intended for variants P1D-S, P1D-T and P1D-V.

26) FPM scraper should be chosen for higher chemical resistance on standard temperature versions only.

D

Pneumatic Cylinders

DZ Series

Ø 125-320mm bore size

Standard Cylinder Ø125-320mm

to ISO 15552
(ISO 6431)
CETOP RP53P

Series DZ....

D

Versions:
double acting with cushioning

for contactless position sensing

ATEX-Version (Ex)
(Series DZ5...)

Special Versions:
– to CETOP RP53P (piston rod thread M24x2)
– with through piston rod

– longer cushion strokes - on request
– without adjustable end cushioning - on request
– versions for application at approx. +80° to 150°C - on request

Delivery includes:
1 Cylinder
1 Hexagon nut for piston rod thread

Magnetic switches are not included - please order these separately.

Characteristics

Characteristics	Symbol	Unit	Description				
Type			Cylinder				
Series			DZ1, DZ5				
System			Piston rod cylinder Double acting with cushioning				
Mounting			See drawing				
Tube connection			Thread				
Ambient temperatur range	T_{min}	°C	-20	Note: When using below freezing point (°C) it is necessary to consult us			
	T_{max}	°C	+80				
Medium temperatur range	T_{max}	°C	+80				
Weight (mass)		kg	See table				
Installation			In any position				
Medium			Filtered and lubricated or filtered and unlubricated compressed air				
Lubrication			Oil mist lubrication compatible with Buna N				
Material							
Cylinder tube			Aluminium, anodized				
Front/Rear end caps			Aluminium, anodized				
Piston rod			Steel, hard-chrome plated				
Pneumatic Characteristics							
Nominal pressure	p_n	bar	6				
Operating pressure range	p_{min}	bar	1				
	p_{max}	bar	10				
Piston diameter		mm	125	160	200	250	320
Port size			G 1/2	G 3/4	G 3/4	G 1	G1
Piston rod diameter		mm	32	40	40	50	63
Piston rod thread			M27x2**	M36x2	M36x2	M42x2	M48x2
Stroke length		mm	For standard stroke lengths see order instructions max. 2000mm				
Piston force and air consumption							
Cushioning			At both ends, infinitely variable				
Cushioning stroke		Cyl. Ø	125	160	200	250	320
		mm	42	52	52	52	50

** Standard piston rod thread M27x2
– on request M24x2 to CETOP RP53P can also be delivered.

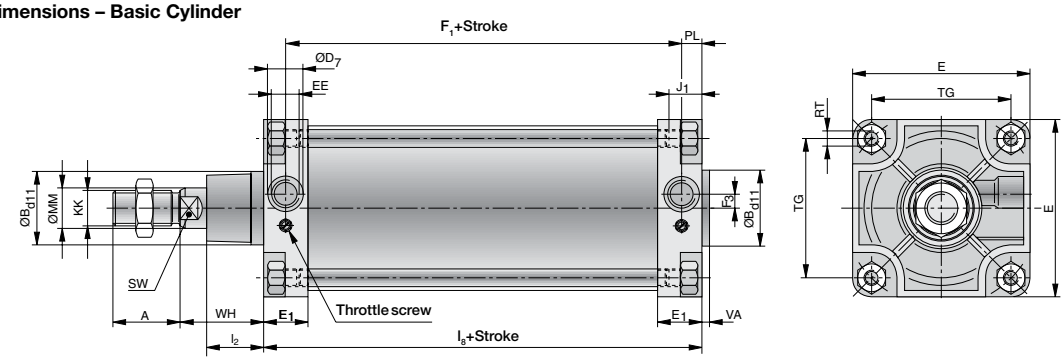
Weight (mass) kg

Cylinder version	Cylinder diameter									
	Ø125		Ø160		Ø200		Ø250		Ø320	
	1*	2*	1*	2*	1*	2*	1*	2*	1*	2*
Standard Type DZ	7.200	1.300	12.500	2.050	20.000	2.200	35.000	4.000	66.000	6.000

* 1 = Weight for cylinder with 100 mm stroke
2 = Weight for further 100 mm stroke length

Mounting	Cylinder diameter				
	Ø125	Ø160	Ø200	Ø250	Ø320
A	2.100	3.800	5.000	9.700	17.000
B	1.400	2.600	4.100	7.100	31.000
BA	1.600	2.700	4.200	15.700	33.000
BAS	1.600	2.600	11.300	19.000	30.000
C	1.400	7.200	12.200	19.200	38.000
D	1.400	7.200	12.200	19.200	38.000
EN	3.300	6.100	8.100	14.800	16.000

Dimensions – Basic Cylinder



Dimension Table (mm) – for Basic Cylinder

Cyl. Ø	A	ØB$_{d11}$	ØD$_7$	E	E$_1$	F$_1$ + Stroke	F$_3$	J$_1$ max.	l$_2$	l$_8$ + Stroke	EE	KK		PL	RT	SW	TG	VA	WH
125	54	60	28	140	35	122	11	18	45	160	G1/2	M27x2*	32	19	M12	27	110	6	65
160	72	65	33	180	45	130	11	23	50	180	G3/4	M36x2	40	25	M16	36	140	6	80
200	72	75	33	220	45	130	15	23	60	180	G3/4	M36x2	40	25	M16	36	175	6	95
250	84	90	40	280	64	136	21	27	70	200	G 1	M42x2	50	32	M20	46	220	10	105
320	96	110	44	340	55	158	–	28	89,5	220	G1	M48x2	63	31	M24	55	270	9,5	120

* Standard piston rod thread M27x2 - on request M24x2 to CETOP RP53P can also be deliverd

Accessories

Piston Rod Eye

Piston Rod Clevis

Compensating Coupling

Coupling

Magnetic Switch

Pivot for Mounting B

Pivot for Mounting E

Standard Cylinder Ø 125 mm

Series DZ5.../....FSE

D

Version:
with locking unit – locks if pressure drops

double acting with cushioning

for contactless position sensing

For further technical informations and examples see page 114, 115

Characteristics

Characteristics	Symbol	Unit	Description
General			
Benennung			Cylinder with locking unit
Type			Piston rod cylinder
Series			DZ5125/....-FSE
Locking unit			FSE- locks if pressure drops
Material FSE			
Cartridge			Aluminium, anodised
Housing			Aluminium, anodised
Clamping jaw			Ms
Cylinder piston rod			Steel, high-alloy
FSE unlocking pressure		bar	≥4 to 10
Cylinder diameter		mm	125
Pilot air connection			G1/8
Locking force, static **)		N	7000

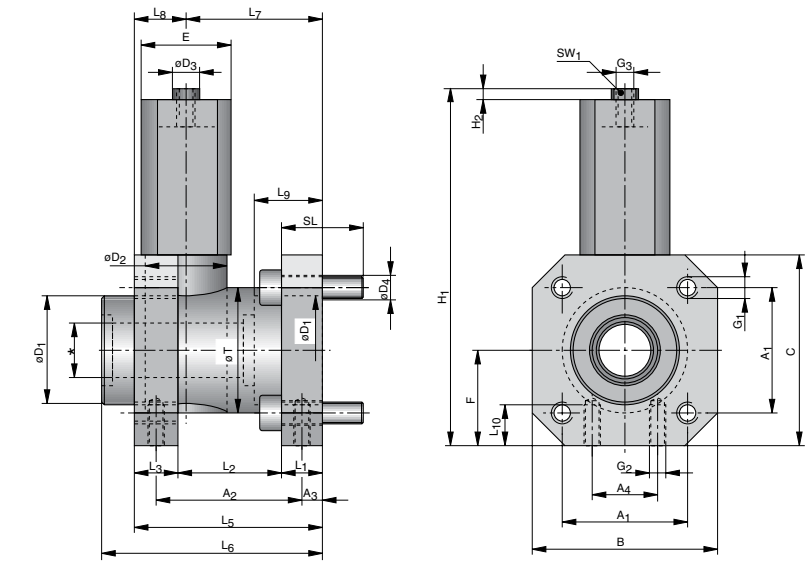
For all other dimensions for cylinders and cylinder mountings see page 60, 61

Weight (mass) kg

Description	Cylinder diameter (mm)
	125
Locking unit	1.80
Basic cylinder*)	7.87

*) with 100 mm stroke and longer piston rod

Dimensions – Locking unit FSE-..., Ø125 mm



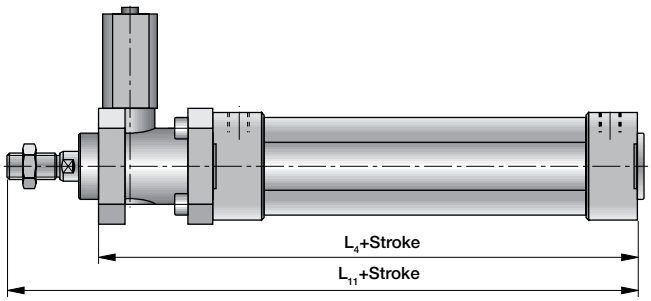
* Piston rod diameter

**) Note:

The holding force quoted relates to a static load. If this load is exceeded, slippage can occur. Any dynamic forces occurring in operation must not exceed the static holding force.
In clamped operating mode, if the load is fluctuatung, the clamping unit is not free from play. The cylinder is not
suitable for positioning tasks.

Actuation:
The clamping unit must only be released when both cylinder chambers are pressurised, otherwise there is danger of an accident from the jerky movement of the piston rod. Shutting off the compressed air supply at both ends with a 5/3 way valve provides adequate safety only for a short time.

Dimensions of Cylinder with Locking Unit FSE-..., Ø125 mm



For all other dimensions for cylinders and cylinder mountings see page 61, 64-65

Dimensions Table (mm) – for Locking Unit FSE-... and Dimensions including Cylinder

Cyl. Ø	A_1	A_2	A_3	A_4	B	C	$ØD_1$	$ØD_2$	$ØD_3$	$ØD_4$	E	F	G_1	G_2	G_3
125	110	95	11	75	140	150	60	65	19	13	65	75	M12	M10	G1/8

Cyl. Ø	H_1	H_2	L_1	L_2	L_3	L_4 +Stroke	L_5	L_6	L_7	L_8	L_9	L_{10}	L_{11} +Stroke	SL	SW1	ØT
125	223.5	4	25	70	27	282	122	154	85	37	45.5	20	388	45	17	80

Accessories

Piston Rod Eye

Piston Rod Clevis

Compensating Coupling

Coupling

Magnetic Switch

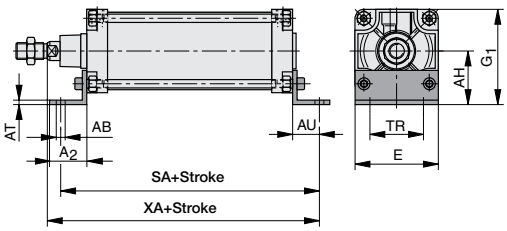
Pivot for Mounting B

Pivot for Mounting E

D

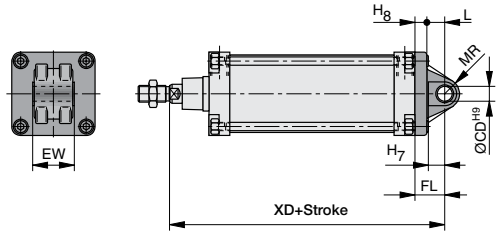
Mountings – Series DZ...., Ø 125 – 320 mm

Dimensions for Mounting A



Material: steel, passivated

Dimensions for Mounting BA



Material: cast aluminium

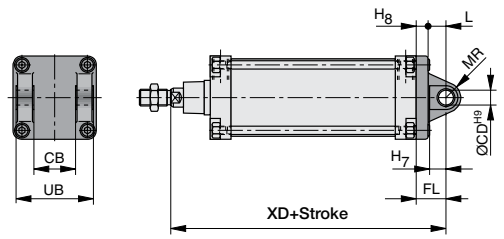
Dimensions Table (mm) – for Mounting A

Cyl. Ø	A_2	E	G_1	AB	AH	AT	AU	SA +Stroe	TR	XA +Stroe
125	60	140	160	16	90	8	45	250	90	270
160	80	180	205	18	115	8	60	300	115	320
200	100	220	245	22	135	9	70	320	135	345
250	110	280	305	26	165	10	75	350	165	380
320	130	353	370	35	200	23	85	390	200	425

Dimensions Table (mm) – for Mounting BA

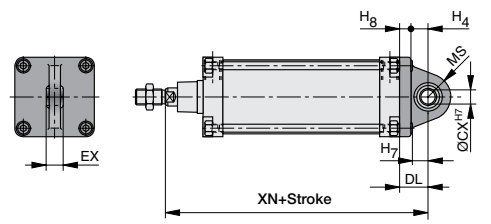
Cyl. Ø	H_7	H_8	L	CD^{H9}	EW	FL	MR	XD +Stroke
125	27.5	20	30	25	70	50	25	275
160	28.5	20	35	30	90	55	30	315
200	28.5	25	35	30	90	60	31	335
250	39	25	45	40	110	70	41	375
320	26	30	50	45	120	80	46	420

Dimensions for Mounting B



Material: cast aluminium

Dimensions for Mounting BAS



Material: cast aluminium

Dimensions Table (mm) – for Mounting B

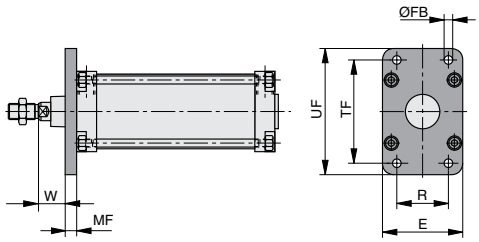
Cyl. Ø	H_7	H_8	L	CD^{H9}	CB	FL	MR	UB	XD +Stroke
125	27,5	20	30	25	70	50	25	130	275
160	28,5	20	35	30	90	55	30	170	315
200	28,5	25	35	30	90	60	31	170	335
250	25	25	45	40	110	70	41	200	375
320	26	30	50	45	120	80	46	220	420

Dimensions Table (mm) – for Mounting BAS

Cyl. Ø	H_4	H_7	H_8	$ØCX^{H7}$	DL	EX	MS	XN +Stroke
125	30	27,5	20	25	50	31	40	275
160	35	28,5	20	30	55	37	48	315
200	36	33	24	35	60	43	47	335
250	42	39	28	40	70	49	53	375
320	50	26	30	50	80	60	63	420

Mountings – Series DZ...., Ø 125 – 320 mm

Dimensions for Mounting C

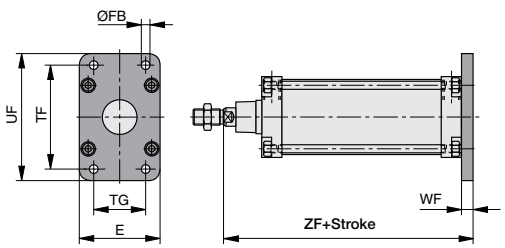


Material: Ø125 cast aluminium
Ø160 - Ø320 steel, passivated

Dimension Table (mm) – for Mounting C

Cyl. Ø	E	R	W	ØFB	MF	TF	UF
125	145	90	45	16	20	180	220
160	180	115	60	18	20	230	275
200	220	135	70	22	25	270	315
250	280	165	80	26	25	330	380
320	353	200	90	33	30	400	475

Dimensions for Mounting D

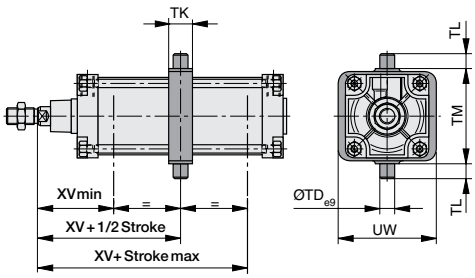


Material: Ø125 cast aluminium
Ø160 - Ø320 steel, passivated

Dimension Table (mm) – for Mounting D

Cyl. Ø	E	ØFB	TF	TG	UF	WF	ZF +Stro-ke
125	145	16	180	90	220	20	245
160	180	18	230	115	275	20	280
200	220	22	270	135	315	25	300
250	280	26	330	165	380	25	330
320	353	33	400	200	475	30	370

Dimensions for Mounting EN



Material: nodular graphite cast iron, passivated

* Position centre trunnion mounting

Standard position: Type EN1 – The taps of the EN attachment are horizontally aligned to the air supply
Option: Type EN2 – The taps of the EN attachment are vertically aligned to the air supply

Dimension Table (mm) – for Mounting EN

Cyl. Ø	TD_{e9}	TK	TL	TM	UW	XV_{min}	XV +1/2 Stroke	XV_{max} + stroke
125	25	32	25	160	155	116	145	174
160	32	40	32	200	190	145	170	195
200	32	40	32	250	240	160	185	210
250	40	50	40	320	296	194	205	216
320	50	70	50	400	400	210	230	250

Note:

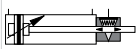
When ordering please give exact dimension XV+ 1/2 Hub. Mounting is assembled when delivered.

Instructions for mounting EN:

In order to avoid faulty operation of the magnetic switches, a min. distance of 10 to 20 mm has to be kept between switch and EN-mounting when fastening them to the cylinder.

D

Order Instructions – Basic Cylinder, Series DZ...., Ø 125 – 320 mm

System	Symbol	Standard	Piston-Ø	Order instructions Type	Order-No.
Double acting with adjustable end cushioning		ISO	125	DZ1125/....	PA53530-....
		CETOP	125	DZ1125/....	PA53500-....
		ISO	160	DZ1160/....	PA54000-....
		ISO	200	DZ1200/....	PA54500-....
		ISO	250	DZ1250/....	PA55000-....
		ISO	320	DZ1320/....	PA55500-....
Double acting with adjustable end cushioning, for contactless position sensing		ISO	125	DZ5125/....	PA53540-....
		CETOP	125	DZ5125/....	PA53510-....
		ISO	160	DZ5160/....	PA54010-....
		ISO	200	DZ5200/....	PA54510-....
		ISO	250	DZ5250/....	PA55010-....
		ISO	320	DZ5320/....	PA55520-....
With locking unit Double acting with adjustable end cushioning, for contactless position sensing		ISO	125	DZ5125/....-FSE	PA64027-....
		CETOP	125	DZ5125/....-FSE	PA64017-....

Complete type designation and order no. with stroke length in mm (4-digit)

Standard stroke length 0025, 0050, 0080, 0100, 0125, 0160, 0200, 0250, 0320, 0400, 0500 delivered preferably

Order Instructions – Cylinder with Mounting EN, Series DZ...., Ø 125 – 320 mm

System	Symbol	Standard	Piston-Ø	Order instructions Type	Order-No.
Double acting with adjustable end cushioning		ISO	125	DZ1125EN/.../....	PA53536-....
		CETOP	125	DZ1125EN/.../....	PA53506-....
		ISO	160	DZ1160EN/.../...	PA54006-.../...
		ISO	200	DZ1200EN/.../...	PA54506-.../...
		ISO	250	DZ1250EN/.../...	PA55006-.../...
Double acting with adjustable end cushioning, for contactless position sensing		ISO	125	DZ5125EN/.../...	PA53546-.../...
		CETOP	125	DZ5125EN/.../...	PA53516-.../...
		ISO	160	DZ5160EN/.../...	PA54016-.../...
		ISO	200	DZ5200EN/.../...	PA54516-.../...
		ISO	250	DZ5250EN/.../...	PA55016-.../...

Complete type designation and order no. with stroke length in mm (3-digits)

Give dimension XV+1/2Stroke with type designation and order no.

Cylinder-Ø 320 mm on request

Ordering Example:
Basic Cylinder: DZ5125/0500 PA 53510-0500

Order Instructions – Cylinder Mountings

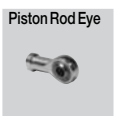
Description	Order-No.				
	Ø125	Ø160	Ø200	Ø250	Ø320
Foot mounting A-...	PD 22026	PD 22027	PD 24792	PD 25758	KL9139
Rear trunnion mounting B-...	PD 22034	PD 22035	PD 24990	PD 25710	KL9137
Rear trunnion mounting BA-...	PD 23418	PD 22628	PD 24999	PD 25759	KL9135
Rear trunnion mounting BAS-...	PD 23849	PD 23850	PD 25766	PD 25760	KL9136
Front flange mounting C-...	PD 23409	PD 23410	PD 24924	PD 25761	KL9140
Rear flange mounting D-...	PD 23409	PD 23410	PD 24924	PD 25761	KL9140
Centre trunnion mounting EN-...*	KL9240	KL9241	KL9242	KL9243	KL9138
Security bolt for mountings B, BA, BAS	PD 22598	PD 22599	PD 22599	KY 8658	KL9141

*** Order information for cylinders with EN-mountings**
When ordering, please indicate the position of the centre trunnion mounting

Standard position: Type EN1 The taps of the EN attachment are horizontally aligned to the air supply

Option: Type EN2
The taps of the EN attachment are vertically aligned to the air supply

Accessories



D

E

Pneumatic Cylinders

AZ Series

Ø 32-100mm bore size

Standard Cylinder Ø 32-100mm

to ISO 15552 (ISO 6431) VDMA 24562 and CETOP RP43P

E

Series AZ....

Versions:
- **double acting with cushioning**
- **for contactless position sensing**
- **ATEX-Version** ⟨Ex⟩

Special Versions:
- Viton version for high temperature range (+150°)
- With through piston rod
- With additional piston rod
- With locking unit
- Version H for hydraulic operation (p_{max} = 10 bar)
- Tie rod version
- With metal wiper
- Various piston rod extensions
- Various piston rod materials
- With adaptor plate for valve mounting

The delivery includes:
1 Cylinder
1 Hexagon nut for piston rod thread

Magnetic switches are not included - please order these separately.

Characteristics

Characteristics	Symbol	Unit	Description					
General Features								
Type			Cylinder					
Series			AZ					
System			Piston rod cylinder					
AZ5..., AZZ5... AZZ5.../..../....			Double acting with cushioning Multi position cylinder					
AZD5...			With through piston rod Double acting with cushioning					
AZV5...			Non-rotating Double acting with cushioning					
AZ35...			Non-rotating, with through piston rod, double acting with cushioning					
AZ45...			Non-rotating, with through piston rod, double acting with cushioning					
Mounting			See drawing					
Tube connection			Thread					
Ambient temperature range	T_{min} T_{max}	°C °C	-20 +80	Note: When using below freezing point (°C) it is necessary to consult us				
Medium temperature range	T_{max}	°C	+80					
Weight (mass)		kg	See table					
Installation			In any position					
Medium			Filtered and lubricated or filtered and unlubricated compressed air					
Lubrication			Oil mist lubrication compatible with Buna N					
Material								
Cylinder tube			Aluminium, anodized					
Front/Rear end caps			Cast Aluminium					
Piston rod			Steel, high-alloy – Series AZ Steel, hard-chrome plated – Series AZV					
Pneumatic Characteristics								
Nominal pressure	p_n	bar	6					
Operating pressure range	p_{min} p_{max}	bar bar	0,5 10					
Piston diameter		mm	32	40	50	63	80	100
Port size			G1/8	G1/4	G1/4	G3/8	G3/8	G1/2
Piston rod diameter Series AZ Series AZV		 mm mm	 12 8	 16 10	 20 12	 20 16	 25 20	 25 20
Piston rod thread			M10 x1.25	M12 x1.25	M16 x1.5	M16 x1.5	M20 x1.5	M20 x1.5
Stroke length		mm	For standard stroke lengths see order instructions max. 2000mm, longer strokes on request					
Piston force and air consumption								
Compression force AZV* AZ3* AZ4*		N N N	430 374 380	680 570 590	1060 890 940	1680 1510 1466	2714 2464 2375	4240 4002 3900
Tensile force AZV* AZ3* AZ4*		N N N	380 380 380	590 590 590	940 940 940	1466 1466 1466	2375 2375 2375	3900 3900 3900
Cushioning		mm	At both ends, infinitely variable					
Cushioned stroke Series AZ		mm	23	23	23	23	37	37
Cushioned stroke Series ZV		mm	20	25	25	25	28	30

*6 bar

Weight (mass) kg

Cylinder version	Cylinder diameter											
	Ø32		Ø40		Ø50		Ø63		Ø80		Ø100	
	1*	2*	1*	2*	1*	2*	1*	2*	1*	2*	1*	2*
Standard Type AZ	0.770	0.220	1.200	0.340	1.740	0.480	2.500	0.610	3.680	0.880	5.200	1.130
with through piston rod Type AZD	0.960	0.250	1.520	0.490	2.260	0.720	3.060	0.850	4.540	1.260	6.190	1.500
non-rotating Type AZV	0.800	0.250	1.000	0.350	1.700	0.500	2.600	0.600	4.200	0.900	6.200	1.000
non-rotating with through piston rod Type AZ3	0.800	0.250	1.000	0.350	1.700	0.500	2.600	0.600	4.200	0.900	6.200	1.000
non-rotating with through piston rods Type AZ4	1.000	0.300	1.400	0.400	2.300	0.600	3.200	0.900	5.600	1.400	7.400	1.500
multiple pos. cyl. Typ ZZ	0.950	0.250	1.300	0.550	2.200	0.650	2.800	0.750	4.600	1.150	6.700	1.400

* 1 = Cylinder weight (100 mm stroke)
2 = Weight per further 100 mm stroke length

Mounting	Cylinder diameter					
	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
A	0.150	0.190	0.340	0.390	0.790	1.000
B	0.070	0.090	0.170	0.220	0.490	0.740
BA	0.100	0.130	0.210	0.300	0.570	0.910
BAS	0.100	0.150	0.220	0.320	0.560	0.860
C	0.100	0.120	0.230	0.280	0.620	0.780
D	0.100	0.120	0.230	0.280	0.620	0.780
EN	0.110	0.180	0.230	0.390	0.530	0.720
EN for series AZZ	0.110	0.290	0.330	0.650	0.830	1.560

Dimensions (mm) for Special Piston Rod Threads and Thread Length

Piston Rod with External Thread (mm)			
Cylinder-Ø	Special thread KK	Standard thread KK	SW
32	M10x1.5	M10x1.25	10
40	M12x1.75	M12x1.25	13
50	M16x2	M16x1.5	17
63	M16x2	M16x1.5	17
80	M20x2.5	M20x1.5	22
100	M20x2.5	M20x1.5	22
External Thread Length of the Piston Rod (mm)			
Cylinder-Ø	$AM_{min.}$	$AM_{Standard}$	$AM_{max.}$
32	12	22	99
40	16	24	99
50	20	32	99
63	20	32	99
80	25	40	99
100	25	40	99
Internal Thread Length of the Piston Rod (mm)			
Cylinder-Ø	Internal thread KK	Thread depth $AF_{min.}$	Core hole depth
32	M6x1	13	18
40	M8x1,25	16	23
50	M10x1,5	20	28
63	M10x1,5	20	28
80	M12x1,75	24	32
100	M12x1,75	24	32

Note:
In the configuration of a cylinder with through piston rod, Series AZD, the assumption is that both piston rods are identical. Only one is configured and this applies to both piston rods. If two different piston rods are required, a special cylinder must be ordered. Special cylinders are not configurable.

The new cylinder profile makes position sensing possible with magnetic switches in either dovetail slot version (Type RS, ES) or T-slot version (Type RST, EST).

One or more magnetic proximity sensors (depending on stroke length) can be mounted in the grooves in the cylinder profile, for sensing the end positions or intermediate positions of the piston.

Profile AZ Basic Cylinder

Ø 32

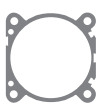
Ø 40

Ø 50

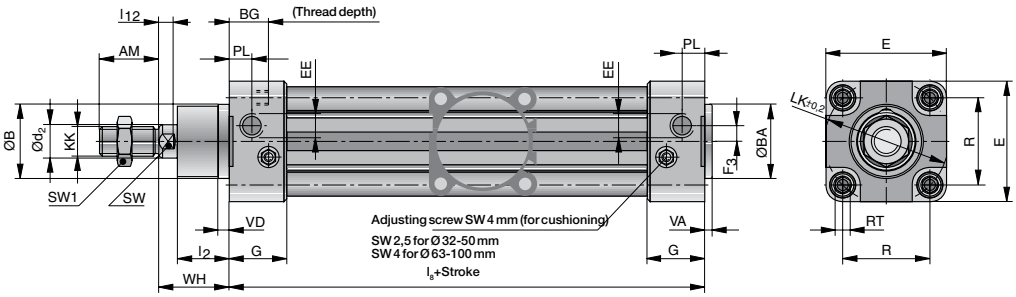
Ø63

Ø80

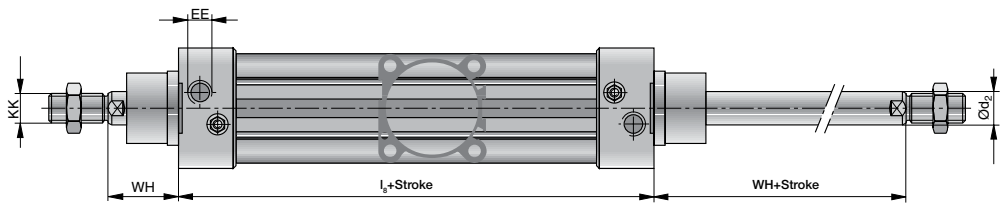
Ø100



Dimensions for Basic Cylinder, Series AZ...., Ø 32 – 100 mm



Dimensions – Basic Cylinder with Through Piston Rod, Series AZD...., Ø 32 – 100 mm



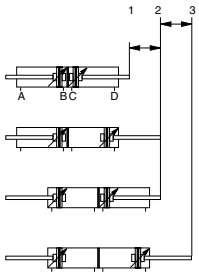
Dimension Table (mm) – Series AZ...., AZD...., AZZ....

Cyl. Ø	$ØB_{d11}$	$Ød_2$	E	F_3	G	l_2	l_8 +Stroke	l_{12}	R	AM	$ØBA_{d11}$	BG
32	30	12	47	4.5	30.5	20	94	6	32.5	22	30	16
40	35	16	55	5.3	34	20.5	105	6.5	38	24	35	16
50	40	20	65	8.5	31	28	106	8	46.5	32	40	16
63	45	20	78	8	33	26	121	8	56.5	32	45	16
80	45	25	95	9	35.5	32.5	128	10	72	40	45	17
100	55	25	115	13	37	37.5	138	10	89	40	55	17

Multiple Position Cylinder

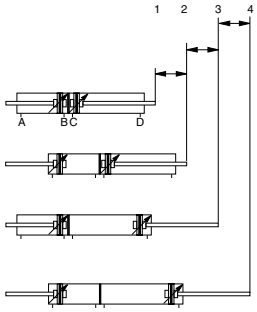
A three- or four-position cylinder consists of two separate cylinders whose piston rods extend in opposite directions. Depending on the control system and the division of the stroke length, this type of cylinder can provide up to four positions, with each position defined exactly by a stop. Note that when a piston rod end is fixed, the cylinder tube itself carries out the movement and therefore requires flexible air connections.

Arrangement for 3 positions



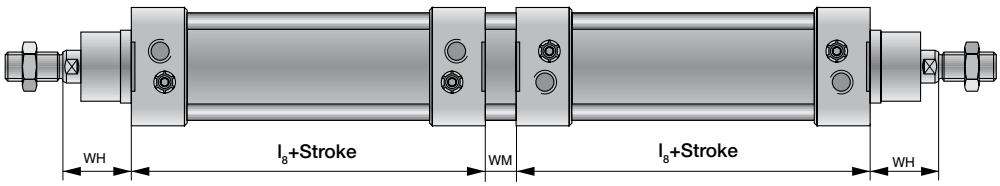
Two cylinders series AZ of the same stroke length are connected together.

Arrangement for 4 positions



Two cylinders series AZ of different stroke lengths are connected together.

Dimensions – Multiple Position Cylinder, Series AZZ...., Ø 32 – 100 mm



Cyl. Ø	EE	ØLK	KK	PL	RT	SW	SW_1	VA	VD	WH	WM
32	G1/8	46	M10x1.25	20	M6	10	17	4	5	26	12
40	G1/4	54	M12x1.25	14.5	M6	13	19	4	4.5	30	12
50	G1/4	66	M16x1.5	16	M8	17	24	4	6	37	15
63	G3/8	80	M16x1.5	16	M8	17	24	4	6	37	14
80	G3/8	102	M20x1.5	20.5	M10	22	30	4	6	46	18
100	G1/2	126	M20x1.5	19	M10	22	30	4	6	51	18

Accessories

Piston Rod Eye

Piston Rod Clevis

Compensating Coupling

Coupling

Magnetic Switch

Adapter plate for Mounting

Pivot for Mounting B

Pivot for Mounting E

Standard Cylinder Ø 32-100 mm

Series AZF

E

Version:
- **with locking unit – locks if pressure drops**
- **double acting with cushioning**
- **for contactless position sensing**

For further technical informations and examples see page 114, 115

****) Note:**

The holding force quoted relates to a static load. If this load is exceeded, slippage can occur. Any dynamic forces occurring in operation must not exceed the static holding force.
In clamped operating mode, if the load is fluctuatung, the clamping unit is not free from play. The cylinder is not suitable for positioning tasks.

Actuation:
The clamping unit must only be released when both cylinder chambers are pressurised, otherwise there is danger of an accident from the jerky movement of the piston rod. Shutting off the compressed air supply at both ends with a 5/3 way valve provides adequate safety only for a short time.

Characteristics

Characteristics	Symbol	Unit	Description					
General								
Description			Cylinder with locking unit					
Type			Piston rod cylinder					
Series			AZF					
Locking unit			Locks if pressure drops					
Materials – Locking unit								
Cartridge			Aluminium, anodised					
Housing			Aluminium, anodised					
Clamping jaw			Ms					
Cylinder piston rod			Steel, high-alloy					
FSE unlocking pressure		bar	≥ 4 to 10					
Cylinder diameter		mm	32	40	50	63	80	100
Cylinder operating pressure			M5	M5	G1/8	G1/8	G1/8	G1/8
Locking force, static **)		N	600	1000	1500	2200	3000	5000

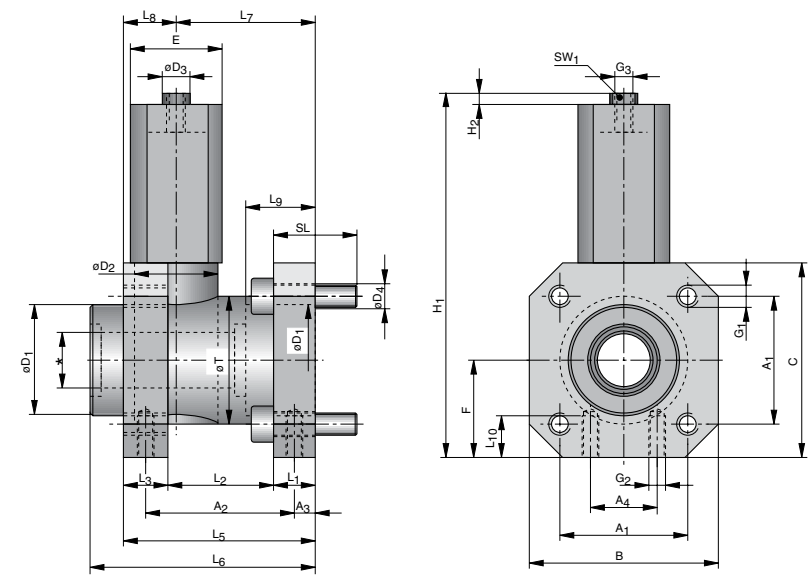
For all other dimensions for cylinders and cylinder mountings see page 46, 47

Weight (mass) kg

Description	Cylinder diameter (mm)					
	32	40	50	63	80	100
Locking unit	0.60	0.80	1.00	1.20	1.40	1.60
Basic cylinder *)	0.82	1.26	1.82	2.40	4.30	5.80

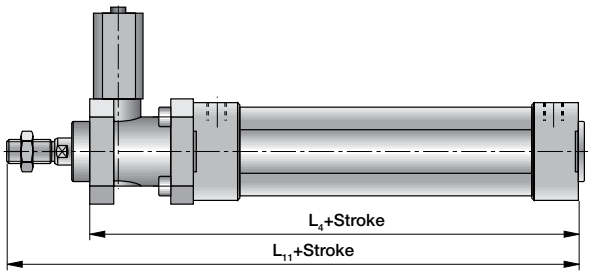
*) with 100 mm stroke and longer piston rod

Dimensions – Locking unit FSE...



* Piston rod diameter

Dimensions of Cylinder with Locking Unit FSE..., Ø 32 – 100 mm



For all other dimensions for cylinders and cylinder mountings see page 48, 49, 52, 53

Dimension Table (mm) – for Locking Unit FSE... and Dimensions including Cylinder

Cyl. Ø	A_1	A_2	A_3	A_4	B	C	$ØD_1$	$ØD_2$	$ØD_3$	$ØD_4$	E	F	G_1	G_2	G_3
32	32.5	40	4.2	16	48	50	30	20	10	6.6	22.5	25	M6	M5	M5
40	38	46	4.5	21	56	58	35	24	10	6.6	27.5	29	M6	M5	G1/8
50	46.5	54	11.5	24	68	70	40	30	15	8.5	32.5	35	M8	M6	G1/8
63	56.5	55	7.5	32	82	85	45	38	15	8.5	41	42.5	M8	M8	G1/8
80	72	70	10	44	100	105	45	40	19	11	49	52.5	M10	M8	G1/8
100	89	70	10	60	120	130	55	48	19	11	53	65	M10	M8	G1/8

Cyl. Ø	H_1	H_2	L_1	L_2	L_3	L_4 +Stroke	L_5	L_6	L_7	L_8	L_9	L_{10}	L_{11} +Stroke	SL	SW1	ØT
32	94	4	8	28	12	142	48	58	32	16	20.5	8	183	20	8	34
40	102.5	4	10	33	12	160	55	65	35.5	19.5	22.5	10	205	25	8	42
50	119.5	4	15	39	16	176	70	82	49	21	29.5	12	231	30	13	50
63	138	4	15	40	15	203	70	82	49	21	29.5	12	246	30	13	50
80	152	4	16	58	16	218	90	110	62	28	35.5	16	292	30	17	60
100	193.5	4	16	58	18	230	92	115	65	27	38.5	16	307	30	17	60

Accessories

Piston Rod Eye

Piston Rod Clevis

Compensating Coupling

Coupling

Magnetic Switch

Adapter plate for Mounting

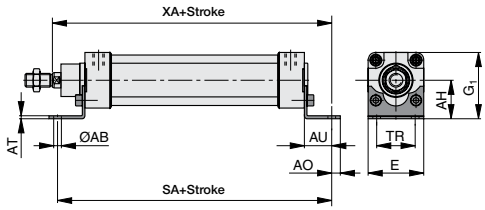
Pivot for Mounting B

Pivot for Mounting E

Mountings – Basic Cylinder, Series AZ...., AZD....., AZZ...., Ø 32 – 100 mm

E

Dimensions for Mounting A



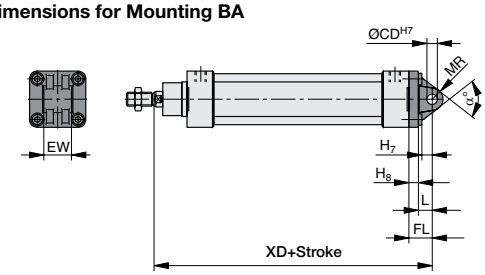
Material: steel passivated

Dimension Table (mm) – for Mounting A

Cyl. Ø	E	G_1	AB	AH	AO	T	AU	SA + Stroke	TR	XA +Stroke
32	47	55.5	7	32	8	4	24	142	32	144
40	53	62.5	9	36	10	4	28	161	36	163
50	65	77.5	9	45	10	5	32	170	45	175
63	75	87.5	9	50	10	5	32	185	50	190
80	95	110.5	12	63	14	6	41	210	63	215
100	115	128.5	14	71	15	6	41	220	75	230

Included in delivery: 2 foot brackets, 4 screws

Dimensions for Mounting BA



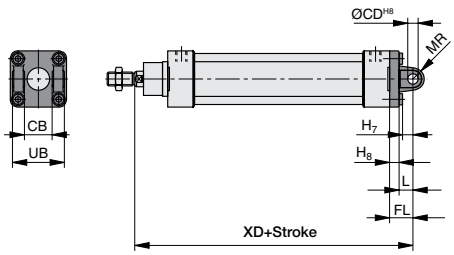
Material: cast aluminium

Dimension Table (mm) – for Mounting BA

Cyl. Ø	H_7	H_8	L	CD^{H7}	EW	FL	MR	XD +Stroke	α°
32	10	10	12	10	26	22	10.5	142	60
40	13	10	15	12	28	25	13	160	60
50	12	11	16	12	32	27	13	170	70
63	17	11	21	16	40	32	17	190	60
80	16	15	21	16	50	36	17	210	70
100	20.5	16	25	20	60	41	21	230	70

Included in delivery: 1 rear trunnion mounting, 4 screws

Dimensions for Mounting B



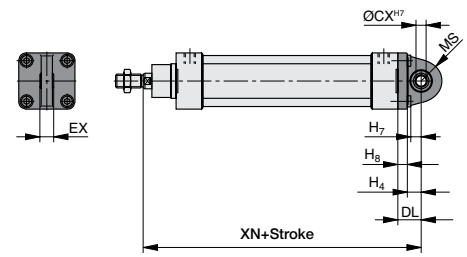
Material: cast aluminium

Dimension Table (mm) – for Mounting B

Cyl. Ø	H_7	H_8	L	CD^{H8}	CB	FL	MR	UB	XD + Stroke
32	10	10	12	10	26	22	9	45	142
40	13	10	15	12	28	25	11	52	160
50	12	11	16	12	32	27	12	60	170
63	17	11	21	16	40	32	15	70	190
80	16	15	22	16	50	36	16	90	210
100	20.5	16	25	20	60	41	20	110	230

Included in delivery: 1 rear trunnion mounting, 4 screws

Dimensions for Mounting BAS
(rear trunnion mounting with spherical bearing)



Material: cast aluminium

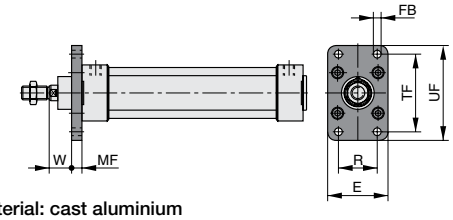
Dimension Table (mm) – for Mounting BAS

Cyl. Ø	H_4	H_6	H_7	CX^{H7}	DL	EX	MS	XN +Stroke
32	12	22	10	10	22	14	18	142
40	15	25	13	12	25	16	21	160
50	16	27	12	12	27	16	23	170
63	21	32	17	16	32	21	27	190
80	21	36	16	26	36	21	29	210
100	25	41	20.5	20	41	25	34	230

Included in delivery: 1 rear trunnion mounting with spherical
bearing, 4 screws

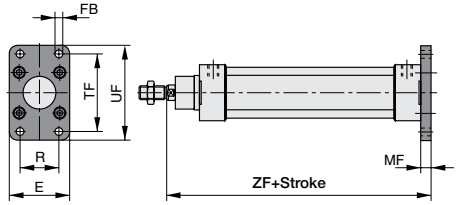
Mounting – Basic Cylinder, Series AZ...., AZD....., AZZ...., Ø 32 – 100 mm

Dimensions for Mounting C



Material: cast aluminium

Dimensions for Mounting D



Material: cast aluminium

Dimension Table (mm) – for Mounting C

Cyl. Ø	E	R	ØFB	MF	TF	UF	W
32	50	32	7	10	64	79	16
40	56	36	9	10	72	90	20
50	70	45	9	12	90	110	25
63	77	50	9	12	100	120	25
80	100	63	12	16	126	153	30
100	120	75	14	16	150	178	35

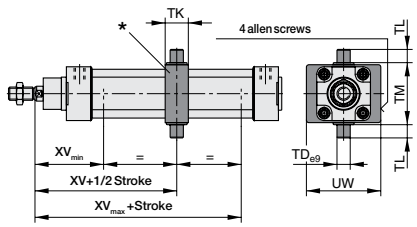
Included in delivery: 1 flange, 4 screws

Dimension Table (mm) – for Mounting D

Cyl. Ø	E	R	ØFB	MF	TF	UF	ZF +Stroke
32	50	32	7	10	64	79	130
40	56	36	9	10	72	90	145
50	70	45	9	12	90	110	155
63	77	50	9	12	100	120	170
80	100	63	12	16	126	153	190
100	120	75	14	16	150	178	205

Included in delivery: 1 flange, 4 screws

Dimensions for Mounting EN for series AZ (profile cylinder barrel version)



Material: cast aluminium

* Position centre trunnion mounting
Standard position: Type EN1 – The taps of the EN attachment are horizontally aligned to the air supply
Option: Type EN2 – The taps of the EN attachment are vertically aligned to the air supply

Dimension Table (mm) – for Mounting EN

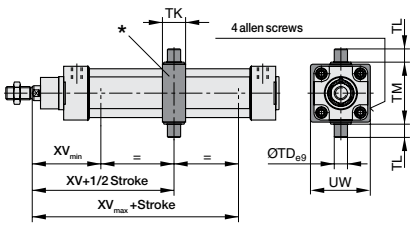
Cyl. Ø	ØTD e9	TK	TL	TM	UW	XV min	XV+ 1/2 Stroke	XV max +Stroke
32	12	25	12	50	65	69	73	77
40	16	28	16	63	75	78	83	87
50	16	28	16	75	85	82	90	98
63	20	36	20	90	100	88	98	107
80	20	36	20	110	120	100	110	120
100	25	48	25	132	135	112	120	128

The trunnion mounting can be moved to any position between XV_{min} and XV_{max} after loosening the clamping screws.

Included in delivery: 1 rear trunnion mounting

As standard, the position of the T-slots and dovetail slots is on the same side as the air connections. Exception: Ø 32 has only T-slots on the same side as the air connections, with a dovetail slot on the underside.

Dimensions for Mounting EN for series AZZ (tie rod version)



Material: SG cast iron, chromated

* Position centre trunnion mounting
Standard position: Type EN1 – The taps of the EN attachment are horizontally aligned to the air supply
Option: Type EN2 – The taps of the EN attachment are vertically aligned to the air supply

Dimension Table (mm) – for Mounting EN

Cyl. Ø	ØTD e9	TK	TL	TM	UW	XV min	XV+ 1/2 Stroke	XV max + Stroke
32	12	15	12	50	46	64	73	82
40	16	20	16	63	59	74	83	91
50	16	20	16	75	69	78	90	102
63	20	25	20	90	84	83	97,5	112
80	20	30	20	110	102	97	110	123
100	25	32	25	132	125	104	120	136

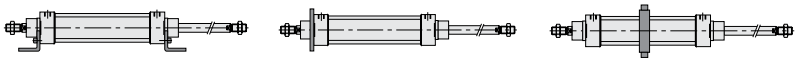
The trunnion mounting can be moved to any position between XV_{min} and XV_{max} after loosening the clamping screws.

Note on EN mounting: To avoid faulty switching, the magnetic switches should be fitted at least 10 to 20 mm away from the EN mounting, depending on cylinder diameter.

Included in delivery: 1 rear trunnion mounting

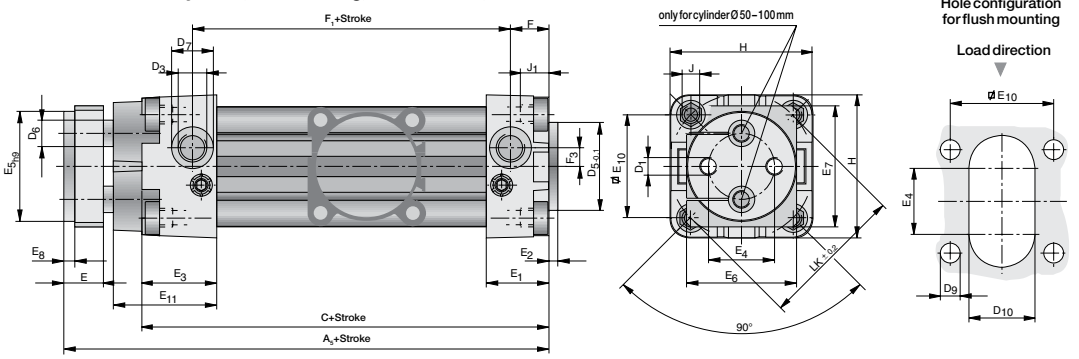
Mountings – Basic Cylinder with Through Piston Rod, Series AZD.... , Ø 32 – 100 mm

Foot mounting A **Front flange mounting C** **Centre trunnion mounting EN**



E

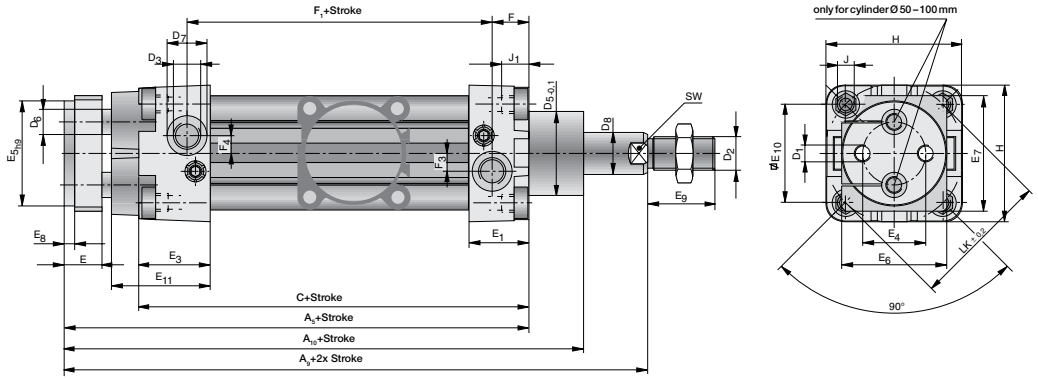
Dimensions – Basic Cylinder, non-rotating, Series AZV...., Ø 32 – 100 mm



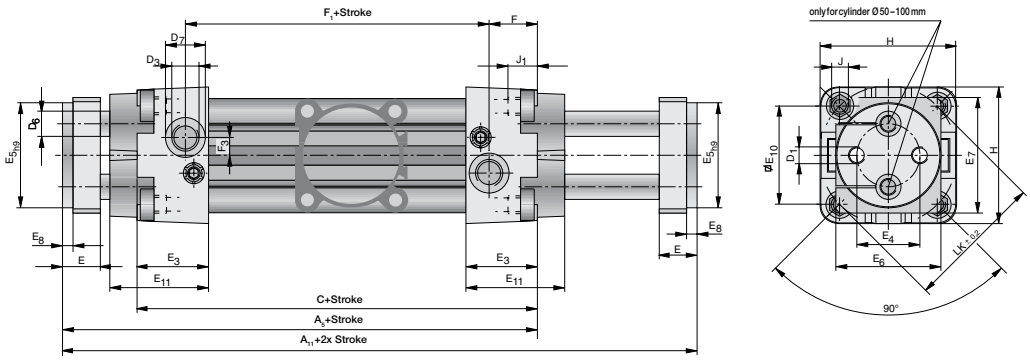
Dimension Table (mm) – Basic Cylinder AZV...., AZ3...., AZ4....

Cyl. Ø	A_5 + Stroke	A_9 + 2x Stroke	A_{10} + Stroke	A_{11} + 2x Stroke	C + Stroke	D_1	D2	D_3	ØD_5	ØD_6	ØD_7	ØD_8	ØD_9	D_{10}	E	E_1	E_2	E_3
32	128	154	146	154	102	M6	M10x1.25	G1/8	30	8	15	12	7	23	15	29	4	26
40	142	172	163	172	112	M8	M12x1.25	G1/4	35	10	19	16	7	25	15	27	4	30
50	151	188	177	185	117	M8	M16x1.5	G1/4	40	12	19	20	9	30	18	29	4	34
63	161	198	187	197	125	M10	M16x1.5	G3/8	45	16	23	20	9	34	22	30	4	34
80	174	220	206	212	136	M12	M20x1.5	G3/8	45	20	23	25	10	38	22	34	4	39
100	181	232	218	219	143	M12	M20x1.5	G1/2	55	20	28	25	10	38	22	35	4	40

Diumensions – Basic Cylinder, non-rotating, with through piston rod, series AZ3...., Ø 32 – 100 mm



Dimensions – Basic Cylinder, non-rotating, with through piston rods, series AZ4...., Ø 32 – 100 mm



Cyl. Ø	ØE4	E5h9	E6	E7	E8	E9	E10	E11	F AZV, AZ3	F AZ4	F1+Stroke AZV, AZ3	F1+Stroke AZ4	F3 AZV, AZ4	F3 AZ3	F4	J	J1max	H	LK	W
32	19	32	32	40	4	20	32.5	34	14.5	17.5	74	75	6	6	6	M6	16	47	46	10
40	22.5	40	40	45	4	24	38	42	16	19	77.5	75	7	7	7	M6	16	53	54	14
50	30	50	50	55	5	32	46.5	47	17.5	23	77	72	9.5	9.5	9.5	M8	16	65	66	17
63	38	63	63	70	5	32	56.5	45	17.5	21.5	87	83	10	10	10	M8	16	75	80	17
80	50	80	80	95	5	40	72	52	20.5	26	90	85	9	9	9	M10	16	95	102	22
100	70	100	100	115	5	40	89	53	19	24.5	100	95	13	13	13	M10	16	115	126	22

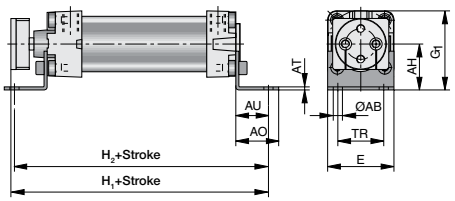
Accessories

Piston Rod Eye	Piston Rod Clevis	Compensating Coupling	Coupling	Magnetic Switch	Adapter plate for Mounting	Pivot for Mounting B	Pivot for Mounting B	
								

E

Mountings – Series AZV...., AZ3...., AZ4...., Ø 32 – 100 mm

Dimensions for Mounting A



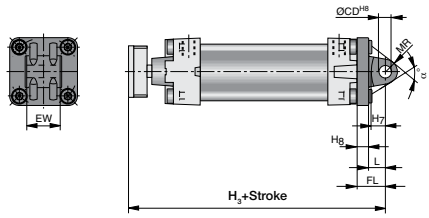
Material: steel, passivated

Dimension Table (mm) – for Mounting A

Cyl. Ø	E	G_1	H_1 + Stroke	H_2 + Stroke	AH	AB	O	AT	AU	TR
32	47	55.5	152	150	32	7	32	4	24	32
40	53	62.5	170	168	36	9	38	4	28	36
50	65	77.5	183	181	45	9	42	5	32	45
63	75	87.5	193	189	50	9	42	5	32	50
80	95	110.5	215	218	63	12	55	6	41	63
100	115	128.5	222	225	71	14	56	6	41	75

Included in delivery: 2 foot brackets, 4 screws

Dimensions for Mounting BA



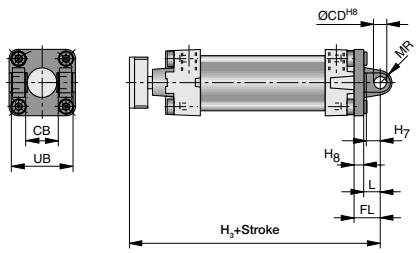
Material: cast aluminium

Dimension Table (mm) – for Mounting BA

Cyl. Ø	H_3 + Stroke	H_7	H_8	L	CD^{H8}	FL	MR	EW	α°
32	150	10	10	12	10	22	10.5	26	60
40	167	13	10	15	12	25	13	28	60
50	178	12	11	16	12	27	13	32	70
63	193	17	11	21	16	32	17	40	60
80	210	16	15	21	16	36	17	50	70
100	222	20.5	16	25	20	41	21	60	70

Included in delivery: 1 rear trunnion mounting, 4 screws

Dimensions for Mounting B



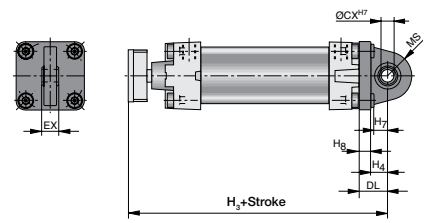
Material: cast aluminium

Dimension Table (mm) – for Mounting B

Cyl. Ø	H_3 + Stroke	H_7	H_8	L	CB	$ØCD^{H8}$	FL	MR	UB
32	150	10	10	12	26	10	22	9	45
40	167	13	10	15	28	12	25	11	52
50	178	12	11	16	32	12	27	12	60
63	193	17	11	21	40	16	32	15	70
80	210	16	15	22	50	16	36	16	90
100	222	20.5	16	25	60	20	41	20	110

Included in delivery: 1 rear trunnion mounting, 4 screws

Dimensions for Mounting BAS
(Rear trunnion mounting with spherical bearing)



Material: cast aluminium

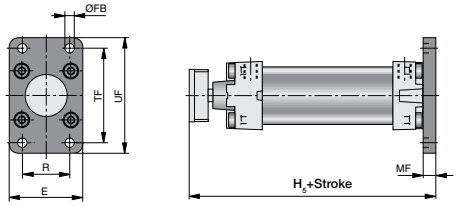
Dimension Table (mm) – for Mounting BAS

Cyl. Ø	H_3 + Stroke	H_4	H_7	H_8	$ØCX^{H7}$	DL	EX	MS
32	150	12	10	10	10	22	14	18
40	167	15	13	10	12	25	16	21
50	178	16	12	11	12	27	16	23
63	193	21	17	11	16	32	21	27
80	210	21	16	15	16	36	21	29
100	222	25	20.5	16	20	41	25	34

Included in delivery: 1 rear trunnion mounting with spherical bearing, 4 screws

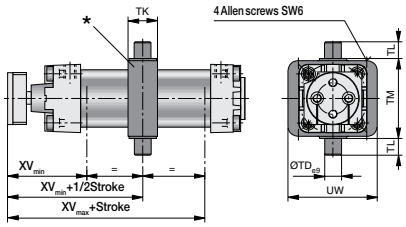
Mountings – Series AZV ...., AZ3...., AZ4...., Ø 32 – 100 mm

Dimensions for Mounting D



Material: cast aluminium

Dimensions for Mounting EN
for series AZ (profile cylinder barrel version)



Material: cast aluminium

* Position centre trunnion mounting
Standard position: Type EN1 – The taps of the EN attachment are horizontally aligned to the air supply
Option: Type EN2 – The taps of the EN attachment are vertically aligned to the air supply

Dimension Table (mm) – for Mounting D

Cyl. Ø	E	H_5 + Stroke	R	ØFB	MF	TF	UF
32	50	138	32	7	10	64	79
40	56	152	36	9	10	72	90
50	70	163	45	9	12	90	110
63	77	173	50	9	12	100	120
80	100	190	63	12	16	126	153
100	120	197	75	14	16	150	178

Included in delivery: 1 flange, 4 screws

Dimension Table (mm) – for Mounting EN

Cyl. Ø	$ØTD_{e9}$	TK	TL	TM	UW	XV_{min}	XV+ 1/Stroke	XV_{max} + Stroke
32	12	25	12	50	65	64	76	87
40	16	28	16	63	75	75	87	99
50	16	28	16	75	85	84	95	106
63	20	36	20	90	100	89	101	112
80	20	36	20	110	120	96	109	121
100	25	48	25	132	135	99	112	125

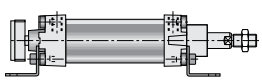
Included in delivery: 1 rear trunnion mounting

After loosening the locking screws, the trunnion mounting is infinitely variable between XV_{min} and XV_{max}.

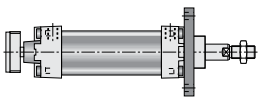
As standard, the position of the T-slots and dovetail slots is on the same side as the air connections. Exception: Ø 32 has only T-slots on the same side as the air connections, with a dovetail slot on the underside.

Diumensions – Basic Cylinder, with through piston rod, series AZ3...., Ø 32 – 100 mm

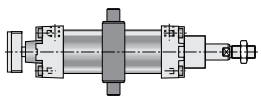
Foot mounting A



Rear flange mounting D

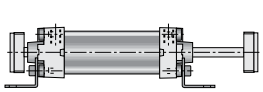


Centre trunnion mounting EN

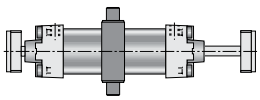


Diumensions – Basic Cylinder, with through piston rods, series AZ4...., Ø 32 – 100 mm

Foot mounting A



Centre trunnion mounting EN

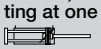


E

Order Instructions for Basic Cylinder Series AZ...., Ø 32 – 100 mm

AZ			5	032		1000		000	-	0	0	0	0	0	X	-12

Series	
AZ	Standard (profile cylinder barrel version)
AZZ	Tie rod version

Type of piston rod	
	Standard (with profile tube) 
D	With Through Piston Rod 
V	With non-rotating Piston Rod 
3	With through piston rod, non-rotating at one end 
4	With through piston rod, non-rotating at both ends 

Locking Unit	
	without (Standard)
F	with Locking Unit 

System	
5	Double acting with adjustable end cushioning, for contactless position sensing

*** Note for piston rod version:**
In the configuration of a cylinder with through piston rod, Series AZD, the assumption is that both piston rods are identical. Only one is configured and this applies to both piston rods. If two different piston rods are required, a special cylinder must be ordered. Special cylinders are not configurable.

Cylinder Diameter	
032	32 mm
040	40 mm
050	50 mm
063	63 mm
080	80 mm
100	100 mm

Stroke Length
Length in mm (4-digit)

Piston Rod Extension *
Length in mm (3-digit)

External Thread Length of the Piston Rod (optional) *	
Length (2-digit) in mm Details see page 47	
-12	for example 12 mm

Pneumatic cylinders for the Ex-Atmospheres (ATEX)	
X	See ATEX Certification 94/9/EG (ATEX 95)
0	Standard without Ex-Protection

Piston Rod Thread *	
0	External Thread (Standard)
1	Special – External Thread Details see page 47
2	Internal Thread

Piston Rod Material *	
0	Steel, high-alloy (Standard)
1	Steel, high-alloy (V2A)
3	Steel, unalloyed, hard-chrome plated (CK45)

Lubrication	
0	Grease (Standard)

Seal / Wiper	
0	Standard (NBR)
1	Viton (+150°C)
2	NBR with metal wiper
3	Hydraulic (10 bar) with metal wiper

Air connection	
0	Standard
1	at one end in rear end cap, Ø 40 – 100 mm
2	at one end in front end cap, Ø 40 – 100 mm
3	Cylinder tube – 90° rotated
4	Cylinder tube – 180° rotated
5	Cylinder tube – 270° rotated

Standard Stroke Length

0025, 0050, 0080, 0100, 0125, 0160, 0200, 0250, 0320, 0400, 0500 delivered preferably

Order Instructions – Multiple Position Cylinder Series AZZ...., Ø 32 – 100 mm

Order Instructions	AZZ5	PD..../..../....	

Series	
AZZ5	with tie rod

Piston Diameter (mm) Order-No.	
032	PD40351
040	PD40354
050	PD40249
063	PD40357
080	PD40216
100	PD40360

2	Stroke Length Cylinder 1 and 2
1	Length in mm
	Standard Stroke Length 0025, 0050, 0080, 0100, 0125, 0160, 0200, 0250, 0320, 0400, 0500 delivered preferably

Order Instructions:

For standard versions of basic cylinder, Series AZ, see price list (e.g. AZ5032-0125)

Ordering example for a configurable basic cylinder:
- Cylinder with through piston rod
- Double acting with cushioning
- for contactless position sensing
- Diameter 32 mm
- Stroke 125 mm
- Piston rod extension 15 mm (at both ends)
- Air connection at one end in rear end cap
- Viton seals (up to +150 °C)
- Standard lubrication
- Piston rod material, high alloy steel 1.4305
- Piston rod with external thread
- Without EX protection
- External thread length of piston rod 25 mm (at both ends)

Type designation per order code

AZ5032-0125/015-110100-25

Ordering example for a cylinder for use in potentially explosive atmospheres:

Standard Basic Cylinder , Ø 32 mm, ATEX, Series AZ:
AZ5032-0500/000-00000X

*** Order information for cylinders with EN-mountings**
When ordering, please indicate the position of the centre trunnion mounting

Standard position: Type EN1 The taps of the EN attachment are horizontally aligned to the air supply

Option: Type EN2 The taps of the EN attachment are vertically aligned to the air supply

Order Instructions for Cylinder Mountings and Accessories

Description	Order-No. Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
Foot mounting A-..	PD 27917	PD 27918	PD 28072	PD 28073	PD 28074	PD 28075
Rear trunnion mounting B-..	PD 22704	PD 22705	PD 22706	PD 22707	PD 22708	PD 22709
Rear trunnion mounting BA-..	PD 23412	PD 23413	PD 23414	PD 23415	PD 23416	PD 23417
Rear trunnion mounting BAS-..	PD 23843	PD 23844	PD 23845	PD 23846	PD 23847	PD 23848
Front flange mounting C-..	PD 23403	PD 23404	PD 23405	PD 23406	PD 23407	PD 23408
Rear flange mounting D-..	PD 23403	PD 23404	PD 23405	PD 23406	PD 23407	PD 23408
Centre trunnion mounting EN-..* (for the tie rod version AZZ)	KL9234	KL9235	KL9236	KL9237	KL9238	KL9239
Centre trunnion mounting EN-..* (for profile cylinder barrel version AZ)	PD 39195	PD 39196	PD 39197	PD 39198	PD 39199	PD 39200
Security bolt for mountings B, BA, BAS	KY 6153	KY 6154	KY 6157	KY 6156	KY 6158	KY 6159

Piston rod eyes

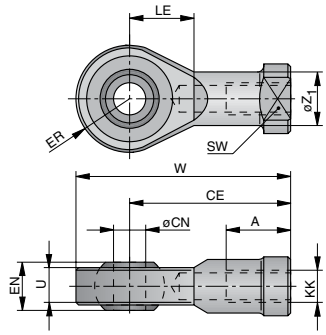
for Cylinder
Ø 10 to 320 mm

– to ISO 8139
– to CETOP RP103P

Series GA-...

E

Dimensions



Material: galvanized steel

Assembly instructions:
When mounting the load avoid lateral forces on the piston rod.

Delivery includes:
1 spherical clevis

Dimension Table (mm)

Type	CN^{H7}	LE	U	EN	ER	W	A	CE	KK	ØZ$_1$	SW
GA-M4	5	9	6	8	9	35	12	27	M4	9	8
GA-M6	6	11	6.75	9	10	40	12	30	M6	10	11
GA-M8	8	13	9	12	12	48	16	36	M8	12.5	14
GA-M10	10	15	10.5	14	14	57	20	43	M10	15	17
GA-M10x1.25	10	15	10.5	14	14	57	20	43	M10x1.25	15	17
GA-M12	12	17	12	16	16	66	22	50	M12	17.5	19
GA-M12x1.25	12	17	12	16	16	66	22	50	M12x1.25	17.5	19
GA-M16	16	22	15	21	21	85	28	64	M16	22	22
GA-M16x1.5	16	22	15	21	21	85	28	64	M16x1.5	22	22
GA-M20x1.5	20	26	18	25	25	102	33	77	M20x1.5	27.5	32
GAN-M24x2	25	31	22	31	$30_{max.}$	$124_{max.}$	42_{min}	94	M24x2	33.5	36
GAN-M27x2	30	36	25	37	$35_{max.}$	$145_{max.}$	$51_{min.}$	110	M27x2	40	41
GAN-M36x2	35	41	28	43	$40_{max.}$	$165_{max.}$	$56_{min.}$	125	M36x2	46	50
GAN-M42x2	40	46	33	49	$45_{max.}$	$187_{max.}$	$60_{min.}$	142	M42x2	53	55
GAN-M48x2	50	59	45	60	$58_{max.}$	$218_{max.}$	$65_{min.}$	160	M48x2	65	65

Order Instructions and Weight

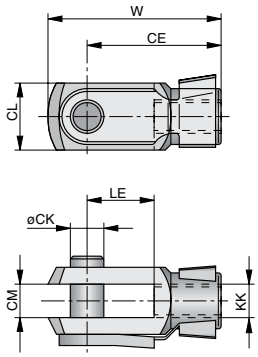
Order Instructions		Weight (mass) (kg)
Type	Order-No.	
GA-M4	KX 6023	0.021
GA-M6	KY 6144	0.025
GA-M8	KY 6145	0.043
GA-M10	KY 6146	0.072
GA-M10x1,25	KY 6147	0.072
GA-M12	KY 6185	0.107
GA-M12x1,25	KY 6148	0.107
GA-M16	KY 6149	0.21
GA-M16x1,5	KY 6150	0.21
GA-M20x1,5	KY 6151	0.38
GAN-M24x2	KY 6152	0.65
GAN-M27x2	KY 6862	1.0
GAN-M36x2	KY 6863	1.6
GAN-M42x2	KY 6864	3.5
GAN-M48x2	KL 9132	5.2

Piston rod clevis

for Cylinder
Ø 10 to 320 mm
– to ISO 8140
– to CETOP RP102P
Series GK-...

E

Dimensions



Material: galvanized steel

Dimension Table (mm)

Type	ØCK	LE	CM	CL	W	CE	KK
GK-M4	4	8	4	8	22	16	M4
GK-M6	6	12	6	12	31	24	M6
GK-M8	8	16	8	16	42	32	M8
GK-M10	10	20	10	20	52	40	M10
GK-M10x1.25	10	20	10	20	52	40	M10x1.25
GK-M12	12	24	12	24	62	48	M12
GK-M12x1.25	12	24	12	24	62	48	M12x1.25
GK-M16	16	32	16	32	83	64	M16
GK-M16x1.5	16	32	16	32	83	64	M16x1.5
GK-M20x1.5	20	40	20	40	105	80	M20x1.5
GKN-M24x2	25	50	25	50	132 max.	100	M24x2
GKN-M27x2	30	54	30	55	148 max.	112	M27x2
GKN-M36x2	35	72	36	70	188 max.	144	M36x2
GKN-M42x2	40	84	40	85	245 max.	168	M42x2
GKN-M48x2	50	96	50	96	277 max.	192	M48x2

Assembly instructions:
On the load side with pin and circlip (supplied).
When mounting the load avoid
lateral forces on the piston rod.

Delivery includes:
1 spherical clevis

From Ø 125 upward, the safety clamp and the pin held with two circlips are omitted.

Order Instructions and Weight

Order Instructions		Weight (mass) (kg)
Type	Order-No.	
GK-M4	KZ 1413	0.008
GK-M6	KY 6132	0.016
GK-M8	KY 6133	0.038
GK-M10	KY 6134	0.08
GK-M10x1.25	KY 6135	0.08
GK-M12	KY 6138	0.125
GK-M12x1.25	KY 6136	0.125
GK-M16	KY 6140	0.3
GK-M16x1.5	KY 6139	0.3
GK-M20x1.5	KY 6141	0.52
GKN-M24x2	KY 6142	1.08
GKN-M27x2	KY 6866	1.5
GKN-M36x2	KY 6867	2.9
GKN-M42x2	KY 6868	6
GKN-M48x2	KL9131	7.9

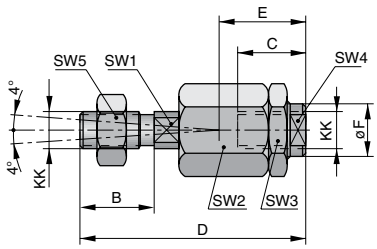
Compensating Coupling

for Piston Rods
Ø 10 to 320 mm
– to ISO 8139
– to CETOP RP103P

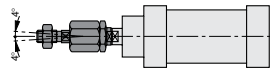
Series AK-...

E

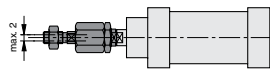
Dimensions



Angular compensation



Radial compensation of the centre axis



Material: Steel
Tensile strength: 500-600 N/mm²

The compensating coupling is used to connect the piston rod end of all types of cylinders to the machine parts which are to be moved.
To compensates for radial and angular misalignments.

Dimension Table (mm)

Type	KK	B	C	D	E	ØF	SW1	SW2	SW3	SW4	SW5
AK-M4	M4	8	14	33	20	SW12	3.2	12	12	12	7
AK-M6	M6	12	11	39	14	8.5	5	13	13	7	10
AK-M8	M8	16	14	55	20	12.4	7	17	17	10	13
AK-M10	M10	20	23	70	31	21	12	30	30	19	17
AK-M10x1.25	M10x1.25	20	23	73	31	21	12	30	30	19	17
AK-M12	M12	24	23	68	31	21	12	30	30	19	19
AK-M12x1.25	M12x1.25	24	23	77	31	21	12	30	30	19	19
AK-M16	M16	40	32	113	45	33.5	19	41	41	30	24
AK-16x1.5	M16x1.5	32	32	108	45	33.5	19	41	41	30	24
AK-M20x1.5	M20x1.5	40	42	122	56	33.5	19	41	41	30	30
AK-M24x2	M24x2	44	48	147	51	–	22	55	55	32	36
AK-M27x2	M27x2	54	48	147	51	39	24	55	55	32	41
AK-M36x2	M36x2	72	50	241	110	56	36	75	75	50	55
AK-M42x2	M42x2	82	88	271	120	–	36	80	80	60	65
AK-M48x2	M48x2	82	88	271	120	–	42	80	80	60	75

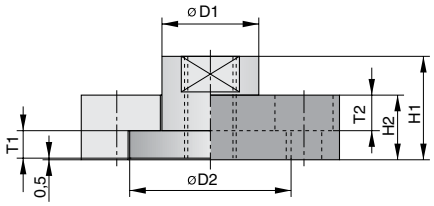
Order Instructions and Weight

Order Instructions		Weight (mass) (kg)
Type	Order-No.	
AK-M4	KY1152	0.020
AK-M6	KY1126	0.020
AK-M8	KY1127	0.060
AK-M10	KY1128	0.230
AK-M10x1.25	KY1129	0.230
AK-M12	KY1130	0.230
AK-M12x1.25	KY1131	0.230
AK-M16	KY1132	0.650
AK-M16x1.5	KY1133	0.650
AK-M20x1.5	KY1134	0.710
AK-M24x2	KC5035	1.600
AK-M27x2	KC5036	1.600
AK-M36x2	KY1139	5.100
AK-M42x2	KY1140	7.900
AK-M48x2	KL9133	7.900

Coupling

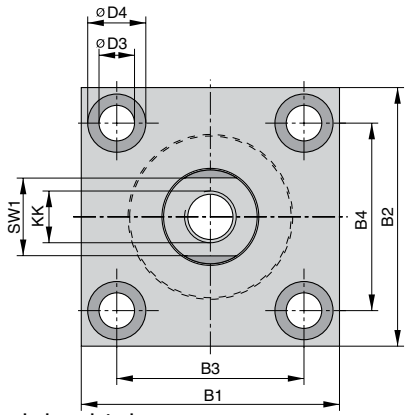
for Cylinder
Ø 32– 100 mm
Series KS-....

Dimensions



– angular compensation O.4 to 0.8 mm
– radial compensation 2 mm

Included in delivery:
1 flange
1 threaded part



Material: steel, zinc-plated

Dimension Table (mm)

Type	B_1	B_2	B_3	B_4	$ØD_1^{H11}$	$ØD_2$	$ØD_3^{H13}$	D_4^{H13}	H_1	H_2	T_1	T_2	KK	SW1
KS-M10x1.25	60	37	36	23	20	30	6.6	11	24	15	7	7	M10x1.25	17
KS-M12x1.25	60	56	42	38	25	40	9	15	30	20	8	9	M12x1.25	19
KS-M16x1.5	80	80	58	58	30	50	11	18	32	20	9	11	M16x1.5	24
KS-M16x1.5	80	80	58	58	30	50	11	18	32	20	9	11	M16x1.5	24
KS-M20x1.5	90	90	65	65	40	60	14	20	35	20	10	13	M20x1.5	36
KS-M20x1.5	90	90	65	65	40	60	14	20	35	20	10	13	M20x1.5	36

Order Instructions and Weight

Order Instructions		Weight (kg)
Type	Order-No.	
KS-M10x1.25	KC 5224	0.300
KS-M12x1.25	KC 5225	0.400
KS-M16x1.5	KC 5226	0.900
KS-M20x1.5	KC 5227	1.100

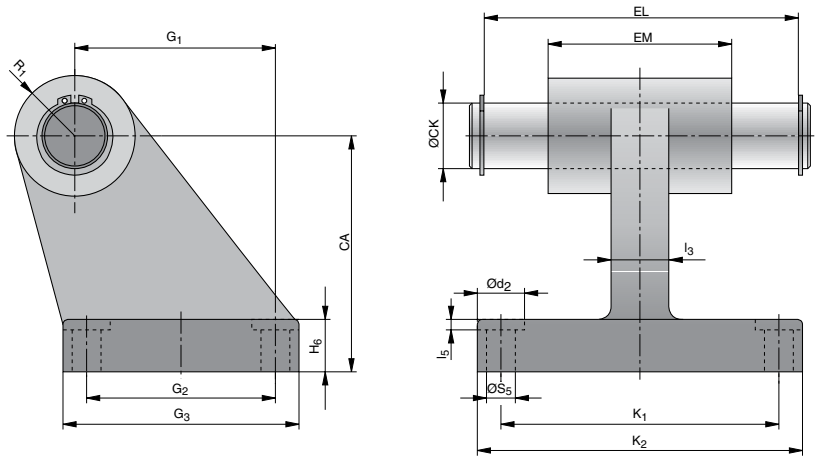
Pivot for mounting B

for Cylinder
Ø 32 to 100 mm
– to ISO 15552
– to VDMA 24562
– to CETOP RP43P
Series GLN-...

E

for 90° rotation

Dimensions – Pivot for mounting B Ø 32-320 mm
for 90° rotation



Included in delivery:

for Ø 32-100 mm:
1 Bracket
1 Pin with collar
1 Circlip

for Ø 125-320 mm:
1 Bracket
1 Pin
2 Circlips DIN 471

Material:
Ø 32-200: cast aluminium
Ø 250-320: cast steel

Dimension Table (mm)

Cyl.	$Ød_2$	l_3	l_5	G_1	G_2	G_3	EL	H_6	K_1	K_2	R_1	$ØS_5$	CA	CK^{H9}	EM
32	11	10	1.6	21	18	31	46	8	38	51	10	6.6	32	10	26
40	11	15	1.6	24	22	35	53	10	41	54	11	6.6	36	12	28
50	15*	16	1.6	33	30	45	61	12	50	65	13	9.0	45	12	32
63	15	16	1.6	37	35	50	71	14*	52	67	15	9.0	50	16	40
80	18	20	2.5	47	40	60	91	14	66	86	15	11.0	63	16	50
100	18	20	2.5	55	50	70	111	17*	76	96	19	11.0	71	20	60
125	20	30	3.2	70	60	90	132	20	94	124	22.5	14.0	90	25	70
160	20	36	4.0	97	88	126	172	25	118	156	31.5	14.0	115	30	90
200	26	40	4.0	105	90	130	172	30	122	162	31.5	18.0	135	30	90
250	33	45	4.5	128	110	160	202	35	150	200	40	22.0	165	40	110
320	40	55	4.5	150	122	186	222	40	170	234	45	26.0	200	45	120

*** strengthened, non-standard dimensions**

Order Instructions and Weight

for Cylinder Ø	Weight (kg)	Order Instructions	
		Type	Order-No.
32*	0.092	GLN-032	PD 40844
40*	0.131	GLN-040	PD 40845
50*	0.193	GLN-050	PD 40846
63*	0.305	GLN-063	PD 40847
80*	0.460	GLN-080	PD 40848
100*	0.840	GLN-100	PD 40849
125**	3.0	GLN-125	PD 24027
160**	6.5	GLN-160	PD 24028
200**	8.0	GLN-200	PD 39193
250**	13.5	GLN-250	PD 39194
320**	21.90	GLN-320	KL9129

* version with circlip
** version with 2 security bolts according to DIN 471

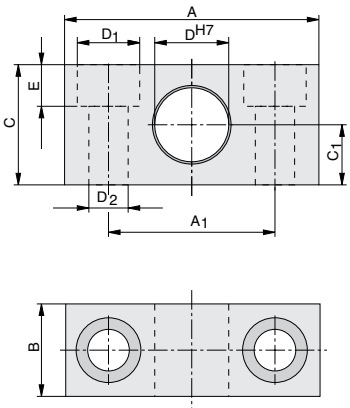
Pivot for mounting EN

for Cylinder
Ø 32 to 320 mm

Series EL-...

E

Dimensions



Material:
Ø32-125 mm – cast aluminium
Ø160-250 mm – Al, anodized
Ø 320 mm – steel

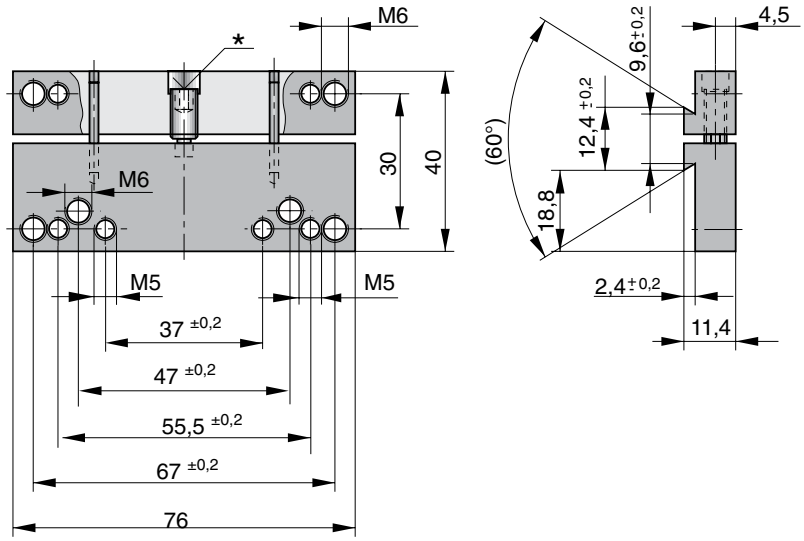
Dimension Table (mm)

for Cyl. Ø	A	A_1	B	C	C_1	ØD^{H7}	ØD_1	ØD_2	E
32	55	36	20	26	13	12	13.5	8.4	9
40, 50	55	36	20	26	13	16	13.5	8.4	9
63, 80	65	42	25	30	15	20	16.5	10.5	11
100, 125	75	50	28	40	20	25	19	13	13
160, 200	92	60	35	60	30	32	26	18	17
250	140	90	40	70	35	40	33	22	21.5
320	150	100	60	80	40	50	40	26	25.5

Order Instructions and Weight

Order Instructions		for Cylinder-Ø	Weight (mass) (kg)
Type	Order-No.		
EL-032	PD 23381	32	0.06
EL-040/050	PD 23382	40, 50	0.06
EL-063/080	PD 23383	63, 80	0.10
EL-100/125	PD 23384	100, 125	0.175
EL-160/200	PD 24425	160, 200	0.35
EL-250	PD 25763	250	0.50
EL-320	KL 9130	320	6,70

Dimensions (mm)



Material: Al, anodized

Adapter plate

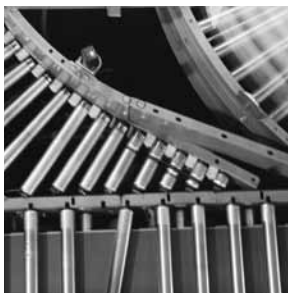
for mounting of S9 valves G1/8, G1/4

for cylinder series Ø 32 – 100 mm
- *NZ...., NZD...., NZV...*
- *AZ...., AZD...., AZ3...., AZ4....*

E

Order Instruction: PD40372

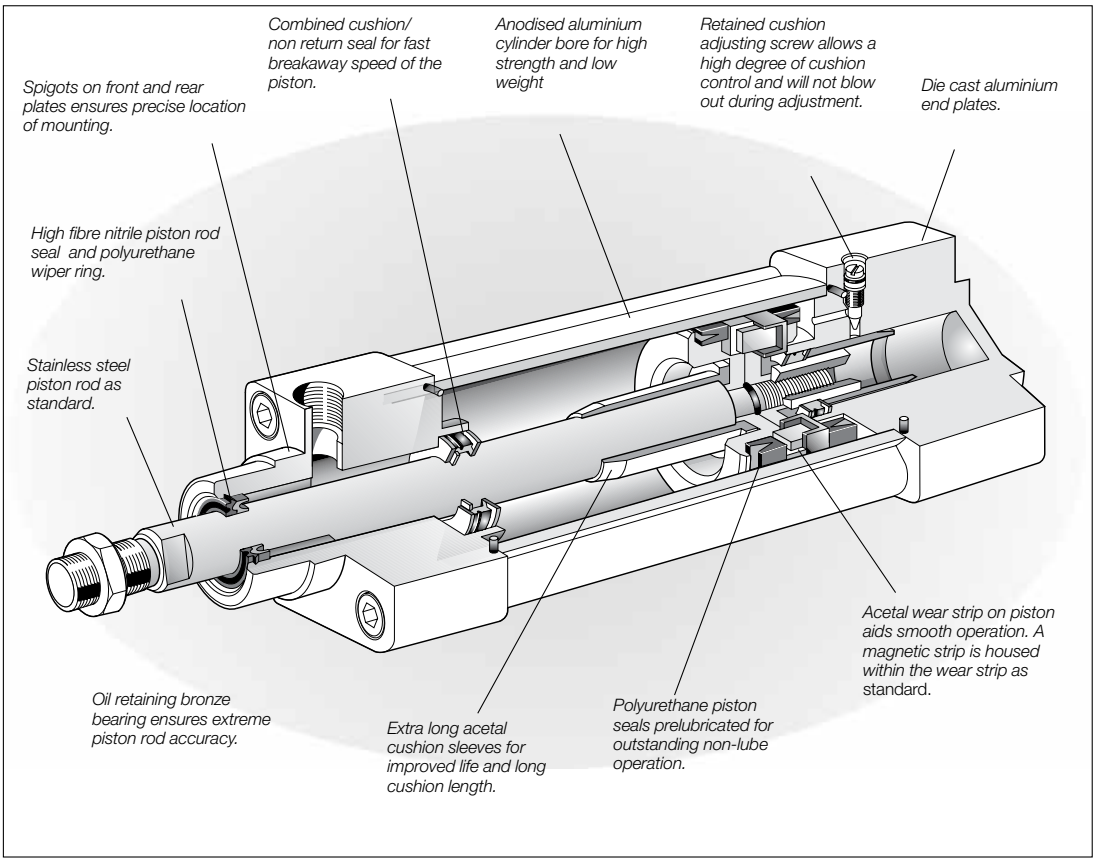
E



F

Pneumatic Cylinders

P1E Series
According to ISO and VDMA
Cylinder diameter 160 and 200mm



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ISO Cylinders – P1E

The P1E Series of I.S.O. cylinders are precision made to the most exacting standards to provide the finest pneumatic cylinders available with the widest choice of options.

Installation dimensions according to international ISO/VDMA standards

The new P1E complies with the current ISO 6431, ISO 15552, VDMA 24562 and AFNOR installation dimension standards. For customer reassurance world-wide.

High quality

As with our other products, the P1E has been developed with quality in all aspects – specification, design, planning, purchasing, production, distribution and service. We have been certified under the ISO 9001 QA standard since 1992. Quality in all our products and services is our prime aim.

Adaptability for use with electronics

P1E Cylinders are equipped as standard with magnetic pistons for position sensing. A full range of sensors enables the cylinders to be integrated into the most advanced automation systems. The sensors can be fitted at any position along the cylinder stroke.

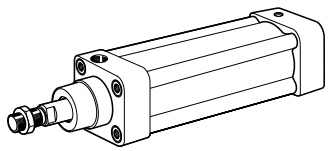
Design

In the development of P1E cylinders, great emphasis was placed on the importance of long service life, and operation with unlubricated air, characteristics essential for applications in demanding environments.

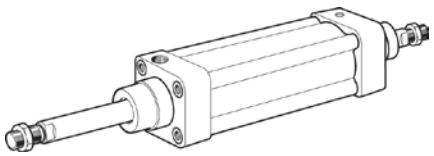
Long service life

Proven sealing systems and pre-lubricated bearings, together with surface smoothness and precise tolerances in all constituent parts, provide long, safe and reliable service life.

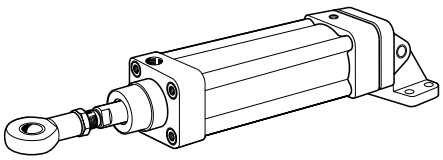
Effective cushioning
A long cushioning zone and simple, adjustable cushion screw facilitates fine adjustment and permits a large mass, high velocity and short cycle time.



Anodised cylinder barrel
The basic P1E Series cylinder features anodised cylinder tubes as standard and are pre lubricated on assembly. The cylinder bore finish and seal quality are such that in most applications they can operate without lubrication for the normal service life of a pneumatic cylinder.



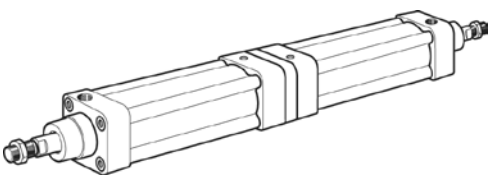
High temperature cylinders
For high temperature applications, we can offer cylinders with high quality fluorocarbon rubber seals and P.T.F.E. wear strips.



Magnetic cylinders
Available for use with electronic or reed sensors, the magnetic versions feature an encapsulated polymer magnet. This protects the magnet from wear and maintains low friction.

Variants
In addition to the basic versions, a number of special variants of the Parker P1E cylinders are available. The special variants are designed to meet the most exacting demands. The available options include:

- Non-standard stroke lengths
- Choice of two different piston-rod materials
- Extended piston rods
- Through piston rod
- High temperature cylinder versions for use in ambient temperatures up to +180 °C
- Factory fitted mountings



Complete range of mountings
A complete range of surface-treated mountings according to ISO, VDMA and AFNOR are available as accessories.

Cylinder forces, double acting variants

Cyl. bore/ pist. rod mm	Stroke	Pistonarea cm²	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
160/40	+	201,1	2011	4021	6032	8042	10053	**12064**	14074	16085	18096	20106
	-	188,5	1885	3770	5655	5740	9425	**11310**	13195	15080	16965	18850
200/40	+	314,2	3142	6283	9425	12566	15708	**18850**	21991	25133	28274	31416
	-	301,6	3016	6032	9048	12064	15080	**18096**	21112	24127	27043	30159

+ = Outward stroke
- = Return stroke

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

Main data: P1E

Cylinder beteckning	Cylinder bore	area	dia.	Piston rod area	thread	Total mass at 0 mm stroke	Mass moving parts Supplement per 10 mm stroke	at 0 mm stroke	Air consumtion Supplements per 10 mm stroke	Conn. thread
	mm	cm²	mm	cm²		kg	kg	kg	litre	
P1E-T160	**160**	201,1	40	12,6	M36x2	11,71	0,228	11,71	0,228	2,814 [1]	G3/4
P1E-T200	**200**	314,2	40	12,6	M36x2	15,45	0,252	15,45	0,252	4,396 [1]	G3/4

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

Material specification

Piston rod	Stainless steel, X 10 CrNiS 18 9
Piston rod seal	Polyurethane
Piston rod bearing	Oil Retaining Bronze
End cover	Black anodised aluminium
Tie Rods	Zinc Plated Steel
Tie Rod Nuts	Zinc Plated Steel
O-ring, internal	Nitrile rubber, NBR
Cylinder barrel	Hard anodised aluminium
Piston	Aluminium
Piston seal	Polyurethane
Piston bearing	Polyurethane
Magnetic ring	Plastic bound magnetic material

Variants:
High-temperature version, type F:

Piston rod seal	Fluorocarbon rubber, FPM
Piston seal	Fluorocarbon rubber, FPM
O-rings	Fluorocarbon rubber, FPM

Operation data

Working pressure	Max 10 bar
Working temperature	max +70 °C min –10 °C
High temp versionmax	+180 °C min 0 °C

Greased for life, does not normally need additional lubrication. If extra lubrication is given, this must always be continued.

Working medium, air quality

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

Recommended air quality for cylinders

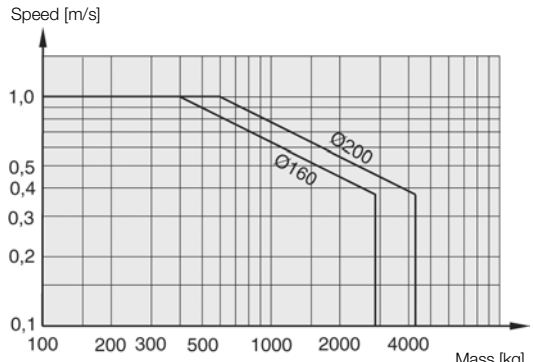
For best possible service life and trouble-free operation, ISO 8573-1 quality class 3.4.3 should be used. This means 5 µm filter (standard filter) dew point +3 ºC for indoor operation (a lower dew point should be selected for outdoor operation) and oil concentration 1.0 mg oil/m³, which is what a standard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

Cushioning characteristics

The diagram below is used for dimensioning of cylinders related to the cushioning capacity. The maximum cushioning capacity shown in the diagram assumes the following:

- Low load, i.e. low pressure drop across the piston
- Equilibrium speed
- Correctly adjusted cushioning screw
- 6 bar at cylinder port

The load is the sum of internal and external friction, plus any gravitational forces. At high relative load (pressure drop exceeding 1 bar), we recommend that for any given speed, the mass should be reduced by a factor of 2.5, or for a given mass, the speed should be reduced by a factor of 1.5. This is in relation to the maximum performance given in the diagram



ISO 8573-1 quality classes

Quality class	Pollution particle size (µm)	Pollution max con-centration (mg/m³)	Water max. press. dew point (°C)	Oil max con-centration (mg/m³)
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	-

Order key

P 1 E - T **1 6 0** **M** **S - 0 2 5 0**

Cylinder version	
T	Tie rod
D	Centre trunnion, tie rod

Cylinder bore mm
160
200

Cylinder type/function	
M	Double acting cushioned
F	Double acting, through rod cushioned

Sealing material	
S	Standard seals, magnetic piston
A	Standard seals, non magnetic piston
F	High temperature seals, non magnetic piston

Stroke length
0025
0050
0080
0100
0125
0160
0200
0250
0320
Standard stroke length in mm

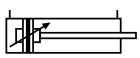
F

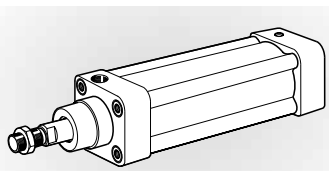
Stroke length

Standard stroke lengths in mm according to ISO 4393. Special stroke lengths up to 2700 mm

Cylinder designation	Cylinder bore	● Standard stroke length in mm: 25	50	80	100	125	160	200	250	320 — Non standard stroke length
Double acting										
P1E-T160MS-xxxx	160	●	●	●	●	●	●	●	●	●
P1E-T200MS-xxxx	200	●	●	●	●	●	●	●	●	●

Double-acting P1E-T
Piston rod Ø40 mm, thread M36x2





Cyl.bore mm	Stroke mm	Weight kg	Order code
160 Conn. G3/4	25	12,28	**P1E-T160MS-0025**
	50	12,85	**P1E-T160MS-0050**
	80	13,53	**P1E-T160MS-0080**
	100	13,99	**P1E-T160MS-0100**
	125	14,56	**P1E-T160MS-0125**
	160	15,36	**P1E-T160MS-0160**
	200	16,27	**P1E-T160MS-0200**
	250	17,41	**P1E-T160MS-0250**
	320	19,01	**P1E-T160MS-0320**
200 Conn. G3/4	25	16,08	**P1E-T200MS-0025**
	50	16,71	**P1E-T200MS-0050**
	80	17,47	**P1E-T200MS-0080**
	100	17,97	**P1E-T200MS-0100**
	125	18,60	**P1E-T200MS-0125**
	160	19,48	**P1E-T200MS-0160**
	200	20,49	**P1E-T200MS-0200**
	250	21,75	**P1E-T200MS-0250**
	320	23,51	**P1E-T200MS-0320**

Non-standard stroke lengths on request

Guide for selecting suitable tubing

The selection of the correct size of tubing is often based on experience, with no great thought to optimizing energy efficiency and cylinder velocity. This is usually acceptable, but making a rough calculation can result in worthwhile economic gains.

The following is the basic principle:

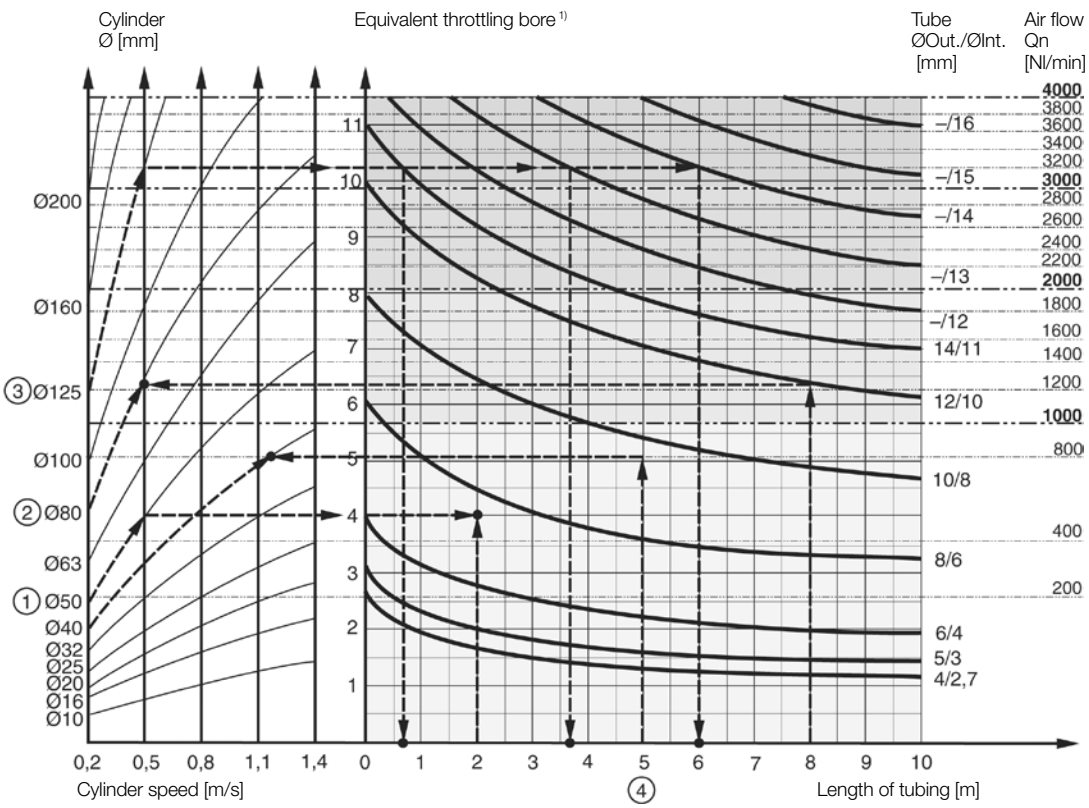
1. The primary line to the working valve could be over sized (this does not cause any extra air consumption and consequently does not create any extra costs in operation).
2. The tubes between the valve and the cylinder should, however, be optimized according to the principle that an insufficient bore throttles the flow and thus limits the cylinder speed, while an oversized pipe creates a dead volume which increases the air consumption and filling time.

F

The chart below is intended to help when selecting the correct size of tube to use between the valve and the cylinder.

The following prerequisites apply:

The *cylinder load should be about 50%* of the theoretical force (= normal load). A lower load gives a higher velocity and vice versa. The tube size is selected as a function of the *cylinder bore*, the desired *cylinder velocity* and the *tube length* between the valve and the cylinder.
If you want to use the capacity of the valve to its maximum, and obtain maximum speed, the tubing should be chosen so that they at least correspond with the equivalent restriction diameter (see description below), so that the tubing does not restrict the total flow. This means that a short tubing must have at least the equivalent restriction diameter. If the tubing is longer, choose it from the table below. Straight fittings should be chosen for highest flow rates. (Elbow and banjo fittings cause restriction.)



1) The "equivalent throttling bore" is a long throttle (for example a tube) or a series of throttles (for example, through a valve) converted to a short throttle which gives a corresponding flow rate. This should not be confused with the "orifice" which is sometimes specified for valves. The value for the orifice does not normally take account of the fact that the valve contains a number of throttles.

2) Qn is a measure of the valve flow capacity, with flow measured in litre per minute (l/min) at 6 bar(e) supply pressure and 1 bar pressure drop across the valve.

Example ①: Which tube diameter should be used?

A 50 mm bore cylinder is to be operated at 0.5 m/s. The tube length between the valve and cylinder is 2 m. In the diagram we follow the line from 50 mm bore to 0.5 m/s and get an "equivalent throttling bore" of approximately 4 mm. We continue out to the right in the chart and intersect the line for a 2 m tube between the curves for 4 mm (6/4 tube) and 6 mm(8/6 tube). This means that a 6/4 tube throttles the velocity somewhat, while an 8/6 tube is a little too large. We select the 8/6 tube to obtain full cylinder velocity.

Example ②: What cylinder velocity will be obtained?

A 80 mm bore cylinder will be used, connected by 8 m 12/10 tube to a valve with Qn 1200 Nl/min. What cylinder velocity will we get? We refer to the diagram and follow the line from 8 mm tube length up to the curve for 12/10 tube. From there, we go horizontally to the curve for the Ø80 cylinder. We find that the velocity will be about 0.5 m/s.

Example ③: What is the minimum inner diameter and maximum lenght of tube?

For a application a 125 mm bore cylinder will be used. Maximum velocity of piston rod is 0.5 m/s. The cylinder will be controlled by a valve with Qn 3200 Nl/min. What diameter of tube can be used and what is maximum lenght of tube.

We refer to the diagram. We start at the left side of the diagram cylinder Ø125. We follow the line until the intersection with the velocity line of 0.5 m/s. From here we draw a horizontal line in the diagram. This line shows us we need an equivalent throttling bore of approximately 10 mm. Following this line horizontally we cross a few intersections. These intersections shows us the minimum inner diameter (rightside diagram) in combination with the maximum length of tube (bottomside diagram).

For example:
Intersection one: When a tube (14/11) will be used, the maximum length of tube is 0.7 meter.
Intersection two: When a tube (—/13) will be used, the maximum length of tube is 3.7 meter.
Intersection three: When a tube (—/14) will be used, the maximum length of tube is 6 meter.

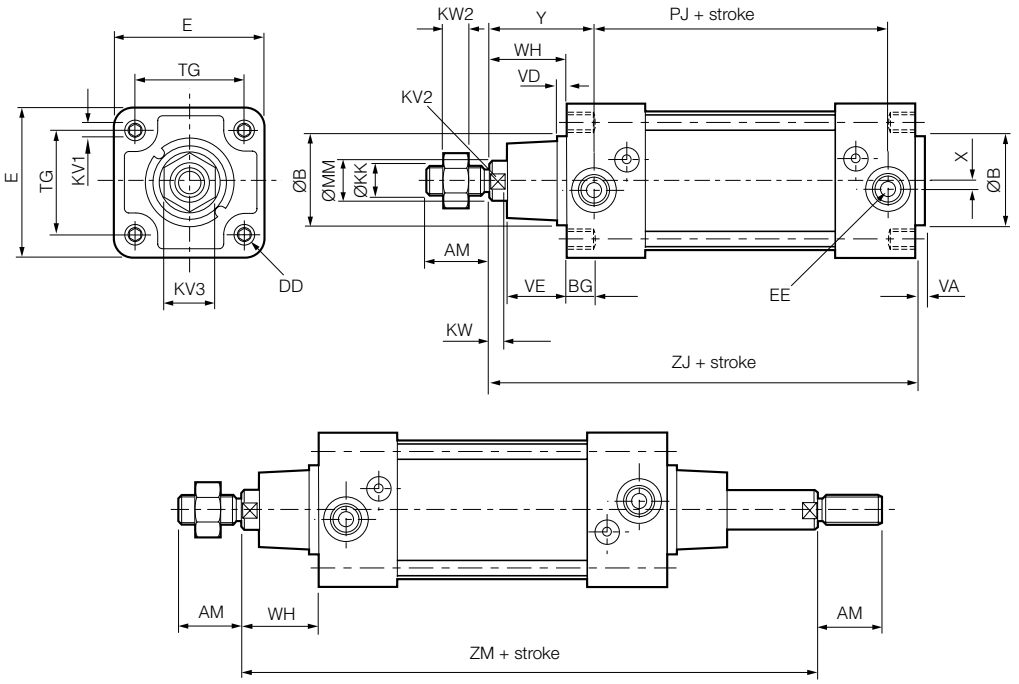
Example 4 : Determining tube size and cylinder velocity with a particular cylinder and valve?

For an application using a 40 mm bore cylinder with a valve with Qn=800 Nl/min. The distance between the cylinder and valve has been set to 5 m.
Tube dimension: What tube bore should be selected to obtain the maximum cylinder velocity? Start at pipe length 5 m, follow the line up to the intersection with 800 Nl/min. Select the next largest tube diameter, in this case Ø10/8 mm.
Cylinder velocity: What maximum cylinder velocity will be obtained? Follow the line for 800 Nl/min to the left until it intersects with the line for the Ø40 mm cylinder. In this example, the speed is just above 1.1 m/s.

Valve series with respective flows in Nl/minute

Valve series	Qn in Nl/Min
Valvetronic Solstar	33
Interface PS1	100
Adex A05	173
Moduflex size 1, (2 x 3/2)	220
Valvetronic PVL-B 5/3 closed centre, 6 mm push in	290
Moduflex size 1, (4/2)	320
B43 Manual and mechanical	340
Valvetronic PVL-B 2 x 2/3, 6 mm push in	350
Valvetronic PVL-B 5/3 closed centre, G1/8	370
Compact Isomax DX02	385
Valvetronic PVL-B 2 x 3/2 G1/8	440
Valvetronic PVL-B 5/2, 6 mm push in	450
Valvetronic PVL-B 5/3 vented centre, 6 mm push in	450
Moduflex size 2, (2 x 3/2)	450
Flowstar P2V-A	520
Valvetronic PVL-B 5/3 vented centre, G1/8	540
Valvetronic PVL-B 5/2, G1/8	540
Valvetronic PVL-C 2 x 3/2, 8 mm push in	540
Adex A12	560
Valvetronic PVL-C 2 x 3/2 G1/8	570
Compact Isomax DX01	585
VIKING Xtreme P2LAX	660
Valvetronic PVL-C 5/3 closed centre, 8 mm push in	700
Valvetronic PVL-C 5/3 vented centre, G1/4	700
B3-Series	780
Valvetronic PVL-C 5/3 closed centre, G1/4	780
Moduflex size 2, (4/2)	800
Valvetronic PVL-C 5/2, 8 mm push in	840
Valvetronic PVL-C 5/3 vented centre, 8 mm push in	840
Valvetronic PVL-C 5/2, G1/4	840
Flowstar P2V-B	1090
ISOMAX DX1	1150
B53 Manual and mechanical	1160
B4-Series	1170
VIKING Xtreme P2LBX	1290
B5-Series, G1/4	1440
Airline Isolator Valve VE22/23	1470
ISOMAX DX2	2330
VIKING Xtreme P2LCX, G3/8	2460
VIKING Xtreme P2LDX, G1/2	2660
ISOMAX DX3	4050
Airline Isolator Valve VE42/43	5520
Airline Isolator Valve VE82/83	13680

Dimensions



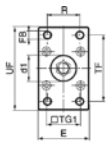
Cyl. bore Ø mm	MM	KK* Ø	AM*	ØB +0/-2	WH e11	VD	VE	ZJ	VA	PJ	X	Y	KV3	KW2 A/F			
160	40	M36x2		72	65		80	7		52	260	5	132	0	104	55	14
200	40	M36x2		72	75		95	7		60	275	5	132	0	119	55	14

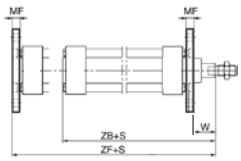
Cyl. bore Ø mm	EE	DD	KV1	BG A/F	KV2 min	KW A/F	E	TG	ZM
	160	G3/4	M16	30	24	36	16	179	140	340
	200	G3/4	M16	30	24	36	16	216	175	370

* According to ISO 6431

Cylinder mountings

Type	Description	Cyl. bore Ø mm	Weight kg	Order code
Flange MF1/MF2	Intended for fixed mounting of cylinder. Flange can be fitted to front or rear end cover of cylinder. Materials Flange: Surface-treated steel, black Mounting screws acc. to DIN 6912: Zinc-plated steel 8.8 Supplied complete with mounting screws for attachment to cylinder.	160 200	6,00 8,00	**P1C-4SMB** **P1C-4TMB**



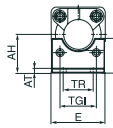


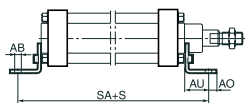
According to ISO MF1/MF2, VDMA 24 562, AFNOR

Cyl. bore	d1	FB	TG1	E	R	MF	TF	UF	W	ZF
	H11	H13			JS14	JS14	JS14			
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
160	65	18	140	190	115	20	230	275	60	280
200	75	22	175	225	135	25	270	318	70	300

S=Stroke length

Foot bracket MS1	Intended for fixed mounting of cylinder. Foot bracket can be fitted to front and rear end covers of cylinder. Materials Foot bracket: Surface-treated steel, black Mounting screws acc. to DIN 912: Zinc-plated steel 8.8 Supplied in pairs with mounting screws for attachment to cylinder.	160 200 ** Weight per item	1,60 4,40	**P1C-4SMF** **P1C-4TMF**



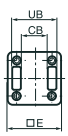


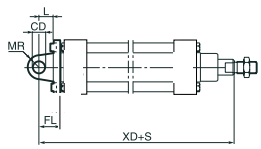
According to ISO MS1, VDMA 24 562, AFNOR

Cyl. bore	AB	TG_1	E	TR	AO	AU	AH	l_7	AT	SA
	H14			JS14			JS15			
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
160	18	140	177	115	24	60	115	-	4,75	300
200	22	175	214	135	30	70	135	-	8	320

S=Stroke lengthd

Clevis bracket MP2	Intended for flexible mounting of cylinder. Clevis bracket MP2 can be combined with clevis bracket MP4. Materials Clevis bracket: Surface-treated aluminium, black Pin: Surface hardened steel Circlips according to DIN 471: Spring steel Mounting screws acc. to DIN 912: Zinc-plated steel 8.8 Supplied complete with mounting screws for attachment to cylinder.	160 200	3,90 6,80	**P1C-4SMT** **P1C-4TMT**





According to ISO MP2, VDMA 24 562, AFNOR

Cyl. bore	E	UB	CB	FL	L	CD	MR	XD
		h14	H14	±0,2		H9		
mm	mm	mm	mm	mm	mm	mm	mm	mm
160	177	170	90	55	35	30	30	315
200	214	170	90	60	36	30	30	335

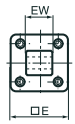
S=Stroke length

Cylinder mountings

Type	Description	Cyl. bore Ø mm	Weight kg	Order code
Clevis bracket MP4	Intended for flexible mounting of cylinder. Clevis bracket MP4 can be combined with clevis bracket MP2.	160 200	3,00 6,20	**P1C-4SME** **P1C-4TME**

Materials
Clevis bracket: Surface-treated aluminium, black
Mounting screws acc. to DIN 912: Zinc-plated steel 8.8

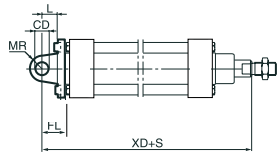
Supplied complete with mounting screws for attachment to cylinder.



According to ISO MP4, VDMA 24 562, AFNOR

Cyl. bore	E	EW	FL ±0,2	L	CD H9	MR	XD
mm	mm	mm	mm	mm	mm	mm	mm
160	177	90	55	35	30	30	315
200	214	90	60	35	30	30	335

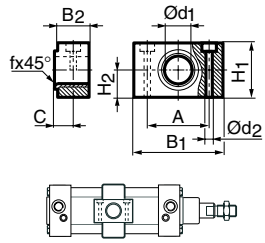
S=Stroke length



Pivot bracket for MT4	Intended for use together with central trunnion MT4.	160 200	6,46 9,20	**9301054268** **9301054268**

Material
Pivot bracket: Surface-treated aluminium
Bearing acc. to DIN 1850 C: Sintered oil-bronze bushing

Supplied in pairs.



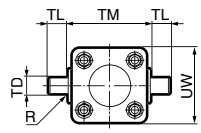
According to ISO, VDMA 24 562, AFNOR

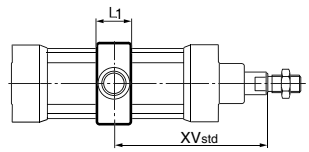
Cyl. bore	B_1	B_2	A	C	d_1	d_2 H13	H_1	H_2	fx45°l min
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
160	92	40	60	22,5	32	18,0	60	30	2,5
200	92	40	60	22,5	32	18,0	60	30	2,5

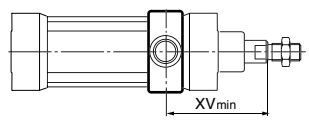
Centre trunnion MT4	Intended for articulated mounting of cylinder. The trunnion is factory-fitted in the centre of the cylinder or at an optional location specified by the XV-measure – see the order code key on page 7. Combined with pivot bracket for MT4. Material: Trunnion: zinc plated steel			

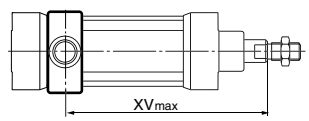
Trunnion centred
The central trunnion is ordered with letter D in position.See the order code key at pages 7.

Trunnion with optional location
Please contact customer service for other XV dimensions









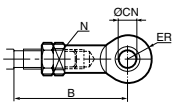
According to ISO MT4, VDMA 24 562, AFNOR

Cyl. bore	TM h14	TL h14	TD e9	R	UW	L1	X1*	XV^*_{min}	X2*
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
160	200	32	32	2,5	190	70	170	169	170
200	250	32	32	2,5	242	70	185	184	186

XVstd = X1 + Stroke length/2, XVmax = X2 + Stroke length

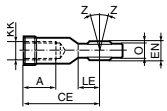
Cylinder mountings

Type	Description	Cyl. bore Ø mm	Weight kg	Order code
Swivel rod eye	Swivel rod eye for articulated mounting of cylinder. Swivel rod eye can be combined with clevis bracket GA. Maintenance-free. Materials Swivel rod eye: Zinc-plated steel Swivel bearing according to DIN 648K: Hardened steel	160 200	2,00 2,00	**P1C-4SRS** **P1C-4SRS**

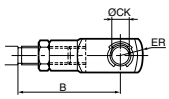


According to ISO 8139

Cyl. bore mm	A mm	B min mm	B max mm	CE mm	CN H9 mm	EN h12 mm	ER mm	KK	LE min mm	N mm	O mm	Z mm
160	56	139	161	125	35	43	40	M36x2	41	14	28	15°
200	56	139	161	125	35	43	40	M36x2	41	14	28	15°

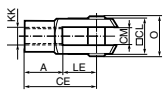


Type	Description	Cyl. bore Ø mm	Weight kg	Order code
Clevis	Clevis for articulated mounting of cylinder. Material Clevis, clip: Galvanized steel Pin: Hardened steel	160 200	4,30 4,30	**P1C-4SRC** **P1C-4SRC**



According to ISO 8140

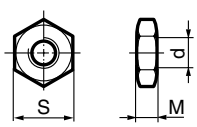
Cyl. bore mm	A mm	B min mm	B max mm	CE mm	CK h11/E9 mm	CL mm	CM mm	ER mm	KK	LE mm	O mm
160	72	158	180	144	35	70	35	50	M36x2	72	83
200	72	158	180	144	35	70	35	50	M36x2	72	83



Type	Description	Cyl. bore Ø mm	Weight kg	Order code
Nut	Intended for fixed mounting of accessories to the piston rod. Material: Zinc-plated steel The cylinders are delivred with a zinc-plated steel piston rod nut	160 200	0,110 0,110	**9128985606** **9128985606**

According to DIN 439 B

Cyl. bore mm	d	M mm	S mm
160	M36x2	14	55
200	M36x2	14	55



New drop-in sensors

The completely new ”drop-in” sensors can easily be installed from the side in the sensor groove, at any position along the piston stroke. The sensors are completely recessed and thus mechanically protected. Choose between electronic or reed sensors and several cable lengths and 8 mm and M12 connectors. The same standard sensors are used for all versions. There is a double jointed adapter for the tie-rod version, which offers simple and flexible use of standard sensors.

F

Electronic sensors

The new electronic sensors are ”Solid State”, i.e. they have no moving parts at all. They are provided with short-circuit protection and transient protection as standard. The built-in electronics make the sensors suitable for applications with high on and off switching frequency, and where very long service life is required.

Technical data

Design	GMR (Giant Magnetic Resistance) magneto-resistive function
Installation	From side, down into the sensor groove, so-called drop-in
Outputs	PNP, normally open (also available in NPN design, normally closed, on request)
Voltage range	10-30 VDC
	10-18 V DC, ATEX sensor
Ripple	max 10%
Voltage drop	max 2,5 V
Load current	max 100 mA
Internal consumption	max 10 mA
Actuating distance	min 9 mm
Hysteresis	max 1,5 mm
Repeatability accuracy	max 0,2 mm
On/off switching frequency	max 5 kHz
On switching time	max 2 ms
Off switching time	max 2 ms
Encapsulation	IP 67 (EN 60529)
Temperature range	–25 °C to +75 °C
	–20 °C to +45 °C, ATEX sensor
Indication	LED, yellow
Material housing	PA 12
Material screw	Stainless steel
Cable	PVC or PUR 3x0.25 mm^2 see order code respectively

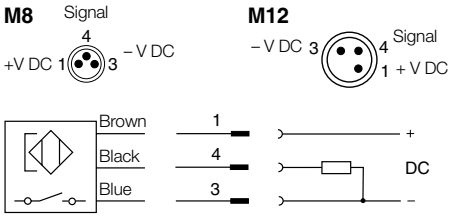
Reed sensors

The sensors are based on proven reed switches, which offer reliable function in many applications. Simple installation, a protected position on the cylinder and clear LED indication are important advantages of this range of sensors.

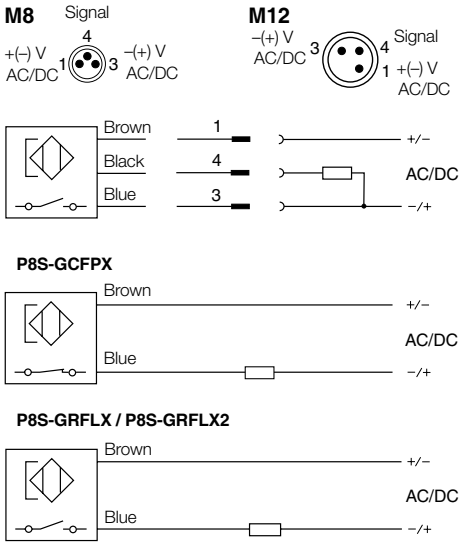
Technical data

Design	Reed element
Mounting	From side, down into the sensor groove, so-called drop-in
Output	Normally open , or normally closed
Voltage range	10-30 V AC/DC or 10-120 V AC/DC
	24-230 V AC/DC
Load current	max 500 mA for 10-30 V or max 100 mA for 10-120 V
	max 30 mA for 24-230 V
Breaking power (resistive)	max 6 W/VA
Actuating distance	min 9 mm
Hysteresis	max 1,5 mm
Repeatability accuracy	0,2 mm
On/off switching frequency	max 400 Hz
On switching time	max 1,5 ms
Off switching time	max 0,5 ms
Encapsulation	IP 67 (EN 60529)
Temperature range	–25 °C to +75 °C
Indication	LED, yellow
Material housing	PA12
Material screw	Stainless steel
Cable	PVC or PUR 3x0.14 mm^2 see order code respectively

Electronic sensors



Reed sensors



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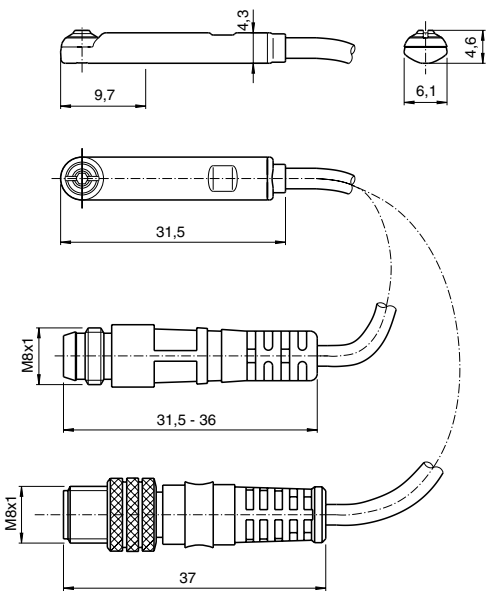
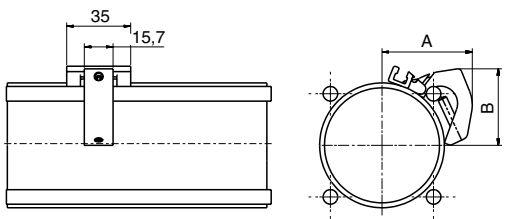
Dimensions

Sensors



Adapter for P1D-T



Cyl. bore mm	A mm	B mm
160	95	90
200	112	107

Ordering data

Output/function	Cable/connector	Weight kg	Order code
Electronic sensors , 10-30 V DC			
PNP type, normally open	0,27 m PUR-cable and 8 mm snap-in male connector [1]	0,007	**P8S-GPSHX**
PNP type, normally open	1,0 m PUR-cable and 8 mm snap-in male connector	0,013	**P8S-GPSCX**
PNP type, normally open	1,0 m PUR-cable and M8 screw male connector	0,013	**P8S-GPCCX**
PNP type, normally open	0,27 m PUR-cable and M12 screw male connector [1]	0,015	**P8S-GPMHX**
PNP type, normally open	3 m PVC-cable without connector	0,030	**P8S-GPFLX**
PNP type, normally open	10 m PVC-cable without connector	0,110	**P8S-GPFTX**
Electronic sensor 18-30 V DC			
ATEX-certified			
CE Ex **II3G EEx nA II T4X II3D 135 °C IP67**			
Type PNP , normally open	3 m PVC-cable without connector	0,030	**P8S-GPFLX/EX**
Reed sensors , 10-30 V AC/DC			
Normally open	0,27 m PUR-cable and 8 mm snap-in male connector [1]	0,007	**P8S-GSSHX**
Normally open	1,0 m PUR-cable and 8 mm snap-in male connector	0,013	**P8S-GSSCX**
Normally open	1,0 m PUR-cable and M8 male connector	0,013	**P8S-GSCCX**
Normally open	0,27 m PUR-cable and M12 screw male connector[1]	0,015	**P8S-GSMHX**
Normally open	1,0 m PUR-cable and M12 screw male connector	0,023	**P8S-GSMCX**
Normally open	3 m PVC-cable without connector	0,030	**P8S-GSFLX**
Normally open	10 m PVC-cable without connector	0,110	**P8S-GSFTX**
Normally closed	5m PVC-cable without connector [2]	0,050	**P8S-GCFPX**
Reed sensors, 10-120 V AC/DC			
Normally open	3 m PVC-cable without connector	0,030	**P8S-GRFLX**
Reed sensorer, 24-230 V AC/DC			
Normalt öppen	3 m PVC-kabel utan kontakt	0,030	**P8S-GRFLX2**

1) Not in combination with P1D Clean (too short cable)

2) Without LED

Adapter for tie-rod design

Description	Weight kg	Order code
Double jointed adapter for cylinder P1D-T cylinder bore Ø32 to Ø125 mm	0,07	**P8S-TMA0X**

Connecting cables with one connector

The cables have an integral snap-in female connector.

Type of cable	Cable/connector	Weight kg	Order code
Cables for sensors, complete with one female connector			
Cable, Flex PVC	3 m, 8 mm Snap-in connector	0,07	**9126344341**
Cable, Flex PVC	10 m, 8 mm Snap-in connector	0,21	**9126344342**
Cable, Super Flex PVC	3 m, 8 mm Snap-in connector	0,07	**9126344343**
Cable, Super Flex PVC	10 m, 8 mm Snap-in connector	0,21	**9126344344**
Cable, Polyurethane	3 m, 8 mm Snap-in connector	0,01	**9126344345**
Cable, Polyurethane	10 m, 8 mm Snap-in connector	0,20	**9126344346**
Cable, Polyurethane	5 m, M12 screw connector	0,07	**9126344348**
Cable, Polyurethane	10 m, M12 screw connector	0,20	**9126344349**

F

Male connectors for connecting cables

Cable connectors for producing your own connecting cables. The connectors can be quickly attached to the cable without special tools. Only the outer sheath of the cable is removed. The connectors are available for M8 and M12 screw connectors and meet protection class IP 65.

Connector	Weight kg	Order code
M8 screw connector	0,017	**P8SCS0803J**
M12 screw connector	0,022	**P8SCS1204J**

Connection block Valvetronic 110

The Valvetronic 110 is a connection block that can be used for collecting signals from sensors at various points on a machine and connecting them to the control system via a multicore cable. Valvetronic 110 can also be used for central connection of the multi-core cable to the outputs of a control system, and can be laid to a machine where the output signals can be connected. The connection block has ten 8 mm snap-in circular connectors and a multi-core cable which is available in lengths of 3 or 10 m. The connections on the block are numbered from 1 to 10. Blanking plugs are available for unused connections, as labels for marking the connections of each block.

Technical data

Connections:

Ten 3-pole numbered 8 mm round snap-in female contacts

Input block	
Pin 1	Common, +24 VDC
Pin 2	Input signal
Pin 3	Common, 0V

Output block	
Pin 1	Common, GND
Pin 2	Output signal
Pin 3	Common, 0V

Electrical data:

Voltage	24 VDC (max. 60 V AC/75 V DC)
Insulation group	according to DIN 0110 class C
Load	max. 1 A per connection total max. 3 A

Cable:

Length	3 m or 10 m
Type of cable LifYY11Y	
Conductor	12
Area	0.34 mm²
Colour marking	According to DIN 47 100

Mechanical data

Enclosure	IP 67, DIN 40050 with fitted contacts and/or blanking plugs.
Temperature	–20 °C to +70 °C

Material

Body	PA 6,6 VD according to UL 94
Contact holder	PBTP
Snap-in ring	LDPE
Moulding mass	Epoxy
Seal	NBR
Screws	Plated steel

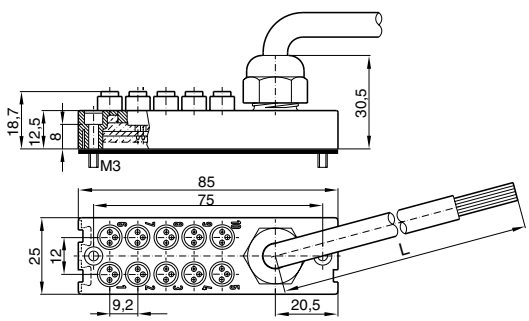
Industrial durability

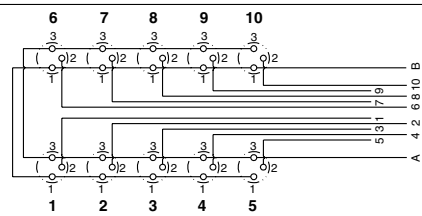
Good chemical and oil resistance. Tests should be performed in aggressive environments.

Ordering data

	Designation	Weight kg	Order code
	Connection block Valvetronic 110 with 3 m cable Connection block Valvetronic 110 with 10 m cable	0,32 0,95	**9121719001** **9121719002**
	Blanking plugs (pack of 10) Use blanking plugs to close unused connections.	0,02	**9121719003**
	Labels (pack of 10) White labels to insert in grooves on the side of the connection	0,02	**9121719004**

Dimensions and wiring diagrams





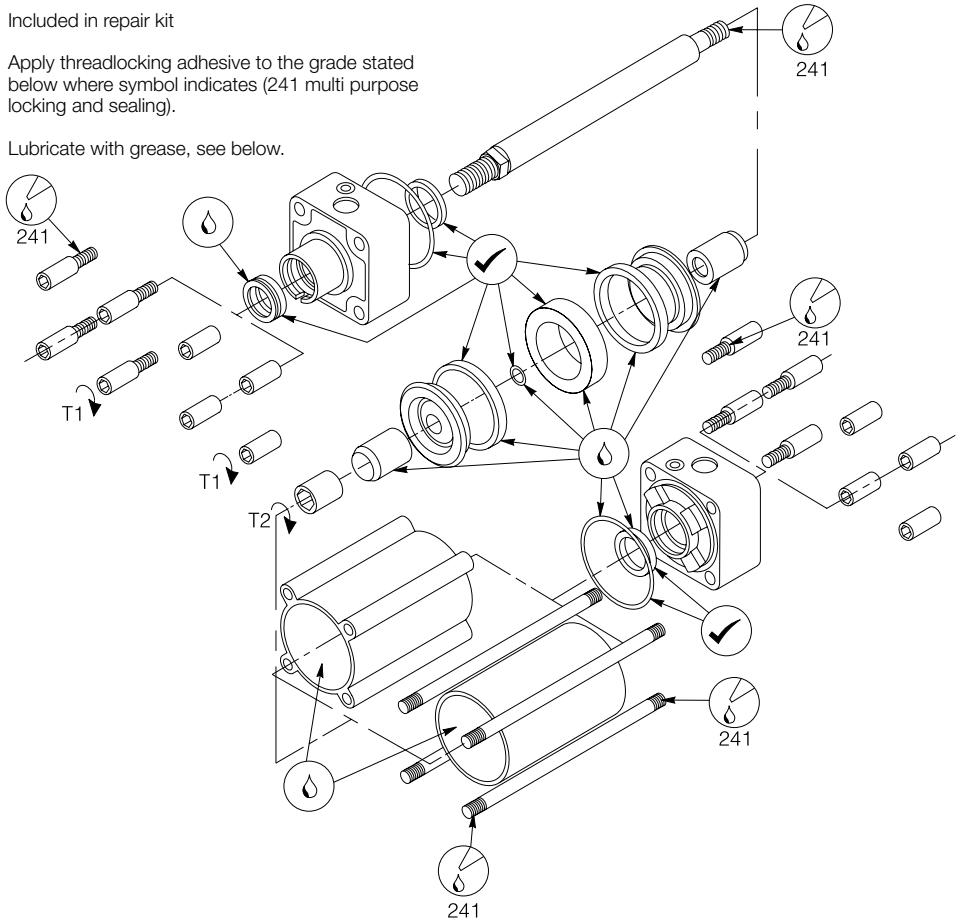
Conductor	Colour	Input	Output
1	Pink	Signal 1	Signal 1
2	Grey	Signal 2	Signal 2
3	Yellow	Signal 3	Signal 3
4	Green	Signal 4	Signal 4
5	White	Signal 5	Signal 5
6	Red	Signal 6	Signal 6
7	Black	Signal 7	Signal 7
8	Violet	Signal 8	Signal 8
9	Grey-Pink	Signal 9	Signal 9
10	Red-Blue	Signal 10	Signal 10
A	Blue	0 V	0 V
B	Brown	+24 V	PE

Repair kits

= Included in repair kit

= Apply threadlocking adhesive to the grade stated below where symbol indicates (241 multi purpose locking and sealing).

= Lubricate with grease, see below.



Ø	T1 Nm	NV	T2 Nm	NV
32	4-5	6	9-10	5
40	4-5	6	9-10	6
50	9-10	8	28-30	12
63	9-10	8	28-30	12
80	18-20	10	80-85	12
100	18-20	10	80-85	12
125	24-26	24	115-125	30
160	36-38	30	163-177	22
200	36-38	30	163-177	22

Repair kits		
Ø	Standard	High temperature
32	**P1E-6KRM**	**P1E-6KRV**
40	**P1E-6LRM**	**P1E-6LRV**
50	**P1E-6MRM**	**P1E-6MRV**
63	**P1E-6NRM**	**P1E-6NRV**
80	**P1E-6PRM**	**P1E-6PRV**
100	**P1E-6QRM**	**P1E-6QRV**
125	**P1E-6RRM**	**P1E-6RRV**
160	**P1E-6SRM**	**P1E-6SRV**
200	**P1E-6TRM**	**P1E-6TRV**

Grease for P1E

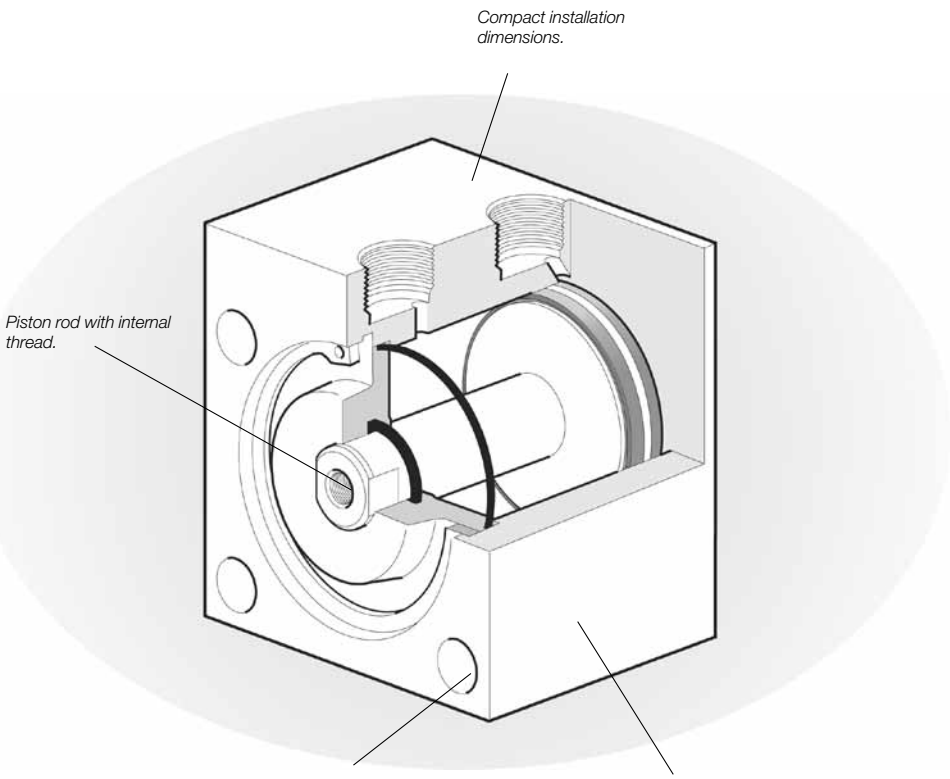
Standard	30g	**9127394541**
High temperature	30g	**9127394521**
Low temperature	30g	**9127394541**

F

G

Short Stroke Cylinders

C05 and C05S Series



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Cylinders, type C05 and C05S

Compact short stroke cylinders are available in single as well as double acting versions. Ideally suited for clamping and locking operations the range includes bores from 12 to 63 mm, providing thrust forces of up to 3000 N.

The design has been optimized to include the following features:

Installation

The compact design with mounting holes through the cylinder body makes the unit easy to install in confined spaces.

Clean design

The main body is machined from one piece thus providing an easy to clean unit. Fitted with stainless steel piston rod as standard for corrosion resistance.

Maintenance free

The units are pre-lubricated for use also without additional lubrication, reducing maintenance costs as well as providing an improved working environment.

Main data

Cylinder	Cylinder bore mm	area cm^2	Piston rod diam mm	area cm^2	Theor. piston force at 6 bar in N plus stroke	minus stroke	Air consumption[1] l	Spring force N	Stroke mm	Weight Kg
C05S-8-4-4	8	0.5	4	0.13	28	-	0,0045	2	4	0.016
C05S-12-5-4	12	1.1	5	0.20	65	-	0,0099	3	4	0.023
C05S-20-10-4	20	3.1	10	0.79	184	-	0,0151	6	4	0.067
C05S-32-12-5	32	8.0	12	1.13	463	-	0,0653	17	5	0.192
C05S-50-16-10	50	19.6	16	2.01	1145	-	0,1695	35	10	0.416
C05S-63-16-10	63	31.1	16	2.01	1825	-	0,2602	45	10	0.663
C05-12-5-10	12	1.1	5	0.20	68	56	0,0186	-	10	0.045
C05-20-10-10	20	3.1	10	0.79	190	143	0,0505	-	10	0.125
C05-32-12-10	32	8.0	12	1.13	480	415	0 1236	-	10	0.320
C05-32-12-25	32	8.0	12	1.13	480	415	0 1236	-	25	0.400
C05-50-16-25	50	19.6	16	2.01	1180	1060	0,3167	-	25	0.675
C05-63-16-25	63	31.1	16	2.01	1870	1750	0,4982	-	25	0.800

1) Consumption of free air per 10 mm stroke for a double stroke at 600 kPa (6 bar).

G

Additional data

Working pressure	Max 10 bar
Working temperature	-20 °C to +70 °C

Prelubricated, further lubrication is not normally necessary.

If additional lubrication is introduced it has to be continued.

Material specifications

Cylinder housing	Black anodized aluminium
Front end cover, single action Ø50-63	Black anodized aluminium
Front end cover, other	Brass
Piston rod bearing single action Ø50-63	PTFE/Brass/steel
Piston rod bearing, other	Brass
Piston, Ø8-32 mm	Stainless steel
Piston, Ø50-63 mm	Aluminium
Piston rod	Stainless steel
Seals	Nitrile, NBR
Circlip	Steel spring
Return spring	Surface treated steel spring

Working medium, air quality

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

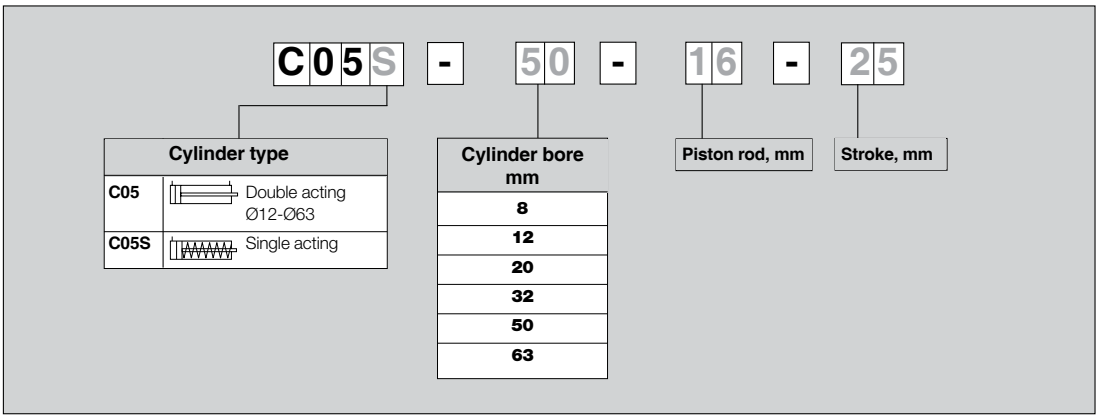
Recommended air quality for cylinders

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 ºC for indoor operation (a lower dew point should be selected for outdoor operation) and oil concentration 1.0 mg oil/m^3, which is what a standard compressor with a standard filter gives.

ISO 8573-1 quality classes

Quality class	Pollution particle size (µm)	Pollution max concentration (mg/m^3)	Water max. press. dew point (°C)	Oil 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	-

Order key



G

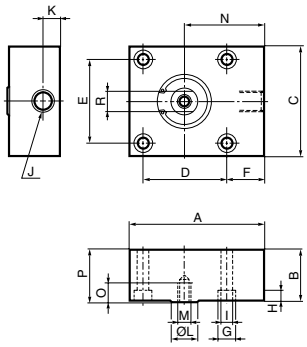
Main data for C05 and C05S cylinders

Symbol	Cyl. dia. mm	Piston rod mm	Spring force Max N	Spring force Min N	Conn. thread	Stroke mm	Weight Kg	Designation
Double acting	**12**	5/-			M5	10	0,01	**C05-12-5-10**
	20	10/M5			M5	10	0,25	**C05-20-10-10**
	32	12/M6			G1/8	10	0,30	**C05-32-12-10**
					G1/8	25	0,79	**C05-32-12-25**
	50	16/M8			G1/4	25	0,65	**C05-50-16-25**
	63	16/M8			G1/4	25	1,07	**C05-63-16-25**
Single acting	**8**	4/-	3	2	M5	4	0,02	**C05S-8-4-4**
	12	5/-	7	3	M5	4	0,02	**C05S-12-5-4**
	20	10/M5	10	6	G1/8	4	0,16	**C05S-20-10-4**
	32	12/M6	25	19	G1/8	5	0,21	**C05S-32-12-5**
	50	16/M8	42	35	G1/4	10	0,36	**C05S-50-16-10**
	63	16/M8	58	45	G1/4	10	0,56	**C05S-63-16-10**

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

Dimensions, basic cylinder

Single acting



AirCad™ Drawing Library

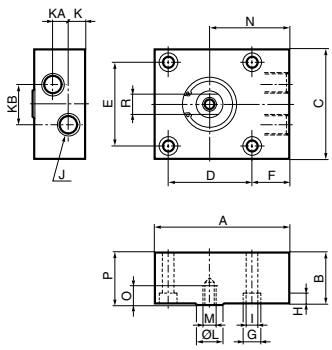
CAD drawings on the Internet

Our home page www.parker.com/euro_pneumatic includes the AirCad Drawing Library with 2D and 3D drawings for the main versions.

Type	A	B	C	D	E	F	G	H	I	J	K	KA	KB	L
C05S-8-4-4	20	16	18	0*	11	5,5	6	3,4	3,4	M5	5,0	-	-	4
C05S-12-5-4	25	16	20	0*	13	7,0	6	3,4	3,4	M5	6,0	-	-	5
C05S-20-10-4	40	20	32	0*	20	9,0	10	5,0	5,5	G1/8	9,5	-	-	10
C05S-32-12-5	55	26	45	0*	32	14,0	10	5,0	5,5	G1/8	9,5	-	-	12
C05S-50-16-10	80	30	65	50	50	22,5	11	6,5	6,5	G1/4	11,0	-	-	16
C05S-63-16-10	90	35	80	62	62	19,0	15	9,0	9,0	G1/4	11,0	-	-	16

Type	M	N	O	P	R
C05S-8-4-4	-	13,5	-	17	-
C05S-12-5-4	-	15,0	-	17	-
C05S-20-10-4	M5	24,0	8	21	-
C05S-32-12-5	M6	32,0	12	27	9
C05S-50-16-10	M8	47,5	12	31	14
C05S-63-16-10	M8	50,0	14	36	14

Double acting



Type	A	B	C	D	E	F	G	H	I	J	K	KA	KB	L
C05-12-5-10	25	27	20	0*	13	7,0	6	3,4	3,4	M5	6,0	13,0	3	5
C05-20-10-10	40	30	32	0*	20	9,0	10	5,0	5,5	M5	6,0	16,0	6	10
C05-32-12-10	55	36	45	0*	32	14,0	10	5,0	5,5	G1/8	9,5	16,5	14	12
C05-32-12-25	55	51	45	0*	32	14,0	10	5,0	5,5	G1/8	9,5	31,5	0**	12
C05-50-16-25	80	50	65	50	50	22,5	11	6,5	6,5	G1/4	11,0	28,0	0**	16
C05-63-16-25	90	55	80	62	62	19,0	15	9,0	9,0	G1/4	11,0	33,0	0**	16

Type	M	N	O	p	R
C05-12-5-10	-	16,0	-	28	-
C05-20-10-10	M5	24,0	8	31	-
C05-32-12-10	M6	32,0	12	37	9
C05-32-12-25	M6	32,0	12	52	9
C05-50-16-25	M8	47,5	12	51	14
C05-63-16-25	M8	50,0	14	56	14

* Only two mounting holes (F).

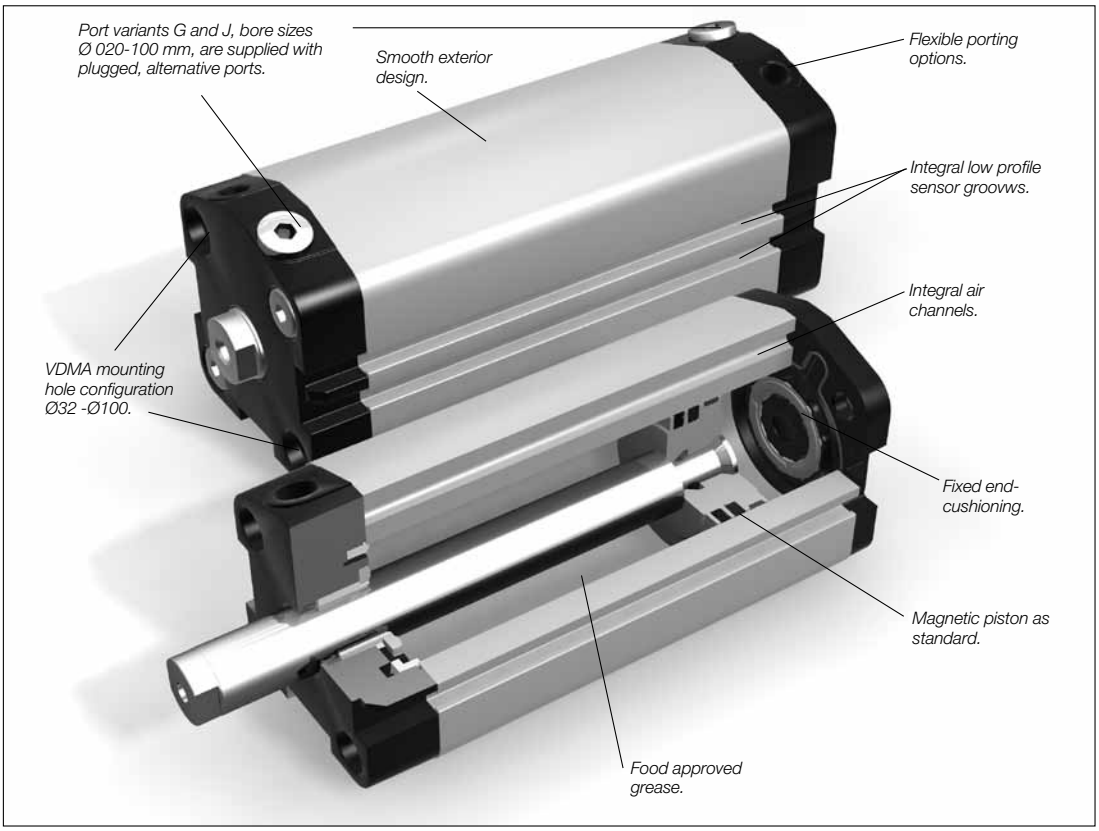
** Connections in-line.

G

H

Compact Cylinders

P1M Series



H

Short Build Cylinders

Parker Pneumatic's versitile range of Short Build Cylinders, with unique porting options, integral sensor grooves and one of the shortest overall lengths on the market is suitable for a wide range of applications.

The range comprises ten cylinder bore sizes, 12 - 100 mm diameter, with stroke lengths from 5 to 500 mm and, as with other Parker cylinders, Short Build Cylinders are factory-lubricated with food grade grease (USDA).

The extremely small overall dimensions have been achieved through an entirely new design. Channels in the body supply air to either end of the cylinder. This means that the connection ports in the front or rear end walls can be configured to suit individual requirements. Port variants G and J, bore sizes Ø 020-100 mm, are also supplied with plugged, alternative ports, which permit a free choice of connections.

The flexible porting option, together with a choice of mounting methods, ensures that this range of cylinders can be used in variety of applications. It is especially suitable for use in applications where space is limited as, for example, in the packaging or electronic industries.

Options

In addition to the basic version with stainless steel piston rod, magnetic piston and fixed end cushioning, the range will include several standard options that provide a wide range of choices.

Options include single acting cylinders, through rod and hollow through rod, male or female threaded rods and high-temperature versions.

Sensors and accessories

The P1M-series incorporates a further unique feature: integral sensor grooves. The grooves are recessed into the barrel, enabling sensors to be quickly and easily fitted without increasing external dimensions. Double grooves allow sensors to be grouped together.

Hole patterns for the mountings, as for all the mounts in the complete range of mountings, comply with the VDMA-standards.

Fixed-cushioning

Bumpers in Polyurethane as standard.

Smooth external design

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

Flexible port location

The P1M is available with several different port locations. Both ports in the front end wall (H), which gives extremely short installation dimensions, both ports in the rear end wall (J), or one port in the front wall and one in the rear wall (G) as in a conventional cylinder.

Port variants G and J, bore sizes Ø 020-100 mm, are also supplied with plugged, alternative ports in the front and rear end walls, which permits a free choice of connections.

Position sensing

All cylinders in standard temperature design are fitted with a magnet for 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 mounting accessories is available.

Variants

In addition to the basic design, several standard variants of these Short Built 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

Cylinders with male piston rod thread

Through piston rods

Through hollow piston rods

Single-acting cylinders with spring return, push and pull

Cylinders with axial connections.

High-temperature versions for operation in temperature range from -10 °C to +150 °C (not magnetic pistons, not bumpers)

Double acting, ports in front and rear plate

Double acting, both ports in front plate

Double acting, both ports in rear plate radially

Single acting

Through piston rod

Through hollow piston rod

Male rod end

H

Cylinder forces, double acting variants

Cyl. bore/ pist. rod mm	Stroke	Piston area cm²	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
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
16/8	+	2,0	20	40	60	80	100	**120**	141	161	181	201
	-	1,5	15	30	45	60	75	**90**	106	121	136	151
20/10	+	3,1	31	63	94	126	157	**188**	220	251	283	314
	-	2,3	23	46	69	92	115	**138**	161	184	207	231
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
32/12	+	8,0	80	161	241	322	402	**483**	563	643	724	804
	-	6,9	69	138	207	276	346	**415**	484	553	622	691
40/16	+	12,6	126	251	377	503	628	**754**	880	1005	1131	1257
	-	10,6	106	211	317	422	528	**633**	739	844	950	1056
50/20	+	19,6	196	393	589	785	982	**1178**	1374	1571	1767	1963
	-	16,5	165	330	495	660	825	**990**	1155	1319	1484	1649
63/20	+	31,2	312	623	935	1247	1559	**1870**	2182	2494	2806	3117
	-	28,0	280	561	841	1121	1402	**1682**	1962	2242	2523	2803
80/25	+	50,3	503	1005	1508	2011	2513	**3016**	3519	4021	4524	5027
	-	45,4	454	907	1361	1814	2268	**2721**	3175	3629	4082	4536
100/25	+	78,5	785	1571	2356	3142	3927	**4712**	5498	6283	7069	7854
	-	73,6	736	1473	2209	2945	3682	**4418**	5154	5890	6627	7363

+ = Outward stroke
- = Return stroke

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

Cylinder forces

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

Cylinder designation	Theoretical cylinder force at 6 bar expanding stroke Nmax	Nmin	spring retraction Nmax	Nmin
Single acting, spring return for retract stroke				
P1M012VR•A••005	59	55	12	8
P1M012VR•A••010	63	55	12	4
P1M016VR•A••005	107	102	18	13
P1M016VR•A••010	111	102	18	9
P1M020VR•A••005	176	169	17	12
P1M020VR•A••010	180	169	17	8
P1M025VR•A••005	276	271	23	18
P1M025VR•A••010	281	271	23	13
P1M032VR•A••005	464	453	29	18
P1M032VR•A••010	469	453	29	13
P1M040VR•A••005	726	720	34	28
P1M040VR•A••010	732	720	34	22
P1M050VR•A••010	1126	1115	63	52
P1M050VR•A••025	1141	1105	73	37
P1M063VR•A••010	1818	1807	63	52
P1M063VR•A••025	1833	1797	73	37
P1M080VR•A••010	2910	2888	128	106
P1M080VR•A••025	2942	2888	128	74
P1M100VR•A••010	4606	4548	128	106
P1M100VR•A••025	4638	4548	128	74

Cylinder designation	Theoretical cylinder force at 6 bar expanding stroke Nmax	Nmin	spring retraction Nmax	Nmin
Single acting, spring return for advanced stroke				
P1M012VE•A••005	43	36	14	7
P1M012VE•A••010	45	40	10	5
P1M016VE•A••005	80	69	22	11
P1M016VE•A••010	84	75	16	7
P1M020VE•A••005	129	123	19	13
P1M020VE•A••010	130	119	23	12
P1M025VE•A••005	232	224	23	15
P1M025VE•A••010	233	217	30	14
P1M032VE•A••005	387	379	35	27
P1M032VE•A••010	395	379	35	19
P1M040VE•A••005	587	577	56	46
P1M040VE•A••010	598	577	56	35
P1M050VE•A••010	951	928	61	38
P1M050VE•A••025	947	901	88	42
P1M063VE•A••010	1643	1625	56	38
P1M063VE•A••025	1639	1593	88	42
P1M080VE•A••010	2593	2525	196	128
P1M080VE•A••025	2621	2531	190	100
P1M100VE•A••010	4289	4221	196	128
P1M100VE•A••025	4317	4227	190	100

Main data: P1M

Cylinder designation	Cylinder bore	Piston rod area	bore	area	Total mass thread (female)	Moving mass thread (male)	at 0 mm stroke	Air addition per 10 mm stroke	Conn. at 0 mm stroke	addition per 10 mm stroke	consump-tion	thread
	mm	cm^2	mm	cm^2			kg	kg	kg	kg	litres	
P1M012	**12**	1,13	6	0,28	M3	M6	0,060	0,016	0,010	0,002	0,0139 [1)]	M5
P1M016	**16**	2,01	8	0,50	M4	M6	0,090	0,022	0,015	0,004	0,0246 [1)]	M5
P1M020	**20**	3,14	10	0,78	M5	M8	0,150	0,032	0,025	0,006	0,0385 [1)]	M5
P1M025	**25**	4,91	10	0,78	M6	M10x1,25	0,170	0,034	0,030	0,006	0,0633 [1)]	M5
P1M032	**32**	8,0	12	1,1	M6	M10x1,25	0,260	0,044	0,050	0,009	0,1050 [1)]	G1/8
P1M040	**40**	12,6	16	2,0	M6	M12x1,25	0,370	0,060	0,090	0,016	0,1620 [1)]	G1/8
P1M050	**50**	19,6	20	3,1	M8	M16x1,5	0,570	0,085	0,140	0,025	0,2530 [1)]	G1/8
P1M063	**63**	31,2	20	3,1	M8	M16x1,5	0,860	0,098	0,220	0,025	0,4140 [1)]	G1/8
P1M080	**80**	50,3	25	4,9	M10	M20x1,5	1,460	0,146	0,380	0,039	0,6690 [1)]	G1/4
P1M100	**100**	78,5	25	4,9	M12	M20x1,5	2,390	0,155	0,650	0,039	1,0430 [1)]	G1/4

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

Material specification

Piston rod	Stainless steel, DIN X 10 CrNiS 18 9
Piston rod seal	Polyurethane
Piston rod bearing	Multilayer PTFE/steel
End plates	Anodised aluminium
End cap screws	Zink plated steel
O-ring, internal	Nitrile rubber, NBR
Cylinder barrel	Anodised aluminium
Piston	Aluminium
Piston seal	Nitrile rubber, NBR
Piston bearing	UHMWPE-plastic
Magnet	Plastic-bound magnetic material
Bumpers	Polyurethane
Return spring	Surface-treated steel

Variants:

High-temperature version, type G

Piston rod seal	Fluorocarbon rubber, FPM
Piston seal	Fluorocarbon rubber, FPM
O-ring	Fluorocarbon rubber, FPM

Additional data

Working pressure	max 10 bar
Working temperature	max +80 °C
	min –20 °C
High-temperature version	max +150 °C
	min –10 °C

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

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 ºC for indoor operation (a lower dew point should be selected for outdoor operation) and oil concentration 1.0 mg oil/m^3, which is what a standard compressor with a standard filter gives.

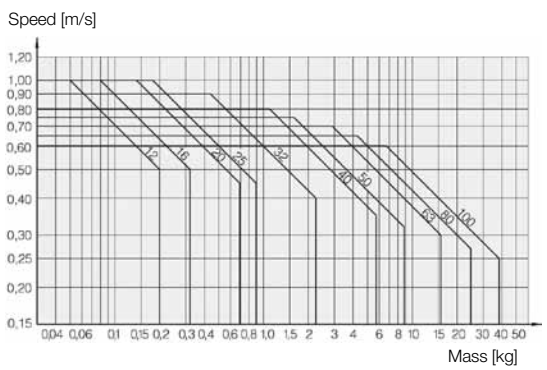
Cushioning diagram

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

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



ISO 8573-1 quality classes

Quality class	Pollution particle size (µm)	Pollution max con-centration (mg/m³)	Water max. press. dew point (°C)	Oil max con-centration (mg/m³)
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	-

Guide for selecting suitable tubing

The selection of the correct size of tubing is often based on experience, with no great thought to optimizing energy efficiency and cylinder velocity. This is usually acceptable, but making a rough calculation can result in worthwhile economic gains.

The following is the basic principle:

1. The primary line to the working valve could be over sized (this does not cause any extra air consumption and consequently does not create any extra costs in operation).
2. The tubes between the valve and the cylinder should, however, be optimized according to the principle that an insufficient bore throttles the flow and thus limits the cylinder speed, while an oversized pipe creates a dead volume which increases the air consumption and filling time.

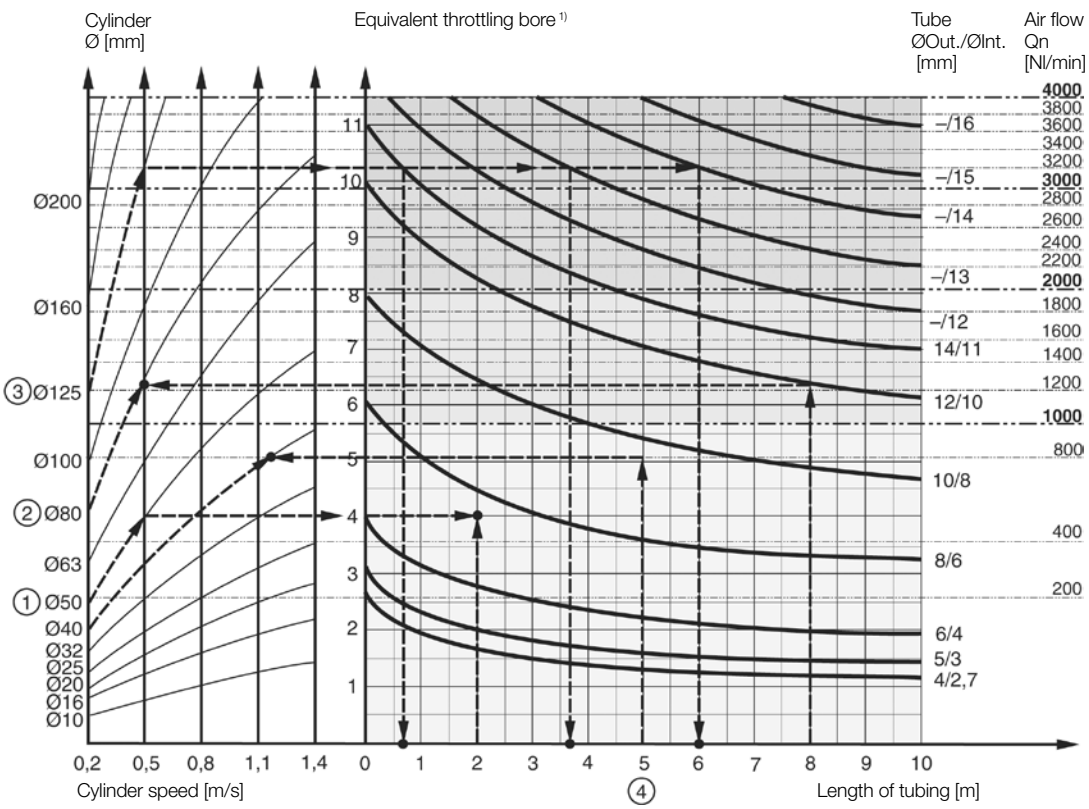
The chart below is intended to help when selecting the correct size of tube to use between the valve and the cylinder.

The following prerequisites apply:

The *cylinder load should be about 50%* of the theoretical force (= normal load). A lower load gives a higher velocity and vice versa. The tube size is selected as a function of the *cylinder bore*, the desired *cylinder velocity* and the *tube length* between the valve and the cylinder.

If you want to use the capacity of the valve to its maximum, and obtain maximum speed, the tubing should be chosen so that they at least correspond with the equivalent restriction diameter (see description below), so that the tubing does not restrict the total flow. This means that a short tubing must have at least the equivalent restriction diameter. If the tubing is longer, choose it from the table below. Straight fittings should be chosen for highest flow rates. (Elbow and banjo fittings cause restriction.)

H



1) The "equivalent throttling bore" is a long throttle (for example a tube) or a series of throttles (for example, through a valve) converted to a short throttle which gives a corresponding flow rate. This should not be confused with the "orifice" which is sometimes specified for valves. The value for the orifice does not normally take account of the fact that the valve contains a number of throttles.

2) Qn is a measure of the valve flow capacity, with flow measured in litre per minute (l/min) at 6 bar(e) supply pressure and 1 bar pressure drop across the valve.

Example ①: Which tube diameter should be used?

A 50 mm bore cylinder is to be operated at 0.5 m/s. The tube length between the valve and cylinder is 2 m. In the diagram we follow the line from 50 mm bore to 0.5 m/s and get an "equivalent throttling bore" of approximately 4 mm. We continue out to the right in the chart and intersect the line for a 2 m tube between the curves for 4 mm (6/4 tube) and 6 mm(8/6 tube). This means that a 6/4 tube throttles the velocity somewhat, while an 8/6 tube is a little too large. We select the 8/6 tube to obtain full cylinder velocity.

Example ②: What cylinder velocity will be obtained?

A 80 mm bore cylinder will be used, connected by 8 m 12/10 tube to a P2L-B valve. What cylinder velocity will we get? We refer to the diagram and follow the line from 8 mm tube length up to the curve for 12/10 tube. From there, we go horizontally to the curve for the Ø80 cylinder. We find that the velocity will be about 0.5 m/s.

Example ③: What is the minimum inner diameter and maximum lenght of tube?

For a application a 125 mm bore cylinder will be used. Maximum velocity of piston rod is 0.5 m/s. The cylinder will be controlled by a P2L-D valve. What diameter of tube can be used and what is maximum lenght of tube.

We refer to the diagram. We start at the left side of the diagram cylinder Ø125. We follow the line until the intersection with the velocity line of 0.5 m/s. From here we draw a horizontal line in the diagram. This line shows us we need an equivalent throttling bore of approximately 10 mm. Following this line horizontally we cross a few intersections. These intersections shows us the minimum inner diameter (rightside diagram) in combination with the maximum length of tube (bottomside diagram).

For example:
Intersection one: When a tube (14/11) will be used, the maximum length of tube is 0.7 meter.
Intersection two: When a tube (—/13) will be used, the maximum length of tube is 3.7 meter.
Intersection three: When a tube (—/14) will be used, the maximum length of tube is 6 meter.

Example ④: Determining tube size and cylinder velocity with a particular cylinder and valve?

For an application using a 40 mm bore cylinder with a valve with Qn=800 Nl/min. The distance between the cylinder and valve has been set to 5 m.
Tube dimension: What tube bore should be selected to obtain the maximum cylinder velocity? Start at pipe length 5 m, follow the line up to the intersection with 800 Nl/min. Select the next largest tube diameter, in this case Ø10/8 mm.
Cylinder velocity: What maximum cylinder velocity will be obtained? Follow the line for 800 Nl/min to the left until it intersects with the line for the Ø40 mm cylinder. In this example, the speed is just above 1.1 m/s.

Valve series with respective flows in Nl/minute

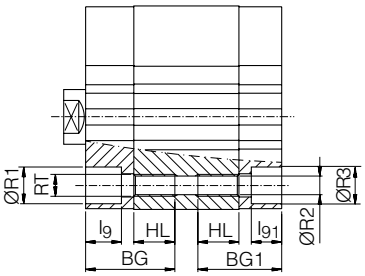
Valve series	Qn in Nl/Min
Valvetronic Solstar	33
Interface PS1	100
Adex A05	173
Moduflex size 1, (2 x 3/2)	220
Valvetronic PVL-B 5/3 closed centre, 6 mm push in	290
Moduflex size 1, (4/2)	320
B43 Manual and mechanical	340
Valvetronic PVL-B 2 x 2/3, 6 mm push in	350
Valvetronic PVL-B 5/3 closed centre, G1/8	370
Compact Isomax DX02	385
Valvetronic PVL-B 2 x 3/2 G1/8	440
Valvetronic PVL-B 5/2, 6 mm push in	450
Valvetronic PVL-B 5/3 vented centre, 6 mm push in	450
Moduflex size 2, (2 x 3/2)	450
Flowstar P2V-A	520
Valvetronic PVL-B 5/3 vented centre, G1/8	540
Valvetronic PVL-B 5/2, G1/8	540
Valvetronic PVL-C 2 x 3/2, 8 mm push in	540
Adex A12	560
Valvetronic PVL-C 2 x 3/2 G1/8	570
Compact Isomax DX01	585
VIKING Xtreme P2LAX	660
Valvetronic PVL-C 5/3 closed centre, 8 mm push in	700
Valvetronic PVL-C 5/3 vented centre, G1/4	700
B3-Series	780
Valvetronic PVL-C 5/3 closed centre, G1/4	780
Moduflex size 2, (4/2)	800
Valvetronic PVL-C 5/2, 8 mm push in	840
Valvetronic PVL-C 5/3 vented centre, 8 mm push in	840
Valvetronic PVL-C 5/2, G1/4	840
Flowstar P2V-B	1090
ISOMAX DX1	1150
B53 Manual and mechanical	1160
B4-Series	1170
VIKING Xtreme P2LBX	1290
B5-Series, G1/4	1440
Airline Isolator Valve VE22/23	1470
ISOMAX DX2	2330
VIKING Xtreme P2LCX, G3/8	2460
VIKING Xtreme P2LDX, G1/2	2660
ISOMAX DX3	4050
Airline Isolator Valve VE42/43	5520
Airline Isolator Valve VE82/83	13680

Dimensions,
Double acting standard cylinders

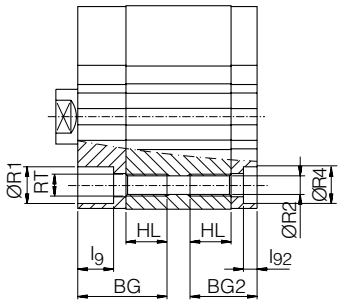
CAD drawings on the Internet
Our home page www.parker.com/euro_pneumatic includes the AirCad Drawing. Library with 2D and 3D drawings for the main versions.

AirCad™ Drawing Library

Port Position G, J

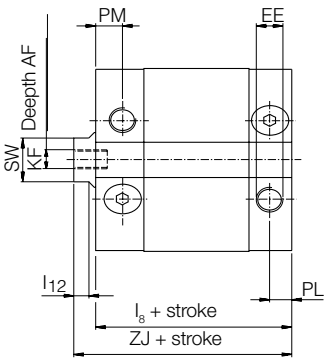


Port Position H

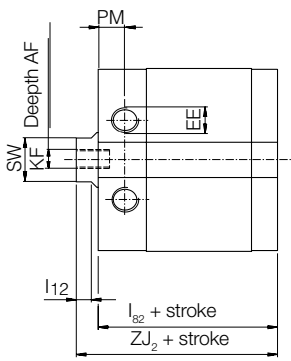


H

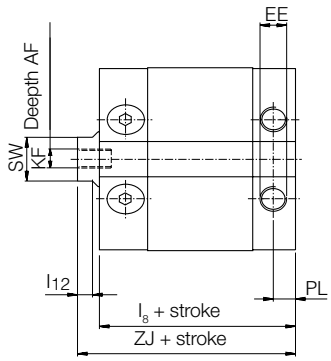
Port Position G



Port Position H



Port Position J



Dimensions

Cylinder designation	AF mm	BG mm	BG1 mm	BG2 mm	EE	HL mm	l8 mm	l9* mm	l12 mm	l82 mm	l91* mm	l92* mm	KF
P1M012	6	25,5	20,5	15,5	M5	12	40,0	3,5	3,0	35,0	3,5	3,5	M3
P1M016	8	26,0	21,0	15,5	M5	12	41,5	5,5	3,0	36,5	3,0	4,0	M4
P1M020	10	32,5	27,0	22,0	M5	18	42,5	10,5	4,0	37,5	5,0	4,5	M5
P1M025	12	32,5	29,0	23,0	M5	18	44,5	4,1	4,0	38,5	4,1	5,0	M6
P1M032	12	41,5	39,0	31,0	G1/8	24	49,0	4,5	5,0	41,0	4,5	4,0	M6
P1M040	12	41,5	39,5	31,0	G1/8	24	50,5	7,2	5,5	42,5	5,2	3,5	M6
P1M050	12	42,5	40,5	34,5	G1/8	25	51,0	5,2	5,5	44,5	5,2	5,0	M8
P1M063	12	43,5	40,5	35,0	G1/8	25	55,5	6,5	5,5	50,0	6,5	4,0	M8
P1M080	14	51,0	51,0	42,0	G1/4	30	63,5	9,5	6,0	54,5	9,5	8,5	M10
P1M100	16	52,0	52,0	43,5	G1/4	30	72,5	9,5	6,0	64,0	9,5	8,5	M12

Cylinder designation	PL mm	PM mm	R1* mm	R2 mm	R3* mm	R4* mm	RT mm	SW	ZJ mm	ZJ2 mm
P1M012	5,0	8,0	6,0	3,5	6,0	6,0	M4	5	43,5	38,5
P1M016	5,0	9,0	7,5	3,5	6,0	6,0	M4	7	45,0	40,0
P1M020	5,0	9,0	10,5	5,0	9,0	9,0	M6	9	47,0	42,0
P1M025	7,0	9,0	10,5	5,0	9,0	9,0	M6	9	49,5	43,5
P1M032	8,0	10,5	10,5	5,0	9,5	9,5	M6	10	57,0	48,5
P1M040	7,5	9,5	10,5	5,0	10,5	10,5	M6	13	58,5	50,5
P1M050	8,0	10,0	14,5	7,0	14,5	11,0	M8	16	59,0	52,5
P1M063	8,0	11,0	10,5	7,0	10,5	10,5	M8	16	63,5	58,0
P1M080	11,5	11,5	14,0	8,5	14,0	14,0	M10	21	73,5	64,5
P1M100	12,0	12,0	14,0	8,5	14,0	14,0	M10	21	84,5	76,0

Length tolerances ±1 mm Stroke length tolerances +1,5/0 mm

Dimensions,
Single acting and High temperature variants

CAD drawings on the Internet

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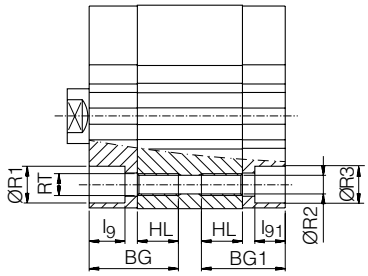
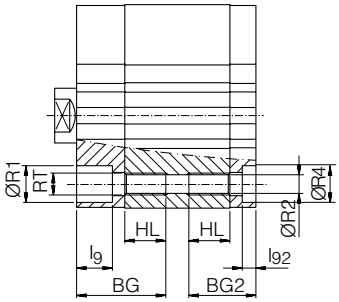
AirCad™ Drawing Library

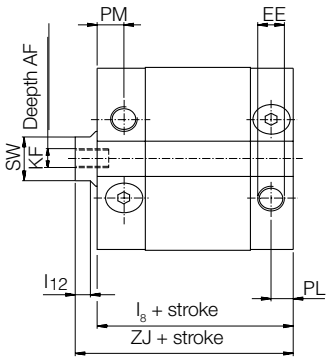
Port Position G, J



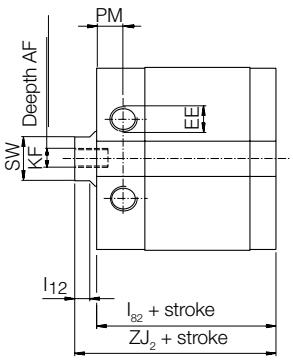
Port Position H



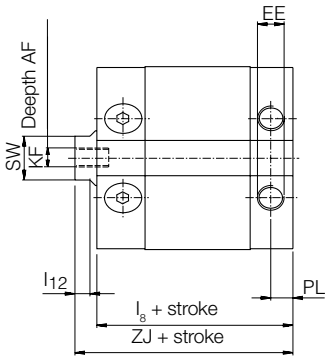
Port Position G



Port Position H



Port Position J



H

Dimensions

Cylinder designation	AF mm	BG mm	BG1 mm	BG2 mm	EE	HL mm	l8 mm	l9* mm	l12 mm	l82 mm	l91* mm	l92* mm	KF
P1M012	6	25,5	20,5	15,5	M5	12	40,0	3,5	3,0	35,0	3,5	3,5	M3
P1M016	8	26,0	21,0	15,5	M5	12	41,5	5,5	3,0	36,5	3,0	4,0	M4
P1M020	10	32,5	27,0	22,0	M5	18	42,5	10,5	4,0	37,5	5,0	4,5	M5
P1M025	12	32,5	29,0	23,0	M5	18	44,5	10,5	4,0	38,5	7,0	5,0	M6
P1M032	12	41,5	39,0	31,0	G1/8	24	49,0	14,5	5,0	41,0	12,5	4,0	M6
P1M040	12	41,5	39,5	31,0	G1/8	24	50,5	14,0	5,5	42,5	12,0	4,0	M6
P1M050	12	42,5	40,5	34,5	G1/8	25	51,0	13,0	5,5	44,5	11,0	5,0	M8
P1M063	12	43,5	40,5	35,0	G1/8	25	55,5	6,5	5,5	50,0	6,5	6,5	M8
P1M080	14	51,0	51,0	42,0	G1/4	30	63,5	9,5	6,0	54,5	9,5	8,5	M10
P1M100	16	52,0	52,0	43,5	G1/4	30	72,5	9,5	6,0	64,0	9,5	8,5	M12

Cylinder designation	PL mm	PM mm	R1* mm	R2 mm	R3* mm	R4* mm	RT mm	SW	ZJ mm	ZJ2 mm
P1M012	5,0	8,0	6,0	3,5	6,0	6,0	M4	5	43,5	38,5
P1M016	5,0	9,0	7,5	3,5	6,0	6,0	M4	7	45,0	40,0
P1M020	5,0	9,0	10,5	5,0	9,0	9,0	M6	9	47,0	42,0
P1M025	7,0	9,0	10,5	5,0	9,0	9,0	M6	9	49,5	43,5
P1M032	8,0	10,5	10,5	5,0	10,5	10,5	M6	10	57,0	48,5
P1M040	7,5	9,5	10,5	5,0	10,5	10,5	M6	13	58,5	50,5
P1M050	8,0	10,0	13,5	7,0	13,5	13,5	M8	16	59,0	52,5
P1M063	8,0	11,0	10,5	7,0	10,5	10,5	M8	16	63,5	58,0
P1M080	11,5	11,5	14,0	8,5	14,0	14,0	M10	21	73,5	64,5
P1M100	12,0	12,0	14,0	8,5	14,0	14,0	M10	21	84,5	76,0

Length tolerances ±1 mm Stroke length tolerances +1,5/0 mm

Dimensions

CAD drawings on the Internet

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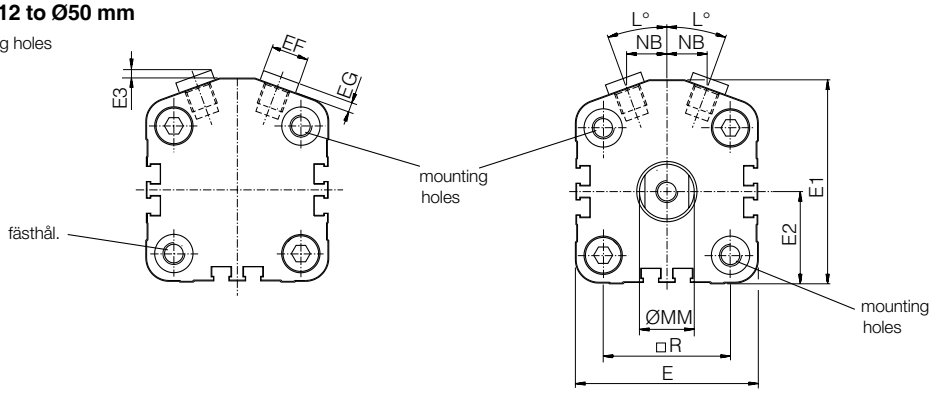
AirCad™ Drawing Library

Port Position G, H, J

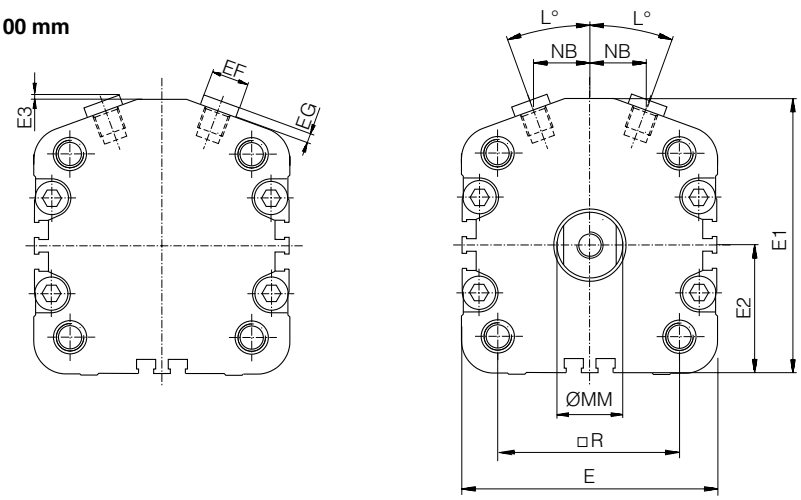
Bore Ø12 to Ø50 mm

2 mounting holes



Bore Ø63 to Ø100 mm

4 mounting holes



Dimensions

Cylinder designation	E mm	E1 mm	E2 mm	E3	EE mm	EF mm	EG mm	L	MM mm	NB mm	R mm
P1M 012	27,0	31,0	14,0	-	M5	-	-	26°	6	5,5	15,5
P1M 016	31,5	35,0	16,0	-	M5	-	-	20°	8	6,5	20,0
P1M 020	38,5	42,5	19,5	3,5	M5	7*	4,5	20°	10	7,5	25,5
P1M 025	41,5	45,5	21,0	3,5	M5	7*	4,5	20°	10	8,5	28,0
P1M 032	48,0	56,0	24,0	3,0	G1/8	14	2,5	20°	12	9,5	32,5
P1M 040	56,0	62,5	28,0	3,0	G1/8	14	2,5	20°	16	11,5	38,0
P1M 050	67,0	74,5	33,5	3,0	G1/8	14	2,5	20°	20	14,5	46,5
P1M 063	82,0	86,0	40,5	2,5	G1/8	14	2,5	20°	20	17,5	56,5
P1M 080	98,0	106,5	48,5	2,5	G1/4	17	3,0	20°	25	25,5	72,0
P1M 100	119,0	126,5	59,5	2,5	G1/4	17	3,0	20°	25	31,5	89,0

* * Hexagon head screw

Dimensions
Cylider variants

CAD drawings on the Internet

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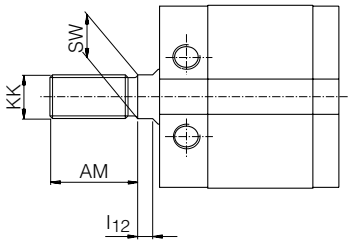
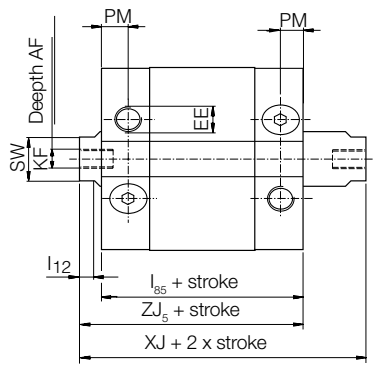
AirCad™ Drawing Library

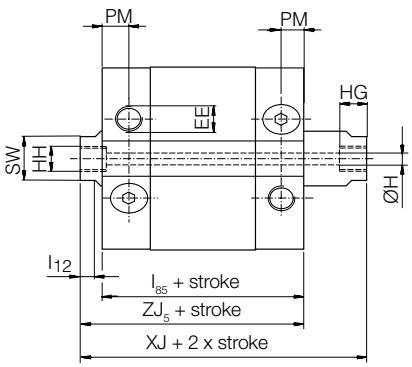
Piston rod thread 8
(external)



Cylinder type K
(through piston rod)



Cylinder type H
(hollow, through piston rod)



Dimensions

Cylinder designation	AF mm	AM mm	H* mm	HG mm	HH mm	I12 mm	I85 mm	KF	KK	PM mm	SW mm	XJ mm	ZJ5 mm
P1M 012	6	16	-	-	-	3,0	46,0	M3	M6	8,0	5	54,0	50,0
P1M 016	8	20	-	-	-	3,0	47,5	M4	M6	9,0	7	54,5	51,5
P1M 020	10	22	3	7	M5	4,0	49,5	M5	M8	9,0	9	58,5	54,0
P1M 025	12	22	3	7	M5	4,0	49,5	M6	M10X1,25	9,0	9	60,0	55,0
P1M 032	12	22	3	7	G1/8	5,0	51,5	M6	M10X1,25	10,5	10	67,5	59,5
P1M 040	12	24	4	8	G1/8	5,5	52,5	M6	M12X1,25	9,5	13	69,0	60,5
P1M 050	12	32	5	8	G1/8	5,5	53,0	M8	M16X1,5	10,0	16	69,0	61,0
P1M 063	12	32	5	8	G1/8	5,5	58,5	M8	M16X1,5	11,0	16	75,0	66,5
P1M 080	14	40	6	11	G1/4	6,0	63,5	M10	M20X1,5	11,5	21	84,0	73,5
P1M 100	16	40	6	11	G1/4	6,0	72,5	M12	M20X1,5	12,0	21	97,0	84,5

* Dimension H only for cylinder H

Length tolerances ±1 mm

Stroke length tolerances +1,5/0 mm

Order key

P 1 M | 0 3 2 | V | D | M | A | 7 | H | 0 2 5

Cylinder bore mm
012
016
020
025
032
040
050
063
080
100

Cylinder type/Function	
D	Double acting
K	Double acting, through rod
H	Double acting, through hollow rod, Ø20-100. Max stroke 125 (Only Piston rod threads 7)
R	Single acting, spring return (Only Port Position G)
E	Single acting, spring extend (Only Port Position G)

Piston rod threads	
7	Female
8	Male

Sealing material/Magnet	
M	Standard sealing -20 °C to +80 °C
G	High temperature -10 °C to +150 °C None magnetic piston

Port Position	
H	Both in front plate
G	Front and rear plate
J	Both in rear plate, radial

Stroke in mm

E.g. **025** = 25 mm For standard stroke length and max length, see table below

Standard stroke length in mm

Standard stroke lengths in mm according to ISO 4393. Special strokes up to: see yellow fields in figure below

Cylinder designation	Cylinder bore	● = Standard stroke length (mm) ▭ = Non standard stroke length (mm) 5 10 15 25 40 50 80 100 125 160 200 250 320 400 500
Double acting		
P1M012VD	12	● ● ● ● ● ● ▭ ▭ ▭ ▭ ▭
P1M016VD	16	● ● ● ● ● ● ▭ ▭ ▭ ▭ ▭
P1M020VD	20	● ● ● ● ● ● ● ▭ ▭ ▭ ▭
P1M025VD	25	● ● ● ● ● ● ● ▭ ▭ ▭ ▭
P1M032VD	32	● ● ● ● ● ● ● ● ▭ ▭ ▭
P1M040VD	40	● ● ● ● ● ● ● ● ▭ ▭ ▭
P1M050VD	50	● ● ● ● ● ● ● ● ▭ ▭ ▭
P1M063VD	63	● ● ● ● ● ● ● ● ▭ ▭ ▭
P1M080VD	80	● ● ● ● ● ● ● ● ▭ ▭ ▭
P1M100VD	100	● ● ● ● ● ● ● ● ▭ ▭ ▭
Single acting, spring return		
P1M012VR	12	● ●
P1M016VR	16	● ●
P1M020VR	20	● ●
P1M025VR	25	● ●
P1M032VR	32	● ●
P1M040VR	40	● ●
P1M050VR	50	● ●
P1M063VR	63	● ●
P1M080VR	80	● ●
P1M100VR	100	● ●
Single acting, spring extended		
P1M012VE	12	● ●
P1M016VE	16	● ●
P1M020VE	20	● ●
P1M025VE	25	● ●
P1M032VE	32	● ●
P1M040VE	40	● ●
P1M050VE	50	● ●
P1M063VE	63	● ●
P1M080VE	80	● ●
P1M100VE	100	● ●

Port options

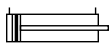
P1M cylinders with diameters 25 to 100 mm and port positions G and J are equipped with four ports, two in the front plate and two in the rear plate. Two plugs are then fitted in order to obtain port position G or J.

This allows any user to move these plugs at any time in order to produce the following port options:

- One port each at front and rear, position G
- One port each at front and rear with the plugs a mirror image of position G
- Both ports at rear, position J
- Both ports at front (note that this lengthens the installed dimensions compared with option H, which has very short installed dimensions)

Double acting

Ports in front and rear plate, female piston rod thread
Ø12 and Ø16 are two-port variants, the rest are four-port variants with two plugs. See also the port options on the previous page

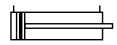


Cyl. bore mm	Stroke mm	Order code
12 M5 thread	5	**P1M012VDMA7G005**
	10	**P1M012VDMA7G010**
	25	**P1M012VDMA7G025**
	40	**P1M012VDMA7G040**
	50	**P1M012VDMA7G050**
	80	**P1M012VDMA7G080**
	100	**P1M012VDMA7G100**
	125	**P1M012VDMA7G125**
	160	**P1M012VDMA7G160**
	200	**P1M012VDMA7G200**
16 M5 thread	5	**P1M016VDMA7G005**
	10	**P1M016VDMA7G010**
	25	**P1M016VDMA7G025**
	40	**P1M016VDMA7G040**
	50	**P1M016VDMA7G050**
	80	**P1M016VDMA7G080**
	100	**P1M016VDMA7G100**
	125	**P1M016VDMA7G125**
	160	**P1M016VDMA7G160**
	200	**P1M016VDMA7G200**
20 M5 thread	5	**P1M020VDMA7G005**
	10	**P1M020VDMA7G010**
	25	**P1M020VDMA7G025**
	40	**P1M020VDMA7G040**
	50	**P1M020VDMA7G050**
	80	**P1M020VDMA7G080**
	100	**P1M020VDMA7G100**
	125	**P1M020VDMA7G125**
	160	**P1M020VDMA7G160**
	200	**P1M020VDMA7G200**
25 M5 thread	5	**P1M025VDMA7G005**
	10	**P1M025VDMA7G010**
	25	**P1M025VDMA7G025**
	40	**P1M025VDMA7G040**
	50	**P1M025VDMA7G050**
	80	**P1M025VDMA7G080**
	100	**P1M025VDMA7G100**
	125	**P1M025VDMA7G125**
	160	**P1M025VDMA7G160**
	200	**P1M025VDMA7G200**
32 G1/8 thread	5	**P1M032VDMA7G005**
	10	**P1M032VDMA7G010**
	25	**P1M032VDMA7G025**
	40	**P1M032VDMA7G040**
	50	**P1M032VDMA7G050**
	80	**P1M032VDMA7G080**
	100	**P1M032VDMA7G100**
	125	**P1M032VDMA7G125**
	160	**P1M032VDMA7G160**
	200	**P1M032VDMA7G200**
	250	**P1M032VDMA7G250**
	320	**P1M032VDMA7G320**
40 G1/8 thread	5	**P1M040VDMA7G005**
	10	**P1M040VDMA7G010**
	25	**P1M040VDMA7G025**
	40	**P1M040VDMA7G040**
	50	**P1M040VDMA7G050**
	80	**P1M040VDMA7G080**
	100	**P1M040VDMA7G100**
	125	**P1M040VDMA7G125**
	160	**P1M040VDMA7G160**
	200	**P1M040VDMA7G200**
	250	**P1M040VDMA7G250**
	320	**P1M040VDMA7G320**

Cyl. bore mm	Stroke mm	Order code
50 G1/8 thread	5	**P1M050VDMA7G005**
	10	**P1M050VDMA7G010**
	25	**P1M050VDMA7G025**
	40	**P1M050VDMA7G040**
	50	**P1M050VDMA7G050**
	80	**P1M050VDMA7G080**
	100	**P1M050VDMA7G100**
	125	**P1M050VDMA7G125**
	160	**P1M050VDMA7G160**
	200	**P1M050VDMA7G200**
	250	**P1M050VDMA7G250**
	320	**P1M050VDMA7G320**
63 G1/8 thread	5	**P1M063VDMA7G005**
	10	**P1M063VDMA7G010**
	25	**P1M063VDMA7G025**
	40	**P1M063VDMA7G040**
	50	**P1M063VDMA7G050**
	80	**P1M063VDMA7G080**
	100	**P1M063VDMA7G100**
	125	**P1M063VDMA7G125**
	160	**P1M063VDMA7G160**
	200	**P1M063VDMA7G200**
	250	**P1M063VDMA7G250**
	320	**P1M063VDMA7G320**
	400	**P1M063VDMA7G400**
	500	**P1M063VDMA7G500**
80 G1/4 thread	5	**P1M080VDMA7G005**
	10	**P1M080VDMA7G010**
	25	**P1M080VDMA7G025**
	40	**P1M080VDMA7G040**
	50	**P1M080VDMA7G050**
	80	**P1M080VDMA7G080**
	100	**P1M080VDMA7G100**
	125	**P1M080VDMA7G125**
	160	**P1M080VDMA7G160**
	200	**P1M080VDMA7G200**
	250	**P1M080VDMA7G250**
	320	**P1M080VDMA7G320**
	400	**P1M080VDMA7G400**
	500	**P1M080VDMA7G500**
100 G1/4 thread	5	**P1M063VDMA7G005**
	10	**P1M063VDMA7G010**
	25	**P1M063VDMA7G025**
	40	**P1M063VDMA7G040**
	50	**P1M063VDMA7G050**
	80	**P1M063VDMA7G080**
	100	**P1M063VDMA7G100**
	125	**P1M063VDMA7G125**
	160	**P1M063VDMA7G160**
	200	**P1M063VDMA7G200**
	250	**P1M063VDMA7G250**
	320	**P1M063VDMA7G320**
	400	**P1M100VDMA7G400**
	500	**P1M100VDMA7G500**

Double acting

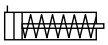
Both ports in front plate, female piston rod thread



Cyl. bore mm	Stroke mm	Order code
12 M5 thread	5	**P1M012VDMA7H005**
	10	**P1M012VDMA7H010**
	25	**P1M012VDMA7H025**
	40	**P1M012VDMA7H040**
	50	**P1M012VDMA7H050**
	80	**P1M012VDMA7H080**
	100	**P1M012VDMA7H100**
	125	**P1M012VDMA7H125**
	160	**P1M012VDMA7H160**
	200	**P1M012VDMA7H200**
16 M5 thread	5	**P1M016VDMA7H005**
	10	**P1M016VDMA7H010**
	25	**P1M016VDMA7H025**
	40	**P1M016VDMA7H040**
	50	**P1M016VDMA7H050**
	80	**P1M016VDMA7H080**
	100	**P1M016VDMA7H100**
	125	**P1M016VDMA7H125**
	160	**P1M016VDMA7H160**
	200	**P1M016VDMA7H200**
20 M5 thread	5	**P1M020VDMA7H005**
	10	**P1M020VDMA7H010**
	25	**P1M020VDMA7H025**
	40	**P1M020VDMA7H040**
	50	**P1M020VDMA7H050**
	80	**P1M020VDMA7H080**
	100	**P1M020VDMA7H100**
	125	**P1M020VDMA7H125**
	160	**P1M020VDMA7H160**
	200	**P1M020VDMA7H200**
25 M5 thread	5	**P1M025VDMA7H005**
	10	**P1M025VDMA7H010**
	25	**P1M025VDMA7H025**
	40	**P1M025VDMA7H040**
	50	**P1M025VDMA7H050**
	80	**P1M025VDMA7H080**
	100	**P1M025VDMA7H100**
	125	**P1M025VDMA7H125**
	160	**P1M025VDMA7H160**
	200	**P1M025VDMA7H200**
32 G1/8 thread	5	**P1M032VDMA7H005**
	10	**P1M032VDMA7H010**
	25	**P1M032VDMA7H025**
	40	**P1M032VDMA7H040**
	50	**P1M032VDMA7H050**
	80	**P1M032VDMA7H080**
	100	**P1M032VDMA7H100**
	125	**P1M032VDMA7H125**
	160	**P1M032VDMA7H160**
	200	**P1M032VDMA7H200**
	250	**P1M032VDMA7H250**
	320	**P1M032VDMA7H320**
40 G1/8 thread	5	**P1M040VDMA7H005**
	10	**P1M040VDMA7H010**
	25	**P1M040VDMA7H025**
	40	**P1M040VDMA7H040**
	50	**P1M040VDMA7H050**
	80	**P1M040VDMA7H080**
	100	**P1M040VDMA7H100**
	125	**P1M040VDMA7H125**
	160	**P1M040VDMA7H160**
	200	**P1M040VDMA7H200**
	250	**P1M040VDMA7H250**
	320	**P1M040VDMA7H320**

Cyl. bore mm	Stroke mm	Order code
50 G1/8 thread	5	**P1M050VDMA7H005**
	10	**P1M050VDMA7H010**
	25	**P1M050VDMA7H025**
	40	**P1M050VDMA7H040**
	50	**P1M050VDMA7H050**
	80	**P1M050VDMA7H080**
	100	**P1M050VDMA7H100**
	125	**P1M050VDMA7H125**
	160	**P1M050VDMA7H160**
	200	**P1M050VDMA7H200**
	250	**P1M050VDMA7H250**
	320	**P1M050VDMA7H320**
63 G1/8 thread	5	**P1M063VDMA7H005**
	10	**P1M063VDMA7H010**
	25	**P1M063VDMA7H025**
	40	**P1M063VDMA7H040**
	50	**P1M063VDMA7H050**
	80	**P1M063VDMA7H080**
	100	**P1M063VDMA7H100**
	125	**P1M063VDMA7H125**
	160	**P1M063VDMA7H160**
	200	**P1M063VDMA7H200**
	250	**P1M063VDMA7H250**
	320	**P1M063VDMA7H320**
	400	**P1M063VDMA7H400**
	500	**P1M063VDMA7H500**
80 G1/4 thread	5	**P1M080VDMA7H005**
	10	**P1M080VDMA7H010**
	25	**P1M080VDMA7H025**
	40	**P1M080VDMA7H040**
	50	**P1M080VDMA7H050**
	80	**P1M080VDMA7H080**
	100	**P1M080VDMA7H100**
	125	**P1M080VDMA7H125**
	160	**P1M080VDMA7H160**
	200	**P1M080VDMA7H200**
	250	**P1M080VDMA7H250**
	320	**P1M080VDMA7H320**
	400	**P1M080VDMA7H400**
	500	**P1M080VDMA7H500**
100 G1/4 thread	5	**P1M063VDMA7H005**
	10	**P1M063VDMA7H010**
	25	**P1M063VDMA7H025**
	40	**P1M063VDMA7H040**
	50	**P1M063VDMA7H050**
	80	**P1M063VDMA7H080**
	100	**P1M063VDMA7H100**
	125	**P1M063VDMA7H125**
	160	**P1M063VDMA7H160**
	200	**P1M063VDMA7H200**
	250	**P1M063VDMA7H250**
	320	**P1M063VDMA7H320**
	400	**P1M100VDMA7H400**
	500	**P1M100VDMA7H500**

Single acting
Spring return, female piston rod thread



Cyl. bore mm	Stroke mm	Order code
12	5	**P1M012VRMA7G005**
M5 thread	10	**P1M012VRMA7G010**
16	5	**P1M016VRMA7G005**
M5 thread	10	**P1M016VRMA7G010**
20	5	**P1M020VRMA7G005**
M5 thread	10	**P1M020VRMA7G010**
25	5	**P1M025VRMA7G005**
M5 thread	10	**P1M025VRMA7G010**
32	5	**P1M032VRMA7G005**
G1/8 thread	10	**P1M032VRMA7G010**
40	5	**P1M040VRMA7G005**
G1/8 thread	10	**P1M040VRMA7G010**
50	5	**P1M050VRMA7G005**
G1/8 thread	10	**P1M050VRMA7G010**
63	5	**P1M063VRMA7G005**
G1/8 thread	10	**P1M063VRMA7G010**
80	5	**P1M080VRMA7G005**
G1/4 thread	10	**P1M080VRMA7G010**
100	5	**P1M063VRMA7G005**
G1/4 thread	10	**P1M063VRMA7G010**

Cylinder mountings

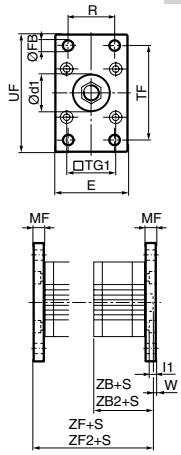
Type	Description	Cyl. bore Ø mm	Mass kg	Order code
Flange MF1/MF2 	Intended for fixed mounting of cylinder. Flange can be fitted to front- or rear end-plates of cylinder. Materials Flange: Surface-treated steel, black Mounting screws according to DIN 6912: Zinc-plated steel 8.8 Supplied complete with mounting screws for attachment to cylinder.	12	0,08	**P1M-4DMB**
		16	0,10	**P1M-4FMB**
		20	0,16	**P1M-4HMB**
		25	0,20	**P1M-4JMB**
		32	0,23	**P1C-4KMB**
		40	0,28	**P1C-4LMB**
		50	0,53	**P1C-4MMB**
		63	0,71	**P1C-4NMB**
		80	1,59	**P1C-4PMB**
		100	2,19	**P1C-4QMB**

Ø32-100 according to ISO MF1/MF2, VDMA, AFNOR

Cyl. bore mm	d1 H11 mm	FB H13 mm	TG1 mm	E mm	R JS14 mm	MF JS14 mm	TF JS14 mm	UF mm	l1 -0,5 mm	W mm	ZF* mm	ZB* mm	ZF2* mm	ZB2* mm
12	9,0	4,5	15,5	25	-	5,5	45,0	55	3,0	2,0	44,0	38,5	49,0	43,5
16	11,5	4,5	20,0	30	-	5,5	45,0	55	3,0	2,0	45,5	40,0	50,5	45,0
20	14,0	6,6	25,5	39	-	8,0	50,5	62	4,2	4,5	49,0	41,0	54,0	46,0
25	14,0	6,6	28,0	42	-	8,0	53,0	65	4,2	3,0	51,5	43,5	56,5	49,5
32	30,0	7,0	32,5	45	32	10,0	64,0	80	5,0	2,0	58,5	48,5	67,0	57,0
40	35,0	9,0	38,0	52	36	10,0	72,0	90	5,0	2,0	60,5	50,5	68,5	58,5
50	40,0	9,0	46,5	65	45	12,0	90,0	110	6,5	4,0	64,5	52,5	71,0	59,0
63	45,0	9,0	56,5	75	50	12,0	100,0	120	6,5	4,0	70,0	58,0	75,5	63,5
80	45,0	12,0	72,0	95	63	16,0	126,0	150	8,0	6,0	80,5	64,5	89,5	73,5
100	55,0	14,0	89,0	115	75	16,0	150,0	170	8,0	4,0	92,0	76,0	100,5	84,5

S = Stroke length

* ZF, ZB for cylinders with both ports in front end (type H)
ZF2, ZB2 for all other cylinders (type G, J, K)



Angle bracket MS1 	Intended for fixed mounting of cylinder. Angle bracket can be fitted to front- and rear end-plates of cylinder. Materials Angle bracket: Bore 12-25 mm, Zinc-plated steel Bore 32-50 mm, Surface-treated aluminium, black Bore 63-100 mm, Surface-treated steel, black Mounting screws: according to DIN 912: Zinc-plated steel 8.8 Supplied in pairs with mounting screws for attachment to cylinder.	12	0,02*	**P1M-4DMF**
		16	0,02*	**P1M-4FMF**
		20	0,04*	**P1M-4HMF**
		25	0,05*	**P1M-4JMF**
		32	0,06*	**P1C-4KMZ**
		40	0,08*	**P1C-4LMZ**
		50	0,16*	**P1C-4MMZ**
		63	0,25*	**P1C-4NMF**
		80	0,50*	**P1C-4PMF**
		100	0,85*	**P1C-4QMF**

* Weight per item

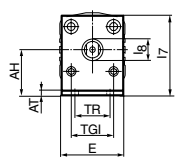
Ø32-100 according to ISO MS1, VDMA, AFNOR

Cyl. bore mm	AB H14 mm	TG1 mm	E mm	TR JS14 mm	AO mm	AU mm	AH JS15 mm	l7 mm	AT mm	l9 JS14 mm	l8 mm	SA* mm	SA2* mm
12	4,5	15,5	44	35	5,5	8,0	17	29,5	2	-	8	51,0	56,0
16	4,5	20,0	48	39	6,0	8,0	19	33,5	2	-	10	52,5	57,5
20	6,6	25,5	62	50	7,5	9,0	24	42,0	3,2	-	12	59,5	64,5
25	6,6	28,0	66	52	7,5	10,5	26	46,0	3,2	-	12	59,5	65,5
32	7,0	32,5	45	32	11,0	24,0	32	54,5	8,0	-	30	88,5	97,0
40	9,0	38,0	52	36	7,0	28,0	36	62,0	8,0	-	35	98,5	106,5
50	9,0	46,5	65	45	13,0	32,0	45	77,5	10,0	-	40	108,5	115,0
63	9,0	56,5	75	50	13,0	32,0	50	35,0	5,5	27,5	-	114,0	119,5
80	12,0	72,0	95	63	14,0	41,0	63	49,0	6,5	40,5	-	136,5	145,5
100	14,0	89,0	115	75	15,0	41,0	71	54,0	6,5	43,5	-	146,0	154,5

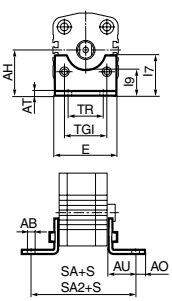
S = Stroke length

* SA for cylinders with both ports in front end (type H)
* SA2 for all other cylinders (type G, J, K)

Bore 12-50 mm

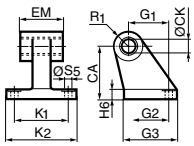


Bore 63-100 mm



Cylinder mountings

Type	Description	Cyl. bore Ø mm	Mass kg	Order code
Pivot bracket with rigid bearing	Intended for flexible mounting of cylinder. The pivot bracket can be combined with clevis bracket MP2. Materials Pivot bracket: Surface-treated aluminium, black Bearing: Sintered oil-bronze bushing	32	0,06	**P1C-4KMD**
		40	0,08	**P1C-4LMD**
		50	0,15	**P1C-4MMD**
		63	0,20	**P1C-4NMD**
		80	0,33	**P1C-4PMD**
		100	0,49	**P1C-4QMD**



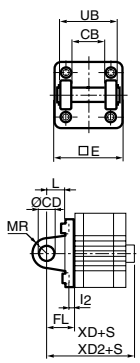
Ø32-100 according to CETOP RP 107 P, VDMA, AFNOR

Cyl. bore	CK H9	S5 H13	K1 JS14	K2	G1 JS14	G2 JS14	EM	G3	CA JS15	H6	R1
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
32	10	6,6	38	51	21	18	25,5	31	32	8	10
40	12	6,6	41	54	24	22	27,0	35	36	10	11
50	12	9,0	50	65	33	30	31,0	45	45	12	13
63	16	9,0	52	67	37	35	39,0	50	50	12	15
80	16	11,0	66	86	47	40	49,0	60	63	14	15
100	20	11,0	76	96	55	50	59,0	70	71	15	19

Clevis bracket MP2	Intended for flexible mounting of cylinder. Clevis bracket MP2 can be combined with clevis bracket MP4. Materials Clevis bracket: Surface-treated aluminium, black Mounting screws according to DIN 912: Zinc-plated steel 8.8 Pin: surface treated steel Supplied complete with mounting screws for attachment to cylinder.	12	0,02	**P1M-4DMT**
		16	0,03	**P1M-4FMT**
		20	0,05	**P1M-4HMT**
		25	0,06	**P1M-4JMT**
		32	0,08	**P1C-4KMT**
		40	0,11	**P1C-4LMT**
		50	0,14	**P1C-4MMT**
		63	0,29	**P1C-4NMT**
		80	0,36	**P1C-4PMT**
		100	0,64	**P1C-4QMT**

Ø32-100 according to ISO MP2, VDMA, AFNOR

Cyl. bore	E	UB h14	CB H14	FL ±0,2	L	l2	CD H9	MR	XD*	XD2*
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
12	27,0	10	5,2	14	7	-	5	6	52,5	57,5
16	31,5	12	6,7	15	10	-	5	6	55,0	60,0
20	38,5	16	8,2	18	12	-	8	9	59,0	65,0
25	41,0	20	10,2	20	14	-	10	10	63,5	69,5
32	45,0	45	26,0	22	13	5,5	10	10	70,5	79,0
40	52,0	52	28,0	25	16	5,5	12	12	75,5	83,5
50	65,0	60	32,0	27	16	6,5	12	12	79,5	86,0
63	75,0	70	40,0	32	21	6,5	16	16	90,0	95,5
80	95,0	90	50,0	36	22	10,0	16	16	100,5	109,5
100	115,0	110	60,0	41	27	10,0	20	20	117,0	125,5



S = Stroke length

* XD for cylinders with both ports in front end (type H)
XD2 for all other cylinders (type G, J, K)

Cylinder mountings

Clevis bracket MP4

Intended for flexible mounting of cylinder. Clevis bracket MP4 can be combined with clevis bracket MP2.

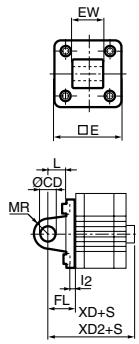
Materials
Clevis bracket: Surface-treated aluminium, black
Mounting screws according to DIN 912: Zinc-plated steel 8.8

Supplied complete with mounting screws for attachment to cylinder.

Cyl. bore Ø mm	Mass kg	Order code
12	0,02	**P1M-4DME**
16	0,03	**P1M-4FME**
20	0,05	**P1M-4HME**
25	0,07	**P1M-4JME**
32	0,09	**P1C-4KME**
40	0,13	**P1C-4LME**
50	0,17	**P1C-4MME**
63	0,36	**P1C-4NME**
80	0,46	**P1C-4PME**
100	0,83	**P1C-4QME**

Ø32-100 according to ISO MP4, VDMA, AFNOR

Cyl. bore mm	E mm	EW mm	FL ±0,2 mm	L mm	l2 mm	CD H9 mm	MR mm	XD* mm	XD2* mm
12	27,0	4,7	14	7	-	5	6	52,5	57,5
16	31,5	6,2	15	10	-	5	6	55,0	60,0
20	38,5	7,7	18	12	-	8	9	59,0	65,0
25	41,0	9,7	20	14	-	10	10	63,5	69,5
32	45,0	26,0	22	13	5,5	10	10	70,5	79,0
40	52,0	28,0	25	16	5,5	12	12	75,5	83,5
50	65,0	32,0	27	16	6,5	12	12	79,5	86,0
63	75,0	40,0	32	21	6,5	16	16	90,0	95,5
80	95,0	50,0	36	22	10,0	16	16	100,5	109,5
100	115,0	60,0	41	27	10,0	20	20	117,0	125,5



S = Stroke length

* XD for cylinders with both ports in front end (type H)
XD2 for all other cylinders (type G, J, K)

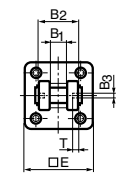
Clevis bracket GA

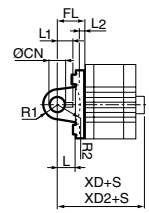
Intended for flexible mounting of cylinder. Clevis bracket GA can be combined with pivot bracket with swivel bearing, swivel eye bracket and swivel rod eye.

Materials
Clevis bracket: Surface-treated aluminium
Pin: Surface hardened steel
Locking pin: Spring steel
Circlips according to DIN 471: Spring steel
Mounting screws acc. to DIN 912: Zinc-plated steel 8.8

Supplied complete with mounting screws for attachment to cylinder.

Cyl. bore Ø mm	Mass kg	Order code
32	0,09	**P1C-4KMCA**
40	0,13	**P1C-4LMCA**
50	0,17	**P1C-4MMCA**
63	0,36	**P1C-4NMCA**
80	0,58	**P1C-4PMCA**
100	0,89	**P1C-4QMCA**





According to VDMA, AFNOR

Cyl. bore mm	E mm	B2 d12 mm	B1 H14 mm	T mm	B3 mm	R2 mm	L1 mm	FL ±0,2 mm	l2 mm	L mm	CN F7 mm	R1 mm	XD* mm	XD2* mm
32	45	34	14	3	3,3	17	11,5	22	5,5	12	10	11	70,5	79,0
40	52	40	16	4	4,3	20	12,0	25	5,5	15	12	13	75,5	83,5
50	65	45	21	4	4,3	22	14,0	27	6,5	17	16	18	79,5	86,0
63	75	51	21	4	4,3	25	14,0	32	6,5	20	16	18	90,0	95,5
80	95	65	25	4	4,3	30	16,0	36	10,0	20	20	22	100,5	109,5
100	115	75	25	4	4,3	32	16,0	41	10,0	25	20	22	117,0	125,5

S = Stroke length

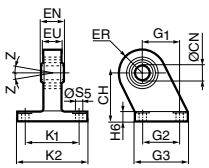
* XD for cylinders with both ports in front end (type H)
XD2 for all other cylinders (type G, J, K)

Stainless steel Pin Set GA
Materials:
Pin: Stainless steel
Locking pin: Stainless steel
Circlips according to DIN 471: Stainless steel

32	0,05	**9301054311**
40	0,06	**9301054312**
50	0,07	**9301054313**
63	0,07	**9301054314**
80	0,17	**9301054315**
100	0,31	**9301054316**

Cylinder mountings

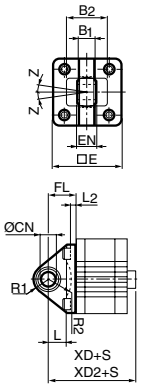
Type	Description	Cyl. bore Ø mm	Mass kg	Order code
Pivot bracket with swivel bearing	Intended for use together with clevis bracket GA. Material Pivot bracket: Surface-treated steel, black Swivel bearing according to DIN 648K: Hardened steel	32	0,18	**P1C-4KMA**
		40	0,25	**P1C-4LMA**
		50	0,47	**P1C-4MMA**
		63	0,57	**P1C-4NMA**
		80	1,05	**P1C-4PMA**
		100	1,42	**P1C-4QMA**



According to VDMA, AFNOR

Cyl. bore mm	CN H7 mm	S5 H13 mm	K1 JS14 mm	K2 mm	EU mm	G1 JS14 mm	G2 JS14 mm	EN mm	G3 mm	CH JS15 mm	H6 mm	ER mm	Z
32	10	6,6	38	51	10,5	21	18	14	31	32	10	16	4°
40	12	6,6	41	54	12,0	24	22	16	35	36	10	18	4°
50	16	9,0	50	65	15,0	33	30	21	45	45	12	21	4°
63	16	9,0	52	67	15,0	37	35	21	50	50	12	23	4°
80	20	11,0	66	86	18,0	47	40	25	60	63	14	28	4°
100	20	11,0	76	96	18,0	55	50	25	70	71	15	30	4°

Type	Description	Cyl. bore Ø mm	Mass kg	Order code
Swivel eye bracket	Intended for use together with clevis bracket GA Material Bracket: Surface-treated aluminium, black Swivel bearing acc. to DIN 648K: Hardened steel Supplied complete with mounting screws for attachment to cylinder.	32	0,08	**P1C-4KMSA**
		40	0,11	**P1C-4LMSA**
		50	0,20	**P1C-4MMSA**
		63	0,27	**P1C-4NMSA**
		80	0,52	**P1C-4PMSA**
		100	0,72	**P1C-4QMSA**



According to VDMA, AFNOR

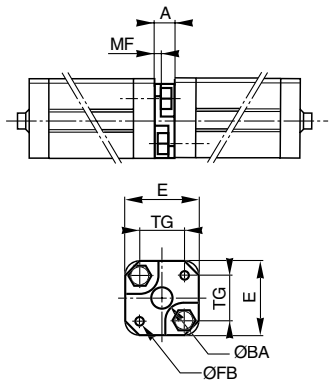
Cyl. bore mm	E mm	B1 mm	B2 mm	EN mm	R1 mm	R2 mm	FL mm	l2 mm	L mm	CN H7 mm	XD* mm	XD2* mm	Z
32	45	10,5	38	14	16	14	22	5,5	12	10	70,5	79,0	4°
40	52	12,0	44	16	18	16	25	5,5	15	12	75,5	83,5	4°
50	65	15,0	51	21	21	19	27	6,5	15	16	79,5	86,0	4°
63	75	15,0	56	21	23	22	32	6,5	20	16	90,0	95,5	4°
80	95	18,0	72	25	29	25	36	10,0	20	20	100,5	109,5	4°
100	115	18,0	82	25	31	27	41	10,0	25	20	117,0	125,5	4°

S=Stroke length

* XD for cylinders with both ports in front end (type H)
XD2 for all other cylinders (type G, J, K)

Cylinder mountings

Type	Description	Cyl. bore Ø mm	Mass kg	Order code
Mounting kit	Mounting kit for back to back mounted cylinders, 3 and 4 position cylinders.	32	0,060	**P1E-6KB0**
		40	0,078	**P1E-6LB0**
		50	0,162	**P1E-6MB0**
		63	0,194	**P1E-6NB0**
	Material:	80	0,450	**P1E-6PB0**
	Mounting, Aluminium	100	0,672	**P1E-6QB0**
	Mounting screws, Zinc-plated steel 8.8			



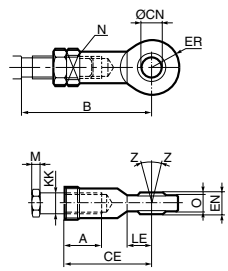
Cyl. bore mm	E mm	TG mm	ØFB mm	MF mm	A mm	ØBA mm
32	50	32,5	6,5	5	16	30
40	60	38,0	6,5	5	16	35
50	66	46,5	8,5	6	20	40
63	80	56,5	8,5	6	20	45
80	100	72,0	10,5	8	25	45
100	118	89,0	10,5	8	25	55

Cylinder mountings

Type	Description	Cyl. bore Ø mm	Mass kg	Order code
Swivel rod eye 	Swivel rod eye for articulated mounting of cylinder. Swivel rod eye can be combined with clevis bracket GA. Maintenance-free. Materials Swivel rod eye, nut: Galvanized steel Swivel bearing according to DIN 648K: Hardened steel	12	0,03	**P1A-4DRS**
		16	0,03	**P1A-4DRS**
		20	0,05	**P1A-4HRS**
		25	0,07	**P1A-4JRS**
		32	0,08	**P1C-4KRS**
		40	0,12	**P1C-4LRS**
		50	0,25	**P1C-4MRS**
		63	0,25	**P1C-4MRS**
		80	0,46	**P1C-4PRS**
		100	0,46	**P1C-4PRS**
Stainless steel swivel rod eye 	Stainless-steel swivel rod eye for articulated mounting of cylinder. Swivel rod eye can be combined with clevis bracket GA. Maintenance-free. Materials Swivel rod eye: Stainless steel Swivel bearing according to DIN 648K: Stainless steel Use stainless steel nut (see page 25) with stainless steel swivel rod eye.	12	0,03	**P1S-4DRT**
		16	0,03	**P1S-4DRT**
		20	0,05	**P1S-4HRT**
		25	0,08	**P1S-4JRT**
		32	0,08	**P1S-4JRT**
		40	0,12	**P1S-4LRT**
		50	0,25	**P1S-4MRT**
		63	0,25	**P1S-4MRT**
		80	0,46	**P1S-4PRT**
		100	0,46	**P1S-4PRT**

According to ISO 8139

Cyl. bore	A	B min	B max	CE	CN H9	EN h12	ER	KK	LE min	M	N	O	Z
mm	mm	mm	mm	mm	mm	mm	mm		mm	mm	mm	mm	
12	9	37	40	30	6	9	10	M6	10	3,2	10	6,8	10°
16	9	37	40	30	6	9	10	M6	10	3,2	10	6,8	10°
20	12	44	48	36	8	12	12	M8	12	4,0	13	9,0	12°
25	15	48	55	43	10	14	14	M10X1,25	14	5,0	17	10,5	12°
32	20	48	55	43	10	14	14	M10x1,25	15	5,0	17	10,5	12°
40	22	56	62	50	12	16	16	M12x1,25	17	6,0	19	12,0	12°
50	28	72	80	64	16	21	21	M16x1,5	22	8,0	22	15,0	15°
63	28	72	80	64	16	21	21	M16x1,5	22	8,0	22	15,0	15°
80	33	87	97	77	20	25	25	M20x1,5	26	10,0	32	18,0	15°
100	33	87	97	77	20	25	25	M20x1,5	26	10,0	32	18,0	15°



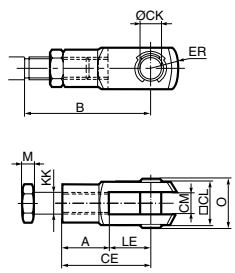
Cylinder mountings

Type	Description	Cyl. bore Ø mm	Mass kg	Order code
Clevis	Clevis for articulated mounting of cylinder.	12	0,02	**P1A-4DRC**
		16	0,02	**P1A-4DRC**
		20	0,05	**P1A-4HRC**
	Material	25	0,09	**P1A-4JRC**
	Clevis, clip, nut: Galvanized steel	32	0,09	**P1C-4KRC**
	Pin: Hardened steel	40	0,15	**P1C-4LRC**
		50	0,35	**P1C-4MRC**
		63	0,35	**P1C-4MRC**
		80	0,75	**P1C-4PRC**
		100	0,75	**P1C-4PRC**
Stainless steel clevis	Stainless-steel clevis for articulated mounting of cylinder.	12	0,02	**P1S-4DRD**
		16	0,02	**P1S-4DRD**
		20	0,05	**P1S-4HRD**
	Material	25	0,09	**P1S-4JRD**
	Clevis: Stainless steel	32	0,09	**P1S-4JRD**
	Pin: Stainless steel	40	0,15	**P1S-4LRD**
	Circlips according to DIN 471: Stainless steel	50	0,35	**P1S-4MRD**
		63	0,35	**P1S-4MRD**
	Use stainless steel nut (see page 25) with stainless steel swivel rod eye.	80	0,75	**P1S-4PRD**
		100	0,75	**P1S-4PRD**

H

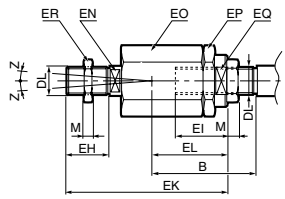
According to ISO 8140

Cyl. bore	A	B min	B max	CE	CK h11/E9	CL	CM	ER	KK	LE	M	O
mm	mm	mm	mm	mm	mm	mm	mm	mm		mm	mm	mm
12	12	28	34	24	6	12	6	7	M6	12	3,2	17,0
16	12	28	34	24	6	12	6	7	M6	12	3,2	17,0
20	16	37	44	32	8	16	8	10	M8	16	4,0	22,0
25	20	45	52	40	10	20	10	12	M10X1,25	20	5,0	28,0
32	20	45	52	40	10	20	10	16	M10x1,25	20	5,0	28,0
40	24	54	60	48	12	24	12	19	M12x1,25	24	6,0	32,0
50	32	72	80	64	16	32	16	25	M16x1,5	32	8,0	41,5
63	32	72	80	64	16	32	16	25	M16x1,5	32	8,0	41,5
80	40	90	100	80	20	40	20	32	M20x1,5	40	10,0	50,0
100	40	90	100	80	20	40	20	32	M20x1,5	40	10,0	50,0



Cylinder mountings

Type	Description	Cyl. bore Ø mm	Mass kg	Order code
Flexocoupling	Flexocoupling for articulated mounting of piston rod. Flexocoupling is intended to take up axial angle errors within a range of ±4°. Material Flexocoupling, nut: Galvanized steel Socket: Hardened steel Supplied complete with galvanized adjustment nut.	32	0,21	**P1C-4KRF**
		40	0,22	**P1C-4LRF**
		50	0,67	**P1C-4MRF**
		63	0,67	**P1C-4MRF**
		80	0,72	**P1C-4PRF**
		100	0,72	**P1C-4PRF**

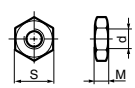


Cyl. bore mm	B min mm	B max mm	DL	EH mm	EI mm	EK mm	EL mm	EN mm	EO mm	EP mm	EQ mm	M mm	Z
32	36	43	M10x1,25	20	23	70	31	12	30	30	19	5	4°
40	37	43	M12x1,25	23	23	67	31	12	30	30	19	6	4°
50	53	61	M16x1,5	40	32	112	45	19	41	41	30	8	4°
63	53	61	M16x1,5	40	32	112	45	19	41	41	30	8	4°
80	57	67	M20x1,5	39	42	122	56	19	41	41	30	10	4°
100	57	67	M20x1,5	39	42	122	56	19	41	41	30	10	4°

Nut	Intended for fixed mounting of accessories to the piston rod. Material: Galvanized steel (Cylinders supplied with galvanized nut)	12	0,002	**0261210800**
		16	0,002	**0261210800**
		20	0,005	**0261211000**
		25	0,007	**9128985601**
		32	0,007	**9128985601**
		40	0,010	**0261109910**
		50	0,021	**9128985603**
		63	0,021	**9128985603**
		80	0,040	**0261109911**
		100	0,040	**0261109911**
Stainless steel nut	Intended for fixed mounting of accessories to the piston rod. Material: Stainless steel A2	12	0,002	**9127385122**
		16	0,002	**9127385122**
		20	0,005	**9127385123**
		25	0,007	**9126725404**
		32	0,007	**9126725404**
		40	0,010	**9126725405**
		50	0,021	**9126725406**
		63	0,021	**9126725406**
		80	0,040	**0261109921**
		100	0,040	**0261109921**

According to DIN 439 B

Cyl. bore mm	d	M mm	S mm
12	M6	3,2	10
16	M6	3,2	10
20	M8	4,0	13
25	M10x1,25	5,0	17
32	M10x1,25	5,0	17
40	M12x1,25	6,0	19
50	M16x1,5	8,0	24
63	M16x1,5	8,0	24
80	M20x1,5	10,0	30
100	M20x1,5	10,0	30



Our global series of sensors

This series of sensors is already being used or will be used in all future ranges in our global product programme involving cylinders/actuators. The sensors have small installation dimensions and either fit into the groove in the case profile or, as shown here, are fastened to the cylinder using a special attachment.

You can choose from electronic or reed sensors with a range of cable lengths fitted with 8 mm or M12 terminals.

H

Electronic sensors

The new electronic sensors are "Solid State", i.e. they have no moving parts at all. They are provided with short-circuit protection and transient protection as standard. The built-in electronics make the sensors suitable for applications with high on and off switching frequency, and where very long service life is required.

Technical data

Design	GMR (Giant Magnetic Resistance) magneto-resistive function
Installation	Sensor mounting P8S-TMC01
Outputs	PNP, normally open (also available in NPN design, normally closed, on request)
Voltage range	10-30 VDC
	10-18 V DC, ATEX sensor
Ripple	max 10%
Voltage drop	max 2,5 V
Load current	max 100 mA
Internal consumption	max 10 mA
Actuating distance	min 9 mm
Hysteresis	max 1,5 mm
Repeatability accuracy	max 0,2 mm
On/off switching frequency	max 5 kHz
On switching time	max 2 ms
Off switching time	max 2 ms
Encapsulation	IP 67 (EN 60529)
Temperature range	–25 °C to +75 °C
	–20 °C to +45 °C, ATEX sensor
Indication	LED, yellow
Material housing	PA 12
Material screw	Stainless steel
Cable	PVC or PUR 3x0.25 mm^2 see order code respectively

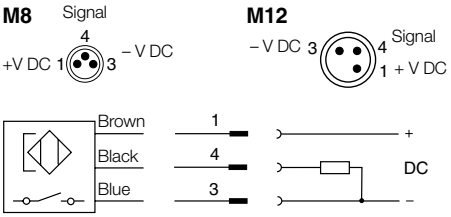
Reed sensors

The sensors are based on proven reed switches, which offer reliable function in many applications. Simple installation, a protected position on the cylinder and clear LED indication are important advantages of this range of sensors.

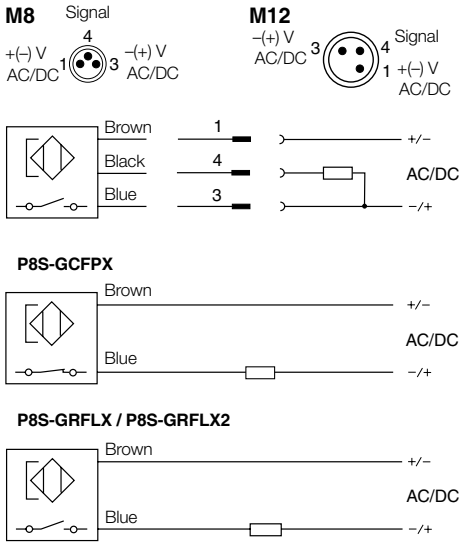
Technical data

Design	Reed element
Mounting	Sensor mounting P8S-TMC01
Output	Normally open , or normally closed
Voltage range	10-30 V AC/DC or 10-120 V AC/DC
	24-230 V AC/DC
Load current	max 500 mA for 10-30 V or max 100 mA for 10-120 V
	max 30 mA for 24-230 V
Breaking power (resistive)	max 6 W/VA
Actuating distance	min 9 mm
Hysteresis	max 1,5 mm
Repeatability accuracy	0,2 mm
On/off switching frequency	max 400 Hz
On switching time	max 1,5 ms
Off switching time	max 0,5 ms
Encapsulation	IP 67 (EN 60529)
Temperature range	–25 °C to +75 °C
Indication	LED, yellow
Material housing	PA12
Material screw	Stainless steel
Cable	PVC or PUR 3x0.14 mm^2 see order code respectively

Electronic sensors

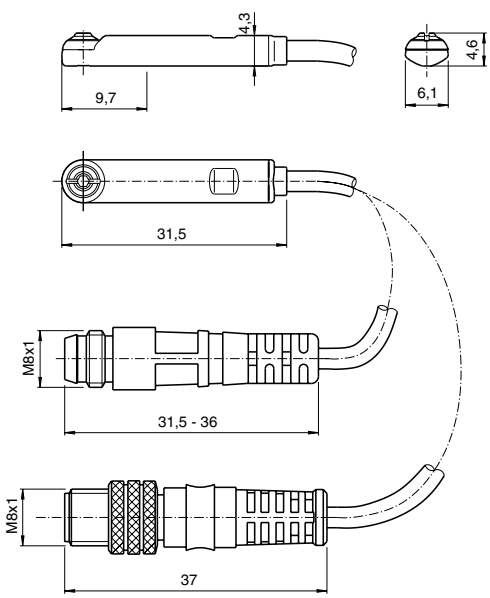


Reed sensors



Dimensions

Sensors



Ordering data

Output/function	Cable/connector	Weight kg	Order code
Electronic sensors , 10-30 V DC			
PNP type, normally open	0,27 m PUR-cable and 8 mm snap-in male connector	0,007	**P8S-GPSHX**
PNP type, normally open	1,0 m PUR-cable and 8 mm snap-in male connector	0,013	**P8S-GPSCX**
PNP type, normally open	1,0 m PUR-cable and M8 screw male connector	0,013	**P8S-GPCCX**
PNP type, normally open	0,27 m PUR-cable and M12 screw male connector	0,015	**P8S-GPMHX**
PNP type, normally open	3 m PVC-cable without connector	0,030	**P8S-GPFLX**
PNP type, normally open	10 m PVC-cable without connector	0,110	**P8S-GPFTX**
Electronic sensor 18-30 V DC ATEX-certified			
CE Ex **II3G EEx nA II T4X II3D 135 °C IP67**			
Type PNP , normally open	3 m PVC-cable without connector	0,030	**P8S-GPFLX/EX**
Reed sensors , 10-30 V AC/DC			
Normally open	0,27 m PUR-cable and 8 mm snap-in male connector	0,007	**P8S-GSSHX**
Normally open	1,0 m PUR-cable and 8 mm snap-in male connector	0,013	**P8S-GSSCX**
Normally open	1,0 m PUR-cable and M8 male connector	0,013	**P8S-GSCCX**
Normally open	0,27 m PUR-cable and M12 screw male connector	0,015	**P8S-GSMHX**
Normally open	1,0 m PUR-cable and M12 screw male connector	0,023	**P8S-GSMCX**
Normally open	3 m PVC-cable without connector	0,030	**P8S-GSFLX**
Normally open	10 m PVC-cable without connector	0,110	**P8S-GSFTX**
Normally closed	5m PVC-cable without connector [1]	0,050	**P8S-GCFPX**
Reed sensors, 10-120 V AC/DC			
Normally open	3 m PVC-cable without connector	0,030	**P8S-GRFLX**
Reed sensorer, 24-230 V AC/DC			
Normally open	3 m PVC-cable without connector	0,030	**P8S-GRFLX2**

1) Without LED

Sensors for special applications

Sensors for applications where the short installation length and the 90 degree cable outlet are important factors. This type of sensor is an good alternative if a cylinder has a short stroke or tight installation.

Reed switch sensors

The reed switch sensors incorporate a well-proven, universal-voltage, compact reed switch element, making them suitable for a wide range of applications. They can work with electronic control systems or conventional relay systems. No environment is too severe.

Technical data

Design	Reed
Output	Making
Voltage range	10 to 120 VAC/VDC
Max permissible ripple	10%
Max voltage drop	3 V
Max load current	100 mA
Max breaking power (resistive)	10 W
Min actuating distance	5 mm
Hysteresis	≤1,0 mm
Repeatability accuracy	≤0,2 mm
Max on/off switching frequency	400 Hz
Max on/off switching time	1 ms
Encapsulation	IP 67
Temperature range	–25 °C to +75 °C
Indication	LED, yellow
Shock resistance	30 g
Material, housing	PA 12
Material, mould	Epoxy
Cable	PVC 3x0,14 mm^2
Cable incl. female part connector	PVC 3x0,14 mm^2
Mounting	T slot

Ordering data

Output	Cable connection	Cable length	Weight kg	Order code
Reed sensors				
making	90°	3,0 m	0,030	**P8S-SRELX**
making	90°	10,0 m	0,110	**P8S-SRETX**
making	90°	0,3 m*	0,005	**P8S-SRTHX**

*) Cable shall be ordered separately.

Electronic sensors

These sensors are of solid-state type, with no moving parts. Short-circuit and transient protection is incorporated as standard. The integral electronics make these sensors suitable for applications with very high switching frequencies.

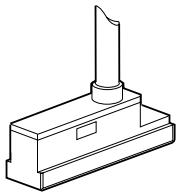
Technical data

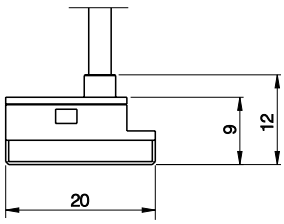
Design	Hall element
Output	PNP resp. NPN, N.O.
Voltage range	10-30 VDC
Max permissible ripple	10%
Max voltage drop	≤2 V
Max load current	150 mA
Max breaking power (resistive)	6 W
Internal consumption	15 mA
Min actuating distance	5 mm
Hysteresis	≤1,5 mm
Repeatability accuracy	≤0,2 mm
Max on/off switching frequency	
P8S-SPELXD, SPETXD, SPTHXD	50 Hz
Others	5 kHz
Max on/off switching time	0,8/3,0 ms
Encapsulation	IP 67
Temperature range	–25 °C to +75 °C
Indication	LED, yellow
Shock resistance	30 g
Material, housing	PA 12
Material, mould	Epoxy
Cable	PVC 3x0,14 mm^2
Cable incl. female part connector	PVC 3x0,14 mm^2
Connector	Diam. 8 mm snap on
Mounting	T slot

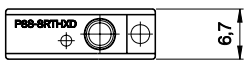
Ordering data

Output	Cable connection	Cable length	Weight kg	Order code
Electronic sensors				
PNP, N.O.	90°	3,0 m	0,030	**P8S-SPELXD**
PNP, N.O.	90°	10,0 m	0,110	**P8S-SPETXD**
PNP, N.O.	90°	0,3 m*	0,005	**P8S-SPTHXD**

Dimensions







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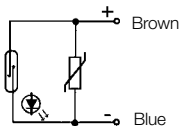
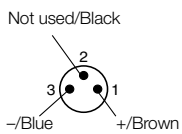
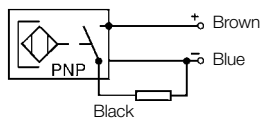
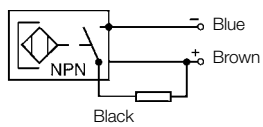
Reed sensor symbol

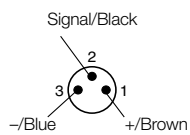




Electronic sensor symbol







Connecting cables with one connector

The cables have an integral snap-in female connector.

Type of cable	Cable/connector	Weight kg	Order code
Cables for sensors, complete with one female connector			
Cable, Flex PVC	3 m, 8 mm Snap-in connector	0,07	**9126344341**
Cable, Flex PVC	10 m, 8 mm Snap-in connector	0,21	**9126344342**
Cable, Super Flex PVC	3 m, 8 mm Snap-in connector	0,07	**9126344343**
Cable, Super Flex PVC	10 m, 8 mm Snap-in connector	0,21	**9126344344**
Cable, Polyurethane	3 m, 8 mm Snap-in connector	0,01	**9126344345**
Cable, Polyurethane	10 m, 8 mm Snap-in connector	0,20	**9126344346**
Cable, Polyurethane	5 m, M12 screw connector	0,07	**9126344348**
Cable, Polyurethane	10 m, M12 screw connector	0,20	**9126344349**

Male connectors for connecting cables

Cable connectors for producing your own connecting cables. The connectors can be quickly attached to the cable without special tools. Only the outer sheath of the cable is removed. The connectors are available for M8 and M12 screw connectors and meet protection class IP 65.

Connector	Weight kg	Order code
M8 screw connector	0,017	**P8SCS0803J**
M12 screw connector	0,022	**P8SCS1204J**

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Connection block Valvetronic 110

The Valvetronic 110 is a connection block that can be used for collecting signals from sensors at various points on a machine and connecting them to the control system via a multicore cable. Valvetronic 110 can also be used for central connection of the multi-core cable to the outputs of a control system, and can be laid to a machine where the output signals can be connected. The connection block has ten 8 mm snap-in circular connectors and a multi-core cable which is available in lengths of 3 or 10 m. The connections on the block are numbered from 1 to 10. Blanking plugs are available for unused connections, as labels for marking the connections of each block.

Technical data

Connections:

Ten 3-pole numbered 8 mm round snap-in female contacts

Input block

Pin 1	Common, +24 VDC
Pin 2	Input signal
Pin 3	Common, 0V

Output block

Pin 1	Common, GND
Pin 2	Output signal
Pin 3	Common, 0V

Electrical data:

Voltage	24 VDC (max. 60 V AC/75 V DC)
Insulation group	according to DIN 0110 class C
Load	max. 1 A per connection total max. 3 A

Cable:

Length	3 m or 10 m
Type of cable LifYY11Y	
Conductor	12
Area	0.34 mm²
Colour marking	According to DIN 47 100

Mechanical data

Enclosure	IP 67, DIN 40050 with fitted contacts and/or blanking plugs.
Temperature	–20 °C to +70 °C

Material

Body	PA 6,6 VD according to UL 94
Contact holder	PBTP
Snap-in ring	LDPE
Moulding mass	Epoxy
Seal	NBR
Screws	Plated steel

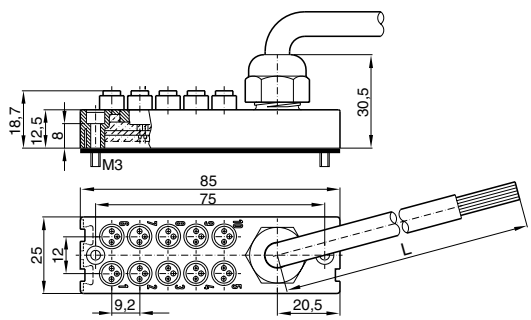
Industrial durability

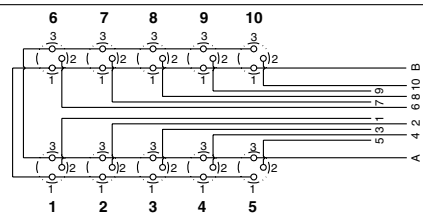
Good chemical and oil resistance. Tests should be performed in aggressive environments.

Ordering data

	Designation	Weight kg	Order code
	Connection block Valvetronic 110 with 3 m cable Connection block Valvetronic 110 with 10 m cable	0,32 0,95	**9121719001** **9121719002**
	Blanking plugs (pack of 10) Use blanking plugs to close unused connections.	0,02	**9121719003**
	Labels (pack of 10) White labels to insert in grooves on the side of the connection	0,02	**9121719004**

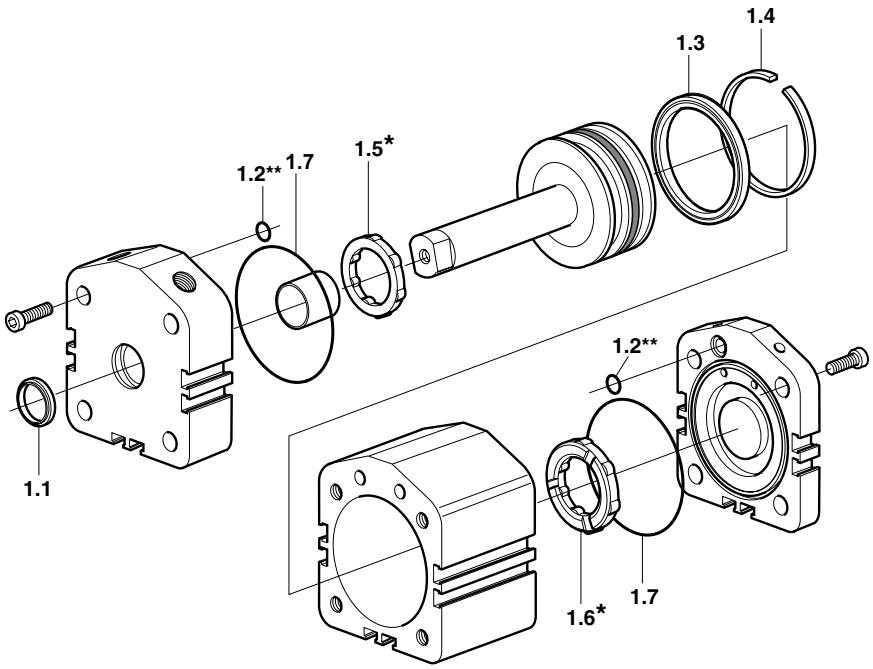
Dimensions and wiring diagrams





Conductor	Colour	Input	Output
1	Pink	Signal 1	Signal 1
2	Grey	Signal 2	Signal 2
3	Yellow	Signal 3	Signal 3
4	Green	Signal 4	Signal 4
5	White	Signal 5	Signal 5
6	Red	Signal 6	Signal 6
7	Black	Signal 7	Signal 7
8	Violet	Signal 8	Signal 8
9	Grey-Pink	Signal 9	Signal 9
10	Red-Blue	Signal 10	Signal 10
A	Blue	0 V	0 V
B	Brown	+24 V	PE

Seal kits for P1M



Seal kits for P1M

No	Qty	Part
1.1	1	Scraper ring/Piston rod seal
1.2	2	O-ring
1.3	1	Piston seals
1.4	1	Piston bearing
1.5	1	Front end bumper
1.6	1	Rear end bumper
1.7	2	O-ring

Material specification, see page 5

* Bumpers 1.5 and 1.6 not valid for high-temperature version, type G.

** Quantity and design vary, depending on the cylinder variant and model.

Seal kits for complete P1M cylinder

Cyl. bore	Option	
mm	Standard	High Temp
12	**P1M-6DRN**	**P1M-6DRV**
16	**P1M-6FRN**	**P1M-6FRV**
20	**P1M-6HRN**	**P1M-6HRV**
25	**P1M-6JRN**	**P1M-6JRV**
32	**P1M-6KRN**	**P1M-6KRV**
40	**P1M-6LRN**	**P1M-6LRV**
50	**P1M-6MRN**	**P1M-6MRV**
63	**P1M-6NRN**	**P1M-6NRV**
80	**P1M-6PRN**	**P1M-6PRV**
100	**P1M-6QRN**	**P1M-6QRV**

Grease for P1M

Weight	Option	
g	Standard	High Temp
30	**9127394541**	**9127394521**

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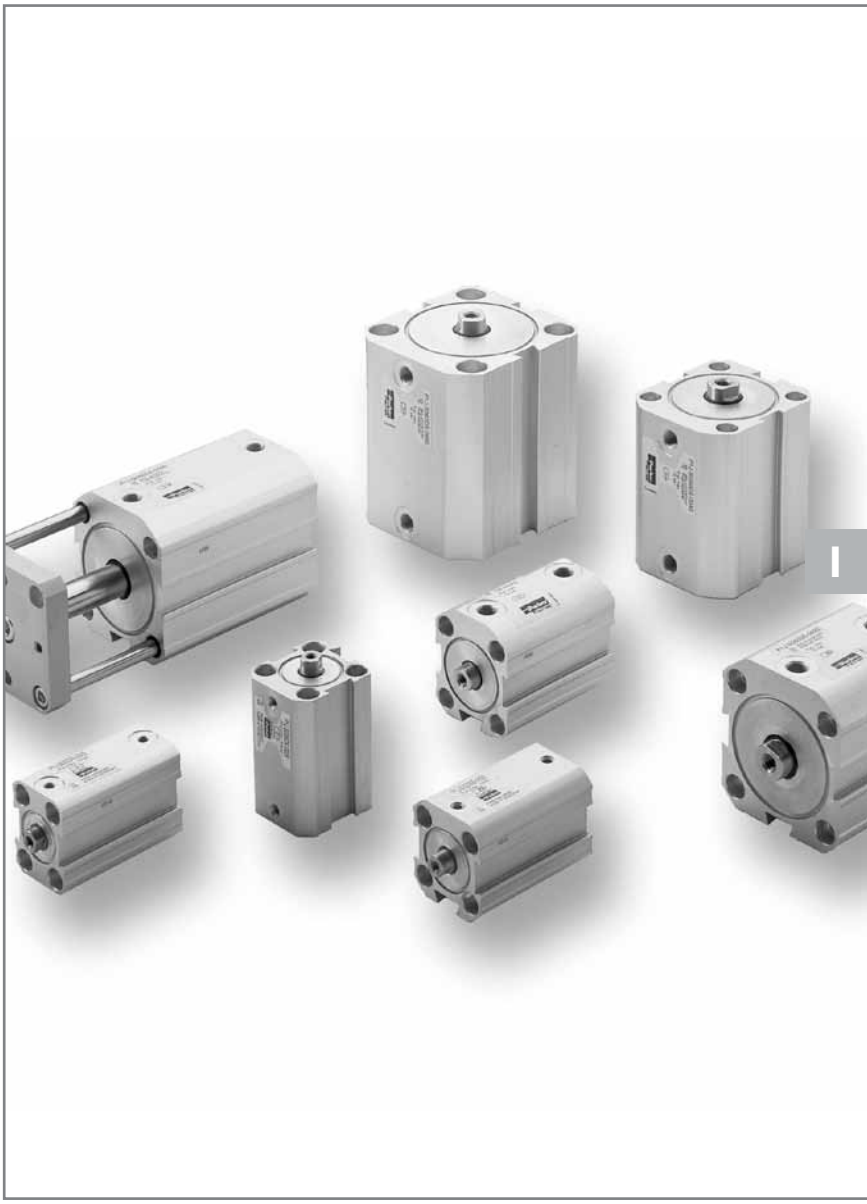

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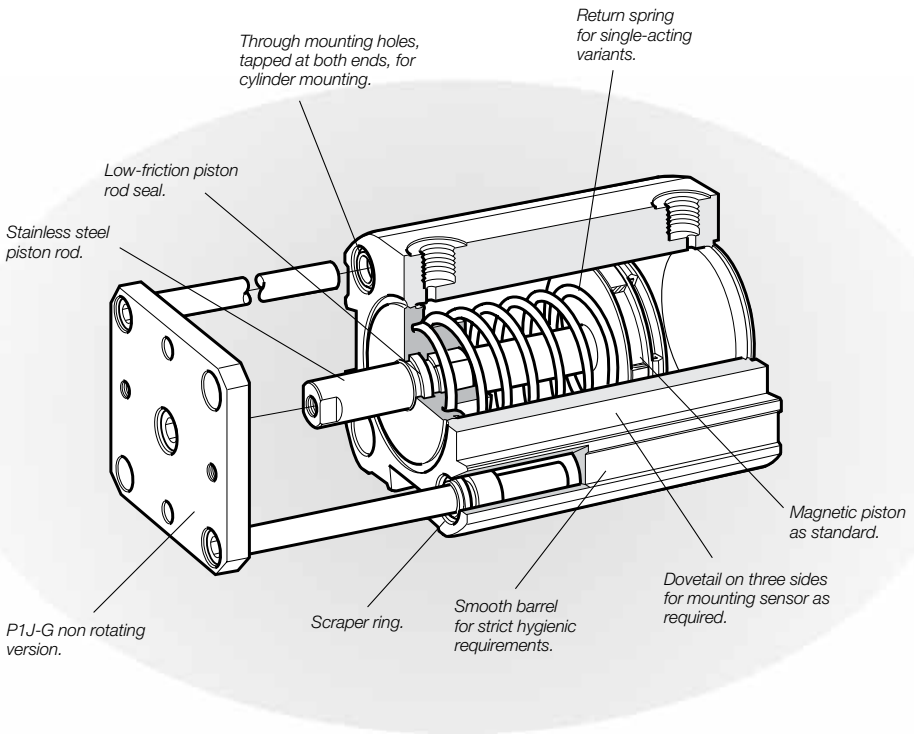
Compact Cylinders

P1J Series



Single acting and double acting versions

The P1J range of cylinders is intended for use in a wide range of applications. These cylinders are particularly suitable in applications such as packaging, the food industry and the textile industry.

Careful design and high quality throughout ensure long, trouble free service life.

The compact design, with through mounting holes that are countersunk and tapped at both ends, make the cylinders easy to mount, with or without mountings.

They are available in diameters of 12, 20, 25, 32, 40, 50 and 63 mm, with stroke lengths up to 100 mm.

The single acting version is available in the same bore size as the double acting version and with stroke lengths up to 50 mm. All cylinder types have magnetic pistons as standard, and are initially lubricated with our food-grade grease. Reed switch and solid state sensors are available as accessories, and can be fitted in the dovetail slots on three of the sides of the cylinder body.

External guide device

The cylinder can be supplied with an external guide unit to prevent the piston from turning. It guides the piston rod and enables the cylinder to resist turning moments on the piston rod and/or transverse forces. The device consists of a substantial mounting plate and two guides that run along the sides of the cylinder in two bearing-support guide sleeves. The plate has pre-drilled mounting holes to aid assembly.

Options

In addition to a large selection of standard cylinders, the P1J is available in several standard variants, such as custom stroke length, extended piston rods, double piston rods etc.

Additionally, a complete range of sensor and mounting devices is available.

Smooth external design

There are no recesses or pockets in the end covers that could trap dirt or liquid, making cleaning simple and effective.

Corrosion resistant

Even the basic versions of the cylinders have good corrosion resistance through appropriate choice of materials and surface treatment, allowing them to be used in demanding environments.

As the end face of the cylinders is not fully anodised in the standard version, extra anodising can be specified when ordering to provide extra corrosion protection.

Piston sensing

A complete range of sensors for piston sensing is available as accessories: both reed switch and solid state sensors are available. They are supplied with either a flying lead or with a cable plug connector, with a moulded cable.

Mounting

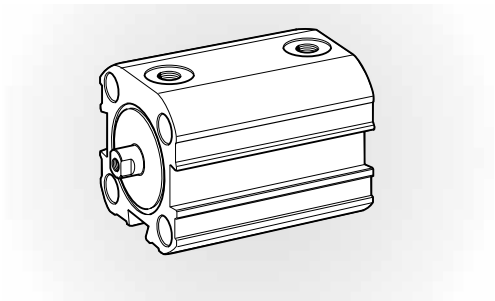
A range of mountings with appropriate surface finish is available as accessories.

Variants

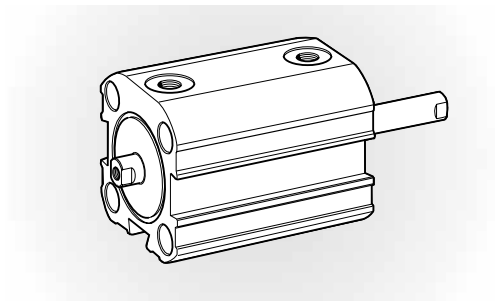
In addition to the basic versions, P1J cylinders are available in several standard variants:

Cylinders with non-standard stroke lengths
Cylinders with extended piston rods
Cylinders with through piston rod
Cylinders with through, hollow piston rod
Single-acting cylinders
Cylinders with anodised end faces
Cylinders with piston rod guides

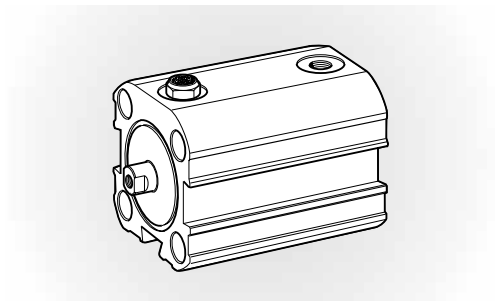
Double acting



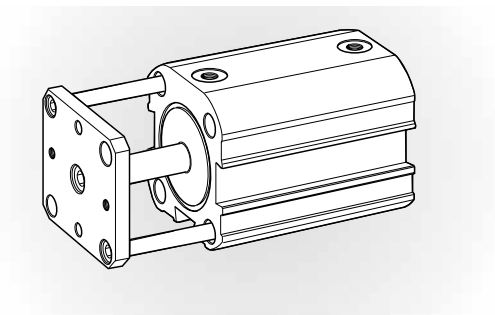
Double acting, through piston rod



Single acting, spring return



Double acting, guided piston rod



Cylinder forces, double acting variants

Cyl. bore/ pist. rod mm	Stroke	Piston area cm²	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
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
20/10	+	3,1	31	63	94	126	157	**188**	220	251	283	314
	-	2,3	23	46	69	92	115	**138**	161	184	207	231
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
32/12	+	8,0	80	161	241	322	402	**483**	563	643	724	804
	-	6,9	69	138	207	276	346	**415**	484	553	622	691
40/12	+	12,6	126	251	377	503	628	**754**	880	1005	1131	1257
	-	11,4	114	229	343	457	572	**686**	800	915	1029	1144
50/16	+	19,6	196	393	589	785	982	**1178**	1374	1571	1767	1963
	-	17,6	176	352	529	705	881	**1057**	1234	1410	1586	1762
63/16	+	31,2	312	623	935	1247	1559	**1870**	2182	2494	2806	3117
	-	29,2	292	583	875	1166	1548	**1750**	2041	2333	2625	2916

+ = Outward stroke
- = Return stroke

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

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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 + stroke Nmax	Nmin	Spring retraction Nmax	Nmin
Single acting,				
P1J-S012SS-0005	59	58	9	8
P1J-S012SS-0010	60	58	9	7
P1J-S012SS-0015	61	58	9	6
P1J-S020SS-0005	159	156	32	29
P1J-S020SS-0010	161	156	32	27
P1J-S020SS-0015	164	156	32	24
P1J-S020SS-0020	166	156	32	22
P1J-S020SS-0025	169	156	32	19
P1J-S020SS-0030	172	156	32	16
P1J-S025SS-0005	265	262	32	29
P1J-S025SS-0010	267	262	32	27
P1J-S025SS-0015	270	262	32	24
P1J-S025SS-0020	272	262	32	22
P1J-S025SS-0025	275	262	32	19
P1J-S025SS-0030	278	262	32	16
P1J-S025SS-0040	272	262	32	22
P1J-S025SS-0050	275	262	32	19
P1J-S032SS-0005	439	436	46	43
P1J-S032SS-0010	442	436	46	40
P1J-S032SS-0015	445	436	46	37
P1J-S032SS-0020	447	436	46	35
P1J-S032SS-0025	450	436	46	32
P1J-S032SS-0030	453	436	46	29
P1J-S032SS-0040	447	436	46	35
P1J-S032SS-0050	450	436	46	32

Order code	Theoretical piston force at 6 bar + stroke Nmax	Nmin	Spring retraction Nmax	Nmin
Single acting,				
P1J-S040SS-0005	704	701	53	50
P1J-S040SS-0010	706	701	53	48
P1J-S040SS-0015	709	701	53	45
P1J-S040SS-0020	712	701	53	42
P1J-S040SS-0025	715	701	53	39
P1J-S040SS-0030	718	701	53	36
P1J-S040SS-0040	712	701	53	42
P1J-S040SS-0050	715	701	53	39
P1J-S050SS-0005	1088	1079	99	90
P1J-S050SS-0010	1096	1079	99	82
P1J-S050SS-0015	1105	1079	99	73
P1J-S050SS-0020	1114	1079	99	64
P1J-S050SS-0025	1123	1079	99	55
P1J-S050SS-0030	1131	1079	99	47
P1J-S050SS-0040	1114	1079	99	64
P1J-S050SS-0050	1123	1079	99	55
P1J-S063SS-0005	1774	1767	103	96
P1J-S063SS-0010	1780	1767	103	90
P1J-S063SS-0015	1786	1767	103	84
P1J-S063SS-0020	1793	1767	103	77
P1J-S063SS-0025	1799	1767	103	71
P1J-S063SS-0030	1806	1767	103	64
P1J-S063SS-0040	1793	1767	103	77
P1J-S063SS-0050	1799	1767	103	71

Main data

Cylinder designation	Cylinder Bore	Piston rod Area	Diam.	Basic weight Area	Thread (female)	Guided weight at 0 mm stroke	addition per 10 mm stroke	at 0 mm stroke	Air addition per 10 mm stroke	Port con-sump-tion	thread
	mm	cm^2	mm	cm^2		kg	kg	kg	kg	Litre	
Double acting											
P1J-S 012 DS	12	1,13	6	0,28	M3	0,06	0,016	-	-	0,0139 [1)]	M5
P1J-S 020 DS	20	3,14	10	0,78	M5	0,13	0,030	0,17	0,033	0,0385 [1)]	M5
P1J-S 025 DS	25	4,91	10	0,78	M5	0,15	0,035	0,21	0,038	0,0633 [1)]	M5
P1J-S 032 DS	32	8,04	12	1,13	M6	0,20	0,044	0,27	0,050	0,1050 [1)]	G1/8
P1J-S 040 DS	40	12,6	12	1,13	M6	0,29	0,054	0,40	0,058	0,1680 [1)]	G1/8
P1J-S 050 DS	50	19,6	16	2,01	M8	0,50	0,070	0,65	0,080	0,2610 [1)]	G1/8
P1J-S 063 DS	63	31,2	16	2,01	M8	0,77	0,100	1,08	0,110	0,4220 [1)]	G1/8
Single acting											
P1J-S 012 SS	12	1,13	6	0,28	M3	0,06	0,016	-	-	0,0079 [1)]	M5
P1J-S 020 SS	20	3,14	10	0,78	M5	0,13	0,030	0,17	0,033	0,0220 [1)]	M5
P1J-S 025 SS	25	4,91	10	0,78	M5	0,16	0,035	0,22	0,038	0,0344 [1)]	M5
P1J-S 032 SS	32	8,04	12	1,13	M6	0,21	0,044	0,28	0,050	0,0563 [1)]	G1/8
P1J-S 040 SS	40	12,6	12	1,13	M6	0,30	0,054	0,41	0,058	0,0882 [1)]	G1/8
P1J-S 050 SS	50	19,6	16	2,01	M8	0,52	0,070	0,67	0,080	0,1372 [1)]	G1/8
P1J-S 063 SS	63	31,2	16	2,01	M8	0,80	0,100	1,11	0,110	0,2184 [1)]	G1/8

1) Free air consumption per 10 mm stroke length for a double stroke at a pressure of 600 kPa (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 ºC for indoor operation (a lower dew point should be selected for outdoor operation) and oil concentration 1.0 mg oil/m^3, which is what a standard compressor with a standard filter gives.

ISO 8573-1 quality classes

Quality class	Pollution particle size (µm)	Pollution max con-centration (mg/m^3)	Water max. press. dew point (°C)	Oil max con-centration (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

Double and single-acting

Piston rod	Stainless steel, DIN X10 CrNiS 18 9
Piston rod seal	Nitrile rubber, NBR
Piston rod bearing, Ø20-Ø63 mm	Multi-layer PTFE/bronze/steel
Piston bearing, Ø20-Ø63 mm	UHMWPE plastic
A-cover, Ø12 mm	Brass
End cover	Aluminium
Locking ring, Ø12 mm	Surface-finished steel
O-ring, cover, Ø12 mm	Nitrile rubber, NBR
Barrel	Anodised aluminium
Piston, Ø12 mm	Brass
Piston, Ø20-Ø63 mm	Aluminium
Piston seal	Nitrile rubber, NBR
Return spring, Ø12 mm	Stainless steel
Return spring, Ø20-Ø63 mm	Surface-treated steel

Other data

Working pressure	Max. 10 bar
Working temperature	Max +80 °C
	Min –20 °C

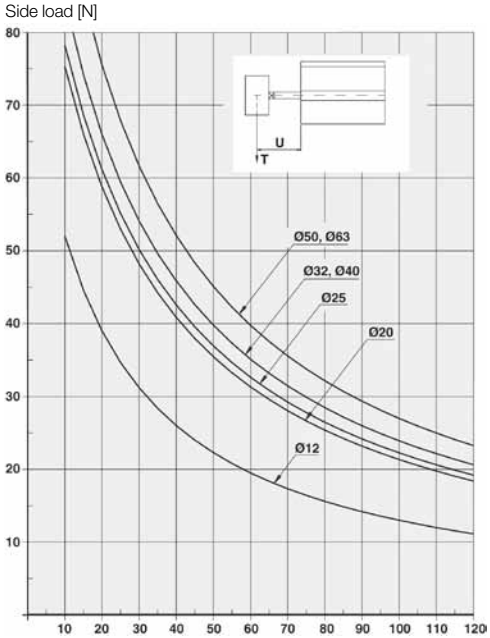
Prelubricated, further lubrication is not normally necessary.

If additional lubrication is introduced it must be continued.

Side load force diagram

Permissible side loading as a function of piston rod extension.

Side load [N]



Piston rod extension [mm]

Guide for selecting suitable tubing

The selection of the correct size of tubing is often based on experience, with no great thought to optimizing energy efficiency and cylinder velocity. This is usually acceptable, but making a rough calculation can result in worthwhile economic gains.

The following is the basic principle:

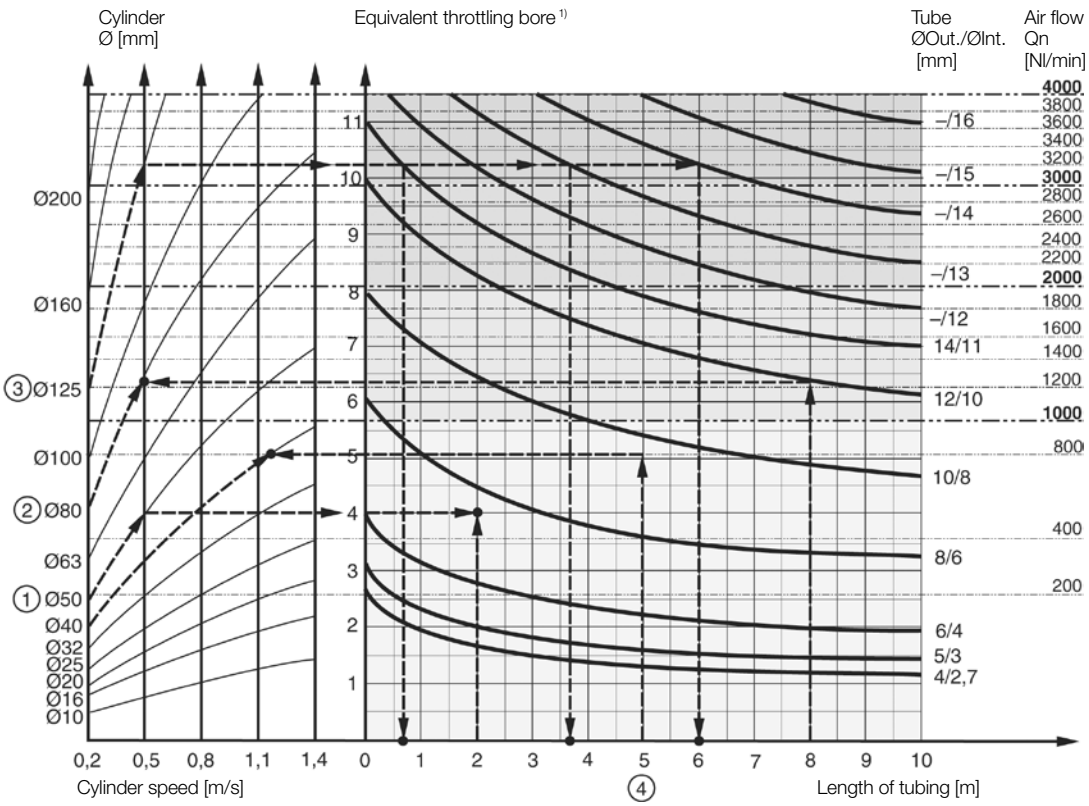
1. The primary line to the working valve could be over sized (this does not cause any extra air consumption and consequently does not create any extra costs in operation).
2. The tubes between the valve and the cylinder should, however, be optimized according to the principle that an insufficient bore throttles the flow and thus limits the cylinder speed, while an oversized pipe creates a dead volume which increases the air consumption and filling time.

The chart below is intended to help when selecting the correct size of tube to use between the valve and the cylinder.

The following prerequisites apply:

The *cylinder load should be about 50%* of the theoretical force (= normal load). A lower load gives a higher velocity and vice versa. The tube size is selected as a function of the *cylinder bore*, the desired *cylinder velocity* and the *tube length* between the valve and the cylinder.

If you want to use the capacity of the valve to its maximum, and obtain maximum speed, the tubing should be chosen so that they at least correspond with the equivalent restriction diameter (see description below), so that the tubing does not restrict the total flow. This means that a short tubing must have at least the equivalent restriction diameter. If the tubing is longer, choose it from the table below. Straight fittings should be chosen for highest flow rates. (Elbow and banjo fittings cause restriction.)



1) The "equivalent throttling bore" is a long throttle (for example a tube) or a series of throttles (for example, through a valve) converted to a short throttle which gives a corresponding flow rate. This should not be confused with the "orifice" which is sometimes specified for valves. The value for the orifice does not normally take account of the fact that the valve contains a number of throttles.

2) Qn is a measure of the valve flow capacity, with flow measured in litre per minute (l/min) at 6 bar(e) supply pressure and 1 bar pressure drop across the valve.

Example ①: Which tube diameter should be used?

A 50 mm bore cylinder is to be operated at 0.5 m/s. The tube length between the valve and cylinder is 2 m. In the diagram we follow the line from 50 mm bore to 0.5 m/s and get an "equivalent throttling bore" of approximately 4 mm. We continue out to the right in the chart and intersect the line for a 2 m tube between the curves for 4 mm (6/4 tube) and 6 mm(8/6 tube). This means that a 6/4 tube throttles the velocity somewhat, while an 8/6 tube is a little too large. We select the 8/6 tube to obtain full cylinder velocity.

Example ②: What cylinder velocity will be obtained?

A 80 mm bore cylinder will be used, connected by 8 m 12/10 tube to a P2L-B valve. What cylinder velocity will we get? We refer to the diagram and follow the line from 8 mm tube length up to the curve for 12/10 tube. From there, we go horizontally to the curve for the Ø80 cylinder. We find that the velocity will be about 0.5 m/s.

Example ③: What is the minimum inner diameter and maximum lenght of tube?

For a application a 125 mm bore cylinder will be used. Maximum velocity of piston rod is 0.5 m/s. The cylinder will be controlled by a P2L-D valve. What diameter of tube can be used and what is maximum lenght of tube.

We refer to the diagram. We start at the left side of the diagram cylinder Ø125. We follow the line until the intersection with the velocity line of 0.5 m/s. From here we draw a horizontal line in the diagram. This line shows us we need an equivalent throttling bore of approximately 10 mm. Following this line horizontally we cross a few intersections. These intersections shows us the minimum inner diameter (rightside diagram) in combination with the maximum length of tube (bottomside diagram).

For example:
Intersection one: When a tube (14/11) will be used, the maximum length of tube is 0.7 meter.
Intersection two: When a tube (—/13) will be used, the maximum length of tube is 3.7 meter.
Intersection three: When a tube (—/14) will be used, the maximum length of tube is 6 meter.

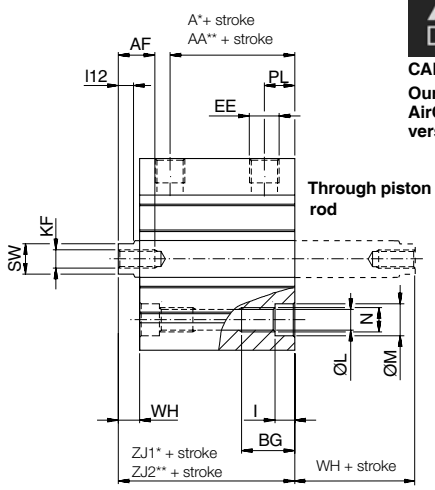
Example ④: Determining tube size and cylinder velocity with a particular cylinder and valve?

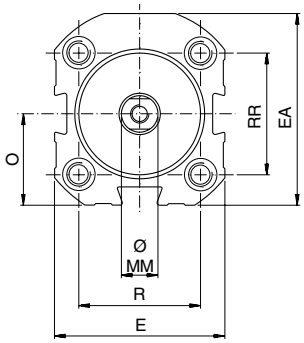
For an application using a 40 mm bore cylinder with a valve with Qn=800 Nl/min. The distance between the cylinder and valve has been set to 5 m.
Tube dimension: What tube bore should be selected to obtain the maximum cylinder velocity? Start at pipe length 5 m, follow the line up to the intersection with 800 Nl/min. Select the next largest tube diameter, in this case Ø10/8 mm.
Cylinder velocity: What maximum cylinder velocity will be obtained? Follow the line for 800 Nl/min to the left until it intersects with the line for the Ø40 mm cylinder. In this example, the speed is just above 1.1 m/s.

Valve series with respective flows in Nl/minute

Valve series	Qn in Nl/Min
Valvetronic Solstar	33
Interface PS1	100
Adex A05	173
Moduflex size 1, (2 x 3/2)	220
Valvetronic PVL-B 5/3 closed centre, 6 mm push in	290
Moduflex size 1, (4/2)	320
B43 Manual and mechanical	340
Valvetronic PVL-B 2 x 2/3, 6 mm push in	350
Valvetronic PVL-B 5/3 closed centre, G1/8	370
Compact Isomax DX02	385
Valvetronic PVL-B 2 x 3/2 G1/8	440
Valvetronic PVL-B 5/2, 6 mm push in	450
Valvetronic PVL-B 5/3 vented centre, 6 mm push in	450
Moduflex size 2, (2 x 3/2)	450
Flowstar P2V-A	520
Valvetronic PVL-B 5/3 vented centre, G1/8	540
Valvetronic PVL-B 5/2, G1/8	540
Valvetronic PVL-C 2 x 3/2, 8 mm push in	540
Adex A12	560
Valvetronic PVL-C 2 x 3/2 G1/8	570
Compact Isomax DX01	585
VIKING Xtreme P2LAX	660
Valvetronic PVL-C 5/3 closed centre, 8 mm push in	700
Valvetronic PVL-C 5/3 vented centre, G1/4	700
B3-Series	780
Valvetronic PVL-C 5/3 closed centre, G1/4	780
Moduflex size 2, (4/2)	800
Valvetronic PVL-C 5/2, 8 mm push in	840
Valvetronic PVL-C 5/3 vented centre, 8 mm push in	840
Valvetronic PVL-C 5/2, G1/4	840
Flowstar P2V-B	1090
ISOMAX DX1	1150
B53 Manual and mechanical	1160
B4-Series	1170
VIKING Xtreme P2LBX	1290
B5-Series, G1/4	1440
Airline Isolator Valve VE22/23	1470
ISOMAX DX2	2330
VIKING Xtreme P2LCX, G3/8	2460
VIKING Xtreme P2LDX, G1/2	2660
ISOMAX DX3	4050
Airline Isolator Valve VE42/43	5520
Airline Isolator Valve VE82/83	13680

Double and single acting cylinders



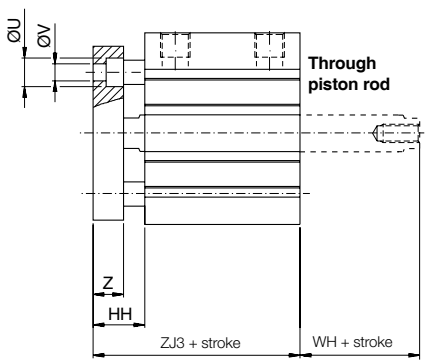


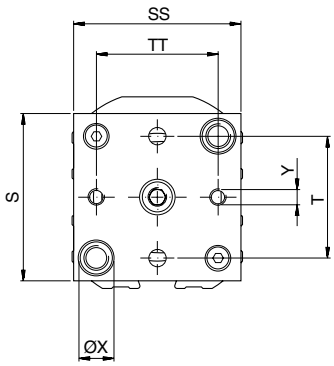
AirCad™ Drawing Library

CAD drawings on the Internet

Our home page www.parker.com/euro_pneumatic includes the AirCad Drawing. Library with 2D and 3D drawings for the main versions.

Guided cylinder





Dimensions (mm)

Cylinder bore	A*	AA**	AF	BG	E	EA	EE	HH	I	KF	L	I12	M	MM	N	O	PL
12	25,0	-	5	9	26	30,0	M5	-	3,5	M3	3,4	3,0	6,1	6	M4	15,0	6,5
20	31,5	-	10	15	33	43,0	M5	14,8	5,5	M5	5,3	4,5	9,2	10	M6	21,5	6,5
25	32,5	47,5	10	15	40	44,5	M5	16,0	5,5	M5	5,3	4,5	9,2	10	M6	22,5	6,5
32	32,6	50,6	12	15	46	54,0	G1/8	15,7	5,5	M6	5,3	5,0	9,2	12	M6	25,5	10,0
40	34,0	52,0	12	18	56	63,0	G1/8	17,0	6,5	M6	6,9	5,0	10,5	12	M8	30,0	10,0
50	38,5	56,5	12	18	66	73,0	G1/8	19,0	6,5	M8	6,9	5,5	10,5	16	M8	35,0	10,0
63	40,0	60,0	12	25	83	87,5	G1/8	20,0	9,0	M8	9,3	5,5	15,0	16	M10	41,5	10,0

Cylinder bore	R	RR	S	SS	SW	T	TT	U	V	WH	X	Y	Z	ZJ1*	ZJ2**	ZJ3
12	13	18	-	-	5	-	-	-	-	4,0	-	-	-	38,0	-	-
20	20	30	42	32	8	22	22	8,0	4,5	4,8	9,4	M4	10	42,8	-	52,8
25	27	27	40	39	8	28	26	8,0	4,5	6,0	9,4	M4	10	45,0	60,0	45,5
32	32	36	48	45	10	36	32	9,4	5,5	5,7	9,4	M4	10	45,5	63,5	55,5
40	40	40	55	55	10	40	40	9,4	5,5	7,0	11,5	M5	10	47,0	65,0	57,0
50	50	50	65	65	13	50	50	11,5	6,5	7,0	11,5	M6	12	53,0	71,0	65,0
63	62	62	80	80	13	62	62	14,5	9,0	8,0	14,5	M6	12	57,0	77,0	69,0

* A and ZJ1 = Double acting cylinders and single acting cylinders up to stroke length 30 mm

** AA and ZJ2 = Single acting cylinders, stroke length 31 to 50 mm

Length tolerances ±1 mm

Stroke length tolerances +1.5/0 mm

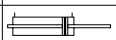
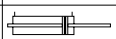
Order key

P 1 J – S 0 3 2 D S – 0 0 2 5

Cylinder bore mm

012
020
025
032
040
050
063

Cylindertype/Function

D		Double-acting, Ø12 - Ø63
K		Double-acting, through piston rod, Ø20 - Ø63
P		Double-acting, through piston rod hollow, Ø20 - Ø63, Not cylinder version **G**
S		Single-acting, spring return for retract stroke, Ø12 - Ø63

Stroke length mm

E.g. **0025** = 25 mm

For standard stroke length and max length see tabel below.

Sealing material

S	Standard seals, -20 °C to +80 °C Stainless steel piston rod Magnetic piston

Cylinder version

S		Standard cylinder
K		Cylinder with end cover in anodised aluminium.
G		Cylinder with mounted guide unit, Ø20 - Ø63.

I

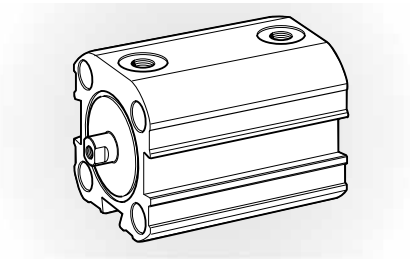
Standard stroke length

Cylinder designation	Cylinder bore	● Standard stroke length in mm 5	10	15	20	25*	30	40	50*	80*	100*
Double acting:											
P1J-S012D	12	●	●	●	●	●					
P1J-S020D	20	●	●	●	●	●	●	●	●		
P1J-S025D	25	●	●	●	●	●	●	●	●		
P1J-S032D	32	●	●	●	●	●	●	●	●	●	
P1J-S040D	40	●	●	●	●	●	●	●	●	●	
P1J-S050D	50	●	●	●	●	●	●	●	●	●	
P1J-S063D	63	●	●	●	●	●	●	●	●	●	●
Double acting with guide unit:											
P1J-G020D	20	●	●	●	●	●	●	●	●		
P1J-G025D	25	●	●	●	●	●	●	●	●		
P1J-G032D	32	●	●	●	●	●	●	●	●	●	
P1J-G040D	40	●	●	●	●	●	●	●	●	●	
P1J-G050D	50	●	●	●	●	●	●	●	●	●	
P1J-G063D	63	●	●	●	●	●	●	●	●	●	●
Single acting:											
P1J-S012S	12	●	●	●							
P1J-S020S	20	●	●	●	●	●	●				
P1J-S025S	25	●	●	●	●	●	●	●	●		
P1J-S032S	32	●	●	●	●	●	●	●	●		
P1J-S040S	40	●	●	●	●	●	●	●	●		
P1J-S050S	50	●	●	●	●	●	●	●	●		
P1J-S063S	63	●	●	●	●	●	●	●	●		

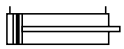
* Standard stroke length in mm according to ISO 4393

Data

Working pressure	Max. 10 bar
Working temperature	Max. +80 °C
	Min. –20 °C

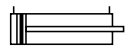


Double acting



Cyl. bore mm	Stroke mm	Order code
12 M5 thread	05	**P1J-S012DS-0005**
	10	**P1J-S012DS-0010**
	15	**P1J-S012DS-0015**
	20	**P1J-S012DS-0020**
	25	**P1J-S012DS-0025**
20 M5 thread	05	**P1J-S020DS-0005**
	10	**P1J-S020DS-0010**
	15	**P1J-S020DS-0015**
	20	**P1J-S020DS-0020**
	25	**P1J-S020DS-0025**
	30	**P1J-S020DS-0030**
	40	**P1J-S020DS-0040**
	50	**P1J-S020DS-0050**
25 M5 thread	05	**P1J-S025DS-0005**
	10	**P1J-S025DS-0010**
	15	**P1J-S025DS-0015**
	20	**P1J-S025DS-0020**
	25	**P1J-S025DS-0025**
	30	**P1J-S025DS-0030**
	40	**P1J-S025DS-0040**
	50	**P1J-S025DS-0050**
32 G1/8 thread	05	**P1J-S032DS-0005**
	10	**P1J-S032DS-0010**
	15	**P1J-S032DS-0015**
	20	**P1J-S032DS-0020**
	25	**P1J-S032DS-0025**
	30	**P1J-S032DS-0030**
	40	**P1J-S032DS-0040**
	50	**P1J-S032DS-0050**
	80	**P1J-S032DS-0080**

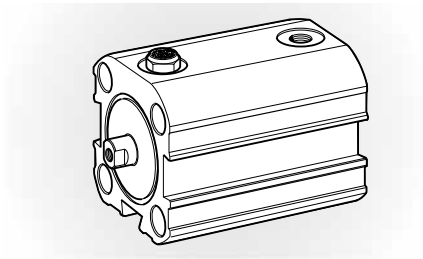
Double acting



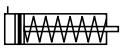
Cyl. bore mm	Stroke mm	Order code
40 G1/8 thread	05	**P1J-S040DS-0005**
	10	**P1J-S040DS-0010**
	15	**P1J-S040DS-0015**
	20	**P1J-S040DS-0020**
	25	**P1J-S040DS-0025**
	30	**P1J-S040DS-0030**
	40	**P1J-S040DS-0040**
	50	**P1J-S040DS-0050**
	80	**P1J-S040DS-0080**
50 G1/8 thread	05	**P1J-S050DS-0005**
	10	**P1J-S050DS-0010**
	15	**P1J-S050DS-0015**
	20	**P1J-S050DS-0020**
	25	**P1J-S050DS-0025**
	30	**P1J-S050DS-0030**
	40	**P1J-S050DS-0040**
	50	**P1J-S050DS-0050**
	80	**P1J-S050DS-0080**
63 G1/8 thread	05	**P1J-S063DS-0005**
	10	**P1J-S063DS-0010**
	15	**P1J-S063DS-0015**
	20	**P1J-S063DS-0020**
	25	**P1J-S063DS-0025**
	30	**P1J-S063DS-0030**
	40	**P1J-S063DS-0040**
	50	**P1J-S063DS-0050**
	80	**P1J-S063DS-0080**
	100	**P1J-S063DS-0100**

Data

Working pressure	Max. 10 bar
Working temperature	Max. +80 °C
	Min. –20 °C

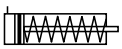


Single acting



Cyl. bore mm	Stroke mm	Order code
12 M5 thread	05	**P1J-S012SS-0005**
	10	**P1J-S012SS-0010**
	15	**P1J-S012SS-0015**
20 M5 thread	05	**P1J-S020SS-0005**
	10	**P1J-S020SS-0010**
	15	**P1J-S020SS-0015**
	20	**P1J-S020SS-0020**
	25	**P1J-S020SS-0025**
	30	**P1J-S020SS-0030**
25 M5 thread	05	**P1J-S025SS-0005**
	10	**P1J-S025SS-0010**
	15	**P1J-S025SS-0015**
	20	**P1J-S025SS-0020**
	25	**P1J-S025SS-0025**
	30	**P1J-S025SS-0030**
	40	**P1J-S025SS-0040**
	50	**P1J-S025SS-0050**
32 G1/8 thread	05	**P1J-S032SS-0005**
	10	**P1J-S032SS-0010**
	15	**P1J-S032SS-0015**
	20	**P1J-S032SS-0020**
	25	**P1J-S032SS-0025**
	30	**P1J-S032SS-0030**
	40	**P1J-S032SS-0040**
	50	**P1J-S032SS-0050**

Single acting



Cyl. bore mm	Stroke mm	Order code
40 G1/8 thread	05	**P1J-S040SS-0005**
	10	**P1J-S040SS-0010**
	15	**P1J-S040SS-0015**
	20	**P1J-S040SS-0020**
	25	**P1J-S040SS-0025**
	30	**P1J-S040SS-0030**
	40	**P1J-S040SS-0040**
	50	**P1J-S040SS-0050**
50 G1/8 thread	05	**P1J-S050SS-0005**
	10	**P1J-S050SS-0010**
	15	**P1J-S050SS-0015**
	20	**P1J-S050SS-0020**
	25	**P1J-S050SS-0025**
	30	**P1J-S050SS-0030**
	40	**P1J-S050SS-0040**
	50	**P1J-S050SS-0050**
63 G1/8 thread	05	**P1J-S063SS-0005**
	10	**P1J-S063SS-0010**
	15	**P1J-S063SS-0015**
	20	**P1J-S063SS-0020**
	25	**P1J-S063SS-0025**
	30	**P1J-S063SS-0030**
	40	**P1J-S063SS-0040**
	50	**P1J-S063SS-0050**

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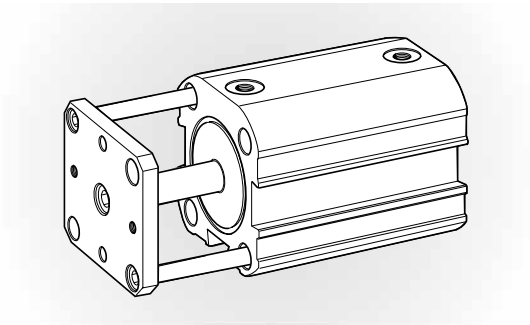


Technical data

Working medium	Dry, filtered compressed air
Working pressure	Max. 10 bar
Working temperature	–20 °C to +80 °C

Materials, external guide device

Mounting plate	Anodised aluminium
Guides	Stainless steel, DIN X 10 CrNiS 18 9
Sleeves	Multi-layer, PTFE/bronze/steel
Securing bolts	Surface-finished steel

Other data as for the basic cylinder.

Guide unit

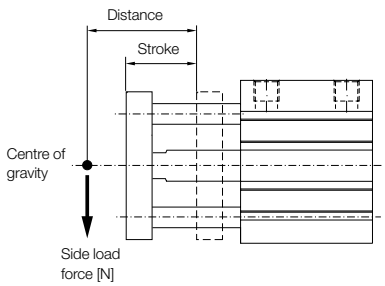
The P1J cylinders can be fitted with an external guide unit to prevent the piston rod from turning. It guides the piston rod and enables the cylinder to resist turning torques on the piston rod and/or transverse forces.

The device consists of a substantial mounting plate and twin guide rods that run in two support bearings. The mounting plate, which has pre-drilled mounting holes, is connected to the piston rod.

The device is available for 20, 25, 32, 40, 50 and 63 mm diameter cylinders, with stroke lengths from 5 to 100 mm. Order codes on Pages 6 and 10.

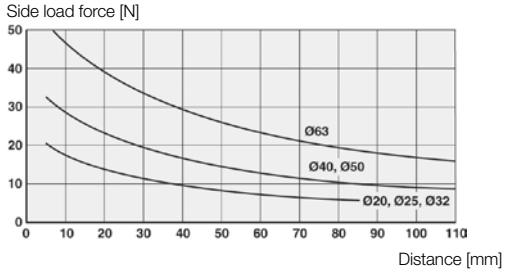
Permissible side loading

Permissible side loading as a function of the load distance as shown below.



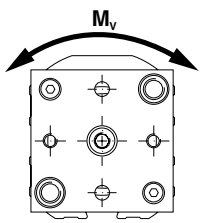
Side load diagram

Side load force [N]



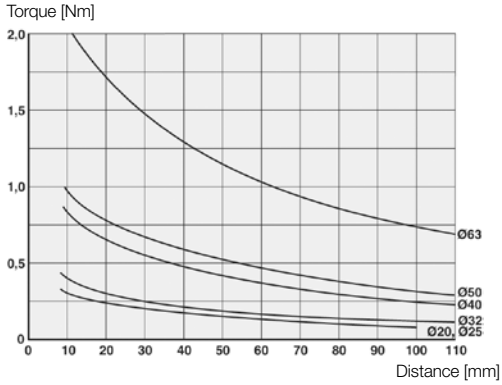
Permissible Torque

Permissible torque as shown below as a function of the load distance as shown in the load figure above.



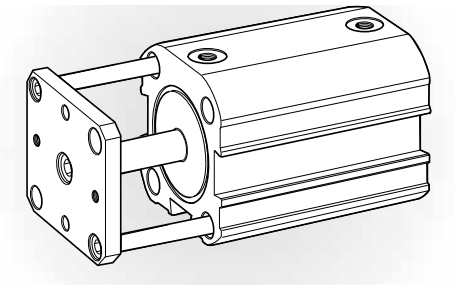
Torque diagram

Torque [Nm]

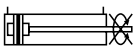


Data

Working pressure	Max. 10 bar
Working temperature	Max. +80 °C
	Min. –20 °C

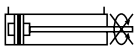


Double acting, guided



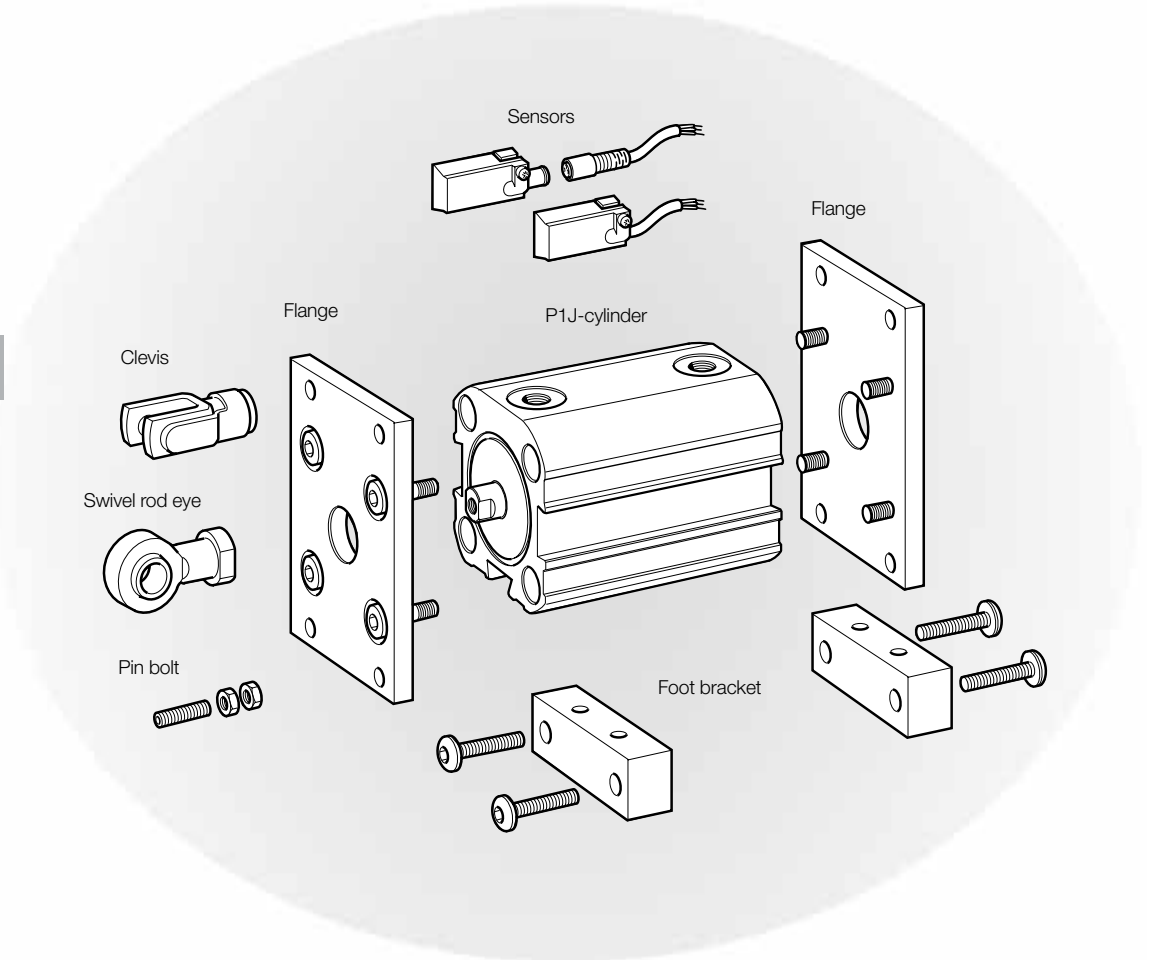
Cyl. bore mm	Stroke mm	Order code
20 M5 thread	05	**P1J-G020DS-0005**
	10	**P1J-G020DS-0010**
	15	**P1J-G020DS-0015**
	20	**P1J-G020DS-0020**
	25	**P1J-G020DS-0025**
	30	**P1J-G020DS-0030**
	40	**P1J-G020DS-0040**
	50	**P1J-G020DS-0050**
25 M5 thread	05	**P1J-G025DS-0005**
	10	**P1J-G025DS-0010**
	15	**P1J-G025DS-0015**
	20	**P1J-G025DS-0020**
	25	**P1J-G025DS-0025**
	30	**P1J-G025DS-0030**
	40	**P1J-G025DS-0040**
	50	**P1J-G025DS-0050**
32 G1/8 thread	05	**P1J-G032DS-0005**
	10	**P1J-G032DS-0010**
	15	**P1J-G032DS-0015**
	20	**P1J-G032DS-0020**
	25	**P1J-G032DS-0025**
	30	**P1J-G032DS-0030**
	40	**P1J-G032DS-0040**
	50	**P1J-G032DS-0050**
	80	**P1J-G032DS-0080**

Double acting, guided

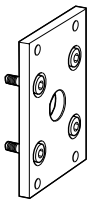


Cyl. bore mm	Stroke mm	Order code
40 G1/8 thread	05	**P1J-G040DS-0005**
	10	**P1J-G040DS-0010**
	15	**P1J-G040DS-0015**
	20	**P1J-G040DS-0020**
	25	**P1J-G040DS-0025**
	30	**P1J-G040DS-0030**
	40	**P1J-G040DS-0040**
	50	**P1J-G040DS-0050**
	80	**P1J-G040DS-0080**
50 G1/8 thread	05	**P1J-G050DS-0005**
	10	**P1J-G050DS-0010**
	15	**P1J-G050DS-0015**
	20	**P1J-G050DS-0020**
	25	**P1J-G050DS-0025**
	30	**P1J-G050DS-0030**
	40	**P1J-G050DS-0040**
	50	**P1J-G050DS-0050**
	80	**P1J-G050DS-0080**
63 G1/8 thread	05	**P1J-G063DS-0005**
	10	**P1J-G063DS-0010**
	15	**P1J-G063DS-0015**
	20	**P1J-G063DS-0020**
	25	**P1J-G063DS-0025**
	30	**P1J-G063DS-0030**
	40	**P1J-G063DS-0040**
	50	**P1J-G063DS-0050**
	80	**P1J-G063DS-0080**
	100	**P1J-G063DS-0100**

Combinations



Flange, MF1

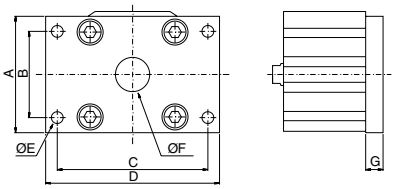


Intended for fixed mounting of cylinder. This bracket can be fitted to front or rear end covers.

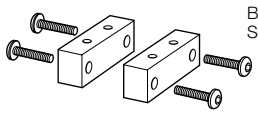
Material:
Bracket: Anodised aluminium
Screws: Zinc plated steel

12	0,012	**P1J-4DMB**
20	0,031	**P1J-4HMB**
25	0,036	**P1J-4JMB**
32	0,052	**P1J-4KMB**
40	0,124	**P1J-4LMB**
50	0,151	**P1J-4MMB**
63	0,306	**P1J-4NMB**

Cyl. Ø mm	A mm	B mm	C mm	D mm	E mm	F mm	G mm
12	25,4	18	38	46,0	3,6	10	4,8
20	38,0	24	50	58,0	3,6	15	6,0
25	40,0	28	54	63,5	4,6	15	6,0
32	48,0	36	66	76,0	4,6	15	6,0
40	63,5	42	78	92,0	6,6	20	9,5
50	70,0	50	90	102,0	6,6	25	9,5
63	85,0	63	110	127,0	8,6	25	12,7



Foot bracket

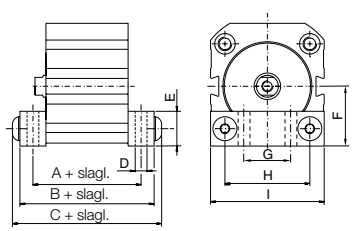


Intended for fixed mounting of cylinder. This bracket can be fitted to front or rear end covers.

Material:
Bracket: Anodised aluminium
Screws: Zinc plated steel

12	0,015	**P1J-4DMF**
20	0,016	**P1J-4HMF**
25	0,034	**P1J-4JMF**
32	0,030	**P1J-4KMF**
40	0,060	**P1J-4LMF**
50	0,072	**P1J-4MMF**
63	0,178	**P1J-4NMF**

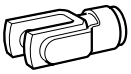
Cyl. Ø mm	A1* mm	A2** mm	B1* mm	B2** mm	C1* mm	C2** mm	D mm	E mm	F mm	G mm	H mm	I mm
12	42,0	-	50,0	-	54,4	-	3,5	12,7	17,0	25	13	33
20	44,5	-	51,0	-	57,5	-	3,5	12,7	22,0	35	20	43
25	48,5	63,5	58,0	73,0	64,5	79,5	4,5	16,0	23,0	41	27	51
32	49,3	67,3	58,7	76,7	65,3	83,3	4,5	16,0	27,0	19	32	46
40	53,7	71,7	66,5	84,5	75,2	93,2	6,5	19,0	31,5	21	40	56
50	58,7	76,7	71,5	89,5	80,3	98,3	6,5	19,0	37,0	27	50	66
63	69,0	89,0	88,0	108,0	99,0	119,0	8,5	25,4	43,0	34	62	83



* Double acting cylinders and single acting cylinders up to stroke length 30 mm

** Single acting cylinders, stroke length 31 to 50 mm

Clevis

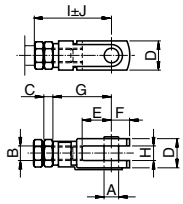


According to ISO 8140
Intended for articulated mounting of the cylinder. This mounting is adjustable in the axial direction, and is supplied complete with shaft. Intended for use with the pin bolt.

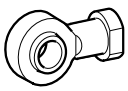
Material:
Zinc plated steel

Cyl. Ø mm	Weight kg	Order code
20	0,011	**P1J-4HRC**
25	0,011	**P1J-4HRC**
32	0,022	**P1A-4DRC**
40	0,022	**P1A-4DRC**
50	0,045	**P1A-4HRC**
63	0,045	**P1A-4HRC**

Cyl. Ø mm	A mm	B	C mm	D mm	E mm	F mm	G mm	H mm	I mm	J mm
20	5	M5	2,5	10	10	6	20	5	25	2,0
25	5	M5	2,5	10	10	6	20	5	25	2,0
32	6	M6	3,0	12	12	7	24	6	30	3,0
40	6	M6	3,0	12	12	7	24	6	30	3,0
50	8	M8	5,0	16	16	10	32	8	42	3,5
63	8	M8	5,0	16	16	10	32	8	42	3,5



Swivel rod eye

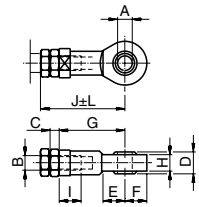


According to ISO 8139
Intended for articulated mounting of the cylinder. This mounting is adjustable in the axial direction.

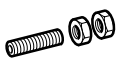
Material:
Swivel rod eye: Zinc plated steel
Swivel: tempered steel

Cyl. Ø mm	Weight kg	Order code
12	0,008	**P1J-4DRS**
20	0,019	**P1J-4HRS**
25	0,019	**P1J-4HRS**
32	0,025	**P1A-4DRS**
40	0,025	**P1A-4DRS**
50	0,045	**P1A-4HRS**
63	0,045	**P1A-4HRS**

Cyl. Ø mm	A mm	B	C mm	D mm	E mm	F mm	G mm	H mm	I mm	J mm	L mm
12	3	M3	1,6	6	10	7	21	4,5	4,5	24,2	1,0
20	5	M5	2,5	8	10	9	27	6,0	7,5	34,5	1,0
25	5	M5	2,5	8	10	9	27	6,0	7,5	34,5	1,0
32	6	M6	3,0	9	10	10	30	6,8	9,0	38,5	1,5
40	6	M6	3,0	9	10	10	30	6,8	9,0	38,5	1,5
50	8	M8	5,0	12	12	12	36	9,0	12,0	49,0	2,0
63	8	M8	5,0	12	12	12	36	9,0	12,0	49,0	2,0



Pin bolt

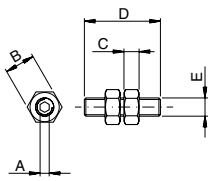


Intended for securing to the piston rod. The bolt can be combined with the swivel mount or clevis mount.

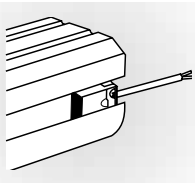
Material:
Zinc plated steel

Cyl. Ø mm	Weight kg	Order code
12	0,002	**P1J-6DS0**
20	0,005	**P1J-6HS0**
25	0,005	**P1J-6HS0**
32	0,008	**P1J-6KS0**
40	0,008	**P1J-6KS0**
50	0,014	**P1J-6MS0**
63	0,014	**P1J-6MS0**

Cyl. Ø mm	A mm	B mm	C mm	D mm	E
12	1,5	5,5	1,6	10	M3
20	2,5	8,0	2,5	20	M5
25	2,5	8,0	2,5	20	M5
32	3,0	10,0	3,0	25	M6
40	3,0	10,0	3,0	25	M6
50	4,0	13,0	5,0	25	M8
63	4,0	13,0	5,0	25	M8



P8S-DRFLX
P8S-DPFLX



Reed switch sensors

These sensors are based on a thoroughly proven reed switch, suitable for use at a wide range of voltages. This, together with the compact size and simple dovetail mounting, makes these sensors suitable for a wide range of applications. They can interface with electronic control systems, relay systems or conventional valves.

Technical data

Specification	P8S-DRFLX, 3 m P8S-DRSHX
Type	Reed switch
Output	Normally open
Voltage range, P8S-DRFLX	0-110 VAC/VDC
Voltage range, P8S-DRSHX	0-60 VAC/VDC
Maximum voltage drop	2,8 V
Maximum load current	380 mA
Maximum interrupting capacity (resistive)	10 W
Minimum activation distance	11 mm
Repetition accuracy	±0,1 mm
Maximum operating frequency	500 Hz
Maximum response time	1 ms
Protection class	IP 67
Operating temperature range	–10 °C to +70 °C
Indication	LED, red
Material, sensor casing	Polyamide
Cable	PVC 2x0,2 mm^2
Cable including female connector	PVC 3x0,2 mm^2
Weight, sensor with 3 m cable	55 g
Weight, sensor with male connector	8 g
Weight, cable with connector, 3 m	90 g
Weight, cable with connector, 5 m	146 g
Weight, cable with connector, 10 m	286 g
Fitting	Dovetail

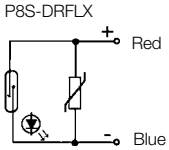
Ordering data

Output	Cable length	Order code
Reed switch sensors		
Normally open	3 m*	**P8S-DRFLX**
Normally open	**	**P8S-DRSHX**

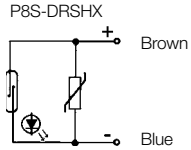
* Moulded cable
** Cable must be ordered separately.

Symbols

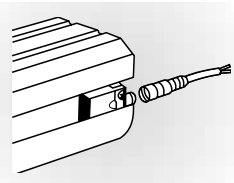
P8S-DRFLX



P8S-DRSHX



P8S-DRSHX
P8S-DPSHX



Electronic sensors

The electronic sensors are solid state sensors with no moving parts, and include squelch and transient protection circuitry as standard. The integral electronics make these sensors suitable for use in applications with very high switching frequencies.

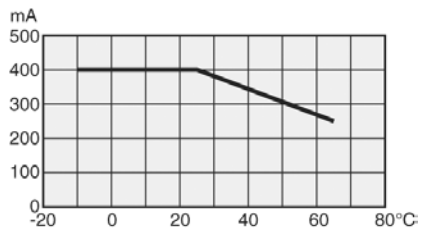
Technical data

Specification	P8S-DPFLX, 3 m P8S-DPSHX
Type	Hall element
Output	PNP, N.O.
Voltage range	10-28 VDC
Maximum voltage drop	1 V
Maximum load current	See diagram below
Maximum interrupting capacity (resistive)	12 W
Minimum activation distance	12 mm
Repetition accuracy	±0,1 mm
Maximum operating frequency	1 kHz
Maximum response time	0,01 ms
Protection class	IP 67
Operating temperature range	–10 °C to +70 °C
Indication	LED, red
Material, sensor casing	Polyamide
Cable	PVC 2x0,2 mm^2
Cable including female connector	PVC 3x0,2 mm^2
Weight, sensor with 3 m cable	55 g
Weight, sensor with male connector	8 g
Weight, cable with connector, 3 m	90 g
Weight, cable with connector, 5 m	146 g
Weight, cable with connector, 10 m	286 g
Fitting	Dovetail

Ordering data

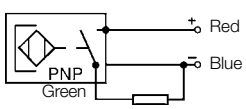
Output	Cable length	Order code
Electronic sensors		
PNP, NO	3 m*	**P8S-DPFLX**
PNP, NO	**	**P8S-DPSHX**

Maximum load current

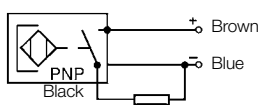


Symbols

P8S-DPFLX



P8S-DPSHX



Connecting cables with one connector

The cables have an integral snap-in female connector.

Type of cable	Cable/connector	Weight kg	Order code
Cables for sensors, complete with one female connector			
Cable, Flex PVC	3 m, 8 mm Snap-in connector	0,07	**9126344341**
Cable, Flex PVC	10 m, 8 mm Snap-in connector	0,21	**9126344342**
Cable, Super Flex PVC	3 m, 8 mm Snap-in connector	0,07	**9126344343**
Cable, Super Flex PVC	10 m, 8 mm Snap-in connector	0,21	**9126344344**
Cable, Polyurethane	3 m, 8 mm Snap-in connector	0,01	**9126344345**
Cable, Polyurethane	10 m, 8 mm Snap-in connector	0,20	**9126344346**
Cable, Polyurethane	5 m, M12 screw connector	0,07	**9126344348**
Cable, Polyurethane	10 m, M12 screw connector	0,20	**9126344349**

Male connectors for connecting cables

Cable connectors for producing your own connecting cables. The connectors can be quickly attached to the cable without special tools. Only the outer sheath of the cable is removed. The connectors are available for M8 and M12 screw connectors and meet protection class IP 65.

Connector	Weight kg	Order code
M8 screw connector	0,017	**P8SCS0803J**
M12 screw connector	0,022	**P8SCS1204J**

Connection block Valvetronic 110

The Valvetronic 110 is a connection block that can be used for collecting signals from sensors at various points on a machine and connecting them to the control system via a multicore cable. Valvetronic 110 can also be used for central connection of the multi-core cable to the outputs of a control system, and can be laid to a machine where the output signals can be connected. The connection block has ten 8 mm snap-in circular connectors and a multi-core cable which is available in lengths of 3 or 10 m. The connections on the block are numbered from 1 to 10. Blanking plugs are available for unused connections, as labels for marking the connections of each block.

Technical data

Connections:

Ten 3-pole numbered 8 mm round snap-in female contacts

Input block	
Pin 1	Common, +24 VDC
Pin 2	Input signal
Pin 3	Common, 0V

Output block	
Pin 1	Common, GND
Pin 2	Output signal
Pin 3	Common, 0V

Electrical data:

Voltage	24 VDC (max. 60 V AC/75 V DC)
Insulation group	according to DIN 0110 class C
Load	max. 1 A per connection total max. 3 A

Cable:

Length	3 m or 10 m
Type of cable	LifYY11Y
Conductor	12
Area	0.34 mm²
Colour marking	According to DIN 47 100

Mechanical data

Enclosure	IP 67, DIN 40050 with fitted contacts and/or blanking plugs.
Temperature	–20 °C to +70 °C

Material

Body	PA 6,6 VD according to UL 94
Contact holder	PBTP
Snap-in ring	LDPE
Moulding mass	Epoxy
Seal	NBR
Screws	Plated steel

Industrial durability

Good chemical and oil resistance. Tests should be performed in aggressive environments.

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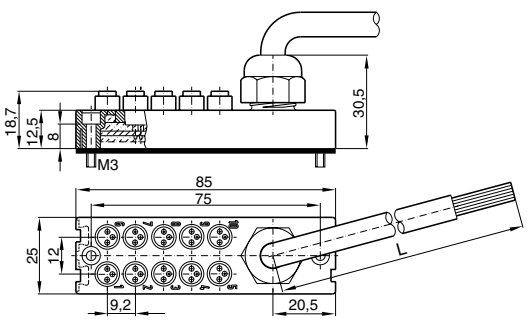
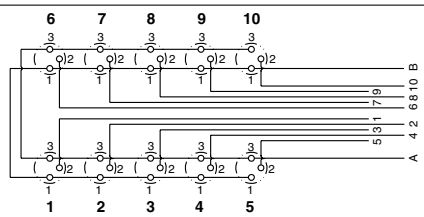
Ordering data

	Designation	Weight kg	Order code
	Connection block Valvetronic 110 with 3 m cable Connection block Valvetronic 110 with 10 m cable	0,32 0,95	**9121719001** **9121719002**
	Blanking plugs (pack of 10) Use blanking plugs to close unused connections.	0,02	**9121719003**
	Labels (pack of 10) White labels to insert in grooves on the side of the connection	0,02	**9121719004**

Dimensions and wiring diagrams





Conductor	Colour	Input	Output
1	Pink	Signal 1	Signal 1
2	Grey	Signal 2	Signal 2
3	Yellow	Signal 3	Signal 3
4	Green	Signal 4	Signal 4
5	White	Signal 5	Signal 5
6	Red	Signal 6	Signal 6
7	Black	Signal 7	Signal 7
8	Violet	Signal 8	Signal 8
9	Grey-Pink	Signal 9	Signal 9
10	Red-Blue	Signal 10	Signal 10
A	Blue	0 V	0 V
B	Brown	+24 V	PE

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Compact Cylinders

NZ Series

Compact Cylinder Ø 12-25 mm

to ISO 21287

Series NZ....
Series NZD....
Series NZV....

Versions:
- **single acting**
- **double acting without cushioning**
- **for contactless position sensing**
- **with through piston rod**
- **non-rotating**
- **option of internal or external mounting on piston rod**

Special version:
- high temperature version (150°C)

The cylinder profile has grooves in which, depending on stroke length, one or more magnetic switches can be mounted for sensing the end positions or intermediate positions of the magnetic piston.

The delivery includes:
1 Cylinder

Magnetic switches are not included - please order these separately.

Versions without contactless position sensing on request.

Characteristics

Characteristics	Symbol	Unit	Description			
General Features						
Type			Piston rod cylinder			
Series			NZ7, NZ8, NZ6			
Series			Piston rod cylinder			
NZ7..., NZ8...			Double acting without cushioning			
NZ6...			Double acting without cushioning			
NZD6...			With through piston rod Double acting without cushioning			
NZV6...			Non-rotating Double acting without cushioning			
Mountig			See drawing			
Tube connection			Thread			
Ambient temperature range	T_{min} T_{max}	°C °C	-20 +80	Note: When using below freezing point (°C) it is necessary to consult us		
Medium temperature range	T_{max}	°C	+80			
Weight (mass)		kg	See table			
Installation			In any position			
Medium			Filtered and lubricated or filtered and unlubricated compressed air			
Lubrication			Oil mist lubrication compatible with polyurethane			
Material						
Cylinder tube			Aluminium, anodised			
Front/rear end caps			Aluminium, laquered			
Piston rod			Steel, high-alloy			
Pneumatic Chracteristics						
Nominal pressure	p_n	bar	6			
Operating pressure	p_{min} p_{max}	bar bar	1,0 (1,5 Single acting version) 10			
Piston diameter		mm	12	16	20	25
Port size			M5	M5	M5	M5
Piston rod diameter		mm	6	8	10	10
Piston rod thread						
Internal			M3	M4	M6	M6
External			M5	M6	M8x1.25	M8x1.25
Stroke length		mm	Standard stroke lengths see order instructions, max. 200			
Piston force and air consumption			See page 9			
Cushioning		mm	Elastomer cushioning at both ends			
Spring return force max.		N	See diagram			

Weight (mass) kg

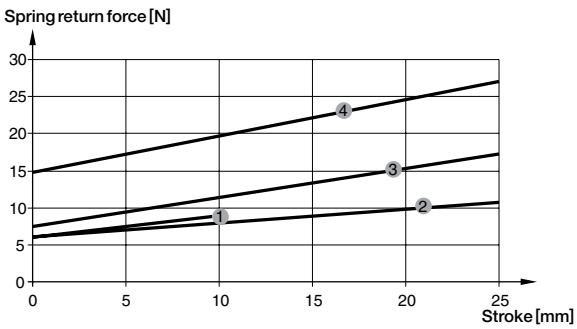
Cylinder version	Cylinder diameter							
	Ø12		Ø16		Ø20		Ø25	
	1*	2*	1*	2*	1*	2*	1*	2*
Standard Type NZ	0.095	0.015	0.105	0.019	0.162	0.024	0.199	0.027
With through piston rod Type NZD	0.103	0.016	0.115	0.020	0.177	0.026	0.215	0.028
Non-rotating Type NZV	0.112	0.018	0.122	0.022	0.188	0.028	0.233	0.031

* 1 = Cylinder weight (10 mm stroke)
  2 = Weight per further 10 mm stroke length

Mounting	Cylinder diameter			
	Ø12	Ø16	Ø20	Ø25
A	0.047	0.047	0.086	0.100
BA	0.021	0.021	0.038	0.042
C	0.110	0.110	0.180	0.220
D	0.110	0.110	0.180	0.220

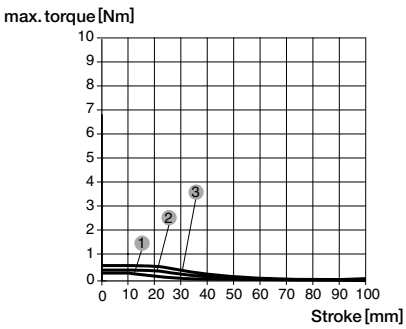
Theoretical Spring Return Forces in relation to Stroke Length
Series NZ7000, NZ8000

1 = Cyl. Ø12
2 = Cyl. Ø16
3 = Cyl. Ø20
4 = Cyl. Ø25

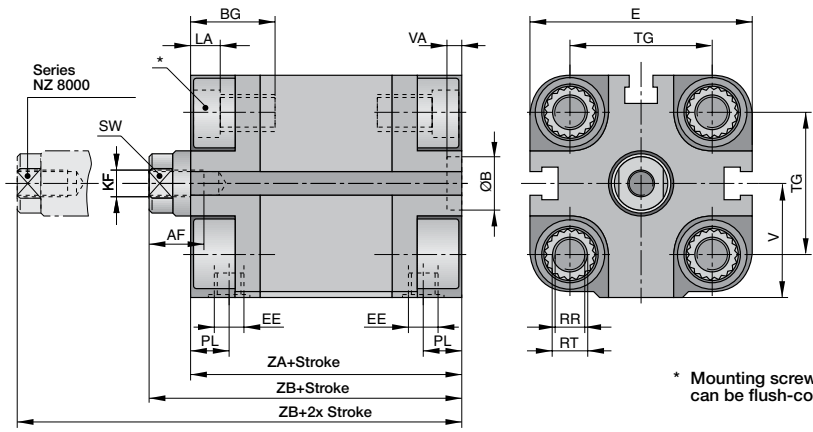


Torque (Nm) in relation to Stroke Length
Series NZV

1 = Cyl. Ø12, 16
2 = Cyl. Ø20
3 = Cyl. Ø25



Dimensions – Basic Cylinder, Ø 12 – 25 mm
Version: Piston Rod with Internal Thread (Series NZ..../...)



* Mounting screws to DIN 912 can be flush-countersunk

Dimensions – Basic Cylinder, Ø 12 – 25 mm
Version: Piston Rod with External Thread (Series NZ..../...-AG)

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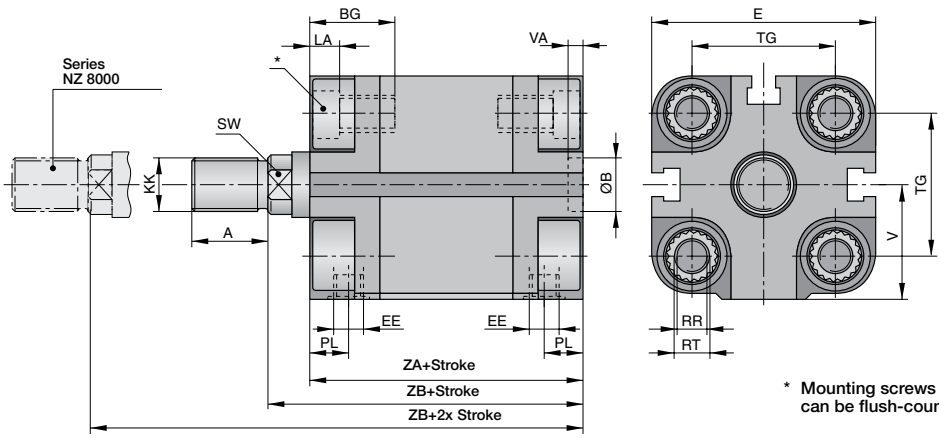
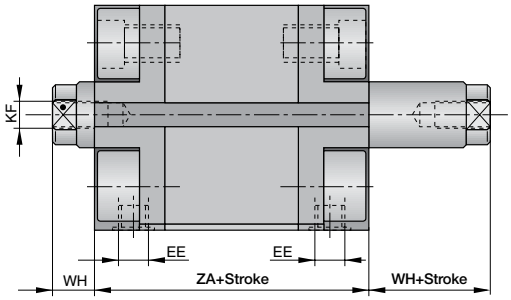


* Mounting screws to DIN 912 can be flush-countersunk

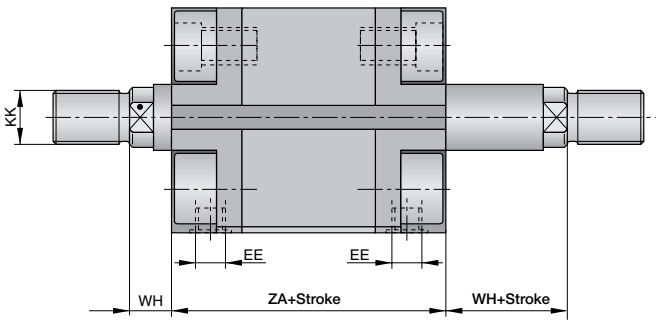
Dimension table (mm) – Basic Cylinder

Cyl. Ø	A	B	E	V	AF	BG	EE	KF	KK	LA	PL	RR	RT	TG	VA	ZA +Strok	ZB +Strok	ZB +2x Stroke	W	WH	WH +Strok
12	12	6	29	15,5	8	8	M5	M3	M5	5	5	3,2	M4	18	4	37	42,5	42,5	5	5,5	5,5
16	16	6	29	15,5	10	10	M5	M4	M6	5	5	3,2	M4	18	4	37	42,5	42,5	7	5,5	5,5
20	16	6	36	19,5	10	15	M5	M6	M8x1,25	5	5	4,1	M5	22	4	37	43	43	8	6	6
25	16	6	40	21,5	10	15	M5	M6	M8x1,25	5	5	4,1	M5	26	4	39	45	45	8	6	6

Dimensions – Basic Cylinder with through piston rod, Ø 12 – 25 mm
Version: Piston Rod with Internal Thread (Series NZD..../...)



Dimensions – Basic Cylinder with through piston rod, Ø 12 – 25 mm
Version: Piston Rod with External Thread (Series NZD..../...-AG)



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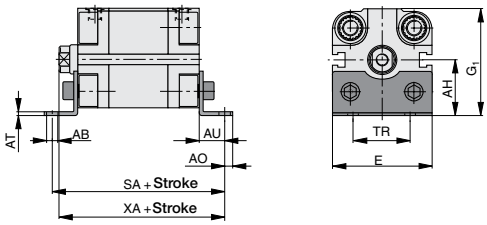
Accessories

Piston Rod Eye	Piston Rod Clevis	Compensating Coupling	Magnetic Switch					
								

Mountings – Series NZ.... , Ø 12 –25 mm

Dimensions for Mounting A



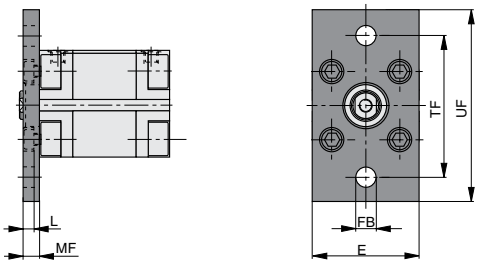
Material: steel, passivated

Dimension Table (mm) – Mounting A

Cyl. Ø	AB	AH	AO	AT	AU	E	G_1	TR	SA +Stro-ke	XA +Stro-ke
12	5.8	22	4.5	3	13	28	36.5	18	63	55.5
16	5.8	22	4.5	3	13	28	36.5	18	63	55.5
20	7	27	7	4	16	36	46	22	69	59
25	7	29	7	4	16	40	49.5	26	71	61

Included in delivery: 2 foot brackets, 4 screws

Dimensions for Mounting C



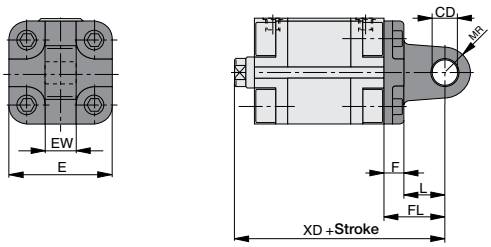
Material: steel, zinc-plated

Dimension Table (mm) – Mounting C

Cyl. Ø	ØFB	E	L	MF	TF	UF
12	5.5	29	5	8	43	55
16	5.5	29	5	8	43	55
20	6.6	36	5	8	55	70
25	6.6	40	5	8	60	76

Included in delivery: 1 flange, 4 screws

Dimensions for Mounting BA



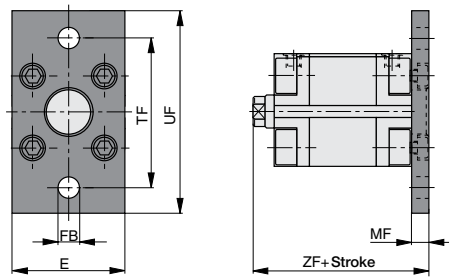
Material: cast aluminium

Dimension Table (mm) – Mounting BA

Cyl. Ø	ØCD^{H9}	E	EW	F	FL	L	MR	D+Stroke
12	6	27	12	6	16	10	6	58.5
16	6	27	12	6	16	10	6	58.5
20	8	34	16	6	20	14	8	63
25	8	38	16	6	20	14	8	65

Included in delivery: 1 mounting eyelets, 4 screws

Dimensions for Mounting D



Material: steel, zinc-plated

Dimension Table (mm) – Mounting D

Cyl. Ø	ØFB	E	MF	TF	UF	F+Stroke
12	5.5	29	8	43	55	50.5
16	5.5	29	8	43	55	50.5
20	6.6	36	8	55	70	51
25	6.6	40	8	60	76	53

Included in delivery: 1 flange, 4 screws

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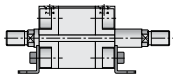
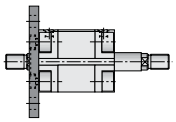
Mountings – Series NZD...., Ø 12 – 25 mm

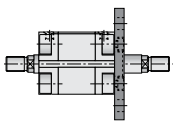
Mounting A-.. (Foot mounting)



Mounting C-.. (Front flange mounting)



Mounting D-..(Rear flange mounting)



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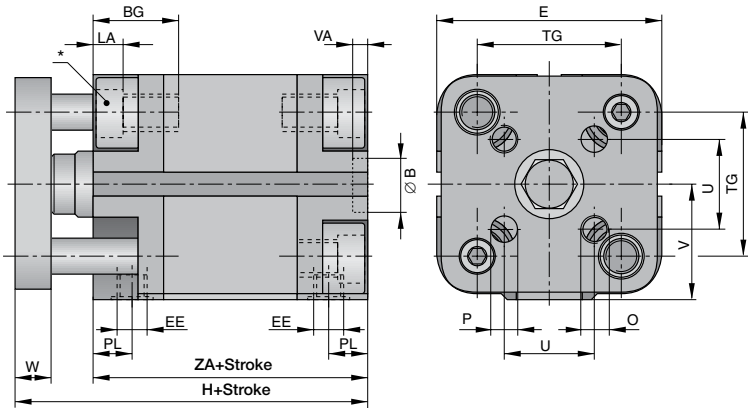
Accessories

Piston Rod Eye	Piston Rod Clevis	Compensating Coupling	Magnetic Switch					
								

Dimensions – Basic Cylinder, non-rotating, Ø 12 – 25 mm
Series NZV....

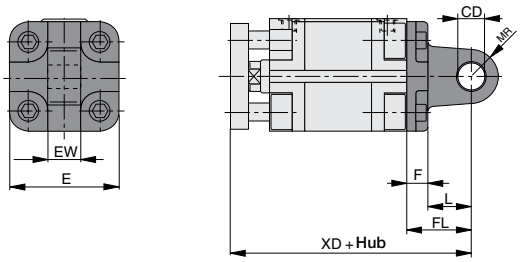


* Mounting screws to DIN 912 can be flush-countersunk

Dimensions Table (mm) – Basic Cylinder, Series NZV

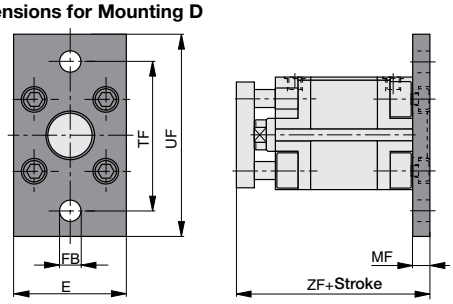
Cyl. Ø	ØB	BG	E	EE	H	LA	O	P	PL	U	TG	V	VA	W	ZA +Stroke
12	6	8	29	M5	48.5	5	M3	3	5	9.9	18	15.5	4	6	37
16	6	10	29	M5	48.5	5	M3	3	5	9.9	18	15.5	4	6	37
20	6	15	38	M5	51	5	M4	4	5	12	22	19.5	4	8	37
25	6	15	41	M5	53	5	M5	5	5	15.6	26	21.5	4	8	39

Dimensions for Mounting BA



Material: cast aluminium

Dimensions for Mounting D



Material: steel, zinc-plated

Dimensions Table (mm) – Mounting BA

Cyl. Ø	ØCD	E	EW	F	FL	L	MR	XD +Strok
12	6	27	12	6	16	10	6	64.5
16	6	27	12	6	16	10	6	64.5
20	8	34	16	6	20	14	8	71
25	8	38	16	6	20	14	8	73

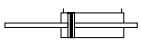
Included in delivery: 1 mounting eyelets, 4 screws

Dimensions Table (mm) – Mounting D

Cyl. Ø	ØFB	E	MF	TF	UF	ZF +Stroke
12	5.5	29	8	43	55	56.5
16	5.5	29	8	43	55	56.5
20	6.6	36	8	55	70	59
25	6.6	40	8	60	76	61

Included in delivery: 1 flange, 4 screws

Order Instructions for Basic Cylinder, Series NZ...., NZD...., Ø 12 – 25 mm

System	Symbol	Piston-Ø	Order instructions Type	Order-No.
Single acting without cushioning For contactless position sensing		12	NZ 7012/..	PA 67960-....
		12	NZ 7012/..-AG	PA 68320-....
		16	NZ 7016/..	PA 67970-....
		16	NZ 7016/..-AG	PA 68330-....
		20	NZ 7020/..	PA 67980-....
		20	NZ 7020/..-AG	PA 68340-....
		25	NZ 7025/..	PA 67990-....
		25	NZ 7025/..-AG	PA 68350-....
Single acting without cushioning For contactless position sensing		12	NZ 8012/..	PA 68000-....
		12	NZ 8012/..-AG	PA 68360-....
		16	NZ 8016/..	PA 68010-....
		16	NZ 8016/..-AG	PA 68370-....
		20	NZ 8020/..	PA 68020-....
		20	NZ 8020/..-AG	PA 68380-....
		25	NZ 8025/..	PA 68030-....
		25	NZ 8025/..-AG	PA 68390-....
Double acting without cushioning For contactless position sensing		12	NZ6012/..	PA67920-....
		12	NZ6012/..-AG	PA68280-....
		16	NZ6016/..	PA67930-....
		16	NZ6016/..-AG	PA68290-....
		20	NZ6020/..	PA67940-....
		20	NZ6020/..-AG	PA68300-....
		25	NZ6025/..	PA67950-....
		25	NZ6025/..-AG	PA68310-....
With through piston rod Double acting without cushioning For contactless position sensing		12	NZD6012/..	PA68200-....
		12	NZD6012/..-AG	on request
		16	NZD6016/..	PA68210-....
		16	NZD6016/..-AG	on request
		20	NZD6020/..	PA68220-....
		20	NZD6020/..-AG	on request
		25	NZD6025/..	PA68230-....
		25	NZ6025/..-AG	on request

Complete type designation and order no. with stroke length in mm (4-digits)

Standard stroke length
– Single acting version: 0005, 0010, 0015, 0020, 0025 (Ø12: 0005, 0010)
– Double acting version: 0005, 0010, 0015, 0020, 0025, 0030, 0040, 0050 delivered preferably

Magnetic switches are not included - please order these separately.

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Order Instructions for Basic Cylinder, Series NZV...., Ø 12 – 25 mm

System	Symbol	Piston-Ø	Order instructions Type	Order-No.
Non-rotating Double acting without cushioning For contactless position sensing		12	NZV6012/..	PA68160-....
		16	NZV6016/..	PA68170-....
		20	NZV6020/..	PA68180-....
		25	NZV6025/..	PA68190-....

Complete type designation and order no. with stroke length in mm (4-digits)

Standard stroke length
– Double acting version: 0005, 0010, 0015, 0020, 0025, 0030, 0040, 0050 delivered preferably

Order Instructions for Cylinder Mountings

Description	Order-No. Ø12	Ø16	Ø20	Ø25
Foot mounting A-..	KL5510	KL5510	KL5511	KL5512
Rear trunnion mounting BA-..	KL5513	KL5513	KL5514	KL5515
Front flange mounting C-..	KL5516	KL5516	KL5517	KL5518
Rear flange mounting D-..	KL5516	KL5516	KL5517	KL5518

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Compact Cylinder Ø 32-100 mm

Compact cylinder to ISO 21287

Series NZ....
Series NZD....
Series NZV....
Series NZVD....

Versions:
- **single acting**
- **double acting without cushioning**
- **for contactless position sensing**
- **with through piston rod**
- **non-rotating**
- **option of internal or external mounting on piston rod**
- **ATEX-Version** ⟨Ex⟩

Special versions:
- Viton version for high temperature range (+150°)
- various piston rod extensions
- various piston rod materials
- with adaptor plate for valve mounting

The cylinder profile has grooves in which, depending on stroke length, one or more magnetic swtiches can be mounted for sensing the end positions or intermediate positions of the magnetic piston.

The delivery includes:
1 Cylinder
1 Hexagon nut for piston rod thread

Magnetic switches are not included - please order these separately

Characteristics

Characteristics	Symbol	Unit	Description					
General Features								
Type			Compact cylinder					
Series			NZ7, NZ8, NZ6					
Series			Piston rod cylinder					
NZ7..., NZ8...			Single acting without cushioning					
NZ6...			Double acting without cushioning					
NZD6...			With through piston rod Double acting without cushioning					
NZV6...			Non-rotating Double acting without cushioning					
NZVD6...			Non-rotating, double acting without cushioning and with through piston rod					
Mounting			See drawing					
Tube connection			Thread					
Ambient temperature range	T_{min} T_{max}	°C °C	-20 +80	Note: When using below freezing point (°C) it is necessary to consult us				
Medium temperature range	T_{max}	°C	+80					
Weight (mass)		kg	See table					
Installation			In any position					
Medium			Filtered and lubricated or filtered and unlubricated compressed air					
Lubrication			Oil mist lubrication compatible with polyurethane					
Material								
Cylinder tube			Aluminium, anodised					
Front/Rear end caps			Aluminium					
Piston rod			Steel, high-alloy					
Pneumatic Characteristics								
Nominal pressure	p_n	bar	6					
Operating pressure	p_{min} p_{max}	bar bar	0,5 (1,0 Single acting version) 10					
Piston diameter		mm	32	40	50	63	80	100
Port size			G1/8	G1/8	G1/8	G1/8	G1/8	G1/8
Piston rod diameter		mm	12	16	20	20	25	25
Piston rod thread								
Internal			M8	M8	M10	M10	M12	M12
External			M10 x1.25	M10 x1.25	M12 x1.25	M12 x1.25	M16 x1.5	M16 x1.5
Stroke length		mm	Standard stroke length					
Piston force and air consumption								
Cushioning		mm	Elastomer cushioning at both ends					
Spring return force max.		N	See diagram					

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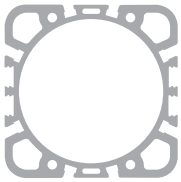
Profile for Basic Cylinder NZ

Ø32 mm, Ø40 mm

Ø50 mm, Ø63 mm

Ø80 mm, Ø100 mm



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Weight (mass) kg

Cylinder version	Cylinder diameter											
	Ø32		Ø40		Ø50		Ø63		Ø80		Ø100	
	1*	2*	1*	2*	1*	2*	1*	2*	1*	2*	1*	2*
Standard Type NZ	0.293	0.036	0.417	0.051	0.573	0.071	0.826	0.081	1.272	0.104	2,209	0,128
With through rod piston Type NZD	0.313	0.045	0.453	0.066	0.635	0.095	0.872	0.105	1.371	0.142	2,337	0,161
Non-rotating Type NZV	0.395	0.044	0.543	0.059	0.778	0.083	1.093	0.093	1.738	0.122	2,843	0,148
Non-rotating, with through rod piston Type NZVD	0.517	0.061	0.705	0.082	1.046	0.120	1.404	0.130	2.303	0.178	3,605	0,198

* 1 = Cylinder weight (10 mm stroke)
2 = Weight per further 10 mm stroke length

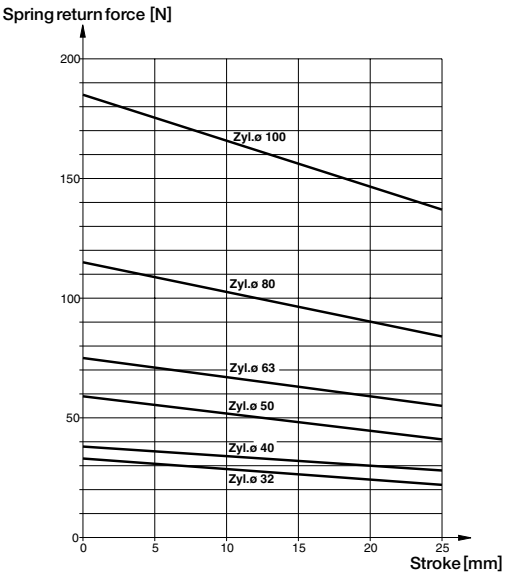
Mounting	Cylinder diameter					
	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
A	0.146	0.186	0.335	0.390	0.789	1.003
B	0.072	0.093	0.166	0.221	0.487	0.741
BA	0.100	0.128	0.205	0.303	0.568	0.905
BAS	0.106	0.146	0.216	0.322	0.561	0.864
C	0.095	0.115	0.229	0.277	0.623	0.780
D	0.095	0.115	0.229	0.277	0.623	0.780
Security bolt for mounting B,BA,BAS	0.034	0.055	0.062	0.127	0.160	0.315

Dimensions (mm) for Special Piston Rod Threads and Thread length

Piston Rod with External Thread (mm)			
Cylinder-Ø	Special Thread KK	Standard Thread KK	SW
32	M10	M10x1.25	10
40	M10	M10x1.25	13
50	M12	M12x1.25	17
63	M12	M12x1.25	17
80	M16	M16x1.5	19
100	M16	M16x1.5	22
External Thread Length of the Piston Rod (mm)			
Cylinder-Ø	$A_{min.}$	$A_{Standard}$	$A_{max.}$
32	13	19	99
40	13	19	99
50	13	22	99
63	13	22	99
80	13	28	99
100	13	28	99

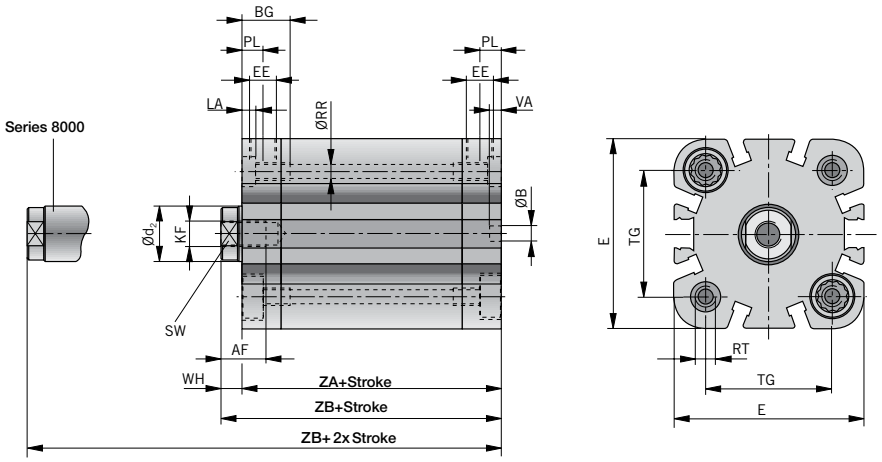
Note:
In the configuration of a cylinder with through piston rod, Series NZD, the assumption is that both piston rods are identical. Only one is configured and this applies to both piston rods. If two different piston rods are required, a special cylinder must be ordered. Special cylinders are not configurable.

Theoretical Spring Return Forces in relation to Stroke Length
Series NZ7000, NZ8000

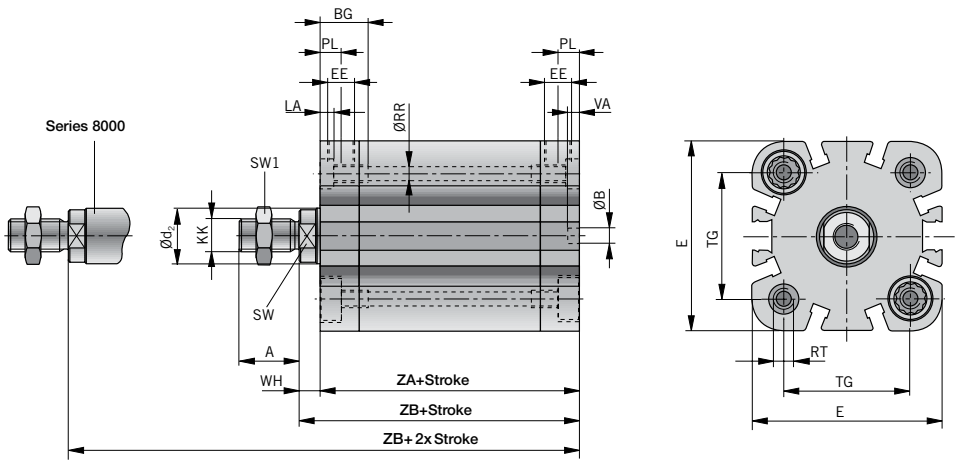


J

Dimensions – Basic Cylinder, Ø 32 – 100 mm
Version: Piston rod with Internal Thread (Series NZ..../...)



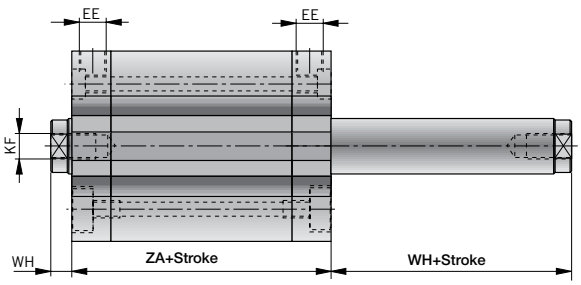
Dimensions – Basic Cylinder, Ø 32 – 100 mm
Version: Piston rod with External Thread (Series NZ..../...-AG)



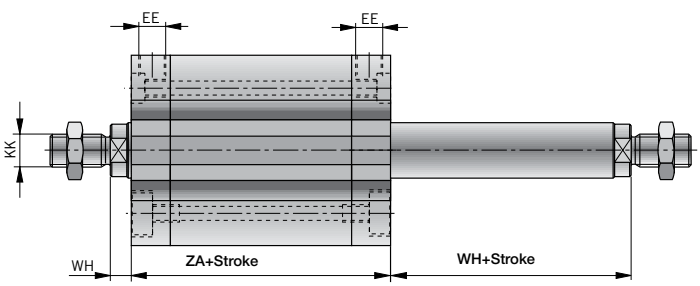
Dimension Table (mm) – Series NZ...., NZD...

Cyl. Ø	A	ØB^{H9}	Ød2$_{h9}$	E	AF	BG	EE	KF	KK
32	19	6	12	50	13	14.5	G1/8	M8	M10x1.25
40	19	6	16	58	13	14.5	G1/8	M8	M10x1.25
50	22	6	20	70	16	14	G1/8	M10	M12x1.25
63	22	8	20	80	16	14.5	G1/8	M10	M12x1.25
80	28	8	25	96	20	15.5	G1/8	M12	M16x1.5
100	28	8	25	116	20	20	G1/8	M12	M16x1.5

Dimensions – Basic Cylinder with Through Piston Rod, Ø 32 – 100 mm
Version: Piston rod with Internal Thread (Series NZ..../...)



Dimensions – Basic Cylinder with Through Piston Rod, Ø 32 – 100 mm
Version: Piston rod with External Thread (Series NZ..../...-AG)

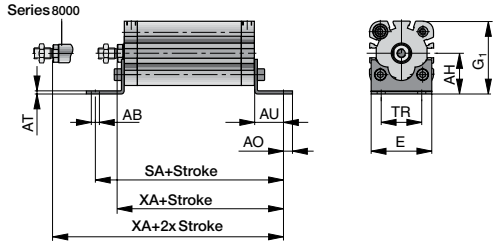


Cyl. Ø	LA	PL	TG	ØRR	RT	SW	SW1	VA	WH	H+Stroke	ZA+Stroke	ZB+Stroke (*
32	5	7.5	32.5	8.5	M6	10	17	4	7	7	44	51
40	5	7.5	38	8.5	M6	13	17	4	7	7	45	52
50	6	7.5	46.5	10.5	M8	17	19	4	8	8	45	53
63	6	7.5	56.5	10.5	M8	17	19	4	8	8	49	57
80	2	7.5	72	13.8	M10	19	24	4	10	10	54	64
100	2	10	89	13.8	M10	22	24	4	10	10	67	77

(* for Series NZ8000: ZB+2xStroke

Mountings – Series NZ...., Ø 32 – 100 mm

Dimensions for Mounting A



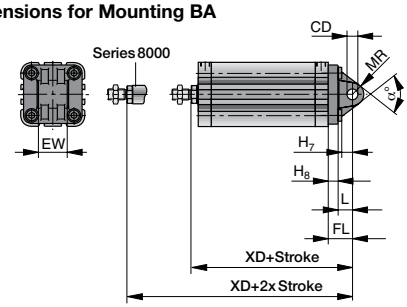
Material: steel, passivated

Dimension Table (mm) – Mounting A

Cyl. Ø	E	G_1	ØAB	AH	AO	AT	AU	SA +Strok	TR	XA +Stroke (*
32	47	57	7	32	8	4	24	92	32	75
40	53	65	10	36	10	4	28	101	36	80
50	65	80	10	45	10	5	32	109	45	85
63	75	90	10	50	10	5	32	113	50	89
80	95	111	12	63	14	6	41	136	63	105
100	115	129	14.5	71	15	6	41	149	75	118

Included in delivery: 2 foot brackets, 4 screws
(* Series NZ8000: XA + 2x Stroke

Dimensions for Mounting BA



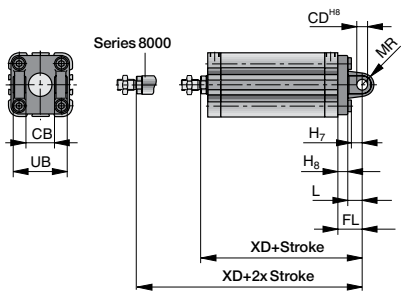
Material: cast aluminium

Dimension Table (mm) – Mounting BA

Cyl. Ø	H_7	H_8	L	CD^{H8}	EW	FL	MR	XD + Stroke (*	α°
32	10	10	12	10	26	22	10.5	73	60
40	13	10	15	12	28	25	13	77	60
50	12	11	16	12	32	27	13	80	70
63	17	11	21	16	40	32	17	89	60
80	16	15	21	16	50	36	17	100	70
100	20.5	16	25	20	60	41	21	118	70

Included in delivery: 1 rear trunnion mounting, 4 screws
(* Series NZ8000: XD + 2x Stroke

Dimensions for Mounting B



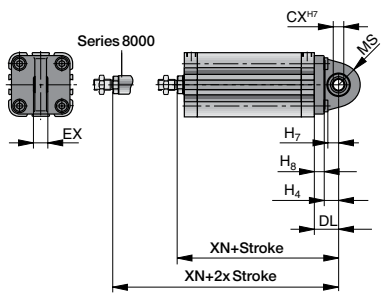
Material: cast aluminium

Dimension Table (mm) – Mounting B

Cyl. Ø	H_7	H_8	L	CB	CD^{H8}	FL	MR	UB	D+Hub (*
32	10	10	12	26	10	22	9	45	73
40	13	10	15	28	12	25	11	52	77
50	12	11	16	32	12	27	12	60	80
63	17	11	21	40	16	32	15	70	89
80	16	15	21	50	16	36	16	90	100
100	20.5	16	25	60	20	41	20	110	118

Included in delivery: 1 rear trunnion mounting, 4 screws
(* Series NZ8000: XD + 2x Stroke

Dimensions for Mounting BAS
(Rear trunnion mounting with spherical bearing)



Material: cast aluminium

Dimension Table (mm) – Mounting BAS

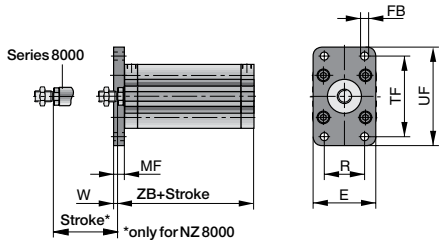
Cyl. Ø	H_4	H_7	H_8	$ØCX^{H7}$	DL	MR	EX	XN+Hub (*
32	12	10	10	10	22	18	14	73
40	15	13	10	12	25	21	16	77
50	16	12	11	12	27	23	16	80
63	21	17	11	16	32	27	21	89
80	21	16	15	16	36	29	21	100
100	25	20.5	16	20	41	34	25	118

Included in delivery: 1 rear trunnion mounting with spherical bearing, 4 screws (* Series NZ8000: XN + 2x Stroke

J

Mountings – Series NZ...., Ø 32 – 100 mm

Dimensions for Mounting C



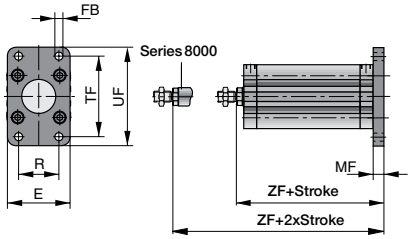
Material: cast aluminium

Dimension Table (mm) – for Mounting C

Cyl. Ø	ØFB	E	MF	R	TF	UF	W	ZB+Stroke
32	7	50	10	32	64	79	3	51
40	9	56	10	36	72	90	3	52
50	9	70	12	45	90	110	4	53
63	9	80	12	50	100	120	4	57
80	12	100	16	63	126	153	6	64
100	14	120	16	75	150	178	6	77

Included in delivery: 1 flange, 4 screws

Dimensions for Mounting D



Material: cast aluminium

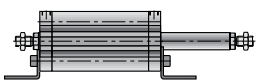
Dimension Table (mm) – for Mounting D

Cyl. Ø	ØFB	E	MF	R	TF	UF	ZF+Stroke (*
32	7	50	10	32	64	79	61
40	9	56	10	36	72	90	62
50	9	70	12	45	90	110	65
63	9	80	12	50	100	120	69
80	12	100	16	63	126	153	80
100	14	120	16	75	150	178	93

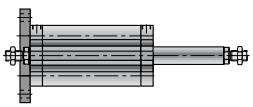
Included in delivery: 1 flange, 4 screws
(*for Series NZ8000 : ZF+2 x Stroke

Mountings – Series NZD...., Ø 32 – 100 mm

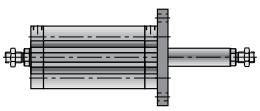
Mounting A-..
(Foot mounting)



Mounting C-..
(Front flange mounting)



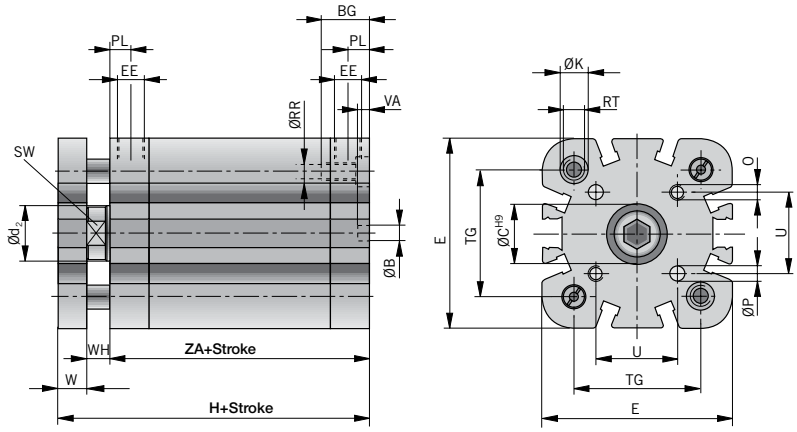
Mounting D-..
(Rear flange mounting)



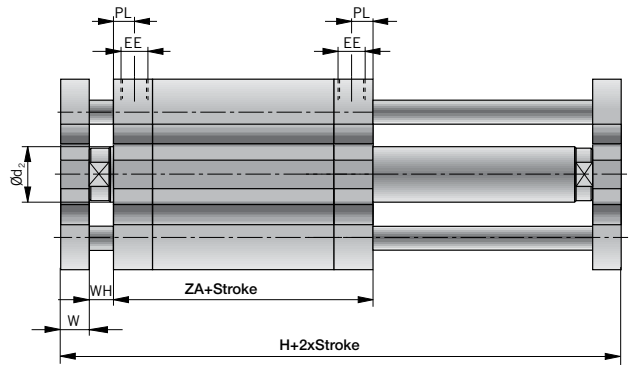
Accessories

Piston Rod Eye	Piston Rod Clevis	Compensating Coupling	Coupling	Magnetic Switch	Adapter plate for Mounting	Pivot for Mounting B
						

Dimensions – Basic Cylinder, non-rotating, Ø 32 – 100 mm
Series NZV....



Dimensions – Basic Cylinder, non-rotating, with through piston rod, Ø 32 – 100 mm
Series NZVD....

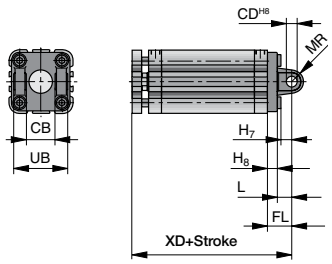


Dimension Table (mm) – Series NZV...., NZVD....

Cyl. Ø	ØB	C H9	Ød2 h9	E	H +Stroke	H +2xstroke	ØK	O	ØP H8	U	W	BG	EE	PL	TG	ØRR	RT	W	VA	H	ZA +stroke
32	6	17	12	50	61	78	9	M5	5	19.8	10	14.5	1/8	7.5	32.5	8.5	M6	10	4	7	44
40	6	17	16	58	62	79	9	M5	5	23.3	10	14.5	1/8	7.5	38	8.5	M6	13	4	7	45
50	6	22	20	70	65	85	9	M6	6	29.7	12	14	1/8	7.5	46.5	10.5	M8	17	4	8	45
63	8	22	20	80	69	89	9	M6	6	35.4	12	14.5	1/8	7.5	56.5	10.5	M8	17	4	8	49
80	8	28	25	96	78	102	12	M8	8	46	14	15.5	1/8	7.5	72	13.8	M10	19	4	10	54
100	8	30	25	116	91	115	12	M10	10	56.6	14	20	1/8	10	89	13.8	M10	22	4	10	67

Mountings – Series NZV...., Ø 32 – 100 mm

Dimensions for Mounting B



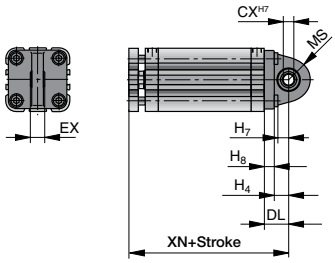
Material: cast aluminium

Dimension Table (mm) – for Mounting BA

Cyl. Ø	H_7	H_8	L	CB	ØCD H8	FL	MR	UB	XD +Stroke
32	10	10	12	26	10	22	9	45	83
40	13	10	15	28	12	25	11	52	87
50	12	11	16	32	12	27	12	60	92
63	17	11	21	40	16	32	15	70	101
80	16	15	21	50	16	36	16	90	114
100	20.5	16	25	60	20	41	20	110	132

Included in delivery: 1 rear trunnion mounting, 4 screws

Dimensions for Mounting BAS
(Rear trunnion mounting with spherical bearing)



Material: cast aluminium

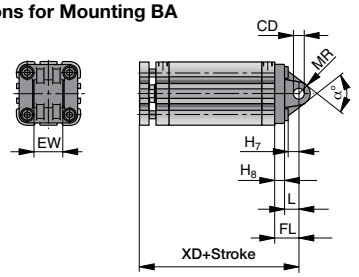
Dimension Table (mm) – for Mounting BAS

Cyl. Ø	H_4	H_7	H_8	CX H7	DL	MS	EX	XN +Stroke
32	12	10	10	10	22	18	14	83
40	15	13	10	12	25	21	16	87
50	16	12	11	12	27	23	16	92
63	21	17	11	16	32	27	21	101
80	21	16	15	16	36	29	21	114
100	25	20.5	16	20	41	34	25	132

Included in delivery: 1 rear trunnion mounting with spherical bearing, 4 screws

J

Dimensions for Mounting BA



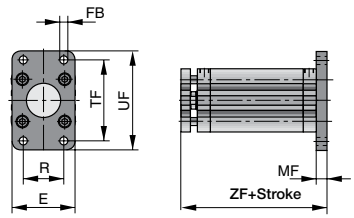
Material: cast aluminium

Dimension Table (mm) – for Mounting BA

Zyl. Ø	H_7	H_8	L	CD H8	EW	FL	MR	XD + stroke	α°
32	11	10	12	10	26	22	10,5	83	60
40	14	10	15	12	28	25	13	87	60
50	15	11	16	12	32	27	13	92	70
63	20	11	21	16	40	32	17	101	60
80	20	15	21	16	50	36	17	114	70
100	24	16	25	20	60	41	21	132	70

Included in delivery: 1 rear trunnion mounting, 4 screws

Dimensions for Mounting D



Material: cast aluminium

Dimension Table (mm) – for Mounting D

Zyl. Ø	E	R	ØFB	MF	TF	UF	ZF +Stroke
32	50	32	7	10	64	79	71
40	56	36	9	10	72	90	72
50	70	45	9	12	90	110	77
63	80	50	9	12	100	120	81
80	100	63	12	16	126	153	94
100	120	75	14	16	150	178	107

Included in delivery: 1 flange, 4 screws

* Note for piston rod version:
In the configuration of a cylinder with through piston rod, Series NZD, the assumption is that both piston rods are identical. Only one is configured and this applies to both piston rods. If two different piston rods are required, a special cylinder must be ordered. Special cylinders are not configurable.

Order Instructions for Basic Cylinder Series NZ

Order-No.	NZ	6	050	-	1000	/	000	-	0	0	0	0	0	X	-13	

Series	
NZ	Standard
NZD	with through piston rod*
NZV	with non-rotating piston rod
ZVD	with non-rotating through piston rod

System	
6	Double acting without cushioning, for contactless position sensing
7	Single acting without cushioning, spring at front end, for contactless position sensing
8	Single acting without cushioning, spring at rear end, for contactless position sensing

Cylinder Diameter	
032	32 mm
040	40 mm
050	50 mm
063	63 mm
080	80 mm
100	100 mm

Stroke Length
Length (4-digit) in mm

Piston Rod Extension*
Length (3-digit) in mm

Air connection	
0	Standard
1**	at one end in rear end cap
2**	at one end in front end cap

** On request

External Thread Length of the Piston Rod (optional) *	
Length (2-digit) in mm Details see page 34	
-13	for example 13 mm

Pneumatic cylinders for the Ex-Atmospheres (ATEX)	
X	See ATEX Certification 94/9/EG (ATEX 95)
0	Standard without Ex-Protection

Piston Rod Thread*	
0	External Thread
1	Special External Thread Details see page 34
2	Internal Thread (Standard)

Piston Rod Material*	
0	Steel, high-alloy (Standard)
1	Steel, high-alloy (V2A)
3	Steel, unalloyed, hard-chrome plated (CK45)

Lubrication	
0	Grease (Standard)

Seals / Wiper	
0	Standard (NBR)
1	Viton (+150°C)

Standard stroke length

Single acting version: 0005, 0010, 0015, 0020, 0025

Double acting version: 0005, 0010, 0025, 0050, 0080, 0100, 0125, 0160, 0200, 0250, 0320, 0400, 0500 delivered preferably

Order Instructions for Cylinder Mountings

Description	Order-No.					
	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
Foot mounting A-..	PD 27917	PD 27918	PD 28072	PD 28073	PD 28074	PD 28075
Rear trunnion mounting B-..	PD 22704	PD 22705	PD 22706	PD 22707	PD 22708	PD 22709
Rear trunnion mounting BA-..	PD 23412	PD 23413	PD 23414	PD 23415	PD 23416	PD 23417
Rear trunnion mounting BAS-..	PD 23843	PD 23844	PD 23845	PD 23846	PD 23847	PD 23848
Front flange mounting C-..	PD 23403	PD 23404	PD 23405	PD 23406	PD 23407	PD 23408
Rear flange mounting D-..	PD 23403	PD 23404	PD 23405	PD 23406	PD 23407	PD 23408
Security bolt for mountings B,BA,BAS	KY 6153	KY 6154	KY 6157	KY 6156	KY 6158	KY 6159

Order Instructions:

For standard versions of basic cylinder, Series NZ, see price list (e.g. NZ6050-0080)

Ordering example for a configurable basic cylinder:
- Cylinder with through piston rod
- Double acting without cushioning
- For contactless position sensing
- Diameter 50 mm
- Stroke 80 mm
- Piston rod extension 15 mm (at both ends)
- Air connection at one end in rear end cap
- Viton seals (up to +150 °C)
- Standard lubrication
- Piston rod material, high alloy steel 1.4305
- Piston rod with external thread
- Without EX-protection
- External thread length of pistonrod 13 mm (at both ends)

Type designation per order code

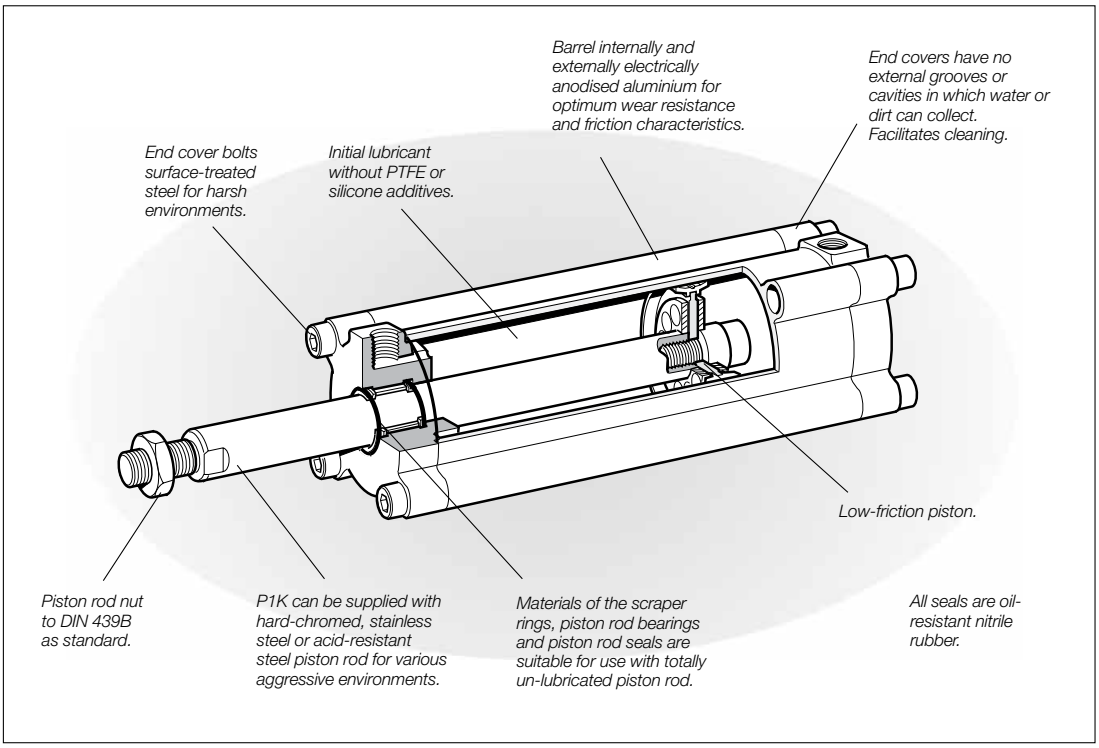
NZ6050-0080/015-110100-13

J

K

Profile Cylinders

P1K Series



K

P1K profile cylinders

The Parker P1K series cylinders are double acting with fixed end cushioning for light duty applications. The range is based upon the international ISO 6431 standard, but with considerably shorter overall length. They are available in bore sizes 32-125 mm with standard stroke lengths, 25-320 mm.

A complete range of mountings is available to suit the numerous application requirements, however, if required, the cylinders can be directly mounted using the existing end cover bolts.

The end plates and aluminium tube have the same profile, eliminating pockets or grooves where dirt could collect, the smooth clean surfaces meet strict hygienic requirements.

P1K cylinders are pre-lubricated during assembly and under normal operating conditions require no further lubrication. To ensure long life, particularly in applications where initial piston rod lubrication may be washed off, for example with detergents, the rod wiper and neck seal are manufactured from lubricant impregnated polythene.

The cylinder is available as a single-acting spring return version with strokes of 25 or 50 mm depending upon bore size.

A range of special cylinders to suit various applications can be produced from the basic P1K unit.

Clean design for foodstuffs applications

The clean design with end plates that precisely line up with the unique housing tube profile means that a lot of P1K cylinders are used in the foodstuffs industry. With a few adaptations, such as fully anodised end plate screws, the P1K is the perfect cylinder for cheesemaking equipment.

The fully anodised cylinders, with their hygienic, easily cleaned design, are installed vertically and press the whey out of the curds. This is an example of where the P1K offers decisive advantages for applications where hygiene and cleanliness are important requirements.

Cushioning

The P1K range of cylinders incorporate fixed end cushioning suitable for lighter duty applications. If used for high loads, provision should be made for external stops and damping. The high and low temperature versions are not available with cushioning.

Clean external design

The end plates of P1K cylinders have no recesses or cavities; this prevents retention of dirt or liquids and enables simple and effective cleaning.

Corrosion resistance

The selection of materials and surface treatments ensure that even standard versions of the P1K cylinder have good corrosion resistance and make them suitable for applications in demanding environments.

Dry Operation

The design of the cylinder makes it ideal for applications demanding hygiene and regular cleaning. Use of pre-lubricated materials together with the design of piston rod bearing, scraper and seal enable regular wiping/de-greasing of the piston rod without jeopardising the service life.

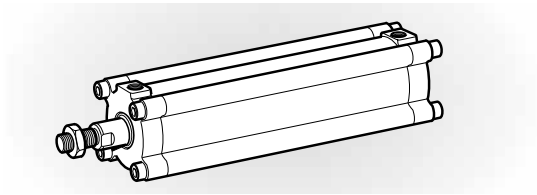
Mountings

A complete range of corrosion resistant mountings is available.

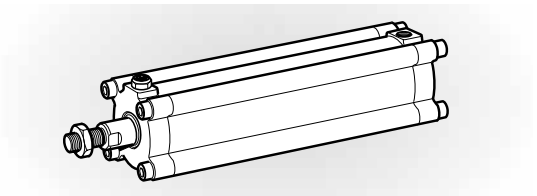
Options

In addition to the standard version, the P1K cylinder is available with various options depending upon the basic model selected.

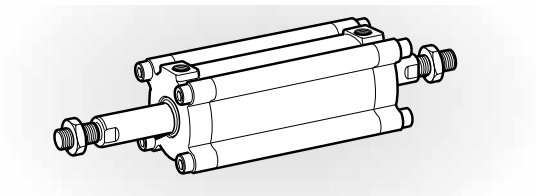
- Non standard stroke lengths
- Choice of piston rod materials
- Extended piston rods
- Through piston rod
- End cap screws in stainless steel
- Single acting



Double acting



Single acting



Double acting with through piston rods

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Cylinder forces, double acting variants

Cyl. bore/ pist. rod mm	Stroke	Pistonarea cm²	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
32/12	+	8,0	80	161	241	322	402	**483**	563	643	724	804
	-	6,9	69	138	207	276	346	**415**	484	553	622	691
40/16	+	12,6	126	251	377	503	628	**754**	880	1005	1131	1257
	-	10,6	106	212	318	424	530	**636**	742	848	954	1060
50/20	+	19,6	196	393	589	785	982	**1178**	1374	1571	1767	1963
	-	16,5	165	330	495	660	825	**990**	1155	1319	1484	1649
63/20	+	31,2	312	623	935	1247	1559	**1870**	2182	2494	2806	3117
	-	28,0	280	561	841	1121	1402	**1682**	1962	2242	2523	2803
80/25	+	50,3	503	1005	1508	2011	2513	**3016**	3519	4021	4524	5027
	-	45,4	454	907	1361	1814	2268	**2721**	3175	3629	4082	4536
100/32	+	78,5	785	1571	2356	3142	3927	**4712**	5498	6283	7069	7854
	-	70,5	705	1410	2115	2820	3525	**4230**	4935	5640	6345	7050
125/32	+	122,7	1227	2454	3682	4909	6136	**7363**	8590	9817	11045	12272
	-	114,7	1147	2294	3440	4587	5734	**6881**	8027	9174	10321	11468

+ = Outward stroke
- = Return stroke

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

Operation data

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Working pressure	Max 10 bar
Working temperature	min max
Standard	-20 °C + 80 °C
High temp version	-10 °C +150 °C
Low temp version	40 °C + 40 °C

Greased for life, does not normally need additional lubrication. If extra lubrication is given, this must always be continued.

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 ºC 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.

ISO 8573-1 quality classes

Quality class	Pollution particle size (µm)	Pollution max concentration (mg/m³)	Water max. press. dew point (°C)	Oil max concentration (mg/m³)
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	-

Important!
When the cylinders are used in applications with heavy side loading on the piston rod, an outer guide must be used to ensure maximum service life.

Main data

Cylinder designation	Cylinder bore	Piston rod area	diam.	area	thread	Total mass at 0 mm stroke length	Addition per 10 mm stroke	Mass, moving parts at 0 mm stroke length	Addition per 10 mm stroke	Air con-sump-tion	Port size
	mm	cm^2	mm	cm^2		kg	kg	kg	kg	litre	G
Double acting											
P1K-S032DT-XXXX[1]	32	8,0	12	1,1	M10x1,25	0,33	0,024	0,09	0,009	0,105[2]	1/8
P1K-S040DT-XXXX[1]	40	12,6	16	2,0	M12x1,25	0,48	0,032	0,14	0,016	0,162[2]	1/8
P1K-S050DT-XXXX[1]	50	19,6	20	3,1	M16x1,5	0,70	0,049	0,26	0,025	0,253[2]	1/8
P1K-S063DT-XXXX[1]	63	31,2	20	3,1	M16x1,5	1,04	0,058	0,31	0,025	0,414[2]	1/8
P1K-S080DT-XXXX[1]	80	50,0	25	4,9	M20x1,5	1,75	0,081	0,56	0,039	0,669[2]	1/4
P1K-S100DT-XXXX[1]	100	79,0	32	8,0	M20x1,5	2,48	0,116	0,86	0,063	1,043[2]	1/4
P1K-S125DT-XXXX[1]	125	123,0	32	8,0	M27x2	4,35	0,138	1,77	0,063	1,662[2]	3/8
Single acting											
P1K-S032ST-0025	32	8,0	12	1,1	M10x1,25	0,48[3]		0,15[3]		0,141[3]	1/8
P1K-S032ST-0050	32	8,0	12	1,1	M10x1,25	0,60[3]		0,27[3]		0,282[3]	1/8
P1K-S040ST-0025	40	12,6	16	2,0	M12x1,25	0,67[3]		0,24[3]		0,220[3]	1/8
P1K-S040ST-0050	40	12,6	16	2,0	M12x1,25	0,84[3]		0,32[3]		0,440[3]	1/8
P1K-S050ST-0025	50	19,6	20	3,1	M16x1,5	1,02[3]		0,44[3]		0,344[3]	1/8
P1K-S050ST-0050	50	19,6	20	3,1	M16x1,5	1,27[3]		0,57[3]		0,688[3]	1/8
P1K-S063ST-0025	63	31,2	20	3,1	M16x1,5	1,41[3]		0,51[3]		0,546[3]	1/8
P1K-S063ST-0050	63	31,2	20	3,1	M16x1,5	1,72[3]		0,63[3]		1,092[3]	1/8
P1K-S080ST-0050	80	50,0	25	4,9	M20x1,5	2,81[3]		1,13[3]		1,760[3]	1/4
P1K-S100ST-0050	100	79,0	32	8,0	M20x1,5	3,99[3]		1,74[3]		2,748[3]	1/4

1) XXXX=stroke length. 2) Free air consumption per 100 mm stroke length for a double stroke at 6 bar. 3) At the relevant stroke length.

Piston forces

The values for piston forces are theoretical and should be reduced to suit working conditions.

Cylinder designation	Theoretical piston force at 6 bar Plus stroke		Spring force Minus stroke	
	Nmin	Nmax	Nmin	Nmax
Single acting				
P1K-S032ST-0025	450	441	30	39
P1K-S032ST-0050	450	432	30	48
P1K-S040ST-0025	714	704	40	50
P1K-S040ST-0050	714	688	40	50
P1K-S050ST-0025	1120	1101	60	79
P1K-S050ST-0050	1120	1090	60	90
P1K-S063ST-0025	1800	1782	70	88
P1K-S063ST-0050	1800	1771	70	99
P1K-S080ST-0050	2925	2878	95	142
P1K-S100ST-0050	4570	4518	140	192

Material specifications

Cylinder barrel	Anodised aluminium
End covers	Anodised aluminium
End cap screws	Galvanized steel
Piston	Steel/Nitrile rubber, NBR
Piston rod bearing	Acetal plastic/Bronze/Steel
Piston rod	Hard chromium plated steel Fe 490-2 FN
Scraper ring, piston rod sealing	UHMWPE-plastic
Cushioning ring	Polyurethane
Other sealings	Nitrile rubber, NBR
Return spring	stainless spring steel

Option

Piston rod material	Hard-chromium plated steel, Fe 490-2 FN
	Acid-proof steel, X 5 CrNiMo 17 13 3
	Hard-chromium plated stainless steel, X 10 CrNiS 18 9

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Guide for selecting suitable tubing

The selection of the correct size of tubing is often based on experience, with no great thought to optimizing energy efficiency and cylinder velocity. This is usually acceptable, but making a rough calculation can result in worthwhile economic gains.

The following is the basic principle:

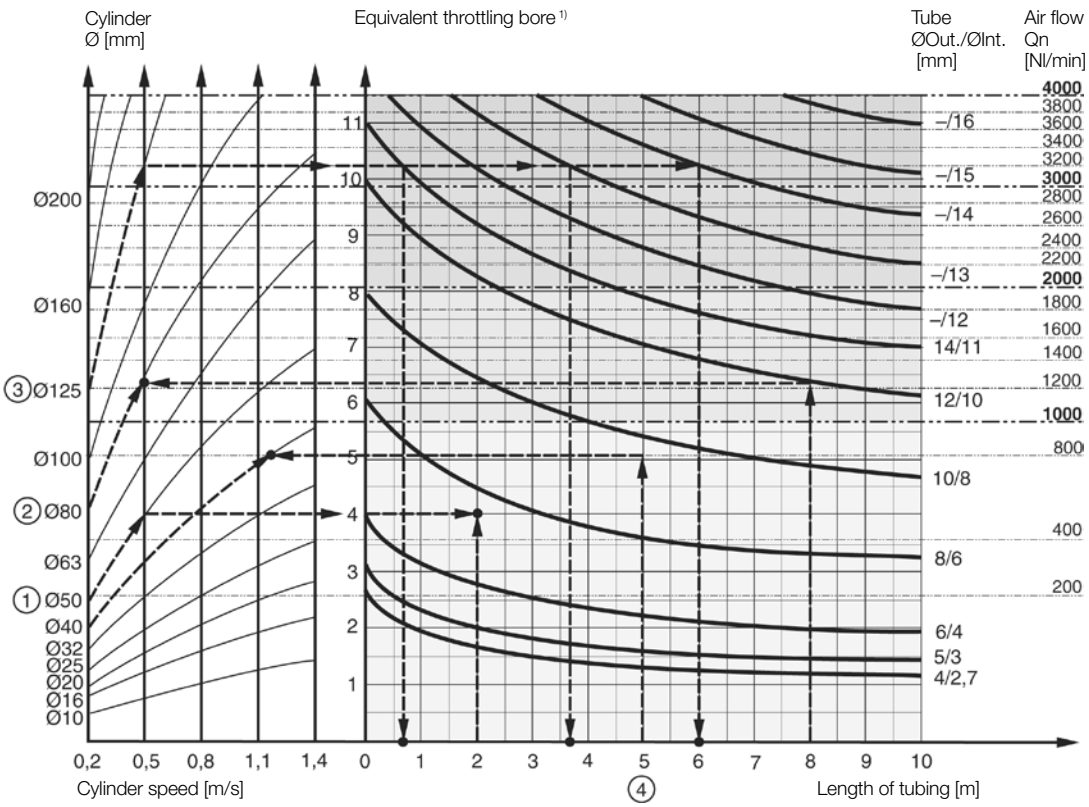
1. The primary line to the working valve could be over sized (this does not cause any extra air consumption and consequently does not create any extra costs in operation).
2. The tubes between the valve and the cylinder should, however, be optimized according to the principle that an insufficient bore throttles the flow and thus limits the cylinder speed, while an oversized pipe creates a dead volume which increases the air consumption and filling time.

The chart below is intended to help when selecting the correct size of tube to use between the valve and the cylinder.

The following prerequisites apply:

The *cylinder load should be about 50%* of the theoretical force (= normal load). A lower load gives a higher velocity and vice versa. The tube size is selected as a function of the *cylinder bore*, the desired *cylinder velocity* and the *tube length* between the valve and the cylinder.

If you want to use the capacity of the valve to its maximum, and obtain maximum speed, the tubing should be chosen so that they at least correspond with the equivalent restriction diameter (see description below), so that the tubing does not restrict the total flow. This means that a short tubing must have at least the equivalent restriction diameter. If the tubing is longer, choose it from the table below. Straight fittings should be chosen for highest flow rates. (Elbow and banjo fittings cause restriction.)



1) The "equivalent throttling bore" is a long throttle (for example a tube) or a series of throttles (for example, through a valve) converted to a short throttle which gives a corresponding flow rate. This should not be confused with the "orifice" which is sometimes specified for valves. The value for the orifice does not normally take account of the fact that the valve contains a number of throttles.

2) Qn is a measure of the valve flow capacity, with flow measured in litre per minute (l/min) at 6 bar(e) supply pressure and 1 bar pressure drop across the valve.

Example ①: Which tube diameter should be used?

A 50 mm bore cylinder is to be operated at 0.5 m/s. The tube length between the valve and cylinder is 2 m. In the diagram we follow the line from 50 mm bore to 0.5 m/s and get an "equivalent throttling bore" of approximately 4 mm. We continue out to the right in the chart and intersect the line for a 2 m tube between the curves for 4 mm (6/4 tube) and 6 mm(8/6 tube). This means that a 6/4 tube throttles the velocity somewhat, while an 8/6 tube is a little too large. We select the 8/6 tube to obtain full cylinder velocity.

Example ②: What cylinder velocity will be obtained?

A 80 mm bore cylinder will be used, connected by 8 m 12/10 tube to a P2L-B valve. What cylinder velocity will we get? We refer to the diagram and follow the line from 8 mm tube length up to the curve for 12/10 tube. From there, we go horizontally to the curve for the Ø80 cylinder. We find that the velocity will be about 0.5 m/s.

Example ③: What is the minimum inner diameter and maximum lenght of tube?

For a application a 125 mm bore cylinder will be used. Maximum velocity of piston rod is 0.5 m/s. The cylinder will be controlled by a P2L-D valve. What diameter of tube can be used and what is maximum lenght of tube.

We refer to the diagram. We start at the left side of the diagram cylinder Ø125. We follow the line until the intersection with the velocity line of 0.5 m/s. From here we draw a horizontal line in the diagram. This line shows us we need an equivalent throttling bore of approximately 10 mm. Following this line horizontally we cross a few intersections. These intersections shows us the minimum inner diameter (rightside diagram) in combination with the maximum length of tube (bottomside diagram).

For example:
Intersection one: When a tube (14/11) will be used, the maximum length of tube is 0.7 meter.
Intersection two: When a tube (—/13) will be used, the maximum length of tube is 3.7 meter.
Intersection three: When a tube (—/14) will be used, the maximum length of tube is 6 meter.

Example 4 : Determining tube size and cylinder velocity with a particular cylinder and valve?

For an application using a 40 mm bore cylinder with a valve with Qn=800 Nl/min. The distance between the cylinder and valve has been set to 5 m.
Tube dimension: What tube bore should be selected to obtain the maximum cylinder velocity? Start at pipe length 5 m, follow the line up to the intersection with 800 Nl/min. Select the next largest tube diameter, in this case Ø10/8 mm.
Cylinder velocity: What maximum cylinder velocity will be obtained? Follow the line for 800 Nl/min to the left until it intersects with the line for the Ø40 mm cylinder. In this example, the speed is just above 1.1 m/s.

Valve series with respective flows in Nl/minute

Valve series	Qn in Nl/Min
Valvetronic Solstar	33
Interface PS1	100
Adex A05	173
Moduflex size 1, (2 x 3/2)	220
Valvetronic PVL-B 5/3 closed centre, 6 mm push in	290
Moduflex size 1, (4/2)	320
B43 Manual and mechanical	340
Valvetronic PVL-B 2 x 2/3, 6 mm push in	350
Valvetronic PVL-B 5/3 closed centre, G1/8	370
Compact Isomax DX02	385
Valvetronic PVL-B 2 x 3/2 G1/8	440
Valvetronic PVL-B 5/2, 6 mm push in	450
Valvetronic PVL-B 5/3 vented centre, 6 mm push in	450
Moduflex size 2, (2 x 3/2)	450
Flowstar P2V-A	520
Valvetronic PVL-B 5/3 vented centre, G1/8	540
Valvetronic PVL-B 5/2, G1/8	540
Valvetronic PVL-C 2 x 3/2, 8 mm push in	540
Adex A12	560
Valvetronic PVL-C 2 x 3/2 G1/8	570
Compact Isomax DX01	585
VIKING Xtreme P2LAX	660
Valvetronic PVL-C 5/3 closed centre, 8 mm push in	700
Valvetronic PVL-C 5/3 vented centre, G1/4	700
B3-Series	780
Valvetronic PVL-C 5/3 closed centre, G1/4	780
Moduflex size 2, (4/2)	800
Valvetronic PVL-C 5/2, 8 mm push in	840
Valvetronic PVL-C 5/3 vented centre, 8 mm push in	840
Valvetronic PVL-C 5/2, G1/4	840
Flowstar P2V-B	1090
ISOMAX DX1	1150
B53 Manual and mechanical	1160
B4-Series	1170
VIKING Xtreme P2LBX	1290
B5-Series, G1/4	1440
Airline Isolator Valve VE22/23	1470
ISOMAX DX2	2330
VIKING Xtreme P2LCX, G3/8	2460
VIKING Xtreme P2LDX, G1/2	2660
ISOMAX DX3	4050
Airline Isolator Valve VE42/43	5520
Airline Isolator Valve VE82/83	13680

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Order key

P1K - S 032 D T - 0100

Cyl. bore mm
032
040
050
063
080
100
125

Cylinder type/Function	
D	Double acting
K	Double acting through rod
S	Single acting spring return For bore 32 - 100
B	Double acting Pin screws and nuts in rear end cover
A	Double acting End cover screws in stainless steel
*	Piston rod with female thread, please contact customer service.

Stroke (mm)
E.g. 0025 = 25 mm

For standard stroke length and max length, see table below

Material piston rod				Type of sealing
Stainless steel	Hard chromed steel	Acid-proof steel	Chromed stainl. steel	
A	T	X	1	Standard -20 °C to +80°C

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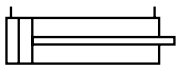
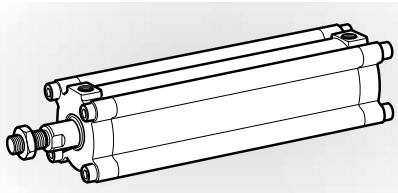
Standard stroke length in mm

Cylinder design. XXXX = Stroke	Cylinder **bore** (mm)	● Standard stroke length (mm) 25	50	80	100	125	160	200	250	Non standard stroke length 320	400	500	600	700	800	900	2800
Double acting																	
P1K-S032DT-XXXX	**32**	●	●	●	●	●	●	●	●							//	
P1K-S040DT-XXXX	**40**	●	●	●	●	●	●	●	●							//	
P1K-S050DT-XXXX	**50**	●	●	●	●	●	●	●	●							//	
P1K-S063DT-XXXX	**63**	●	●	●	●	●	●	●	●							//	
P1K-S080DT-XXXX	**80**	●	●	●	●	●	●	●	●							//	
P1K-S100DT-XXXX	**100**	●	●	●	●	●	●	●	●							//	
P1K-S125DT-XXXX	**125**	●	●	●	●	●	●	●	●							//	
Single acting spring return																	
P1K-S032ST-XXXX	**32**	●	●														
P1K-S040ST-XXXX	**40**	●	●														
P1K-S050ST-XXXX	**50**	●															
P1K-S063ST-XXXX	**63**	●	●														
P1K-S080ST-XXXX	**80**	●															
P1K-S100ST-XXXX	**100**		●														

Double-acting

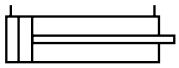
Fixed end cushioning





Cyl. bore mm	Stroke mm	Order code
32 Conn. G1/8	25	**P1K-S032DT-0025**
	50	**P1K-S032DT-0050**
	80	**P1K-S032DT-0080**
	100	**P1K-S032DT-0100**
	125	**P1K-S032DT-0125**
	160	**P1K-S032DT-0160**
	200	**P1K-S032DT-0200**
	250	**P1K-S032DT-0250**
40 Conn. G1/8	25	**P1K-S040DT-0025**
	50	**P1K-S040DT-0050**
	80	**P1K-S040DT-0080**
	100	**P1K-S040DT-0100**
	125	**P1K-S040DT-0125**
	160	**P1K-S040DT-0160**
	200	**P1K-S040DT-0200**
	250	**P1K-S040DT-0250**
50 Conn. G1/8	25	**P1K-S050DT-0025**
	50	**P1K-S050DT-0050**
	80	**P1K-S050DT-0080**
	100	**P1K-S050DT-0100**
	125	**P1K-S050DT-0125**
	160	**P1K-S050DT-0160**
	200	**P1K-S050DT-0200**
	250	**P1K-S050DT-0250**
63 Conn. G1/8	25	**P1K-S063DT-0025**
	50	**P1K-S063DT-0050**
	80	**P1K-S063DT-0080**
	100	**P1K-S063DT-0100**
	125	**P1K-S063DT-0125**
	160	**P1K-S063DT-0160**
	200	**P1K-S063DT-0200**
	250	**P1K-S063DT-0250**

The cylinders are supplied complete with one zinc plated steel piston rod nut.



Fixed end cushioning

Cyl. bore mm	Stroke mm	Order code
80 Conn. G1/4	25	**P1K-S080DT-0025**
	50	**P1K-S080DT-0050**
	80	**P1K-S080DT-0080**
	100	**P1K-S080DT-0100**
	125	**P1K-S080DT-0125**
	160	**P1K-S080DT-0160**
	200	**P1K-S080DT-0200**
	250	**P1K-S080DT-0250**
100 Conn. G1/4	25	**P1K-S100DT-0025**
	50	**P1K-S100DT-0050**
	80	**P1K-S100DT-0080**
	100	**P1K-S100DT-0100**
	125	**P1K-S100DT-0125**
	160	**P1K-S100DT-0160**
	200	**P1K-S100DT-0200**
	250	**P1K-S100DT-0250**
125 Conn. G3/8	25	**P1K-S125DT-0025**
	50	**P1K-S125DT-0050**
	80	**P1K-S125DT-0080**
	100	**P1K-S125DT-0100**
	125	**P1K-S125DT-0125**
	160	**P1K-S125DT-0160**
	200	**P1K-S125DT-0200**
	250	**P1K-S125DT-0250**

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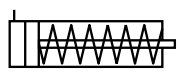
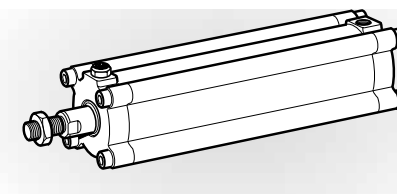
Single-acting, spring return

Fixed end cushioning

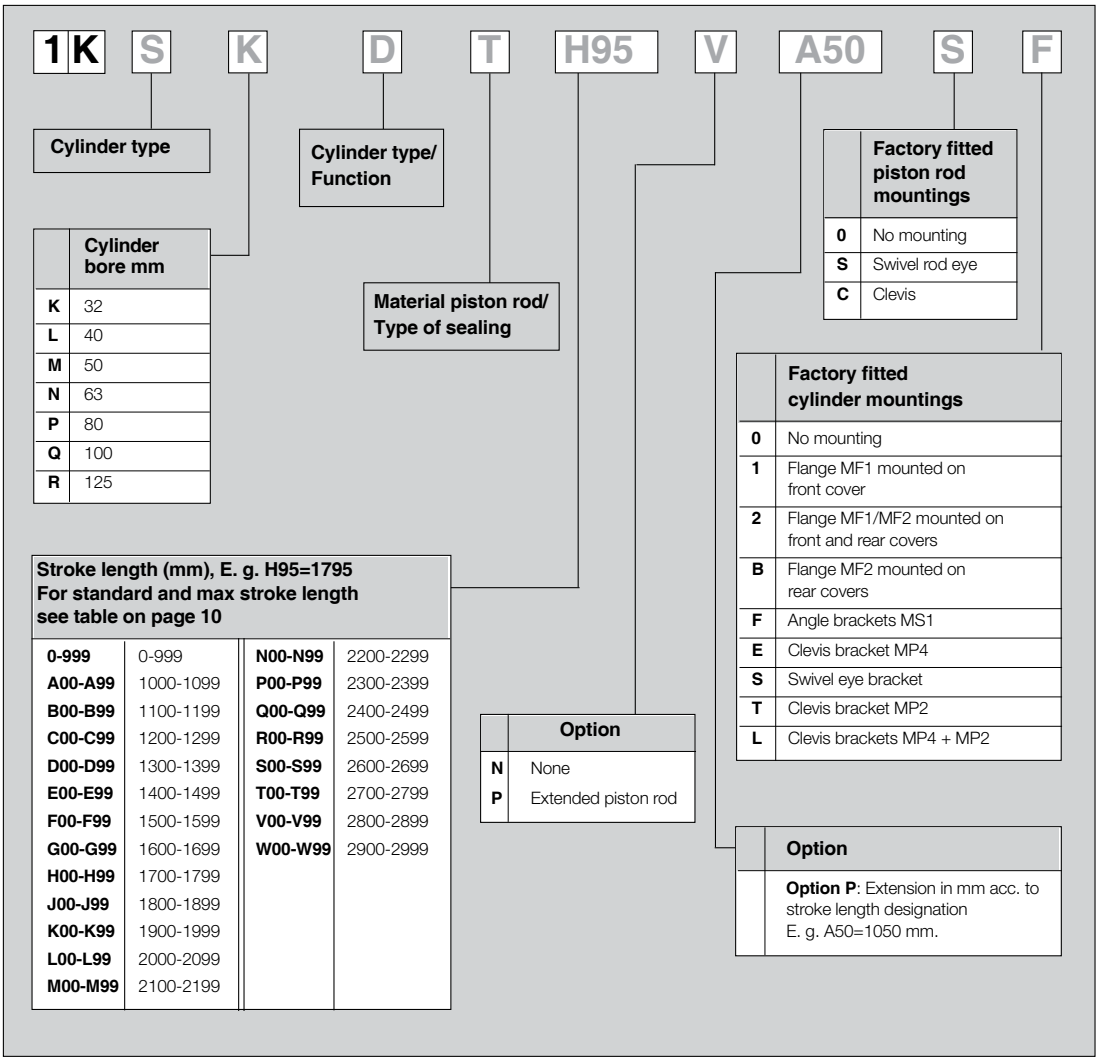




Cyl. bore mm	Stroke mm	Order code
32 Conn. G1/8	25	**P1K-S032ST-0025**
	50	**P1K-S032ST-0050**
40 Conn. G1/8	25	**P1K-S040ST-0025**
	50	**P1K-S040ST-0050**
50 Conn. G1/8	25	**P1K-S050ST-0025**
63 Conn. G1/8	25	**P1K-S063ST-0025**
	50	**P1K-S063ST-0050**
80 Conn. G1/4	50	**P1K-S080ST-0050**
100 Conn. G1/4	50	**P1K-S100ST-0050**

The cylinders are supplied complete with one zinc plated steel piston rod nut.

Order key, special versions



	Cylinder bore mm
K	32
L	40
M	50
N	63
P	80
Q	100
R	125

	Factory fitted piston rod mountings
0	No mounting
S	Swivel rod eye
C	Clevis

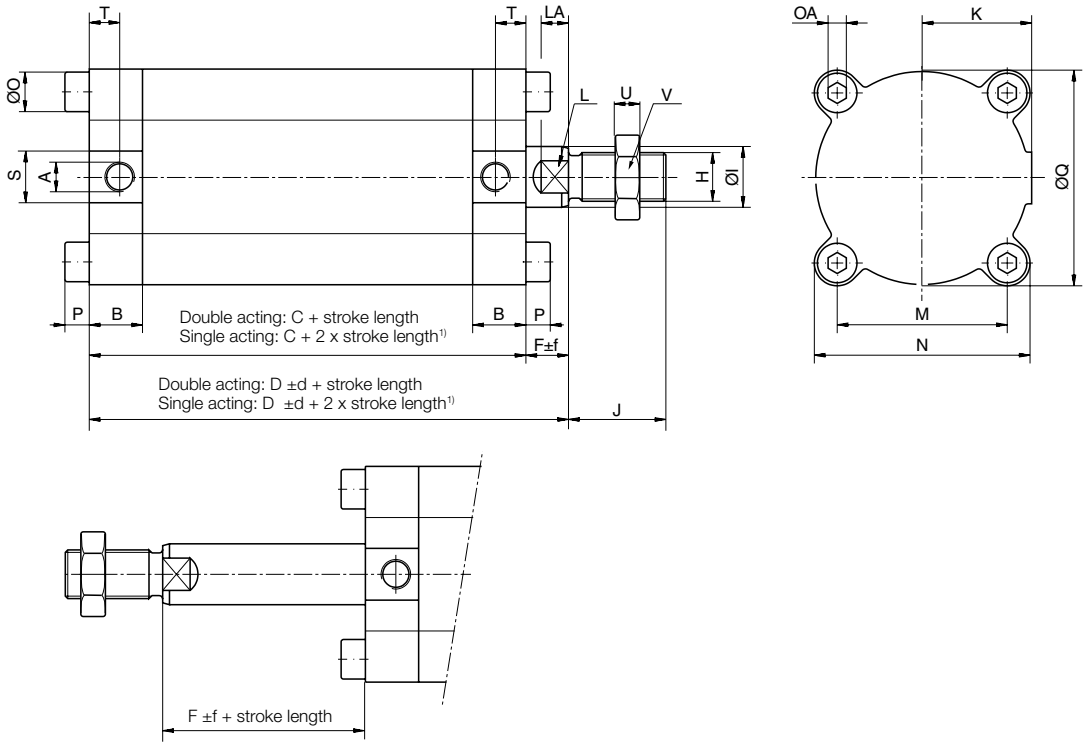
	Factory fitted cylinder mountings
0	No mounting
1	Flange MF1 mounted on front cover
2	Flange MF1/MF2 mounted on front and rear covers
B	Flange MF2 mounted on rear covers
F	Angle brackets MS1
E	Clevis bracket MP4
S	Swivel eye bracket
T	Clevis bracket MP2
L	Clevis brackets MP4 + MP2

	Option
N	None
P	Extended piston rod

	Option
	Option P: Extension in mm acc. to stroke length designation E. g. A50=1050 mm.

Stroke length (mm), E. g. H95=1795
For standard and max stroke length see table on page 10

0-999	0-999	**N00-N99**	2200-2299
A00-A99	1000-1099	**P00-P99**	2300-2399
B00-B99	1100-1199	**Q00-Q99**	2400-2499
C00-C99	1200-1299	**R00-R99**	2500-2599
D00-D99	1300-1399	**S00-S99**	2600-2699
E00-E99	1400-1499	**T00-T99**	2700-2799
F00-F99	1500-1599	**V00-V99**	2800-2899
G00-G99	1600-1699	**W00-W99**	2900-2999
H00-H99	1700-1799		
J00-J99	1800-1899		
K00-K99	1900-1999		
L00-L99	2000-2099		
M00-M99	2100-2199		



K

Dimensions

Cylinder designation	A	B mm	C mm	D mm	F mm	H	I mm	J mm	K mm	L mm	LA mm	M mm	N mm	O mm	OA mm	P mm	Q mm	S mm
P1K-S032	G1/8	17,0	65,0	75,0	10	M10x1,25	12	22	21,0	10	6	32,5	42,5	8,5	4	5	37	17
P1K-S040	G1/8	17,0	65,0	78,0	13	M12x1,25	16	24	24,0	14	9	36,8	48,0	10,0	5	6	45	17
P1K-S050	G1/8	17,5	71,0	85,0	14	M16x1,5	20	32	29,0	17	9	46,7	59,0	10,0	5	6	56	17
P1K-S063	G1/8	17,5	72,0	86,0	14	M16x1,5	20	32	36,0	17	9	55,9	71,0	13,0	6	8	70	17
P1K-S080	G1/4	21,5	85,0	101,0	16	M20x1,5	25	40	44,5	22	10	70,0	87,0	16,0	8	10	87	21
P1K-S100	G1/4	21,5	87,0	108,0	21	M20x1,5	32	40	55,0	27	13	84,1	102,0	16,0	8	10	108	21
P1K-S125	G3/8	25,5	94,5	115,5	21	M27x2	32	54	68,0	27	13	104,0	124,0	18,0	10	12	134	25

Dimensions

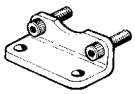
Cylinder designation	T mm	U mm	V mm
P1K-S032	10	5,0	17
P1K-S040	10	6,0	19
P1K-S050	10	8,0	24
P1K-S063	10	8,0	24
P1K-S080	12	10,0	30
P1K-S100	12	10,0	30
P1K-S125	14	13,5	41

Tolerances

Dimensions D and F d mm	f mm	Stroke length 0-320 mm (at 6 bar) mm
0,9	1,2	+2,0
0,9	1,2	+2,0
0,9	1,2	+2,0
1,2	1,6	+2,5
1,2	1,6	+2,5
1,2	1,6	+2,5
1,2	1,6	+2,5

1) Stroke length for dimensions 32-63 = 25 and 50 mm, for dimensions 80-100 = 50 mm.

Foot bracket MS1

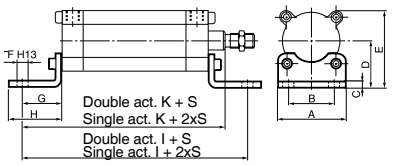


Intended for fixed mounting of cylinder. This bracket can be fitted to front and rear end covers.

Material
Body galvanized steel. These brackets are supplied in pairs.

When fitting:
Remove the bolts from the cylinder end cover and fit the bracket, using the same bolts. The bolts supplied with the mount are intended for use with another range of cylinders and must not be used with the P1K range.

32	0,08	**9121644801**
40	0,11	**9121644802**
50	0,18	**9121644803**
63	0,26	**9121644804**
80	0,50	**9121644805**
100	0,80	**9121644806**
125	1,40	**9121644807**

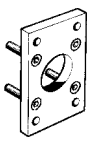


Cyl. Ø mm	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	I mm	K mm
32	48	32	5,0	32	53	7	24	32	113,0	99,0
40	54	36	5,0	36	60	9	31	42	127,0	109,0
50	64	45	6,0	45	75	9	33	45	137,0	118,0
63	76	50	6,0	50	86	9	36	48	144,0	122,0
80	94	63	8,0	63	107	12	43	58	171,0	144,0
100	110	75	10,5	71	122	14	43	60	173,0	151,0
125	135	90	12,5	90	157	16	45	70	184,5	160,5

S=stroke length

K

Flange MF1 and MF2

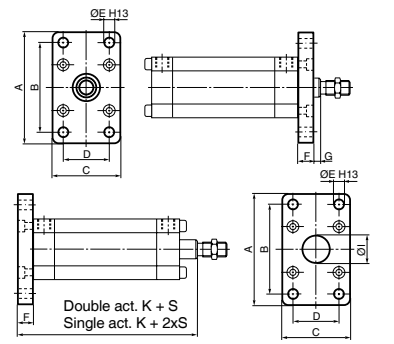


Intended for fixed mounting of cylinder. This bracket can be fitted to front and rear end covers.

Material
Diam. 32 - 63 mm: flange anodised aluminium
Diam. 80 - 125 mm: flange galvanized steel
The flange is supplied complete with screws for mounting on the cylinder.

When fitting:
Remove the bolts from the cylinder end cover and fit the bracket, using the same bolts. The bolts supplied with the mount are intended for use with another range of cylinders and must not be used with the P1K range.

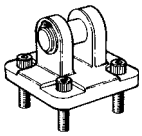
32	0,26	**9121644901**
40	0,37	**9121644902**
50	0,52	**9121644903**
63	0,90	**9121644904**
80	1,59	**9121644905**
100	2,19	**9121644906**
125	3,90	**9121644907**



Cyl. Ø mm	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	I mm
32	80	64	48	32	7	10	0	86,0	27
40	90	72	54	36	9	13	0	91,0	32
50	110	90	64	45	9	13	1	98,0	40
63	120	100	76	50	9	16	-2	102,0	40
80	155	126	94	63	12	18	-2	119,0	50
100	180	150	110	75	14	18	3	126,0	60
125	220	180	135	90	16	20	1	135,5	72

S=stroke length

Clevis bracket MP4



Intended for flexible mounting of cylinder. This bracket can be combined with clevis bracket MP2 and swivel rod bracket.

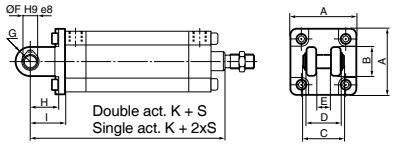
Materials:
Body anodised aluminium and shaft of hardened steel. The mount is supplied complete with shaft.

When fitting:
Remove the bolts from the cylinder end cover and fit the mount, using the same bolts. The bolts supplied with the mount are intended for use with another range of cylinders and must not be used with the P1K range.

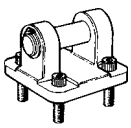
Cyl. Ø mm	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	I mm	K mm
32	48	22	33	26	10	10	11	15,0	22	97,0
40	54	24	35	28	12	12	12	21,0	28	106,0
50	64	32	39	32	12	12	13	19,5	28	113,0
63	76	39	47	40	16	16	17	26,0	36	122,0
80	94	48	57	50	16	16	17	26,0	38	139,0
100	110	62	67	60	20	20	21	29,0	43	151,0
125	135	70	77	70	25	25	26	35,0	50	165,5

S=stroke length

32	0,05	**9121644601**
40	0,13	**9121644602**
50	0,18	**9121644603**
63	0,34	**9121644604**
80	0,57	**9121644605**
100	0,91	**9121644606**
125	2,90	**9121644607**



Clevis bracket MP2



Intended for flexible mounting of cylinder. This bracket can be combined with clevis bracket MP4.

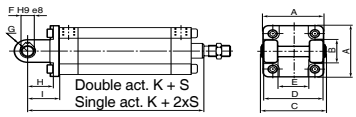
Materials:
Body anodised aluminium and shaft of hardened steel. The mount is supplied complete with shaft.

When fitting:
Remove the bolts from the cylinder end cover and fit the mount, using the same bolts. The bolts supplied with the mount are intended for use with another range of cylinders and must not be used with the P1K range.

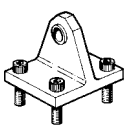
Cyl. Ø mm	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	I mm	K mm
32	48	22	52	45	26	10	11	15,0	22	97,0
40	54	24	59	52	28	12	12	21,0	28	106,0
50	64	32	67	60	32	12	13	19,5	28	113,0
63	76	39	77	70	40	16	17	26,0	36	122,0
80	94	48	97	90	50	16	17	26,0	38	139,0
100	110	62	117	110	60	20	21	29,0	43	151,0
125	135	70	137	130	70	25	26	35,0	50	165,5

S=stroke length

32	0,13	**9121644701**
40	0,19	**9121644702**
50	0,22	**9121644703**
63	0,40	**9121644704**
80	0,65	**9121644705**
100	1,09	**9121644706**
125	3,60	**9121644707**



Swivel rod bracket



Intended for flexible mounting of cylinder. The swivel rod permits lateral articulation. The bracket can be combined with clevis bracket MP4

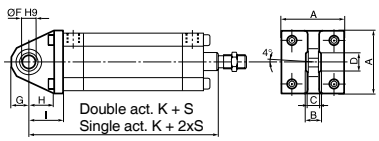
Materials:
Body anodised aluminium and swivel bearing of hardened steel.

When fitting:
Remove the bolts from the cylinder end cover and fit the mount, using the same bolts. The bolts supplied with the mount are intended for use with another range of cylinders and must not be used with the P1K range.

Cyl. Ø mm	A mm	B mm	C mm	D mm	F mm	G mm	H mm	I mm	K mm
32	48	9	7,5	13,0	10	12,5	15,0	22	97,0
40	54	12	9,0	15,5	12	15,5	21,0	28	106,0
50	64	12	9,0	15,5	12	16,5	19,5	28	113,0
63	76	16	12,5	20,0	16	19,5	26,0	36	122,0
80	94	16	12,5	20,0	16	21,5	26,0	38	139,0
100	110	20	16,0	25,0	20	25,5	29,0	43	151,0
125	135	25	20,5	30,5	25	30,0	35,0	50	165,5

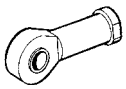
S=stroke length

32	0,08	**9121568601**
40	0,12	**9121568602**
50	0,17	**9121568603**
63	0,30	**9121568604**
80	0,49	**9121568605**
100	0,73	**9121568606**
125	2,40	**9121568607**



K

Swivel rod eye

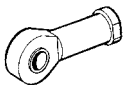


Intended for articulated mounting of the cylinder.
Maintenance-free PTFE.

Material:
Swivel rod eye, nut: galvanized steel.
Swivel bearing according to DIN 648K: Hardened steel.

32	0,08	**P1C-4KRS**
40	0,12	**P1C-4LRS**
50	0,25	**P1C-4MRS**
63	0,25	**P1C-4MRS**
80	0,46	**P1C-4PRS**
100	0,46	**P1C-4PRS**
125	1,28	**P1C-4RRS**

Stainless steel swivel rod eye



Stainless-steel swivel rod eye for articulated mounting of cylinder.
Maintenance-free.

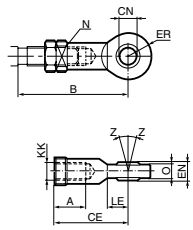
Materials
Swivel rod eye: Stainless steel
Swivel bearing according to DIN 648K: Stainless steel
Use stainless steel nut (see page 17) with stainless steel swivel rod eye.

32	0,08	**P1S-4JRT**
40	0,12	**P1S-4LRT**
50	0,25	**P1S-4MRT**
63	0,25	**P1S-4MRT**
80	0,46	**P1S-4PRT**
100	0,46	**P1S-4PRT**
125	1,28	**P1S-4RRT**

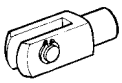
ISO 8139

Cyl.-dia. mm	A mm	B min mm	B max mm	CE mm	CN H9 mm	EN h12 mm	ER mm	KK	LE min mm	N* mm	O mm	Z
32	20	48,0	55	43	10	14	14	M10x1,25	15	17	10,5	12°
40	22	56,0	62	50	12	16	16	M12x1,25	17	19	12,0	12°
50	28	72,0	80	64	16	21	21	M16x1,5	22	22	15,0	15°
63	28	72,0	80	64	16	21	21	M16x1,5	22	22	15,0	15°
80	33	87,0	97	77	20	25	25	M20x1,5	26	32	18,0	15°
100	33	87,0	97	77	20	25	25	M20x1,5	26	32	18,0	15°
125	51	123,5	137	110	30	37	35	M27x2	36	41	25,0	15°

*key grip



Clevis



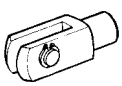
Intended for articulated mounting of the cylinder.

Material:
Clevis and clip galvanized steel.
Pin: Hardened steel

Supplied complete with axle.

32	0,09	**P1C-4KRC**
40	0,15	**P1C-4LRC**
50	0,35	**P1C-4MRC**
63	0,35	**P1C-4MRC**
80	0,75	**P1C-4PRC**
100	0,75	**P1C-4PRC**
125	2,10	**P1C-4RRC**

Stainless steel clevis



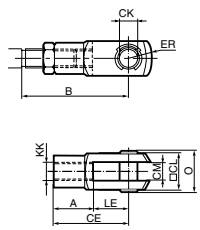
Stainless-steel clevis for articulated mounting of cylinder.

Material
Clevis: Stainless steel
Pin: Stainless steel
Circlips according to DIN 471: Stainless steel
Use stainless steel nut (see page 17) with stainless steel swivel rod eye.

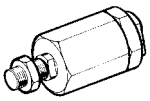
32	0,09	**P1S-4JRD**
40	0,15	**P1S-4LRD**
50	0,35	**P1S-4MRD**
63	0,35	**P1S-4MRD**
80	0,75	**P1S-4PRD**
100	0,75	**P1S-4PRD**
125	2,10	**P1S-4RRD**

ISO 8140

Cyl.-dia. mm	A mm	B min mm	B max mm	CE mm	CK h11/E9 mm	CL mm	CM mm	ER mm	KK	LE mm	O mm
32	20	45,0	52	40	10	20	10	16	M10x1,25	20	28,0
40	24	54,0	60	48	12	24	12	19	M12x1,25	24	32,0
50	32	72,0	80	64	16	32	16	25	M16x1,5	32	41,5
63	32	72,0	80	64	16	32	16	25	M16x1,5	32	41,5
80	40	90,0	100	80	20	40	20	32	M20x1,5	40	50,0
100	40	90,0	100	80	20	40	20	32	M20x1,5	40	50,0
125	56	123,5	137	110	30	55	30	45	M27x2	54	72,0



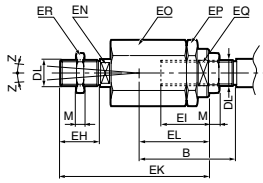
Flexo coupling



Flexo coupling for articulated mounting of piston rod. Flexo fitting is intended to take up axial angle errors within a range of ±4°.

Material
Flexo coupling, nut: Zinc-plated steel
Socket: Hardened steel
Supplied complete with galvanized adjustment nut.

32	0,21	**P1C-4KRF**
40	0,22	**P1C-4LRF**
50	0,67	**P1C-4MRF**
63	0,67	**P1C-4MRF**
80	0,72	**P1C-4PRF**
100	0,72	**P1C-4PRF**
125	1,80	**P1C-4RRF**



Cyl.-bore mm	B min mm	B max mm	DL	EH mm	EI mm	EK mm	EL mm	EN mm	EO mm	EP mm	EQ mm	ER mm	M mm	Z
32	36,0	43	M10x1,25	20	23	70	31	12	30	30	19	30	5,0	4°
40	37,0	43	M12x1,25	23	23	67	31	12	30	30	19	30	6,0	4°
50	53,0	61	M16x1,5	40	32	112	45	19	41	41	30	41	8,0	4°
63	53,0	61	M16x1,5	40	32	112	45	19	41	41	30	41	8,0	4°
80	57,0	67	M20x1,5	39	42	122	56	19	41	41	30	41	10,0	4°
100	57,0	67	M20x1,5	39	42	122	56	19	41	41	30	41	10,0	4°
125	75,5	89	M27x2	48	48	145	60	24	55	55	32	55	13,5	4°

Piston rod nut

Intended for fixed mounting of accessories to the piston rod.

Material: Zinc-plated steel

The cylinders are supplied complete with one zinc plated steel piston rod nut.

32	0,007	**9128985601**
40	0,010	**0261109910**
50	0,021	**9128985603**
63	0,021	**9128985603**
80	0,040	**0261109911**
100	0,040	**0261109911**
125	0,100	**0261109912**

Stainless steel nut

Intended for fixed mounting of accessories to the piston rod.

Material: Stainless steel A2

The cylinders are supplied complete with one zinc plated steel piston rod nut.

32	0,007	**9126725404**
40	0,010	**9126725405**
50	0,021	**9126725406**
63	0,021	**9126725406**
80	0,040	**0261109921**
100	0,040	**0261109921**
125	0,100	**0261109922**

Acid-proof nut

Intended for fixed mounting of accessories to the piston rod.

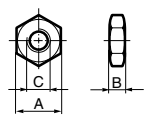
Material: Acid-proof steel A4

Cylinders with acid-proof piston rod are supplied with nut of acid-proof steel

32	0,007	**0261109919**
40	0,010	**0261109920**
50	0,021	**0261109917**
63	0,021	**0261109917**
80	0,040	**0261109916**
100	0,040	**0261109916**
125	0,100	**0261109918**

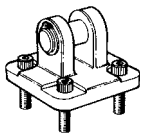
Enligt DIN 439 B

Cyl. Ø mm	A mm	B mm	C
32	17	5,0	M10x1,25
40	19	6,0	M12x1,25
50	24	8,0	M16x1,5
63	24	8,0	M16x1,5
80	30	10,0	M20x1,5
100	30	10,0	M20x1,5
125	41	13,5	M27x2

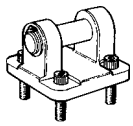


K

Clevis bracket MP4



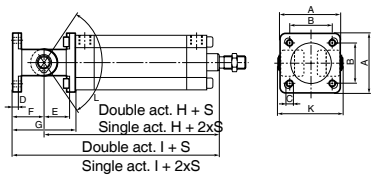
Clevis bracket MP2 In this combination the clevis bracket MP4 is attached to the indicated cylinder.



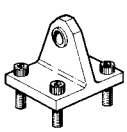
Ø mm	MP4	MP2
32	**9121644601**	**9121644701**
40	**9121644602**	**9121644702**
50	**9121644603**	**9121644703**
63	**9121644604**	**9121644704**
80	**9121644605**	**9121644705**
100	**9121644606**	**9121644706**
125	**9121644607**	**9121644707**

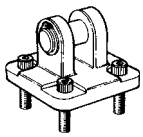
Cyl. Ø mm	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	I mm	K mm	L
32	48	32,5	5,5	7,0	15,0	22	44	97,0	119,0	52	104°
40	54	36,8	6,6	7,0	21,0	28	56	106,0	134,0	59	130°
50	64	46,7	6,6	8,5	19,5	28	56	113,0	141,0	67	120°
63	76	55,9	9,0	10,0	26,0	36	72	122,0	158,0	77	110°
80	94	70,0	11,0	12,0	26,0	38	76	139,0	177,0	97	80°
100	110	84,1	11,0	14,0	29,0	43	86	146,0	189,0	117	82°
125	135	104,0	14,0	15,0	35,0	50	100	165,5	215,5	137	82°

S=stroke length



Swivel rod bracket



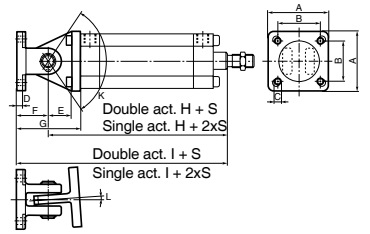


Clevis bracket MP4 In this combination the swivel rod bracket is attached to the indicated cylinder.

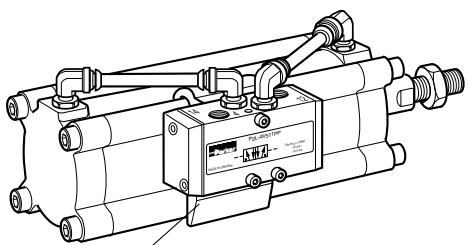
Ø mm	Swivel rod bracket	MP4
32	**9121568601**	**9121644601**
40	**9121568602**	**9121644602**
50	**9121568603**	**9121644603**
63	**9121568604**	**9121644604**
80	**9121568605**	**9121644605**
100	**9121568606**	**9121644606**
125	**9121568607**	**9121644607**

Cyl. Ø mm	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	I mm	K	L
32	48	32,5	5,5	7,0	15,0	22	44	97,0	119,0	104°	5,7°
40	54	36,8	6,6	7,0	21,0	28	56	106,0	134,0	130°	5,5°
50	64	46,7	6,6	8,5	19,5	28	56	113,0	141,0	120°	5,2°
63	76	55,9	9,0	10,0	26,0	36	72	122,0	158,0	110°	5,1°
80	94	70,0	11,0	12,0	26,0	38	76	139,0	177,0	80°	4,6°
100	110	84,1	11,0	14,0	29,0	43	86	146,0	189,0	82°	4,4°
125	135	104,0	14,0	15,0	35,0	50	100	165,5	215,5	82°	4,4°

S=stroke length



Fitted VikingXtreme Valve



Mounting plate in aluminium profile. for fitted valve.

Material specification

Mounting plate	Anodised aluminium
Mounting screws for plate	Stainless steel
Mounting screws for valve	Zinc-plated steel

Accessories

Description	Order code
Silencer (Siflow) for P2LAX valve, G1/8	**9301050901**
Silencer (sintered plastic) for P2LAX valve, G1/8	**P6M-PAB1**
Mounting plate P2LAX P1K- Ø32, Ø40	**9122520050**
Mounting plate P2LAX P1K- Ø50, Ø63	**9122520051**
Mounting plate P2LAX P1K- Ø80	**9122520052**

Tightening torques

When attaching mountings, the bolts should be tightened to the following torques.

If other types of mounting are used, the following maximum metal thicknesses apply when using the cylinder end cover bolts.

Cylinder bore mm	Tightening torque Nm	Maximum metal thickness mm
32	4,5±0,5	7,0
40	8±0,8	7,0
50	8±0,8	8,5
63	20±2	10,0
80	40±4	12,0
100	40±4	14,0
125	60±6	15,0

Seal kits for complete P1K cylinder

Cyl. bore		Option		
mm	Standard	High Temp.	Low Temp.	Hydraulic
32	**9122352088**	**9122421921**	**P1K-6032PL**	**9122421931**
40	**9122352089**	**9122421922**	**P1K-6040PL**	**9122421932**
50	**9122352090**	**9122421923**	**P1K-6050PL**	**9122421933**
63	**9122352091**	**9122421924**	**P1K-6063PL**	**9122421934**
80	**9122352092**	**9122421925**	**P1K-6080PL**	**9122421935**
100	**9122352093**	**9122421926**	**P1K-6100PL**	**9122421936**
125	**9122352100**	*	*	**9122421937**

* Please contact customer service.

Grease for P1K

Standard	30g	**9127394541**
High temperature	30g	**9127394521**
Low temperature	30g	**9127394541**

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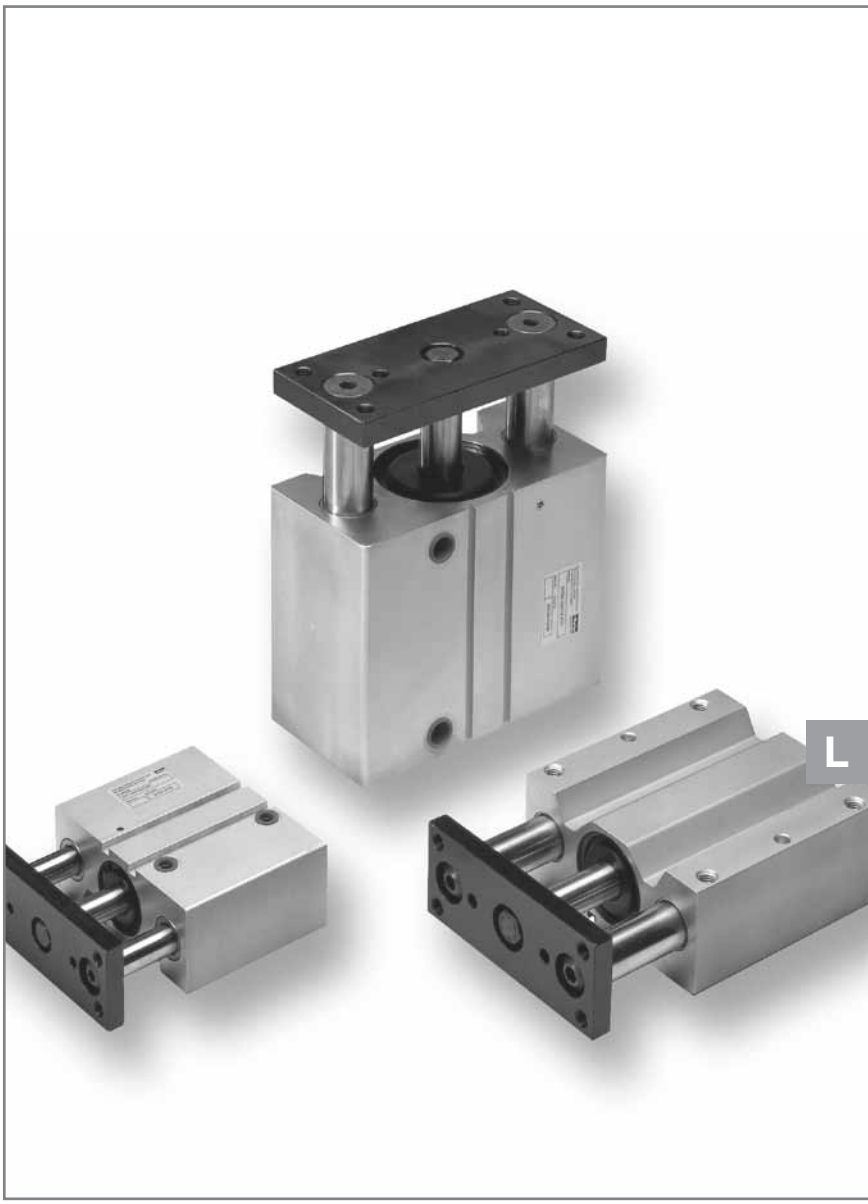

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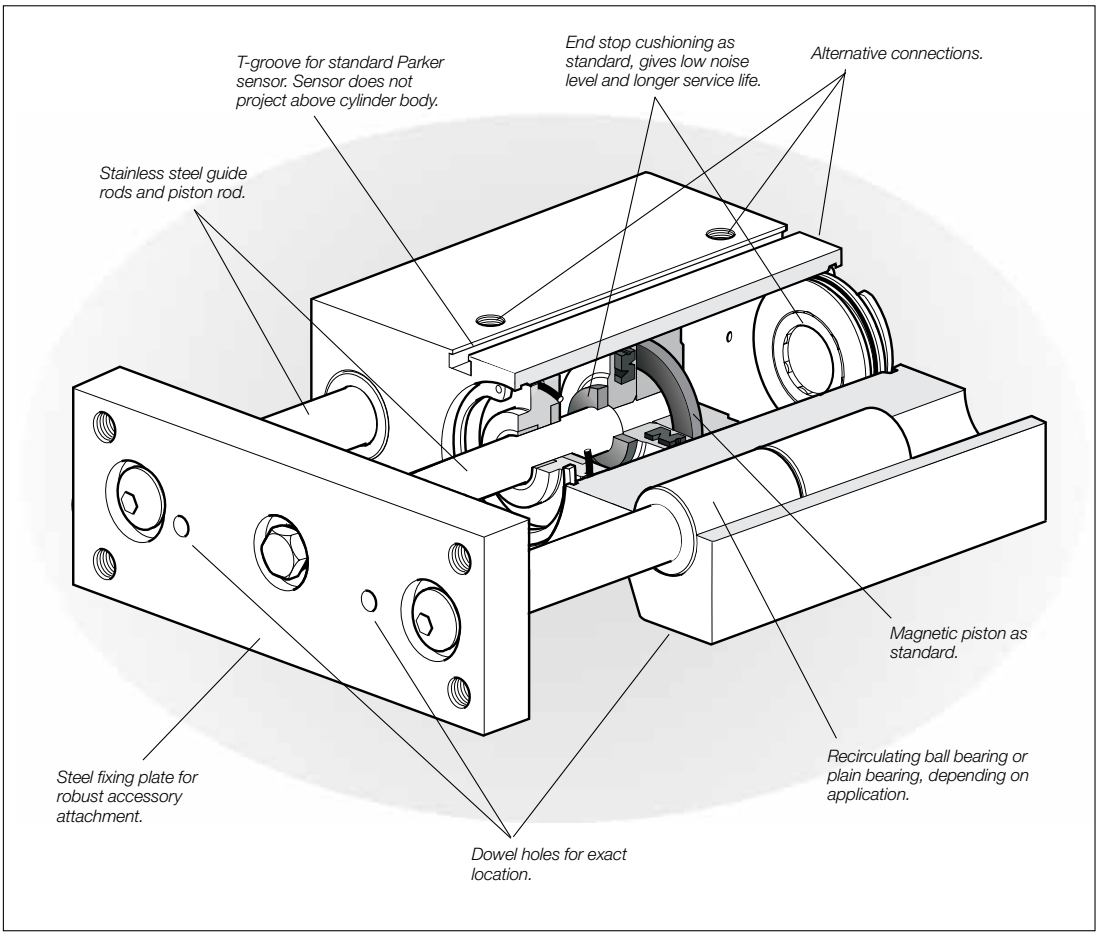
Short Stroke Thrusters

P5T Series



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P5T Cylinder

P5T cylinders are a modern and versatile range of cylinders with integral guides. The cylinders are double-acting, with end stop cushioning for quiet and vibration-free operation. They have strong shafts to prevent twisting, and everything is integrated into the cylinder housing.

The complete programme of cylinders comprises 9 cylinder diameters, Ø16 - Ø100 mm and strokes ranging from 10 to 200 mm. As with other Parker cylinders, the cylinder is initially lubricated with a white, non-poisonous grease which is approved for use in foodstuff preparation (USDA).

The strong guide shafts make it possible to absorb considerable thrust forces and torque. The cylinder is available with two different types of bearing in contact with the shaft, a recirculating ball bearing or plain bearing.

Multiple choice of connections is also a feature, one version has two connections at the rear or two connections from above, selectable by moving the enclosed plugs, and another version with two side connections is also available.

The P5T range has an integrated T-groove for sensors in the body. The T-groove makes it quick and easy to install non-contact sensors without increasing the installation dimensions of the cylinders.

The attachment plate and cylinder housing have dowel holes to give exact location during assembly. This also facilitates cylinder replacement.

The surface-treated steel fixing plate provides robust attachment.

Fixed end stop cushioning

Polyurethane end stop cushioning built in to the end covers is standard

Clean external design

The cylinder is designed without pockets or other cutouts in the body, in which dirt or fluids could collect. This makes cleaning both simple and easy.

Non-contact sensing

All cylinders are supplied with a magnetic piston as standard, for non-contact sensing. Electronic type sensors and reed switches are available. They are supplied with either flying lead or cable plug connector.

Options

In addition to the standard designs, a number of variants of the P5T range are available to special order, to provide effective solutions in a large number of applications.

Cylinders with special strokes

Cylinders with two fixing plates

Cylinders with adjustable stops, with cushioning

High-temperature cylinders for the temperature range of -10°C to +150°C (not magnetic piston).

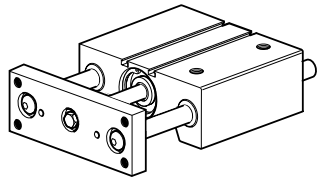
Plain bearing or recirculating ball bearings

The P5T is supplied with plain bearings as standard. This type of bearing has guide rods of greater diameter, providing excellent support for heavy loads, especially static loads. Plain bearings are highly tolerant of vibration and dirt, and are suitable for regular cleaning.

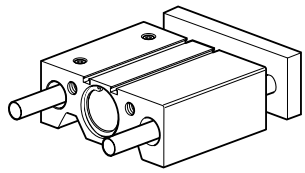
Recirculating ball bearings are used for applications which require high precision and low friction.

The choice should be based on the following factors:

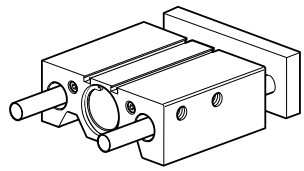
Application requirements	Plain bearing	Recirculating ball bearings
Precision	Good	Excellent
Friction	Higher	Low
Coefficient of friction	Variable	Constant
Precision during service life	Variable	Constant
Static load capacity	Excellent	Good
Dynamic load capacity	Good, but with friction losses	Good
Vibration tolerance	Excellent	Average
Dirt tolerance	Excellent	Poor
Washing tolerance	Excellent	Poor



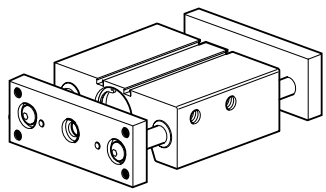
Double acting, connections on top.



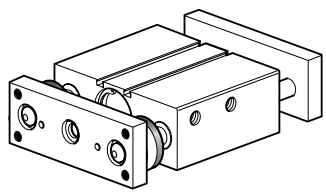
Double acting, connections at rear.



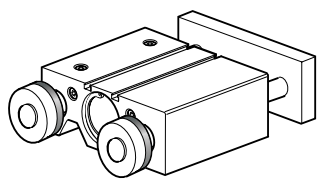
Double acting, connections on side.



Double acting with two fixing plates, side connections are recommended.



Double acting with two fixing plates and adjustable end stops with cushioning, side connections are recommended.



Double acting with one fixing plate adjustable end stops with cushioning, connections on side, on top or at rear.

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Cylinder forces, double acting variants

Cyl. bore/ pist. rod mm	Stroke	Piston area cm²	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
16/8	+	2,0	20	40	60	80	100	**120**	141	161	181	201
	-	1,5	15	30	45	60	75	**90**	106	121	136	151
20/10	+	3,1	31	63	94	126	157	**188**	220	251	283	314
	-	2,3	23	46	69	92	115	**138**	161	184	207	231
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
32/16	+	7,9	79	158	237	316	394	**473**	552	631	710	789
	-	5,9	59	118	178	237	296	**355**	418	473	533	592
40/16	+	12,6	126	251	377	503	628	**754**	880	1005	1131	1257
	-	10,6	106	211	317	422	528	**633**	739	844	950	1056
50/20	+	19,6	196	393	589	785	982	**1178**	1374	1571	1767	1963
	-	16,5	165	330	495	660	825	**990**	1155	1319	1484	1649
63/20	+	31,2	312	623	935	1247	1559	**1870**	2182	2494	2806	3117
	-	28,0	280	561	841	1121	1402	**1682**	1962	2242	2523	2803
80/25	+	50,3	503	1005	1508	2011	2513	**3016**	3519	4021	4524	5027
	-	45,4	454	907	1361	1814	2268	**2721**	3175	3629	4082	4536
100/25	+	78,5	785	1571	2356	3142	3927	**4712**	5498	6283	7069	7854
	-	73,6	736	1473	2209	2945	3682	**4418**	5154	5890	6627	7363

+ = Outward stroke
- = Return stroke

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

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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 ºC 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.

ISO 8573-1 quality classes

Quality class	Pollution particle size (µm)	Pollution max concentration (mg/m³)	Water max. press. dew point (°C)	Oil max concentration (mg/m³)
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	-

Main data: P5T

Cylinder designation	Cylinder diam.	Cylinder area	Piston rod diam.	Piston rod area	Theoretical cylinder thrust at 6 bar outward stroke	Theoretical cylinder thrust at 6 bar return stroke	Air consumption thread litre	Connection
	mm	cm^2	mm	cm^2	N	N		
P5T-•016•G••XXX[1]	16	2,0	8	0,5	120	90	0,026	M5
P5T-•020•G••XXX[1]	20	3,1	10	0,8	188	138	0,040	G1/8
P5T-•025•G••XXX[1]	25	4,9	10	0,8	295	247	0,063	G1/8
P5T-•032•G••XXX[1]	32	8,0	16	2,0	482	363	0,105	G1/8
P5T-•040•G••XXX[1]	40	12,6	16	2,0	754	633	0,162	G1/8
P5T-•050•G••XXX[1]	50	19,6	20	3,1	1178	990	0,253	G1/4
P5T-•063•G••XXX[1]	63	31,2	20	3,1	1870	1682	0,414	G1/4
P5T-•080•G••XXX[1]	80	50,3	25	4,9	3016	2721	0,669	G3/8
P5T-•100•G••XXX[1]	100	78,5	25	4,9	4712	4418	1,043	G3/8

1) XXX = stroke
• = option, as in ordering key

2) Free air consumption for 10 mm stroke for a double stroke at 6 bar.

Weights in kg

Cylinder diam. mm	Type of bearing	Shaft diam. mm	Standard stroke **10**	**25**	**40**	**50**	**75**	**100**	**125**	**150**	**175**	**200**
16	Plain bearing 10	0,35	0,43	0,51	0,57	0,70	0,84					
	Recirculating ball	8	0,32	0,39	0,46	0,51	0,64	0,76				
20	Plain bearing 12		0,76	0,86	0,94	1,11	1,29	1,47				
	Recirculating ball	10		0,70	0,80	0,86	1,03	1,19	1,36			
25	Plain bearing 16		1,13		1,39	1,65	1,91	2,17	2,43			
	Recirculating ball	12		0,98		1,20	1,43	1,65	1,88	2,11		
32	Plain bearing 20		1,67		2,07	2,46	2,86	3,26	3,65	4,05	4,45	
	Recirculating ball	16		1,51		1,86	2,21	2,56	2,91	3,27	3,62	3,97
40	Plain bearing 20		2,00		2,42	2,84	3,26	3,68	4,10	4,52	4,84	
	Recirculating ball	16		1,82		2,20	2,57	2,95	3,32	3,70	4,08	4,45
50	Plain bearing 25		2,63		3,22	3,81	4,40	4,99	5,59	6,18	6,77	
	Recirculating ball	20		2,35		2,87	3,39	3,92	4,44	4,96	5,48	6,01
63	Plain bearing 25		3,29		3,98	4,66	5,34	6,02	6,71	7,39	8,07	
	Recirculating ball	20		2,99		3,60	4,22	4,83	5,45	6,06	6,67	7,29
80	Plain bearing 30		6,06		7,12	8,18	9,24	10,30	11,36	12,42	13,48	
	Recirculating ball	25		5,66		6,63	7,61	8,58	9,56	10,53	11,51	12,49
100	Plain bearing 35		10,69		12,03	13,37	14,47	16,05	17,39	18,73	20,08	
	Recirculating ball	30		10,16		11,40	12,64	13,89	15,13	16,37	17,61	18,85

Material specification

Standard specification

Body	Natural anodised aluminium
End pieces	Black anodised aluminium
Piston rod	Stainless steel (SS 2346)
Guide rods	Stainless steel (SS 2346)
Plain bearing	PTFE / Steel
Ball bushing	Steel
Plate	Surface treated steel
Screws	Surface treated steel
Piston	Natural anodised aluminium
Magnetic ring	Rubber-bound magnetic material
Cushioning rings	Polyurethane
Piston seal	Nitrile rubber, NBR
O-rings	Nitrile rubber, NBR
Piston bearing	UHMWPE plastic

Material specification

High temperature option

Seals	Fluorocarbon rubber, FPM
Piston bearing	Bronze filled PTFE

Other data

Working medium	Dry, filtered air
Working pressure	max. 10 bar
Working temperature	max +80 °C
	min -20 °C
High temp. option	max +150°C
	min -10 °C

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Guide for selecting suitable tubing

The selection of the correct size of tubing is often based on experience, with no great thought to optimizing energy efficiency and cylinder velocity. This is usually acceptable, but making a rough calculation can result in worthwhile economic gains.

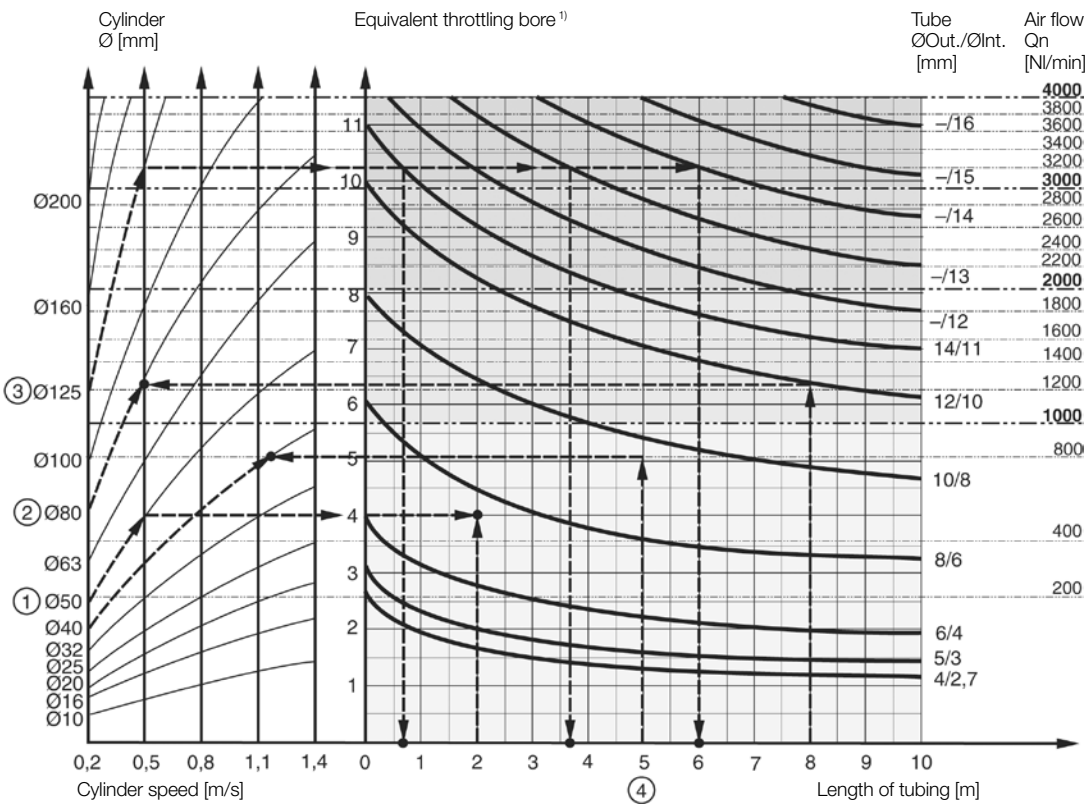
The following is the basic principle:

1. The primary line to the working valve could be over sized (this does not cause any extra air consumption and consequently does not create any extra costs in operation).
2. The tubes between the valve and the cylinder should, however, be optimized according to the principle that an insufficient bore throttles the flow and thus limits the cylinder speed, while an oversized pipe creates a dead volume which increases the air consumption and filling time.

The chart below is intended to help when selecting the correct size of tube to use between the valve and the cylinder.

The following prerequisites apply:

The *cylinder load should be about 50%* of the theoretical force (= normal load). A lower load gives a higher velocity and vice versa. The tube size is selected as a function of the *cylinder bore*, the desired *cylinder velocity* and the *tube length* between the valve and the cylinder.
If you want to use the capacity of the valve to its maximum, and obtain maximum speed, the tubing should be chosen so that they at least correspond with the equivalent restriction diameter (see description below), so that the tubing does not restrict the total flow. This means that a short tubing must have at least the equivalent restriction diameter. If the tubing is longer, choose it from the table below. Straight fittings should be chosen for highest flow rates. (Elbow and banjo fittings cause restriction.)



1) The "equivalent throttling bore" is a long throttle (for example a tube) or a series of throttles (for example, through a valve) converted to a short throttle which gives a corresponding flow rate. This should not be confused with the "orifice" which is sometimes specified for valves. The value for the orifice does not normally take account of the fact that the valve contains a number of throttles.

2) Qn is a measure of the valve flow capacity, with flow measured in litre per minute (l/min) at 6 bar(e) supply pressure and 1 bar pressure drop across the valve.

Example ①: Which tube diameter should be used?

A 50 mm bore cylinder is to be operated at 0.5 m/s. The tube length between the valve and cylinder is 2 m. In the diagram we follow the line from 50 mm bore to 0.5 m/s and get an "equivalent throttling bore" of approximately 4 mm. We continue out to the right in the chart and intersect the line for a 2 m tube between the curves for 4 mm (6/4 tube) and 6 mm(8/6 tube). This means that a 6/4 tube throttles the velocity somewhat, while an 8/6 tube is a little too large. We select the 8/6 tube to obtain full cylinder velocity.

Example ②: What cylinder velocity will be obtained?

A 80 mm bore cylinder will be used, connected by 8 m 12/10 tube to a valve with Qn 1200 Nl/min. What cylinder velocity will we get? We refer to the diagram and follow the line from 8 mm tube length up to the curve for 12/10 tube. From there, we go horizontally to the curve for the Ø80 cylinder. We find that the velocity will be about 0.5 m/s.

Example ③: What is the minimum inner diameter and maximum lenght of tube?

For an application a 125 mm bore cylinder will be used. Maximum velocity of piston rod is 0.5 m/s. The cylinder will be controlled by a valve with Qn 3200 Nl/min. What diameter of tube can be used and what is maximum lenght of tube.

We refer to the diagram. We start at the left side of the diagram cylinder Ø125. We follow the line until the intersection with the velocity line of 0.5 m/s. From here we draw a horizontal line in the diagram. This line shows us we need an equivalent throttling bore of approximately 10 mm. Following this line horizontally we cross a few intersections. These intersections shows us the minimum inner diameter (rightside diagram) in combination with the maximum length of tube (bottomside diagram).

For example:
Intersection one: When a tube (14/11) will be used, the maximum length of tube is 0.7 meter.
Intersection two: When a tube (—/13) will be used, the maximum length of tube is 3.7 meter.
Intersection three: When a tube (—/14) will be used, the maximum length of tube is 6 meter.

Example 4 : Determining tube size and cylinder velocity with a particular cylinder and valve?

For an application using a 40 mm bore cylinder with a valve with Qn=800 Nl/min. The distance between the cylinder and valve has been set to 5 m.
Tube dimension: What tube bore should be selected to obtain the maximum cylinder velocity? Start at pipe length 5 m, follow the line up to the intersection with 800 Nl/min. Select the next largest tube diameter, in this case Ø10/8 mm.
Cylinder velocity: What maximum cylinder velocity will be obtained? Follow the line for 800 Nl/min to the left until it intersects with the line for the Ø40 mm cylinder. In this example, the speed is just above 1.1 m/s.

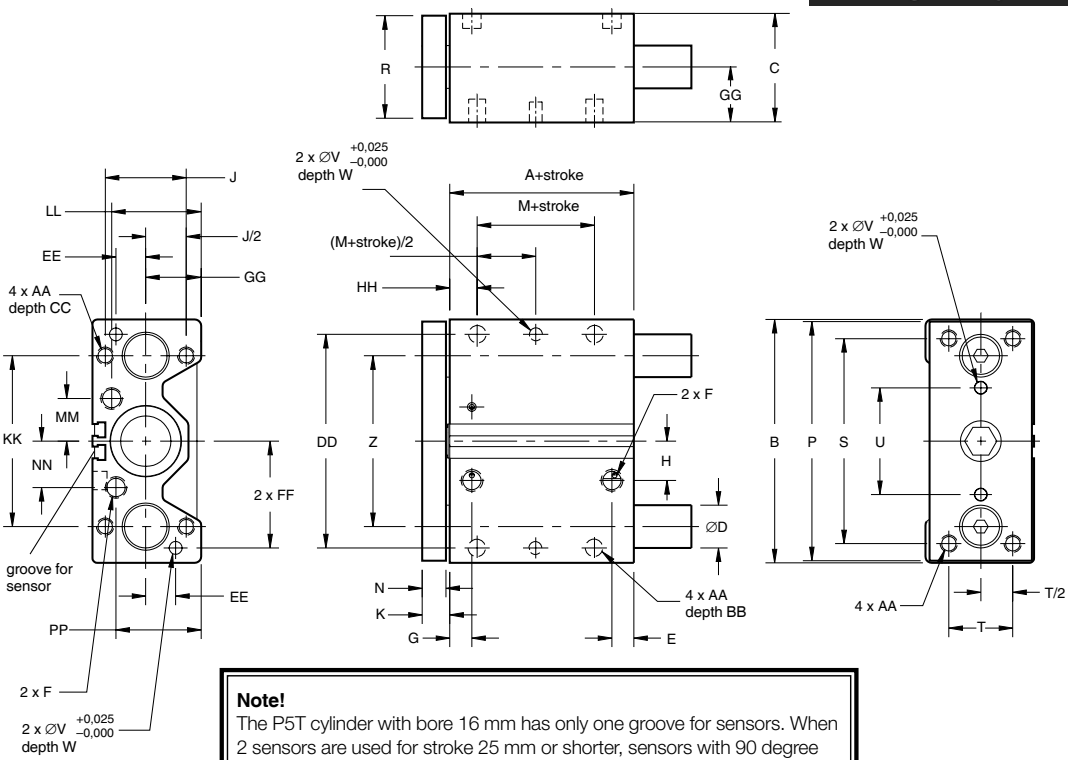
Valve series with respective flows in Nl/minute

Valve series	Qn in Nl/Min
Valvetronic Solstar	33
Interface PS1	100
Adex A05	173
Moduflex size 1, (2 x 3/2)	220
Valvetronic PVL-B 5/3 closed centre, 6 mm push in	290
Moduflex size 1, (4/2)	320
B43 Manual and mechanical	340
Valvetronic PVL-B 2 x 2/3, 6 mm push in	350
Valvetronic PVL-B 5/3 closed centre, G1/8	370
Compact Isomax DX02	385
Valvetronic PVL-B 2 x 3/2 G1/8	440
Valvetronic PVL-B 5/2, 6 mm push in	450
Valvetronic PVL-B 5/3 vented centre, 6 mm push in	450
Moduflex size 2, (2 x 3/2)	450
Flowstar P2V-A	520
Valvetronic PVL-B 5/3 vented centre, G1/8	540
Valvetronic PVL-B 5/2, G1/8	540
Valvetronic PVL-C 2 x 3/2, 8 mm push in	540
Adex A12	560
Valvetronic PVL-C 2 x 3/2 G1/8	570
Compact Isomax DX01	585
VIKING Xtreme P2LAX	660
Valvetronic PVL-C 5/3 closed centre, 8 mm push in	700
Valvetronic PVL-C 5/3 vented centre, G1/4	700
B3-Series	780
Valvetronic PVL-C 5/3 closed centre, G1/4	780
Moduflex size 2, (4/2)	800
Valvetronic PVL-C 5/2, 8 mm push in	840
Valvetronic PVL-C 5/3 vented centre, 8 mm push in	840
Valvetronic PVL-C 5/2, G1/4	840
Flowstar P2V-B	1090
ISOMAX DX1	1150
B53 Manual and mechanical	1160
B4-Series	1170
VIKING Xtreme P2LBX	1290
B5-Series, G1/4	1440
Airline Isolator Valve VE22/23	1470
ISOMAX DX2	2330
VIKING Xtreme P2LCX, G3/8	2460
VIKING Xtreme P2LDX, G1/2	2660
ISOMAX DX3	4050
Airline Isolator Valve VE42/43	5520
Airline Isolator Valve VE82/83	13680

Dimensions, P5T basic cylinder

Connection option **D**
(connection from above or rear)

AirCad™ Drawing Library



Note!
The P5T cylinder with bore 16 mm has only one groove for sensors. When 2 sensors are used for stroke 25 mm or shorter, sensors with 90 degree cable outlet has to be used.

Cylinder dia. mm	A mm	B mm	C mm	D1*) mm	D2*) mm	E mm	F	G mm	H mm	J mm	K mm	M mm	N mm	P mm	R mm	S mm	T mm	U mm	V mm
16	37,8	64	31	8	10	10,1	M5	10,1	7	22	9,9	7	7,9	62	25,4	52	16	20	3
20	35	74	36	10	12	19	G1/8	10	15,8	26	9,9	10	7,9	72	31,8	60	18	30	4
25	38	88	42	12	16	21	G1/8	11,4	15,5	32	9,9	10	7,9	86	38	70	26	34	4
32	36	114	51	16	20	10,3	G1/8	10,4	18,4	38	13,1	5	11,1	112	44,5	96	30	50	6
40	44	124	51	16	20	12,1	G1/8	14,9	22,5	38	13,1	10	11,1	122	44	106	30	60	6
50	44,9	140	62	20	25	14,5	G1/4	16,1	27	44	14,7	10	12,7	138	57	120	40	60	8
63	50,1	150	75	20	25	16,4	G1/4	14,5	33	44	14,7	10	12,7	148	70	130	50	72	8
80	59,5	188	95	25	30	17,5	G3/8	19	37	56	18	15	16	185	88,9	160	60	92	10
100	66**)	224	115	30	35	21,9**)	G3/8	23	40	62	18	15	16	221	108	190	80	114	10

Cylinder dia. mm	W mm	Z mm	AA	BB mm	CC mm	DD mm	EE mm	FF mm	GG mm	HH mm	KK mm	LL mm	MM mm	NN mm	PP mm	Piston rod Ø mm
16	6	42	M5x0,8	7,5	10	54	8	27	15	13,1	42	22,5	11,3	9,7	23	8
20	6	52	M5x0,8	7,5	10	64	10	32	17	13,1	52	26	15,4	15,4	26	10
25	6	62	M6x1,0	10	12	76	11	38	21	14,1	62	33,4	17	17	33,4	10
32	6	80	M8x1,25	11	16	100	14	50	26	12,9	80	42	20	21,7	38	16
40	6	90	M8x1,25	11	16	110	14	55	26	13,9	90	41	24	26,4	37,9	16
50	8	100	M10x1,5	12	20	124	16	62	30	14,3	100	51	29	33	44	20
63	8	110	M10x1,5	15	20	132	18	66	36,5	16,3	110	62	36	37,8	57,8	20
80	10	140	M12x1,75	18	24	166	22	83	46,5	21	140	78	45	48	75,5	25
100	10	170	M14x2,0	21	28	200	24	100	56,5	25	170	91,5	53	51	95.5	25

Length tolerance ± 1 mm
Stoke tolerance + 1.5/0 mm

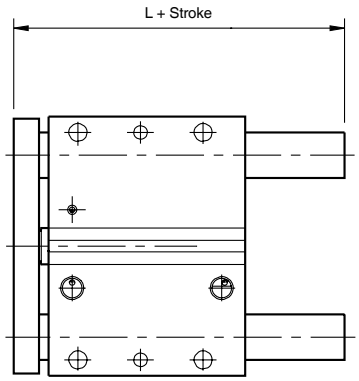
*) D1 = bearing rod diameter for recirculating ball bearing
*) D2 = bearing rod diameter for plain bearing

**) Stroke 25 mm, A=75 mm, E=28 mm

Dimensions, P5T basic cylinder

Standard lengths

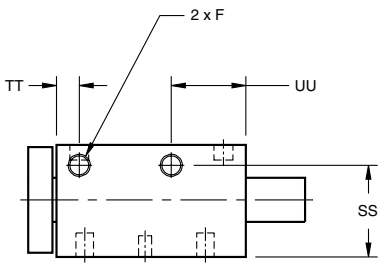
Cylinder dia. mm	Stroke mm	L mm
16	10	36,2
	25, 40, 50, 75	60,2
	100	75,2
20	25, 40, 50, 75	66,9
	100, 125	91,9
25	25, 50, 75, 100	69,9
	125, 150	91,9
32	25, 50, 75, 100	77,9
	125, 150, 175, 200	116,0
40	25, 50, 75, 100	77,9
	125, 150, 175, 200	116,0
50	25, 50, 75, 100	84,0
	125, 150, 175, 200	124,1
63	25, 50, 75, 100	84,0
	125, 150, 175, 200	124,1
80	25, 50, 75, 100	101,8
	125, 150, 175, 200	140,0
100	25	122,8
	50, 75, 100	120,3
	125, 150, 175, 200	158,4



Dimensions, P5T basic cylinder

Connection option **S** (side connections)

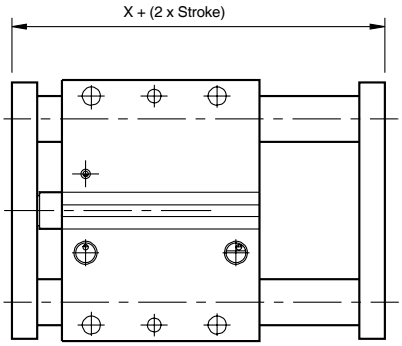
Cylinder dia. mm	SS mm	TT mm	UU mm	F
16	24,1	10	20	M5
20	29,2	10	20	M5
25	35,2	11,4	25	M5
32	41,7	10,4	34	G1/8
40	41,7	14,9	34	G1/8
50	51,3	16,1	38	G1/4
63	60,7	15,6	41,8	G1/4
80	75,5	19	47	G3/8
100	83,7	23	53,3	G3/8



L

Dimensions, P5T basic cylinder

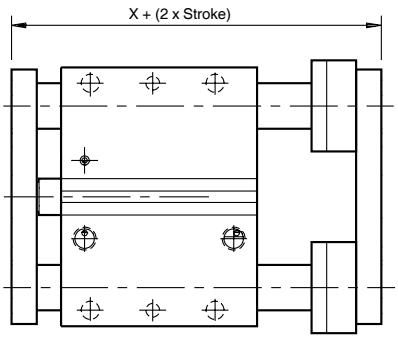
Option **D**



Please note that load capacity increases with two fixing plates, due to greater bearing distance.

Dimensions, P5T with two fixing plates and adjustable end stop with cushioning

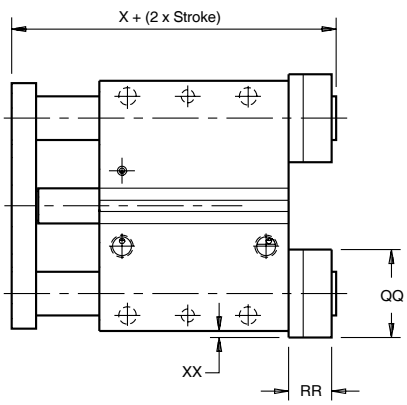
Option **A**



Cylinder dia. mm	Guide rod dia, mm	X for option D mm	A mm	E mm	QQ mm	RR mm	XX mm
16	8	57,6	70,6	62,7	18,0	13,0	0
	10	57,6	70,6	62,7	24,0	13,0	1
20	10	54,9	67,9	59,9	24,0	13,0	1
	12	54,9	72,6	64,6	28,0	17,7	3
25	12	57,8	75,5	67,6	28,0	17,7	1
	16	57,8	77,5	69,6	34,0	19,7	4
32	16	62,2	81,9	70,8	34,0	19,7	0
	20	62,2	83,9	72,8	41,4	21,7	3,7
40	16	70,2	89,9	78,8	34,0	19,7	0
	20	70,2	91,9	80,8	41,4	21,7	3,7
50	20	74,3	96,0	83,3	41,4	21,7	0,7
	25	74,3	96,0	83,3	50,8	21,7	5,4
63	20	79,5	101,2	88,5	41,4	21,7	0,7
	25	79,5	101,2	88,5	50,8	21,7	5,4
80	25	95,5	117,2	101,2	50,8	21,7	1,4
	30	95,5	117,2	101,2	60,5	21,7	6,3
100	30	102,0	123,7	107,7	60,5	21,7	3,3
	35	102,0	123,7	107,7	65,0	21,7	5,5

Dimensions, P5T with adjustable end stop with cushioning

Option **E**

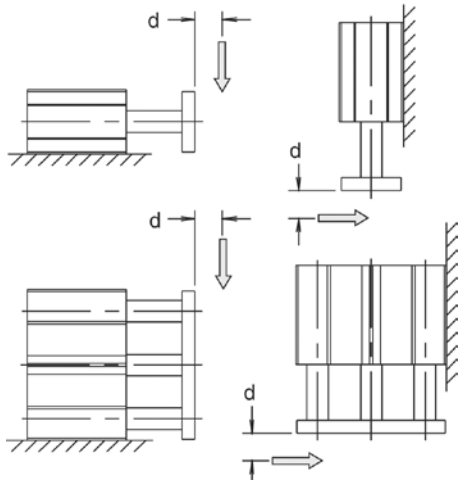


Maximum load

P5T cylinders can absorb the same load, irrespective of how it is installed. The loading diagram is based on a service life for the cylinder of at least 10 million cycles. At higher loadings, the service life will be reduced.

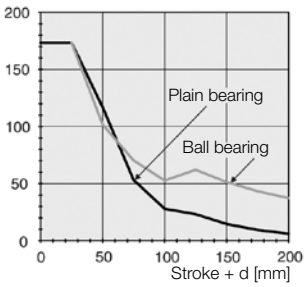
Example

Estimate the load limit for a P5T-16 with plain bearing and stroke + d = 75 mm has load capacity 50 N.

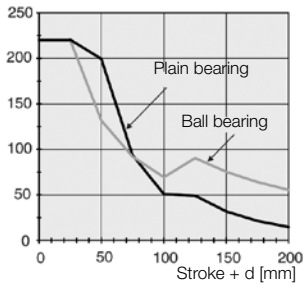


Load capacity as a function of Stroke + d

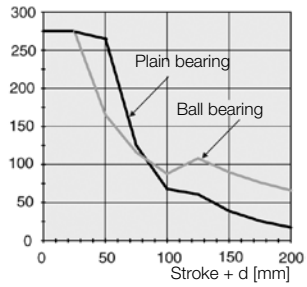
Cylinder bore 16 mm
Load [N]



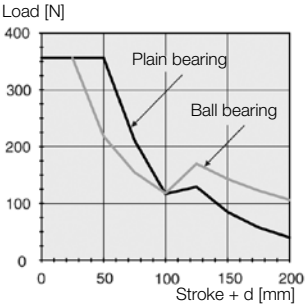
Cylinder bore 20 mm
Load [N]



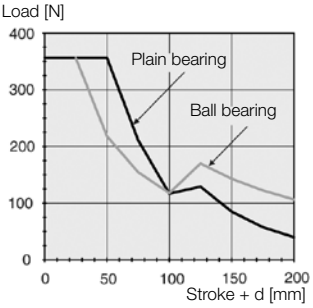
Cylinder bore 25 mm
Load [N]



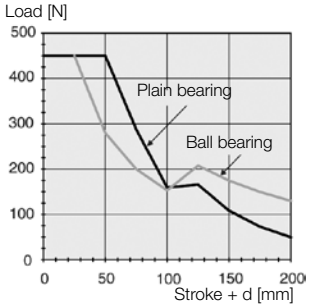
Cylinder bore 32 mm
Load [N]



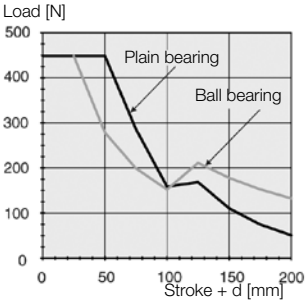
Cylinder bore 40 mm
Load [N]



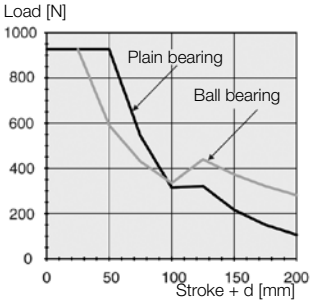
Cylinder bore 50 mm
Load [N]



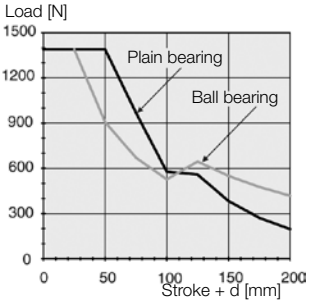
Cylinder bore 63 mm
Load [N]



Cylinder bore 80 mm
Load [N]



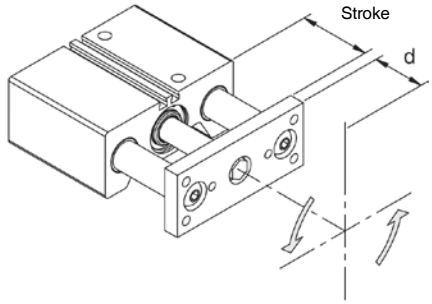
Cylinder bore 100 mm
Load [N]



L

Maximum Torsional Capacity for Symmetrical Torsion

When symmetrical loads are applied, P5T Series load ratings are greater than with asymmetrical loads because both pairs of shaft bearings equally resist the load.



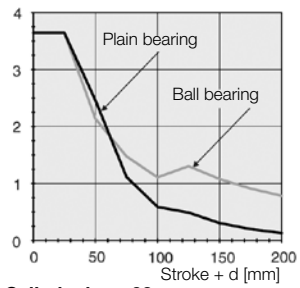
Example:

A wrist rotate mechanism symmetrically grabs and rotates a part. The mechanism exerts a 20 Nm torque on a P5T-50 with 25mm stroke. The center of gravity for the wrist rotate mechanism is 25mm from the face of the P5T-50.

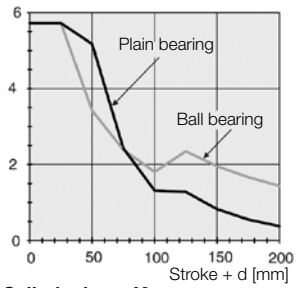
The "stroke + d" dimension equals 50mm (25 + 25). The P5T-50 with plain bearing will have adequate torsional capacity (22.5 Nm).

Maximum torque as a function of Stroke + d

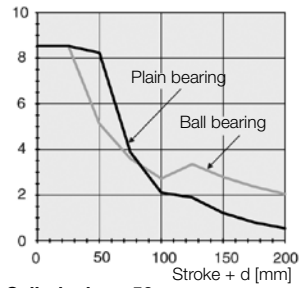
Cylinder bore 16 mm
Load [N]



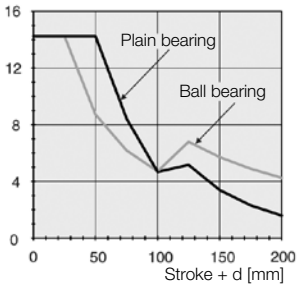
Cylinder bore 20 mm
Load [N]



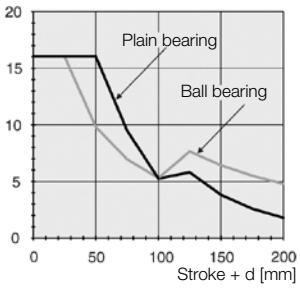
Cylinder bore 25 mm
Load [N]



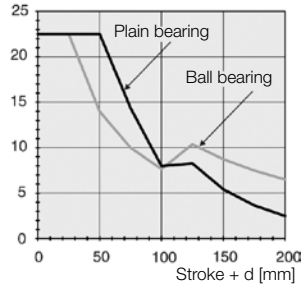
Cylinder bore 32 mm
Load [N]



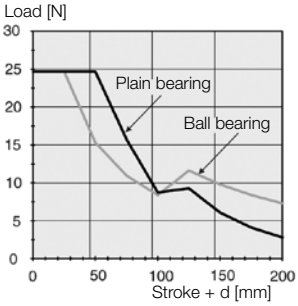
Cylinder bore 40 mm
Load [N]



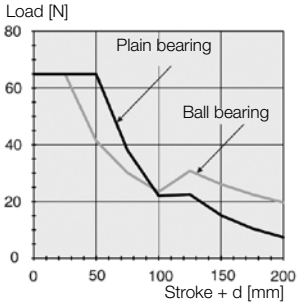
Cylinder bore 50 mm
Load [N]



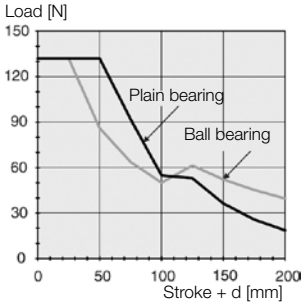
Cylinder bore 63 mm
Load [N]



Cylinder bore 80 mm
Load [N]

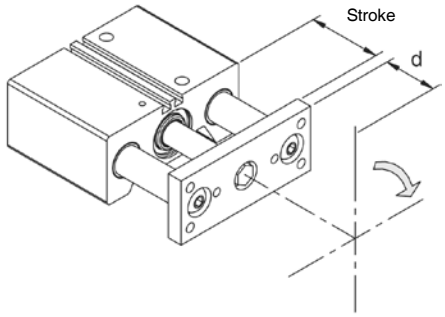


Cylinder bore 100 mm
Load [N]



Maximum Torsional Capacity for Asymmetrical Torque

Asymmetrical loading occurs when the load is applied to one side of the unit. P5T Series units can resist torsional loads that are asymmetrical according to the diagrams below.



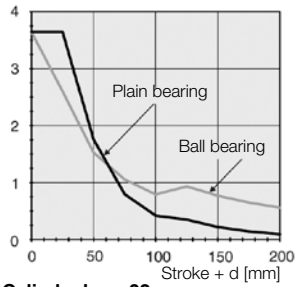
Example:

A mechanism exerts an asymmetrical load of 15 Nm on a P5T-50 with 30 mm stroke. The centre of acymetric torque d = 20 mm. Stroke + d (30+20) = 50 mm.

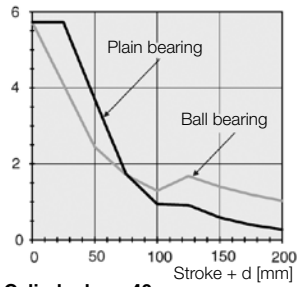
The P5T-50 with plain bearing will have adequate torsional capacity (21 Nm).

Maximum torque as a function of Stroke + d

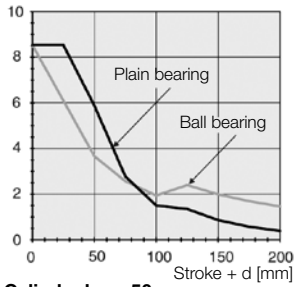
Cylinder bore 16 mm
Load [N]



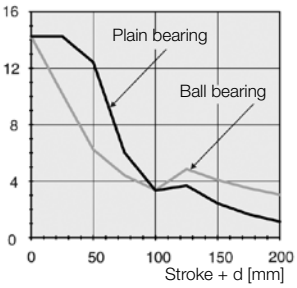
Cylinder bore 20 mm
Load [N]



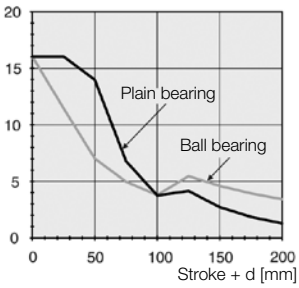
Cylinder bore 25 mm
Load [N]



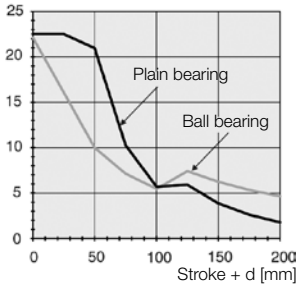
Cylinder bore 32 mm
Load [N]



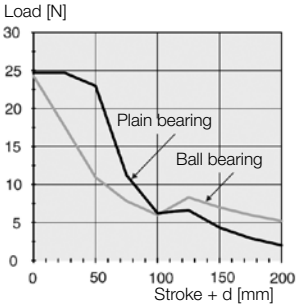
Cylinder bore 40 mm
Load [N]



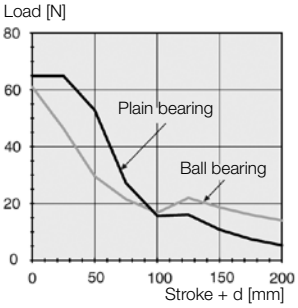
Cylinder bore 50 mm
Load [N]



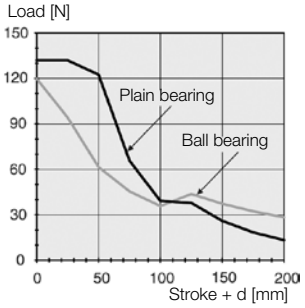
Cylinder bore 63 mm
Load [N]



Cylinder bore 80 mm
Load [N]



Cylinder bore 100 mm
Load [N]

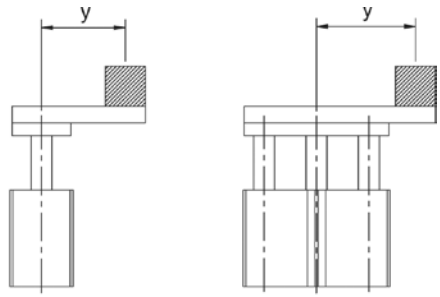


L

Maximum load during vertical lift

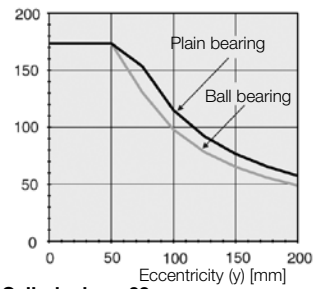
The P5T cylinder has the capacity to absorb eccentric loadings irrespective of location.

The load is assumed to be placed directly on the plate.

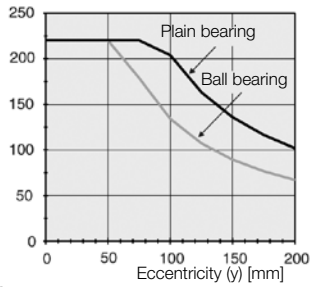


Maximum vertical load as a function of eccentricity

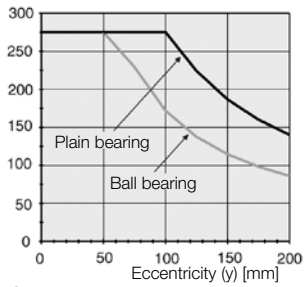
Cylinder bore 16 mm
Load [N]



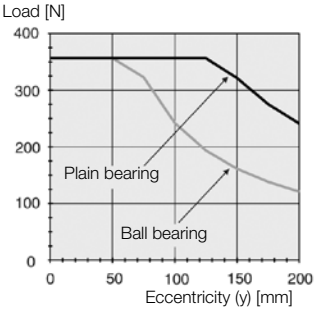
Cylinder bore 20 mm
Load [N]



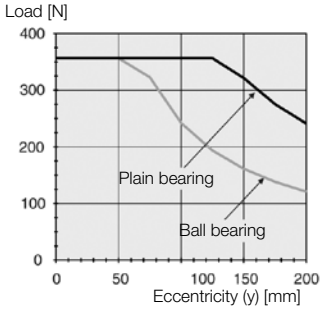
Cylinder bore 25 mm
Load [N]



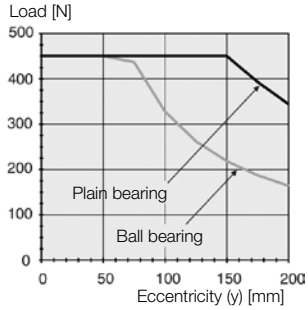
Cylinder bore 32 mm
Load [N]



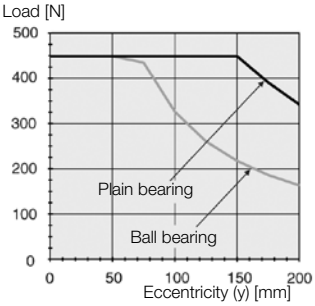
Cylinder bore 40 mm
Load [N]



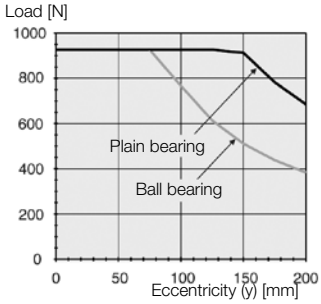
Cylinder bore 50 mm
Load [N]



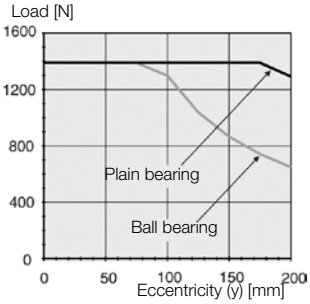
Cylinder bore 63 mm
Load [N]



Cylinder bore 80 mm
Load [N]



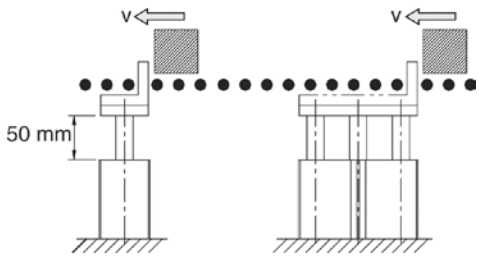
Cylinder bore 100 mm
Load [N]



Maximum loading as a stop cylinder

The P5T cylinder can be used as a stop cylinder. It can be used both horizontally and vertically.

NOTE! Cylinders with plain bearings are recommended for this type of application.



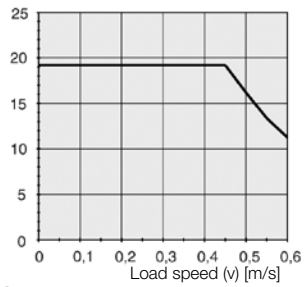
Example:

A P5T-50 unit with a stroke up to 50 mm will stop an object moving at 0.5 m/s that weighs up to 50 kg.

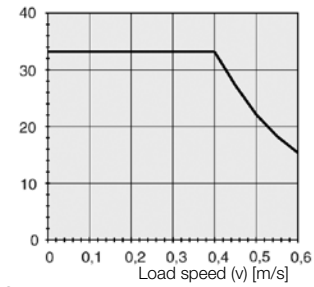
NOTE: The following graphs are based on 50mm of stroke.

Load stopping capacity as a function of speed

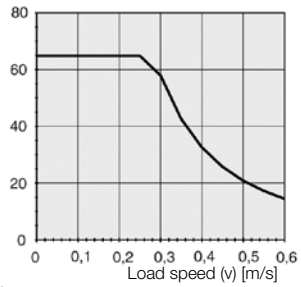
Cylinder bore 16 mm
Mass [kg]



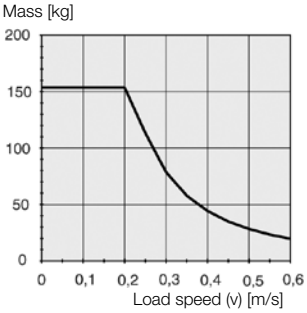
Cylinder bore 20 mm
Mass [kg]



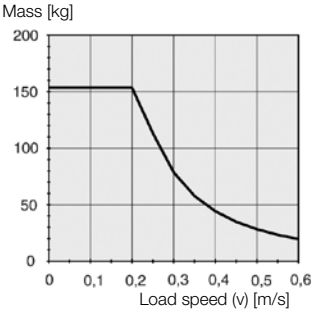
Cylinder bore 25 mm
Mass [kg]



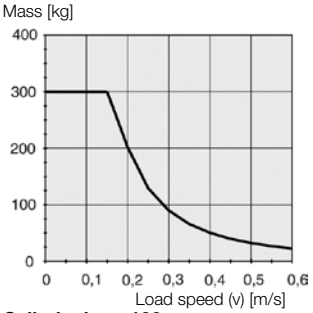
Cylinder bore 32 mm
Mass [kg]



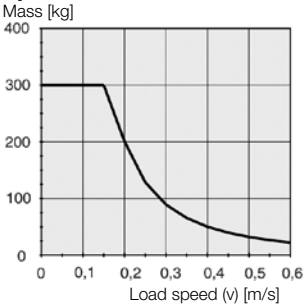
Cylinder bore 40 mm
Mass [kg]



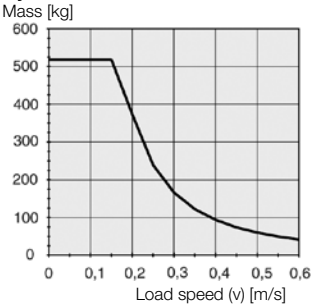
Cylinder bore 50 mm
Mass [kg]



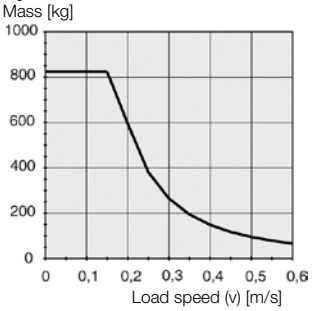
Cylinder bore 63 mm
Mass [kg]



Cylinder bore 80 mm
Mass [kg]



Cylinder bore 100 mm
Mass [kg]



Ordering key

P5T- **C** **032** **D** **G** **S** **N** **100**

Bushing type	
C	Plain bearing
H	Ball bearing

Cylinder Ø mm
016
020
025
032
040
050
063
080
100

Connection options	
D	Connection from above or rear, via movable plugs
S	Connection from side

Seals	
S	Standard seals -20 °C to +80 °C
F	seals -10 °C to +150 °C

Option	
N	None
E	Adjustable stop with cushioning in extended position on the free bearing rods
D*	Two fixing plates, one at each end of cylinder
A*	E+D, i.e. two fixing plates and adjustable stop with cushioning in extended position (side connections recommended)

Stroke in mm

e.g. 025 = 25 mm

Please refer to the table below for standard and maximum strokes.

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* Please note that the load capacity increases for the versions with two fixing plates, due to greater bearing distance.

Standard strokes

Order no. XXX = Stroke	Cylinder diam. (mm)	● Standard stroke (mm) 10	25	40	50	75	100	125	150	175	200
Double acting											
P5T-•016•G••XXX	**16**	●	●	●	●	●	●				
P5T-•020•G••XXX	**20**		●	●	●	●	●	●	●		
P5T-•025•G••XXX	**25**		●		●	●	●	●	●		
P5T-•032•G••XXX	**32**		●		●	●	●	●	●	●	●
P5T-•040•G••XXX	**40**		●		●	●	●	●	●	●	●
P5T-•050•G••XXX	**50**		●		●	●	●	●	●	●	●
P5T-•063•G••XXX	**63**		●		●	●	●	●	●	●	●
P5T-•080•G••XXX	**80**		●		●	●	●	●	●	●	●
P5T-•100•G••XXX	**100**		●		●	●	●	●	●	●	●

For cylinders with special stroke lengths, use the next longest standard stroke length with adjustable stop, option E.

Double acting P5T with plain bearing

Cyl. bore mm	Stroke mm	Order code
16 M5 thread	10	**P5T-C016DGSN010**
	25	**P5T-C016DGSN025**
	40	**P5T-C016DGSN040**
	50	**P5T-C016DGSN050**
	75	**P5T-C016DGSN075**
	100	**P5T-C016DGSN100**
20 G1/8 thread	25	**P5T-C020DGSN025**
	40	**P5T-C020DGSN040**
	50	**P5T-C020DGSN050**
	75	**P5T-C020DGSN075**
	100	**P5T-C020DGSN100**
	125	**P5T-C020DGSN125**
	150	**P5T-C020DGSN150**
25 G1/8 thread	25	**P5T-C025DGSN025**
	50	**P5T-C025DGSN050**
	75	**P5T-C025DGSN075**
	100	**P5T-C025DGSN100**
	125	**P5T-C025DGSN125**
	150	**P5T-C025DGSN150**
32 G1/8 thread	25	**P5T-C032DGSN025**
	50	**P5T-C032DGSN050**
	75	**P5T-C032DGSN075**
	100	**P5T-C032DGSN100**
	125	**P5T-C032DGSN125**
	150	**P5T-C032DGSN150**
	175	**P5T-C032DGSN175**
	200	**P5T-C032DGSN200**
40 G1/8 thread	25	**P5T-C040DGSN025**
	50	**P5T-C040DGSN050**
	75	**P5T-C040DGSN075**
	100	**P5T-C040DGSN100**
	125	**P5T-C040DGSN125**
	150	**P5T-C040DGSN150**
	175	**P5T-C040DGSN175**
	200	**P5T-C040DGSN200**

Cyl. bore mm	Stroke mm	Order code
50 G1/4 thread	25	**P5T-C050DGSN025**
	50	**P5T-C050DGSN050**
	75	**P5T-C050DGSN075**
	100	**P5T-C050DGSN100**
	125	**P5T-C050DGSN125**
	150	**P5T-C050DGSN150**
	175	**P5T-C050DGSN175**
	200	**P5T-C050DGSN200**
63 G1/4 thread	25	**P5T-C063DGSN025**
	50	**P5T-C063DGSN050**
	75	**P5T-C063DGSN075**
	100	**P5T-C063DGSN100**
	125	**P5T-C063DGSN125**
	150	**P5T-C063DGSN150**
	175	**P5T-C063DGSN175**
	200	**P5T-C063DGSN200**
80 G3/8 thread	25	**P5T-C080DGSN025**
	50	**P5T-C080DGSN050**
	75	**P5T-C080DGSN075**
	100	**P5T-C080DGSN100**
	125	**P5T-C080DGSN125**
	150	**P5T-C080DGSN150**
	175	**P5T-C080DGSN175**
	200	**P5T-C080DGSN200**
100 G3/8 thread	25	**P5T-C100DGSN025**
	50	**P5T-C100DGSN050**
	75	**P5T-C100DGSN075**
	100	**P5T-C100DGSN100**
	125	**P5T-C100DGSN125**
	150	**P5T-C100DGSN150**
	175	**P5T-C100DGSN175**
	200	**P5T-C100DGSN200**

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Note!

The P5T cylinder with bore 16 mm has only one groove for sensors. When 2 sensors are used for stroke 25 mm or shorter, sensors with 90 degree cable outlet has to be used.

New drop-in sensors

The completely new "drop-in" sensors can easily be installed from the side in the sensor groove, at any position along the piston stroke. The sensors are completely recessed and thus mechanically protected. Choose between electronic or reed sensors and several cable lengths and 8 mm and M12 connectors. The same standard sensors are used for all versions. There is a double jointed adapter for the tie-rod version, which offers simple and flexible use of standard sensors.

Electronic sensors

The new electronic sensors are "Solid State", i.e. they have no moving parts at all. They are provided with short-circuit protection and transient protection as standard. The built-in electronics make the sensors suitable for applications with high on and off switching frequency, and where very long service life is required.

Technical data

Design	GMR (Giant Magnetic Resistance) magneto-resistive function
Installation	From side, down into the sensor groove, so-called drop-in
Outputs	PNP, normally open (also available in NPN design, normally closed, on request)
Voltage range	10-30 VDC
	10-18 V DC, ATEX sensor
Ripple	max 10%
Voltage drop	max 2,5 V
Load current	max 100 mA
Internal consumption	max 10 mA
Actuating distance	min 9 mm
Hysteresis	max 1,5 mm
Repeatability accuracy	max 0,2 mm
On/off switching frequency	max 5 kHz
On switching time	max 2 ms
Off switching time	max 2 ms
Encapsulation	IP 67 (EN 60529)
Temperature range	–25 °C to +75 °C
	–20 °C to +45 °C, ATEX sensor
Indication	LED, yellow
Material housing	PA 12
Material screw	Stainless steel
Cable	PVC or PUR 3x0.25 mm^2 see order code respectively

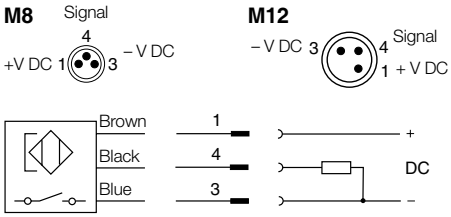
Reed sensors

The sensors are based on proven reed switches, which offer reliable function in many applications. Simple installation, a protected position on the cylinder and clear LED indication are important advantages of this range of sensors.

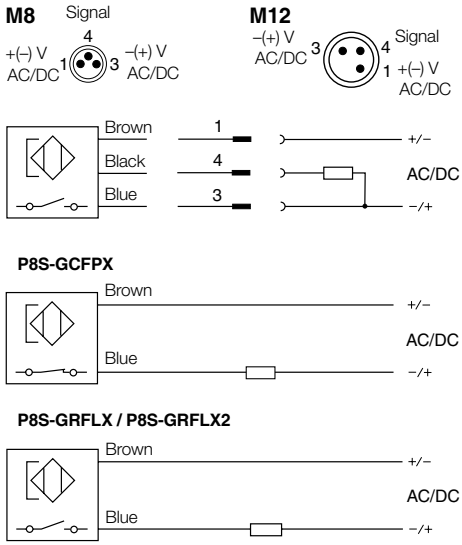
Technical data

Design	Reed element
Mounting	From side, down into the sensor groove, so-called drop-in
Output	Normally open , or normally closed
Voltage range	10-30 V AC/DC or 10-120 V AC/DC
	24-230 V AC/DC
Load current	max 500 mA for 10-30 V or max 100 mA for 10-120 V
	max 30 mA for 24-230 V
Breaking power (resistive)	max 6 W/VA
Actuating distance	min 9 mm
Hysteresis	max 1,5 mm
Repeatability accuracy	0,2 mm
On/off switching frequency	max 400 Hz
On switching time	max 1,5 ms
Off switching time	max 0,5 ms
Encapsulation	IP 67 (EN 60529)
Temperature range	–25 °C to +75 °C
Indication	LED, yellow
Material housing	PA12
Material screw	Stainless steel
Cable	PVC or PUR 3x0.14 mm^2 see order code respectively

Electronic sensors

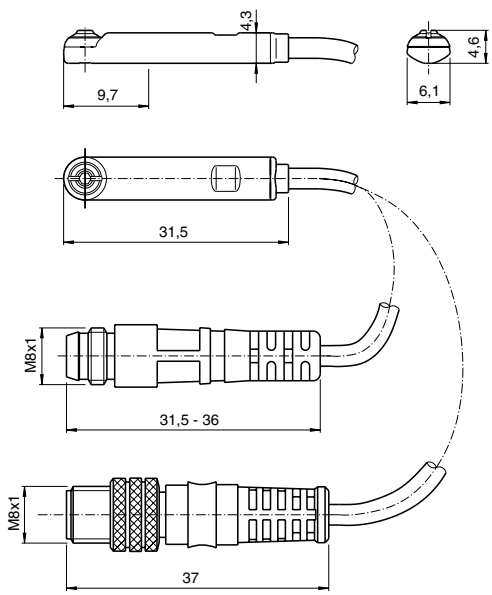


Reed sensors



Dimensions

Sensors



Ordering data

Output/function	Cable/connector	Weight kg	Order code
Electronic sensors , 10-30 V DC			
PNP type, normally open	0,27 m PUR-cable and 8 mm snap-in male connector [1]	0,007	**P8S-GPSHX**
PNP type, normally open	1,0 m PUR-cable and 8 mm snap-in male connector	0,013	**P8S-GPSCX**
PNP type, normally open	1,0 m PUR-cable and M8 screw male connector	0,013	**P8S-GPCCX**
PNP type, normally open	0,27 m PUR-cable and M12 screw male connector [1]	0,015	**P8S-GPMHX**
PNP type, normally open	3 m PVC-cable without connector	0,030	**P8S-GPFLX**
PNP type, normally open	10 m PVC-cable without connector	0,110	**P8S-GPFTX**
Electronic sensor 18-30 V DC			
ATEX-certified			
CE Ex **II3G EEx nA II T4X II3D 135 °C IP67**			
Type PNP , normally open	3 m PVC-cable without connector	0,030	**P8S-GPFLX/EX**
Reed sensors , 10-30 V AC/DC			
Normally open	0,27 m PUR-cable and 8 mm snap-in male connector [1]	0,007	**P8S-GSSHX**
Normally open	1,0 m PUR-cable and 8 mm snap-in male connector	0,013	**P8S-GSSCX**
Normally open	1,0 m PUR-cable and M8 male connector	0,013	**P8S-GSCCX**
Normally open	0,27 m PUR-cable and M12 screw male connector[1]	0,015	**P8S-GSMHX**
Normally open	1,0 m PUR-cable and M12 screw male connector	0,023	**P8S-GSMCX**
Normally open	3 m PVC-cable without connector	0,030	**P8S-GSFLX**
Normally open	10 m PVC-cable without connector	0,110	**P8S-GSFTX**
Normally closed	5m PVC-cable without connector [2]	0,050	**P8S-GCFPX**
Reed sensors, 10-120 V AC/DC			
Normally open	3 m PVC-cable without connector	0,030	**P8S-GRFLX**
Reed sensorer, 24-230 V AC/DC			
Normalt öppen	3 m PVC-kabel utan kontakt	0,030	**P8S-GRFLX2**

1) Not in combination with P1D Clean (too short cable)

2) Without LED

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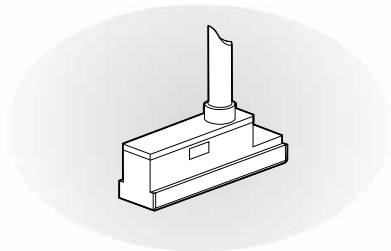
Sensors for special applications

Sensors for applications where the short installation length and the 90 degree cable outlet are important factors. This type of sensor is an good alternative if a cylinder has a short stroke or tight installation.



Reed switch sensors

The reed switch sensors incorporate a well-proven, universal-voltage, compact reed switch element, making them suitable for a wide range of applications. They can work with electronic control systems or conventional relay systems. No environment is too severe.

Technical data

Design	Reed
Output	Making
Voltage range	10 to 120 VAC/VDC
Max permissible ripple	10%
Max voltage drop	3 V
Max load current	100 mA
Max breaking power (resistive)	10 W
Min actuating distance	5 mm
Hysteresis	≤1,0 mm
Repeatability accuracy	≤0,2 mm
Max on/off switching frequency	400 Hz
Max on/off switching time	1 ms
Encapsulation	IP 67
Temperature range	–25 °C to +75 °C
Indication	LED, yellow
Shock resistance	30 g
Material, housing	PA 12
Material, mould	Epoxy
Cable	PVC 3x0,14 mm^2
Cable incl. female part connector	PVC 3x0,14 mm^2
Mounting	T slot

Ordering data

Output	Cable connection	Cable length	Weight kg	Order code
Reed sensors				
making	90°	3,0 m	0,030	**P8S-SRELX**
making	90°	10,0 m	0,110	**P8S-SRETX**
making	90°	0,3 m*	0,005	**P8S-SRTHX**

*) Cable shall be ordered separately.

Electronic sensors

These sensors are of solid-state type, with no moving parts. Short-circuit and transient protection is incorporated as standard. The integral electronics make these sensors suitable for applications with very high switching frequencies.

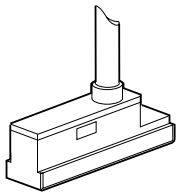
Technical data

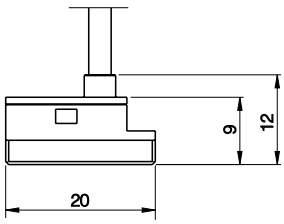
Design	Hall element
Output	PNP resp. NPN, N.O.
Voltage range	10-30 VDC
Max permissible ripple	10%
Max voltage drop	≤2 V
Max load current	150 mA
Max breaking power (resistive)	6 W
Internal consumption	15 mA
Min actuating distance	5 mm
Hysteresis	≤1,5 mm
Repeatability accuracy	≤0,2 mm
Max on/off switching frequency	
P8S-SPELXD, SPETXD, SPTHXD	50 Hz
Others	5 kHz
Max on/off switching time	0,8/3,0 ms
Encapsulation	IP 67
Temperature range	–25 °C to +75 °C
Indication	LED, yellow
Shock resistance	30 g
Material, housing	PA 12
Material, mould	Epoxy
Cable	PVC 3x0,14 mm^2
Cable incl. female part connector	PVC 3x0,14 mm^2
Connector	Diam. 8 mm snap on
Mounting	T slot

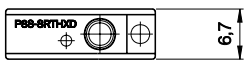
Ordering data

Output	Cable connection	Cable length	Weight kg	Order code
Electronic sensors				
PNP, N.O.	90°	3,0 m	0,030	**P8S-SPELXD**
PNP, N.O.	90°	10,0 m	0,110	**P8S-SPETXD**
PNP, N.O.	90°	0,3 m*	0,005	**P8S-SPTHXD**

Dimensions







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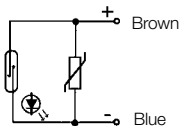
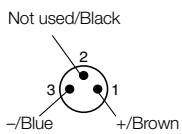
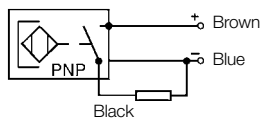
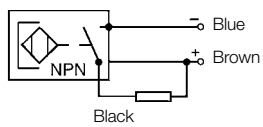
Reed sensor symbol

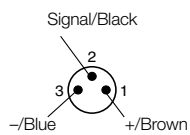




Electronic sensor symbol







Connecting cables with one connector

The cables have an integral snap-in female connector.

Type of cable	Cable/connector	Weight kg	Order code
Cables for sensors, complete with one female connector			
Cable, Flex PVC	3 m, 8 mm Snap-in connector	0,07	**9126344341**
Cable, Flex PVC	10 m, 8 mm Snap-in connector	0,21	**9126344342**
Cable, Super Flex PVC	3 m, 8 mm Snap-in connector	0,07	**9126344343**
Cable, Super Flex PVC	10 m, 8 mm Snap-in connector	0,21	**9126344344**
Cable, Polyurethane	3 m, 8 mm Snap-in connector	0,01	**9126344345**
Cable, Polyurethane	10 m, 8 mm Snap-in connector	0,20	**9126344346**
Cable, Polyurethane	5 m, M12 screw connector	0,07	**9126344348**
Cable, Polyurethane	10 m, M12 screw connector	0,20	**9126344349**

Male connectors for connecting cables

Cable connectors for producing your own connecting cables. The connectors can be quickly attached to the cable without special tools. Only the outer sheath of the cable is removed. The connectors are available for M8 and M12 screw connectors and meet protection class IP 65.

Connector	Weight kg	Order code
M8 screw connector	0,017	**P8SCS0803J**
M12 screw connector	0,022	**P8SCS1204J**

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Connection block Valvetronic 110

The Valvetronic 110 is a connection block that can be used for collecting signals from sensors at various points on a machine and connecting them to the control system via a multicore cable. Valvetronic 110 can also be used for central connection of the multi-core cable to the outputs of a control system, and can be laid to a machine where the output signals can be connected. The connection block has ten 8 mm snap-in circular connectors and a multi-core cable which is available in lengths of 3 or 10 m. The connections on the block are numbered from 1 to 10. Blanking plugs are available for unused connections, as labels for marking the connections of each block.

Technical data

Connections:

Ten 3-pole numbered 8 mm round snap-in female contacts

Input block	
Pin 1	Common, +24 VDC
Pin 2	Input signal
Pin 3	Common, 0V

Output block	
Pin 1	Common, GND
Pin 2	Output signal
Pin 3	Common, 0V

Electrical data:

Voltage	24 VDC (max. 60 V AC/75 V DC)
Insulation group	according to DIN 0110 class C
Load	max. 1 A per connection total max. 3 A

Cable:

Length	3 m or 10 m
Type of cable	LifYY11Y
Conductor	12
Area	0.34 mm²
Colour marking	According to DIN 47 100

Mechanical data

Enclosure	IP 67, DIN 40050 with fitted contacts and/or blanking plugs.
Temperature	–20 °C to +70 °C

Material

Body	PA 6,6 VD according to UL 94
Contact holder	PBTP
Snap-in ring	LDPE
Moulding mass	Epoxy
Seal	NBR
Screws	Plated steel

Industrial durability

Good chemical and oil resistance. Tests should be performed in aggressive environments.

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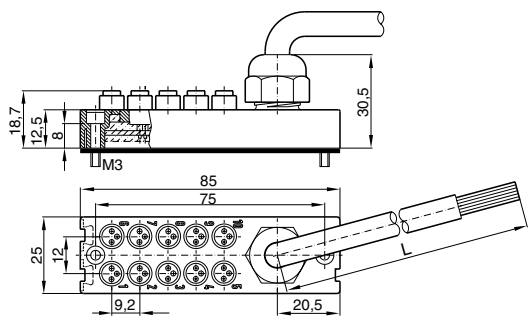
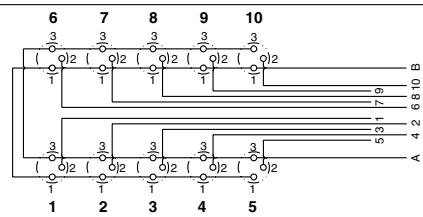
Ordering data

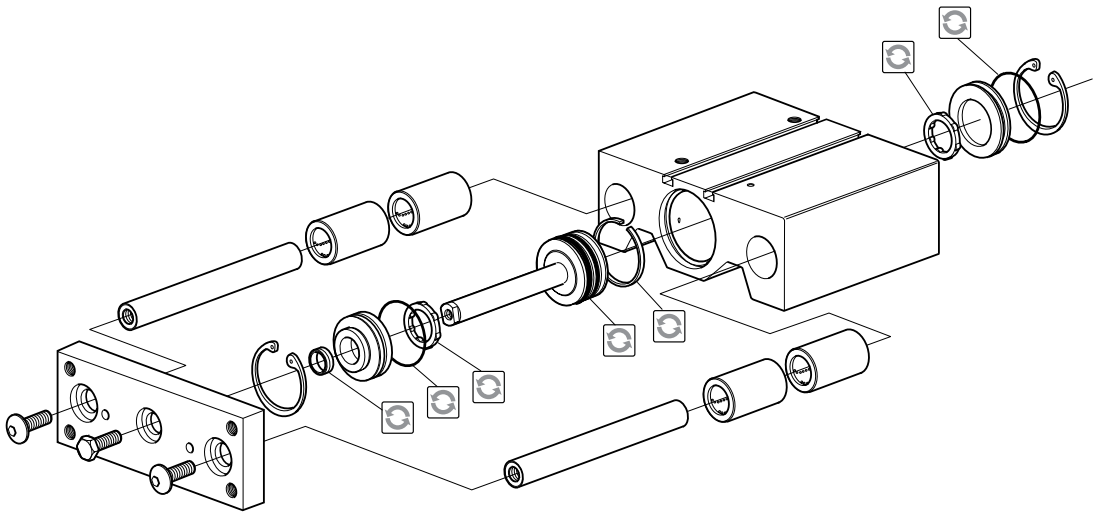
	Designation	Weight kg	Order code
	Connection block Valvetronic 110 with 3 m cable Connection block Valvetronic 110 with 10 m cable	0,32 0,95	**9121719001** **9121719002**
	Blanking plugs (pack of 10) Use blanking plugs to close unused connections.	0,02	**9121719003**
	Labels (pack of 10) White labels to insert in grooves on the side of the connection	0,02	**9121719004**

Dimensions and wiring diagrams

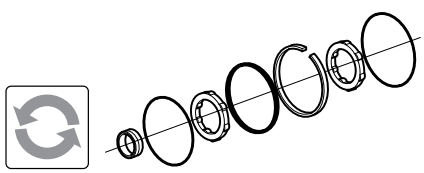




Conductor	Colour	Input	Output
1	Pink	Signal 1	Signal 1
2	Grey	Signal 2	Signal 2
3	Yellow	Signal 3	Signal 3
4	Green	Signal 4	Signal 4
5	White	Signal 5	Signal 5
6	Red	Signal 6	Signal 6
7	Black	Signal 7	Signal 7
8	Violet	Signal 8	Signal 8
9	Grey-Pink	Signal 9	Signal 9
10	Red-Blue	Signal 10	Signal 10
A	Blue	0 V	0 V
B	Brown	+24 V	PE



Seal kits for P5T



Cylinder dia. mm	Standard temperature Nitrile rubber	High temperature Fluorocarbon rubber
16	**PSK-P5T16**	**PSK-P5T16F**
20	**PSK-P5T20**	**PSK-P5T20F**
25	**PSK-P5T25**	**PSK-P5T25F**
32	**PSK-P5T32**	**PSK-P5T32F**
40	**PSK-P5T40**	**PSK-P5T40F**
50	**PSK-P5T50**	**PSK-P5T50F**
63	**PSK-P5T63**	**PSK-P5T63F**
80	**PSK-P5T80**	**PSK-P5T80F**
100	**PSK-P5T100**	**PSK-P5T100F**

Grease for P5T

Weight	Standard temperature	High temperature
30 g	**9127394541**	**9127394521**

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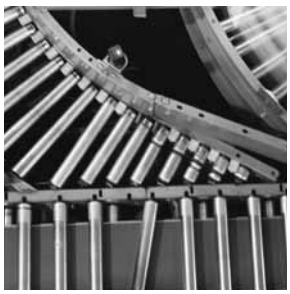
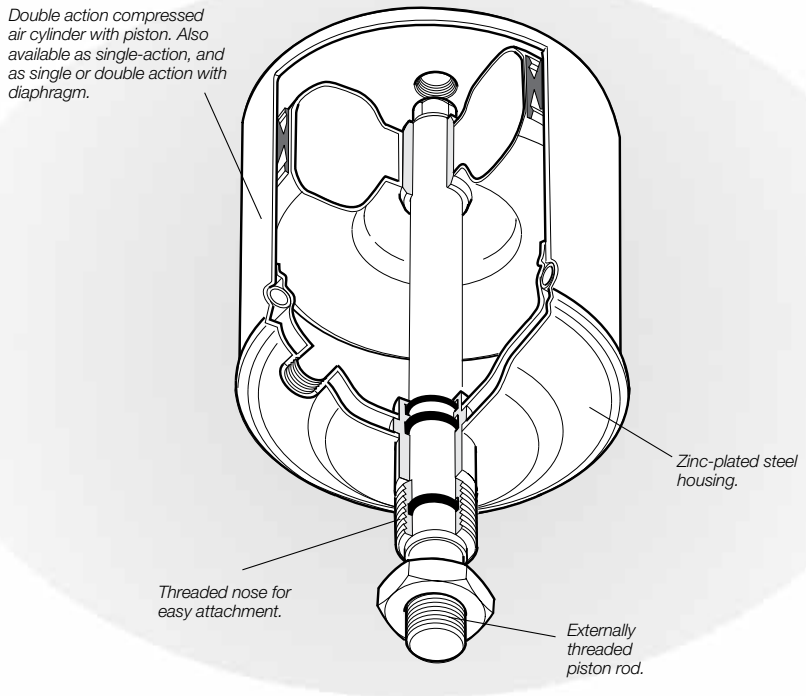


Thrust Cylinders

C0D and C0P Series



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COD and COP
Thrust cylinders

The thrust cylinders are linear actuators, designed for a high force to size ratio. This makes the cylinder ideal to use for clamping, riveting, punching and similar applications where a high force is required.

The range includes 14 different versions, providing forces from 1600 to 25 000 N (at 6 bar), single- as well as double-acting and in piston or diaphragm design.

The single-acting version has a built in powerful spring for the return stroke, but for applications where a high force is required in both directions there is the double-acting version.

The cylinder body is an all zinc plated sheet of steel and the piston rod, which is guided in two maintenance free bearings, is provided with flats and a male thread.

To facilitate the installation, the guiding sleeve is provided with a thread which can be used either for direct mounting in a threaded hole or for installation in a free running hole using a lock nut.

Main data

Thrust cylinder	Force [1] at 600 kPa (6 bar) N	Stroke [2] mm	Spring force Max N	Spring force Min N	Weight Kgs	Displacement [3] plus dm^3	Displacement [3] minus dm^3	Port thread
Double acting								
C0D300-40	3000	40	-	-	2,6	0,50	0,42	G1/4
C0D600-50	6000	50	-	-	5,4	1,05	0,92	G1/4
C0D1200-50	12000	50	-	-	11,4	1,96	1,90	G1/2
C0P2500-60	25000	60	-	-	21,4	3,50	3,40	G1/2
C0P2500-80	25000	80	-	-	21,6	4,40	4,30	G1/2
Single acting								
C0P160-50S	1600	50	314	128	1,0	0,12	-	G1/4
C0P160-80S	1600	80	314	128	1,0	0,20	-	G1/4
C0P300-50S	3000	50	314	128	1,5	0,30	-	G1/4
C0P300-80S	3000	80	314	128	1,5	0,50	-	G1/4
C0D300-40S	3000	40	294	98	2,8	0,50	-	G1/4
C0D600-50S	6000	50	638	98	5,6	1,05	-	G1/4
C0D1200-50S	12000	50	981	235	12,2	1,96	-	G1/2
C0P2500-60S	25000	60	2700	883	22,0	3,50	-	G1/2
C0P2500-100S	25000	100	2700	883	22,2	5,40	-	G1/2

1) In the case of single-acting thrust cylinders, spring force must be considered in calculation of performance.
2) Tolerance ±3 mm (C0P2500 +6/-1)
3) The displacement relates to plus and minus chambers and includes dead volume.

Additional data

Working pressure	Max 8 bar
Working temperature	-20 °C to +70 °C

Prelubricated, further lubrication is not normally necessary.

If additional lubrication is introduced it has to be continued.

Material specification

Cylinder housing	Zinc plated steel
Piston	Steel
Piston rod	Steel
Piston rod nut	Steel
Diaphragm, C0D	Textile reinforced nitrile rubber, NBR
Seals	Nitrile rubber, NBR
Piston rod bearings	Lubricant filled thermoplastic
Return spring	Spring steel

Working medium, air quality

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

Recommended air quality for cylinders

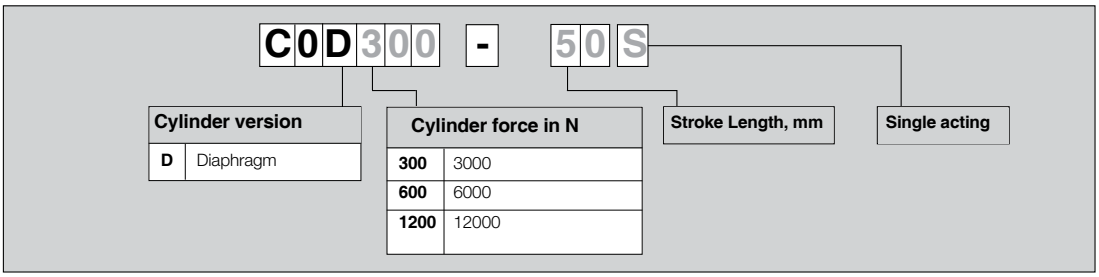
For best possible service life and trouble-free operation, ISO 8573-1 quality class 3.4.3 should be used. This means 5 µm filter (standard filter) dew point +3 ºC for indoor operation (a lower dew point should be selected for outdoor operation) and oil concentration 1.0 mg oil/m^3, which is what a standard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

ISO 8573-1 quality classes

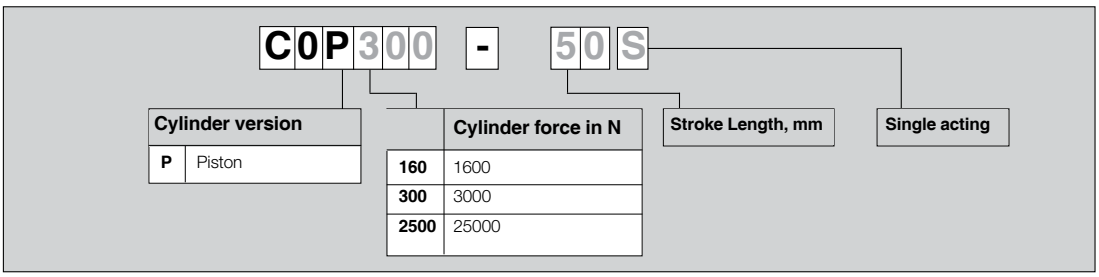
Quality class	Pollution particle size (µm)	Pollution max concentration (mg/m^3)	Water max. press. dew point (°C)	Oil max concentration (mg/m^3)
1	0,1	0,1	-70	0,01
2	1	1	-40	0,1
3	5	5	-20	1,0
4	15	8	+3	5,0
5	40	10	+7	25
6	-	-	+10	-

NOTE!
Compressed air cylinders, types C0P and C0D should not be used in vertical applications without an external stop.

Order key, Diaphragm type



Order key, Piston type



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C0D **C0P**

Main data for C0D and C0P thrust cylinders

Symbol	Force at 6 bar N	Conn.	Stroke mm	Weight Kg	Order code
Double acting	3000	G1/4	40	2,7	**C0D300-40**
	6000	G1/4	50	5,7	**C0D600-50**
	12000	G1/2	50	11,5	**C0D1200-50**
	25000	G1/2	60	21,4	**C0P2500-60**
	25000	G1/2	80	21,6	**C0P2500-80**

Symbol	Force at 6 bar N	Spring force Max N	Min N	Conn.	Stroke mm	Weight Kg	Order code
Single acting	1600	314	128	G1/4	50	0,9	**C0P160-50S**
	1600	314	128	G1/4	80	1,1	**C0P160-80S**
	3000	314	128	G1/4	50	1,2	**C0P300-50S**
	3000	314	128	G1/4	80	1,4	**C0P300-80S**
	3000	294	98	G1/4	40	2,8	**C0D300-40S**
	6000	638	98	G1/4	50	5,9	**C0D600-50S**
	12000	981	235	G1/2	50	12,4	**C0D1200-50S**
	25000	2700	883	G1/2	60	22,0	**C0P2500-60S**
	25000	2700	883	G1/2	100	22,4	**C0P2500-100S**

Thrust cylinders are supplied complete with piston rod nut.

The spring forces in single acting cylinders are sufficient to return the piston rod without load.

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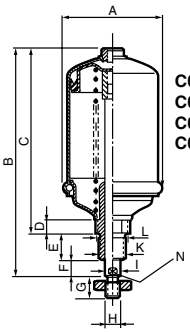
Dimensions: piston type

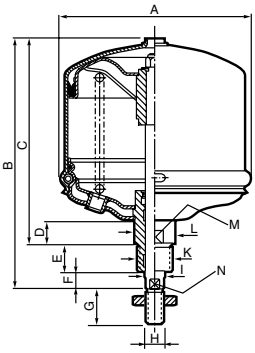
CAD drawings on the Internet
Our home page www.parker.com/euro_pneumatic
includes the AirCad Drawing Library with 2D drawings for the main versions.

AirCad™ Drawing Library



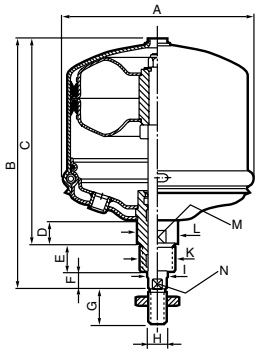
C0P160-50S
C0P160-80S
C0P300-50S
C0P300-80S

Single-acting



C0P2500-60S
C0P2500-100S

Single-acting



C0P2500-60
C0P2500-80

Double-acting

Type	Connection thread	A	B	C	D	E	F	G	H	I Ø	K	L Ø	M	N	
C0P160-50S		G1/4	66	192	151	18	30	11	24M12x1,75	14	M24x3	30	30	12	
C0P160-80S		G1/4	66	222	181	18	30	11	24M12x1,75	14	M24x3	30	30	12	
C0P300-50S		G1/4	93	192	151	18	30	11	24M12x1,75	14	M24x3	30	30	12	
C0P300-80S		G1/4	93	222	181	18	30	11	24M12x1,75	14	M24x3	30	30	12	
C0P2500-60S	G1/2	268	345	285	33	40	20	48	M24x3	28	M48x3	56	50	25	
C0P2500-100S	G1/2	268	385	325	33	40	20	48	M24x3	28	M48x3	56	50	25	
C0P2500-60		G1/2	268	345	285	33	40	20	48M24x3		28M48x3		56	50	25
C0P2500-80		G1/2	268	385	325	33	40	20	48M24x3		28M48x3		56	50	25

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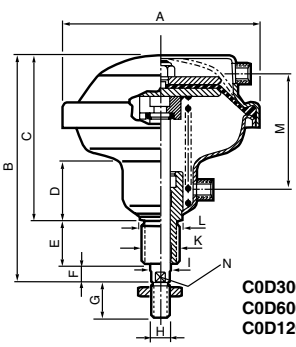
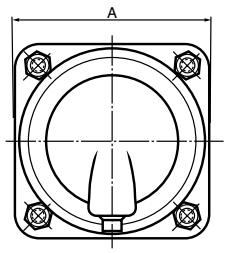
Dimensions: diaphragm type

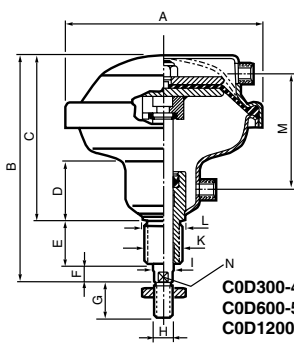


C0D300-40S
C0D600-50S
C0D1200-50S

Single-acting



C0D300-40S **C0D300-40**
C0D600-50S **C0D600-50**
C0D1200-50S **C0D1200-50**



C0D300-40
C0D600-50
C0D1200-50

Double-acting

Type	Connection thread	A	B	C	D	E	F	G	H	I Ø	K	L Ø	M	N
C0D300-40S	G1/4	150	183	131	48	38	14	24	M12x1,75	16	M24x2	30	90	13
C0D300-40	G1/4	150	183	131	48	38	14	24	M12x1,75	16	M24x2	30	90	13
C0D600-50S	G1/4	195	212	154	55	38	20	32	M16x2	20	M36x3	43	107	17
C0D600-50	G1/4	195	212	154	55	38	20	32	M16x2	20	M36x3	43	107	17
C0D1200-50S	G1/2	261	243	178	58	45	20	40	M20x2,5	25	M36x3	43	117	22
C0D1200-50	G1/2	261	243	178	58	45	20	40	M20x2,5	25	M36x3	43	117	22

Neck mounting nut

Neck mount. nut thread	Weight Kg	For cylinder	Order code
M24x2	0,04	C0D300-40	**9141100000**
M36x3	0,14	C0D600-50	**9141100100**
M36x3	0,14	C0D1200-50	**9141100100**
M48x3	0,10	C0P2500-60	**9141100200**
M48x3	0,10	C0P2500-80	**9141100200**
M24x3	0,04	C0P160-50S	**9141100300**
M24x3	0,04	C0P160-80S	**9141100300**
M24x3	0,04	C0P300-50S	**9141100300**
M24x3	0,04	C0P300-80S	**9141100300**
M24x2	0,04	C0D300-40S	**9141100000**
M36x3	0,14	C0D600-50S	**9141100100**
M36x3	0,14	C0D1200-50S	**9141100100**
M48x3	0,10	C0P2500-60S	**9141100200**
M48x3	0,10	C0P2500-100S	**9141100200**

Piston rod nut

Piston rod nut thread	Weight Kg	For cylinder	Order code
M12	0,01	C0D300-40	**0266211200**
M16	0,02	C0D600-50	**0266211400**
M20	0,03	C0D1200-50	**0266211600**
M24	0,04	C0P2500-60	**0266211800**
M24	0,04	C0P2500-80	**0266211800**
M12	0,01	C0P160-50S	**0266211200**
M12	0,01	C0P160-80S	**0266211200**
M12	0,01	C0P300-50S	**0266211200**
M12	0,01	C0P300-80S	**0266211200**
M12	0,01	C0D300-40S	**0266211200**
M16	0,02	C0D600-50S	**0266211400**
M20	0,03	C0D1200-50S	**0266211600**
M24	0,04	C0P2500-60S	**0266211800**
M24	0,04	C0P2500-100S	**0266211800**

Thrust cylinders are supplied complete with piston rod nut.

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Seal kits for C0D and C0P

Description	Order code
C0D300-40/-40S	**9121655401**
C0D600-50/-50S	**9121655501**
C0D1200-50/-50S	**9121655601**
C0P160-50S/-80S	**9121655101**
C0P300-50S/-80S	**9121655201**
C0P2500-60/-80	**9121655301**
C0P2500-60S/-100S	**9121655302**

Grease for C0D and C0P

Weight	Order code
30 g	**9127394541**

Press stand for thrust cylinders

A simple press for efficient mounting and pressing can easily be built by screwing the thrust cylinders into the threaded holes in the very stable and strong steel press stand. The stand is available in two versions with different fastening threads for the cylinders.
The top plate has two different threads, and can be rotated through 180 degrees to present the correct thread for nose fitting of the cylinders.
The sub-base is fitted with a T-track for easy mounting of accessories. It also has two through holes for simple and secure fitting to a work bench.

NOTE! Remember that an approved two-handed press control must be used with the cylinders and the press stand to prevent crush injuries.

We recommend the use of our type PXP two-handed press control. It is available in a number of versions, and is simple, ergonomic and safe to incorporate in the press stand. It meets the requirements of safety standards EN574 and EN954-1.

For more information, see our website:
www.parker.com/euro_pneumatic

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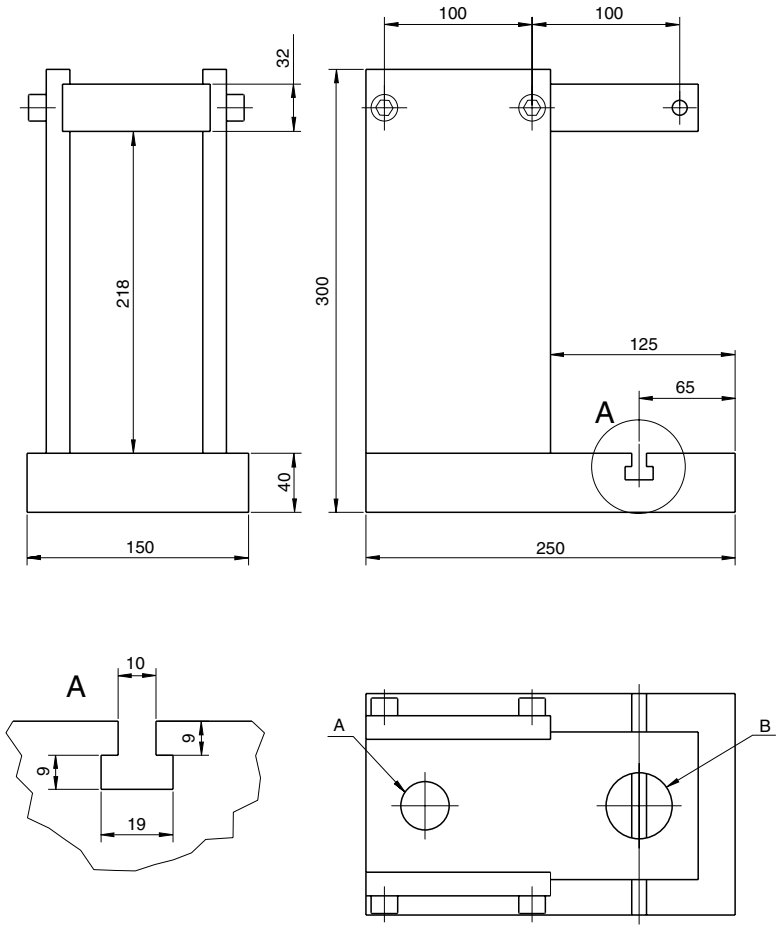
Description	Threads A/B	Weight kg	Order No.
Press stand for C0P160-50S, C0P160-80S, C0P300-50S, C0P300-80S, C0D300-40, C0D300-40S and C0D300-50S	M24x2/M24x3	24	**C0P-C0D-P01**
Press stand for C0D600-40, C0D600-50S, C0D1200-50S, C0D1200-80S, C0P2500-60, C0P2500-80, C0P2500-60S and C0P2500-100S	M36x3/M48x3	24	**C0P-C0D-P02**

Dimensions



M

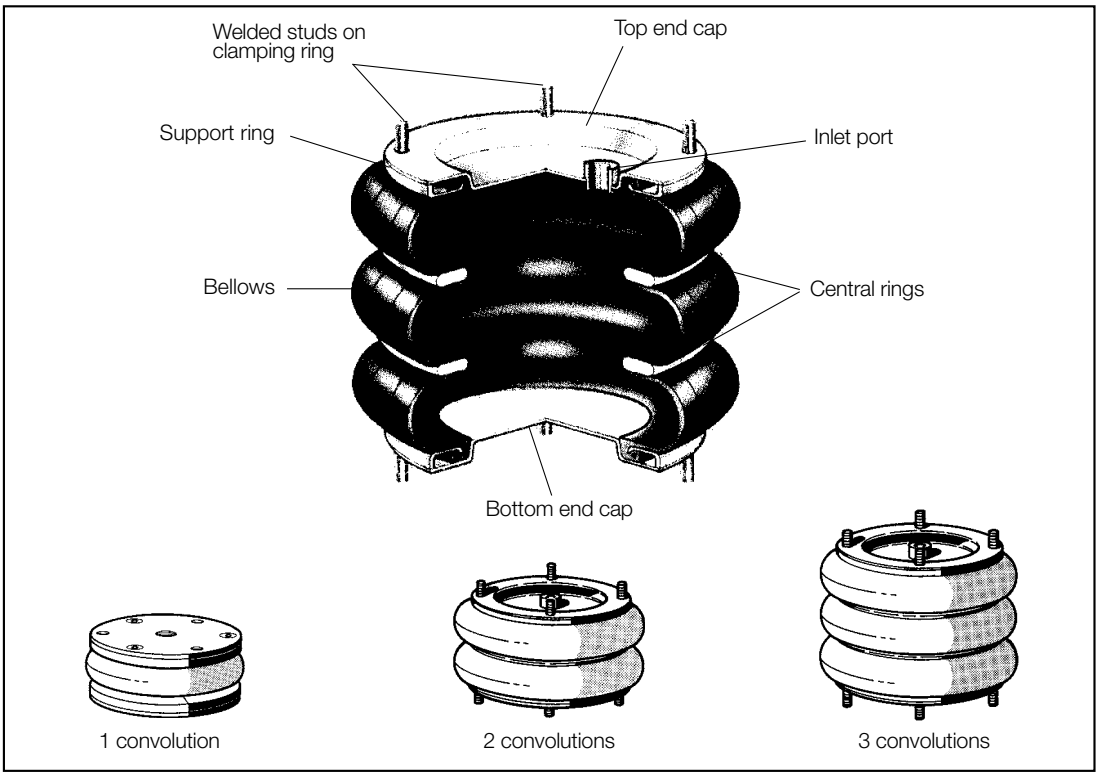
M

N

Air Bellows

Series 9109

Size Ø70 to Ø660 mm (Ø2 3/4" to Ø26")



Air Bellows

N

Air bellows are the ideal choice for applications requiring short stroke, high thrust single acting actuators.

Manufactured from fabric reinforced synthetic rubber in one, two or three convolutions according to stroke and model. They incorporate no reciprocating metal parts and so provide virtually frictionless thrust compared with conventional pneumatic cylinders.

All models are single acting only. The return stroke is provided in part by the natural spring action of the bellows but more usually by the load itself.
The simplicity of construction provides an extremely long, virtually maintenance-free service life even under arduous conditions.

Air bellows are suitable for vibration applications i.e. device feeders at high frequency.

Versions

Air bellows are available with aluminium or steel end plates and support rings depending upon type.

Operation

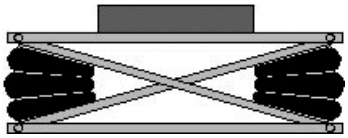
Due to their flexible construction the mounting of Air Bellows is less critical than with conventional pneumatic cylinders, which normally require rigid fixing and guidance and provide only one axis within a limit of 15° between faces. Additionally the axial location of the end plates may be off set by up to 10 mm.

When pressurised Air Bellows will follow the line of leased resistance. Accordingly care must be taken with the mounting geometry in angled applications.

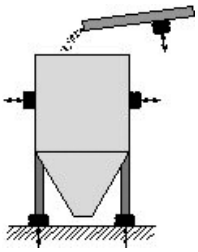
When depressurised Air Bellows will fit in to surprisingly small spaces, especially useful for clamping or moving awkwardly shaped or very heavy loads.

In operation it is recommended that the unit is not allowed to "bottom out" or achieve its maximum height. Various mechanical devices may be employed to achieve this.

Applications



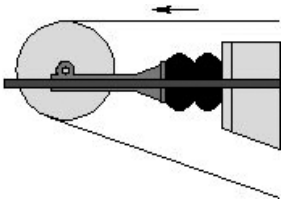
Scissor lift



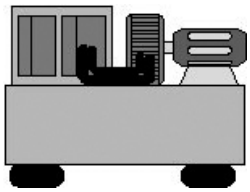
Hopper vibration and damping

Mechanical handling stop

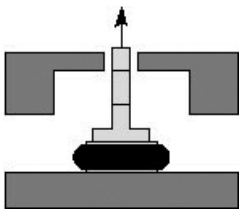
Quick lock device



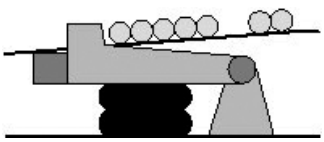
Reel tensioning



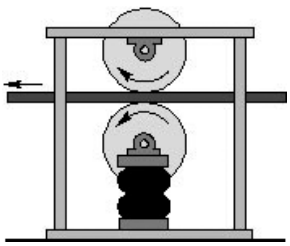
Machine isolation



Direct force

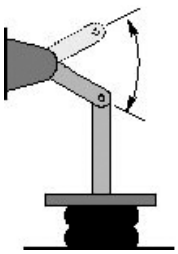


Impact absorbtion

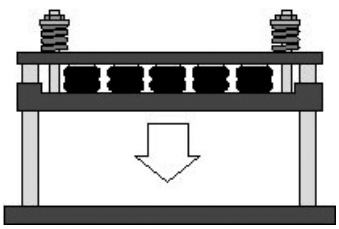


Roller tensioning

Platform lift



Short stroke mechanical linkage



Hot foil stamping press

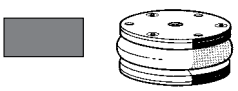
N

Developed forces

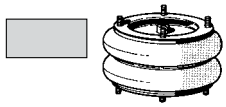
Types bore mm inch	Max force in N for max stroke at 1 bar	Max stroke mm	Height mm min	Height mm max	Load to obtain min. helght in N	Force (in N) at 1 bar Note : Max. force and stroke may exceed values - see columns to the left												
70 2¾	70	50	65	115	140	400	250	70										
	70	65	80	145	140	370	270	150										
110 4½	200	45	45	90	120	1150	700	200										
	280	80	65	145	130	900	750	550	300									
	280	100	100	200	140	900	750	600	450	280								
150 6	350	55	50	105	140	1900	1200	500										
	400	112	78	190	170	1800	1650	1400	1100	800	450							
	400	173	102	275	190	1800	1600	1400	1200	1000	800	600	400					
200 8	850	75	50	125	120	3200	2400	1700	850									
	800	180	70	250	130	3000	2900	2600	2250	1900	1600	1200	800					
	800	225	100	325	150	3000	27500	2500	2250	2000	1750	1500	1250	1050	950			
250 10	1000	100	50	150	100	5000	4000	3300	2100	1000								
	1250	200	70	270	100	4800	4500	4250	3700	3200	2800	2400	1800	1250				
	800	300	100	400	110	4800	4600	4400	4160	3900	3600	3300	2900	2500	2100	1700	1300	800
300 12	2000	100	50	150	90	6500	5900	4900	3500	2000								
	2250	195	75	270	90	6800	6400	6000	5200	4800	4200	3150	2950	2250				
	1800	330	100	430	100	6800	6500	6200	5850	5500	5200	4800	4400	4000	3600	3000	2500	1800
370 14½	3500	115	50	165	80	9600	8800	7700	6300	4500								
	4500	225	70	295	80	10000	9500	9000	8500	7800	7250	6600	6000	5250	4500			
	3500	350	100	450	290	10200	10000	9700	9550	9250	8750	8500	8000	7500	7100	6500	6000	5500
410 16	5300	250	75	325	80	11400	11100	10600	10100	9600	9000	8400	7750	7200	6500	5300		
	4200	375	125	500	640	10500	10250	10000	9600	9250	8900	8600	8200	7700	7250	6750	6250	5750
550 21½	6000	300	90	390	70	24000	23000	22000	20080	19500	18200	17000	15300	13800	12000	10000	8000	6000
660 26	18200	310	90	400	70	30800	30500	30000	29200	28100	26900	25600	24300	23000	21800	20700	19500	18200
Stroke						**0**	**25**	**50**	**75**	**100**	**125**	**150**	**175**	**200**	**225**	**250**	**275**	**300**

N

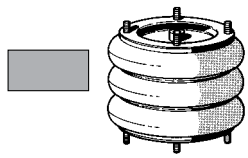
Colour codes for air bellow types



One convolution



Two convolutions



Three convolutions

Selection of Air Bellows

1. Establish the force required in N at working air pressure.
2. Divide the force required by the working air pressure in bar.
3. Select the standard stroke: always choose the next highest stroke to that required.
4. Read upwards in the column to find the figure equal to or greater than the figure which resulted from step 2.
5. Read accross to the left for recommended unit size.

Example

1. Force required 35000 N. Working air pressure 7 bar.
2. Force at 1 bar is: 35000 / 7 = 5000 N.
3. Stroke required 120 mm - Use 125 mm.
4. Use 125 stroke column, 5200 N at 1 bar.
5. Recommended unit is Ø300 mm (i.e. 12") 3 convolutions.

Material

Standard version

End plates

Ø 70, 110, 150*, 550 (i.e. 2¾", 4½", 6"*, 21½")	Aluminium
Ø 150*, 200, 250, 300, 370, 410, 660 (i..e 6"*, 8", 10", 12", 14½", 16", 26")	Steel

Clamping ring, central ring

Ø 70, 110, 150*, 550, 660 (i.e. 2¾", 4½", 6"*, 21½", 26")	Aluminium
Ø 150*, 200, 250, 300, 370, 410 (i.e. 6"*, 8", 10", 12", 14½", 16")	Steel

* Ø 150 (i.e. 6") exists in aluminium and steel version

Steel 304 version (on studs version):
from Ø 150 to Ø 410 (i.e. from 6" to 16")

Bellows

Standard

Natural rubber (NR) (50%), Nitrile butadiene rubber (NBR) (25%), Stryrene butadiene rubber (SBR) (25%)

High temperature version:

Bellows material :	Chlorobutyl

Operation data

Working pressure	Max. 8 bar
Working temperature	-30 °C to +70 °C (in dynamic) -40 °C to +90 °C (in static)
High temperature version:	
	- 30 °C to + 90 °C dynamic - 25 °C to + 100 °C static

Mounting

Ø 70, 110, 150, 550, 660 (i.e. 2¾", 4½", 6", 21½", 26")	Threaded holes
Ø 150, 200, 250, 300, 370, 410 (i.e. 6", 8", 10", 12", 14½", 16")	Studs

Clamping torques for screws and mounting nuts

Ø 70 x 2 and 70 x 3 (i.e. 2¾" x 2 and 2¾" x 3)	5 Nm
Ø 110 x 1 to 110 x 3 (i.e. 4½" x 1 to 4½" x 3)	7 up to 11 Nm
Ø 150 x 1 to 150 x 3 (i.e. 6" x 1 to 6" x 3)	12 Nm
Ø 200 x 1 to 660 x 2 (i.e. 8" x 1 to 26" x 2)	20 to 28 Nm

Main data

- 10 sizes, diameters 70-660 mm (i.e. 2¾"-26")
- Strokes from 65 to 430 mm
- Single, double or triple convolutions
- Angular misalignment: 15° max.
- Axial misalignment: 10 mm max.
- High thrust and frictionless movement
- Maintenance free

Working medium, air quality

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

Recommended air quality for cylinders

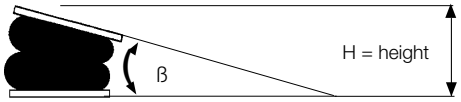
For best possible service life and trouble-free operation, ISO 8573-1 quality class 3.4.3 should be used. This means 5 µm filter (standard filter) dew point +3 ºC for indoor operation (a lower dew point should be selected for outdoor operation) and oil concentration 1.0 mg oil/m^3, which is what a standard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

ISO 8573-1 quality classes

Quality class	Pollution particle size (µm)	Pollution max con-centration (mg/m^3)	Water max. press. dew point (°C)	Oil max con-centration (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	-

N

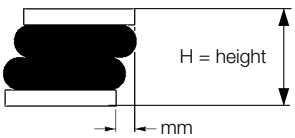
Angular misalignment



It is not possible to combine angular misalignment with axial misalignment.

Ø (mm)	Types	Angle ß = 5° For heights (mm) between	Angle ß = 10° For heights (mm) between	Angle ß =15° For heights (mm) between
70	2¾ x 2	75-100	80-95	/
	2¾ x 3	90-120	95-110	/
110	4½ x 1	60-75	65-70	/
	4½ x 2	/	80-125	105-145
	4½ x 3	125-180	130-170	/
150	6 x 1	65-90	70-85	/
	6 x 2	/	95-160	100-155
	6 x 3	195-255	200-250	/
200	8 x 1	60-105	70-100	/
	8 x 2	/	90-210	100-205
	8 x 3	/	250-305	255-300
250	10 x 1	/	70-115	80-105
	10 x 2	/	95-260	115-250
	10 x 3	/	245-370	280-350
300	12 x 1	/	75-115	90-105
	12 x 2	/	100-255	110-245
	12 x 3	/	230-340	250-310
370	14 ½ x 1	65-145	85-135	/
	14 ½ x 2	/	115-290	135-275
	14½ x 3	/	300-390	310-370
410	16 x 2	/	125-325	135-315
	16 x 3	/	350-480	370-450
550	21½ x 2			
660	26 x 2			

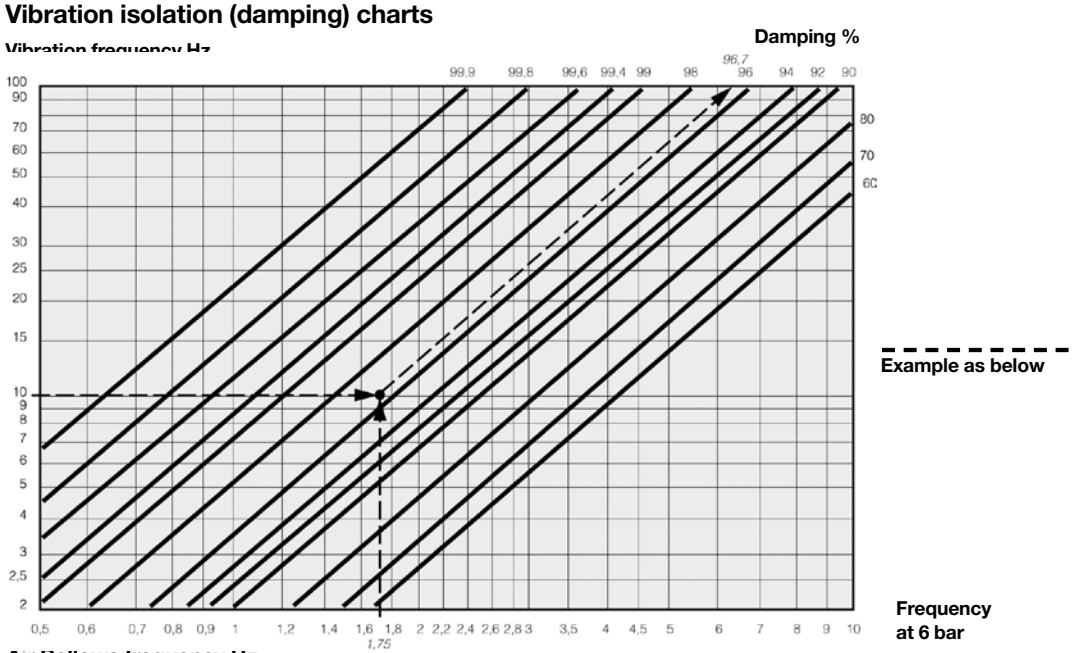
Axial misalignment



The following values are for short time movement during stroke. The air bellows may not be exposed for axial misalignment. permanently.

Ø (mm)	Types	5 m m For heights (mm) between	10 mm For heights (mm) between
70	2¾ x 2	80-100	85-95
	2¾ x 3	90-125	100-115
110	4½ x 1	60-80	70-90
	4½ x 2	75-145	85-135
	4½ x 3	120-200	110-180
150	6 x 1	65-95	75-85
	6 x 2	100-175	110-165
	6 x 3	115-250	105-230
200	8 x 1	70-120	65-115
	8 x 2	85-240	95-230
	8 x 3	110-280	100-260
250	10 x 1	65-145	70-135
	10 x 2	95-270	105-200
	10 x 3	175-390	165-380
300	12 x 1	70-135	80-130
	12 x 2	95-280	105-270
	12 x 3	140-410	150-400
370	14½ x 1	105-170	85-160
	14½ x 2	110-340	120-330
	14½ x 3	160-440	170-430
410	16 x 2	170-325	180-315
	16 x 3	275-500	290-485
550	21½ x 2		
660	26 x 2		

Vibration isolation (damping) charts



Ø mm	Convolution	Types	Frequency 6 bar Hz	Static height mm	Loading 6 bar in kg
70	2	23/4 X 2	3,8	90	150
	3	23/4 X 3	3,2	110	156
110	1	41/2 X 1	3,8	70	335
	2	41/2 X 2	3	100	390
	3	41/2 X 3	2,6	145	378
150	1	6 X 1	3,2	80	640
	2	6 X 2	2,2	140	685
	3	6 X 3	1,9	180	660
200	1	8 x 1	2,77	90	1275
	2	8 x 2	1,95	160	1225
	3	8 x 3	1,75	210	1200
250	1	10 x 1	2,63	100	1960
	2	10 x 2	1,75	170	1900
	3	10 x 3	1,43	250	1770
300	1	12 x1	2,44	100	2975
	2	12 x 2	1,78	170	2910
	3	12 x 3	1,44	250	2930
370	1	141/2 x 1	2,22	110	4555
	2	141/2 x 2	1,61	200	4445
	3	141/2 x 3	1,31	290	4320
410	2	16 x 2	1,44	200	5195
	3	16 x 3	1,24	290	4950
550	2	211/2 x 2	1,49	200	11785

How damping is calculated in %

1. Search the vertical axis of the graph for the frequency of vibration that requires damping.
2. Search for the loading and size of the unit in the lower table.

   (Note that bellows with twin and triple convolutions give better damping but higher static height.)
3. Having chosen the unit required, select the frequency in Hz on the bottom axis on the graph.
4. Where the lines from steps 1 and 3 intersect, follow the diagonal line up to the top right-hand edge of the graph to find the damping value.

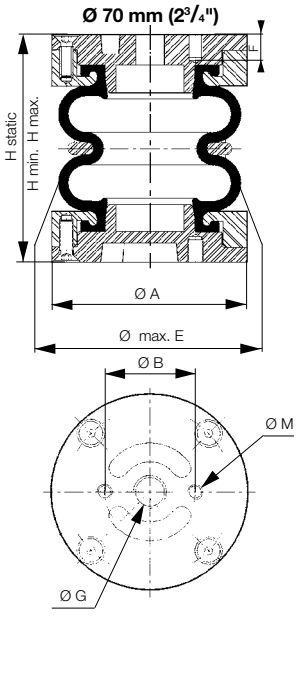
Example

1. Frequency to be damped = 10 Hz.
2. Loading of Air Bellows unit = 1500 kg.
3. The bellows cylinder in this example has twin bellows, Ø 250 (10" x 2) which, according to the table, gives a frequency of 1.75 Hz at 6 bar.
4. This produces 96,7% damping according to the diagram above.

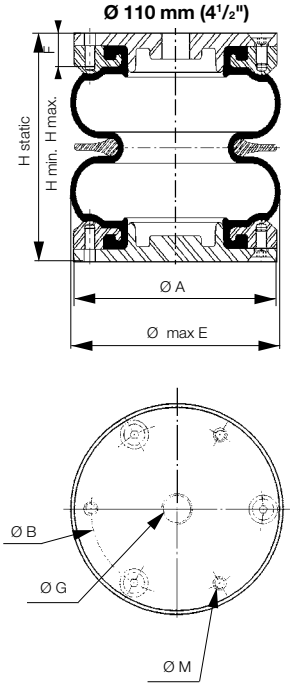
Mounting dimensions

Aluminium end plates version

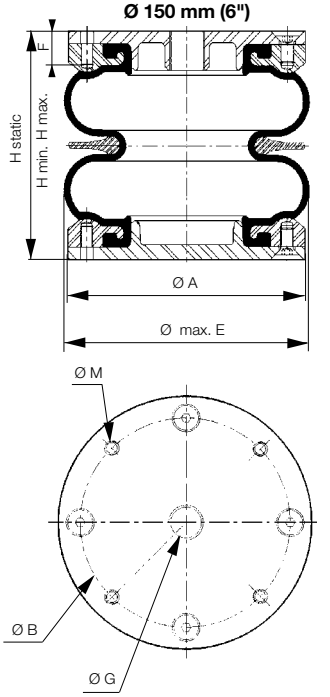
Ø 70 mm (2³/₄")



Ø 110 mm (4¹/₂")

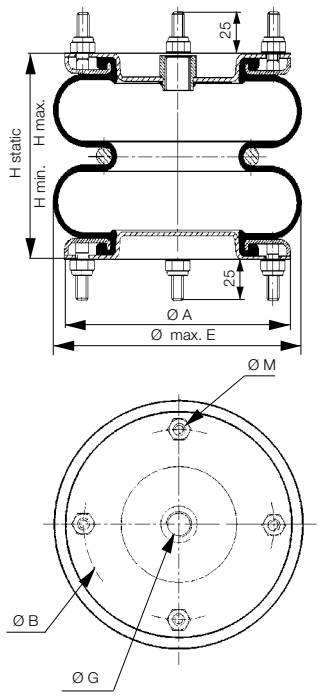


Ø 150 mm (6")



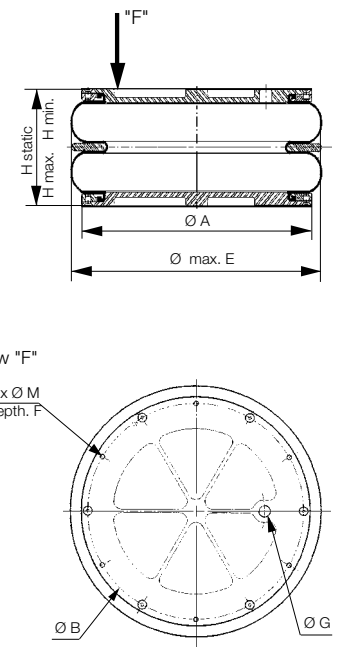
Steel end plates version

Ø 150 to 410 mm (6 to 16")



Aluminium end plates version / **Steel end plates version**

Ø 550 mm (21½") **Ø 660 mm (26")**



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Mounting dimensions

Ø mm	Types	H min mm	H static mm	H max mm	Max stroke mm	ØE static mm	ØE max mm	ØA mm	ØB mm	F mm	ØM mm	Ø Port size	Max. pressure bar	Weight kg
70	2¾ x 2	65	90	115	50	78	80	78	36	9	M6	G1/4	8	0,5
	2¾ x 3	80	110	145	65	78	80	78	36	9	M6	G1/4	8	0,6
110	4½ x 1	45	65	90	45	114	125	110	93	13	M6	G3/8	8	0,8
	4½ x 2	65	100	145	80	114	125	110	93	13	M6	G3/8	8	1
	4½ x 3	100	145	200	100	114	125	110	93	13	M6	G3/8	8	1,2
150	6 x 1 (alu.)	50	80	105	55	153	175	152,5	127	16	M8	G1/2	8	2
	6 x 1 (steel)	50	80	105	55	153	175	155	127		M10	G1/2	8	2,4
	6 x 2 (alu.)	78	130	190	112	153	175	152,5	127	16	M8	G1/2	8	2,7
	6 x 2 (steel)	70	130	190	120	153	175	155	127		M10	G1/2	8	2,7
	6 x 3 (alu.)	102	190	275	173	153	175	152,5	127	16	M8	G1/2	8	3
	6 x 3 (steel)	95	190	275	180	153	175	155	127		M10	G1/2	8	3
200	8 x 1	50	90	125	75	204	230	184	155,5		M10	G1/2	8	3,05
	8 x 2	70	160	250	180	204	230	184	155,5		M10	G1/2	8	3,75
	8 x 3	100	205	325	225	204	230	184	155,5		M10	G1/2	8	4,3
250	10 x 1	50	100	150	100	254	280	210	181		M10	G1/2	8	3,9
	10 x 2	70	170	270	200	254	280	210	181		M10	G1/2	8	5
	10 x 3	100	250	400	300	254	280	210	181		M10	G1/2	8	5,6
300	12 x 1	50	100	150	100	305	330	260	232		M10	G1/2	8	5,2
	12 x 2	75	170	270	195	305	330	260	232		M10	G1/2	8	6,7
	12 x 3	100	250	430	330	305	330	260	232		M10	G1/2	8	8,1
370	14½ x 1	50	110	165	115	368	395	310	282,5		M10	G1/2	8	6,9
	14½ x 2	70	180	295	225	368	395	310	282,5		M10	G1/2	8	9,1
	14½ x 3	100	280	450	350	368	395	310	282,5		M10	G1/2	8	10
410	16 x 2	75	200	325	250	406	440	310	282,5		M10	G1/2	8	9,7
	16 x 3	125	300	500	375	406	440	310	282,5		M10	G1/2	8	12,5
550	21½ x 2	90	200	390	300	546	580	498,5	470	19	M10	G3/4	7	20,6
	21½ x 2 (Air Bellows less end caps)	90	200	390	300	546	580	498,5	470		M10	G3/4	8	11,5
660	26 x 2	90	200	400	310	660	700	601	470	19	M10	G3/4	8	23

Clamping torques for screws and mounting nuts

Ø 70 x 2 and 70 x 3 (i.e. 2¾" x 2 and 2¾" x 3) 5 Nm

Ø 110 x 1 to 110 x 3 (i.e. 4½" x 1 to 4½" x 3) 7 to11 Nm

Ø 150 x 1 to 150 x 3 (i.e. 6" x 1 to 6" x 3) 12 Nm

Ø 200 x 1 to 660 x 2 (i.e. 8" x 1 to 26" x 2) 20 to 28 Nm

It is imperative that external machanical stops are used to limit the stroke. The units should not achieve maximum stroke or be allowed to "bottom out".

Air Bellows may not be stacked, use singly only.

Air Bellows minimum and maximum volume

Ø mm	Types	Minimumvolume* (at 4 bar) cm³	Maximum volume** (at 4 bar) cm³
70	2¾ x 2	75	155
	2¾ x 3	98	206
110	4½ x 1	7	145
	4½ x 2	175	590
	4½ x 3	400	1025
150	6 x 1 (alu.)	70	815
	6 x 1 (steel)	70	815
	6 x 2 (alu.)	120	1670
	6 x 2 (steel)	120	1670
	6 x 3 (alu.)	150	2550
	6 x 3 (steel)	150	2550
200	8 x 1	300	280
	8 x 2	680	4850
	8 x 3	1250	5750
250	10 x 1	400	4400
	10 x 2	1100	8200
	10 x 3	2300	13000
300	12 x 1	793	6400
	12 x 2	500	11900
	12 x 3	8000	21350
370	14½ x 1	910	10700
	14½ x 2	1810	21500
	14½ x 3	4000	33000
410	16 x 2	3610	28300
	16 x 3	9000	39000
550	21½ x 2	10610	55000
660	26 x 2		

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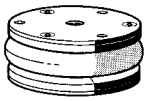
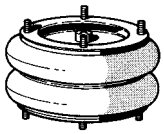
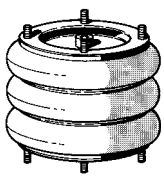
* The minimum volume corresponds to the minimal height of the Air Bellow

** The maximum volume corresponds to the maximal height of the Air Bellow

It is imperative that external machanical stops are used to limit the stroke. The units should not achieve maximum stroke or be allowed to "bottom out".

Air Bellows may not be stacked, use singly only.

Orders codes

Symbol	Ø mm	Types	Port size	Max stroke mm	Order code Standard	Order code High temp	Order code Stainless
One convolution 	**110**	4½ x 1	G3/8	45	**9109400**	**9109600**	**/**
	150	6 x 1 (alu.)	G1/2	55	**9109004A**	**9109204A**	**/**
	150	6 x 1 (steel)	G1/2	55	**9109004**	**9109204**	**9109004N**
	200	8 x 1	G1/2	75	**9109014**	**9109214**	**9109014N**
	250	10 x 1	G1/2	100	**9109024**	**9109224**	**9109024N**
	300	12 x 1	G1/2	100	**9109044**	**9109244**	**9109044N**
	370	14½ x 1	G1/2	115	**9109064**	**9109264**	**9109064N**
Two convolutions 	**70**	2¾ x 2	G1/4	50	**9109009**	**9109509**	**/**
	110	4½ x 2	G3/8	80	**9109401**	**9109502**	**/**
	150	6 x 2 (alu.)	G1/2	112	**9109001A**	**9109201A**	**/**
	150	6 x 2 (steel)	G1/2	112	**9109001**	**9109201**	**9109001N**
	200	8 x 2	G1/2	180	**9109011**	**9109211**	**9109011N**
	250	10 x 2	G1/2	200	**9109021**	**9109221**	**9109021N**
	300	12 x 2	G1/2	195	**9109041**	**9109241**	**9109041N**
	370	14½ x 2	G1/2	225	**9109061**	**9109261**	**9109061N**
	410	16 x 2	G1/2	250	**9109171**	**9109271**	**9109171N**
	550	21½ x 2 21½ x 2 (Air Bellows less end caps)	G3/4	300	**9109150** **9109153**	**9109250** **/**	**/** **/**
	660	26 x 2	G3/4	310	**9109156**	**/**	**/**
Three convolutions 	**70**	2¾ x 3	G1/4	65	**9109010**	**9109510**	**/**
	110	4½ x 3	G3/8	100	**9109402**	**9109503**	**/**
	150	6 x 3 (alu.)	G1/2	173	**9109007A**	**9109207A**	**/**
	150	6 x 3 (steel)	G1/2	173	**9109007**	**9109207**	**9109007N**
	200	8 x 3	G1/2	225	**9109017**	**9109219**	**9109017N**
	250	10 x 3	G1/2	300	**9109031**	**9109231**	**9109031N**
	300	12 x 3	G1/2	330	**9109051**	**9109251**	**9109051N**
	370	14½ x 3	G1/2	350	**9109069**	**9109269**	**9109069N**
	410	16 x 3	G1/2	375	**9109177**	**9109275**	**9109177N**

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Spare parts

Ø mm	Types	Bellows Standard	Bellows High temp.	End plates Without inlet port	End plates With inlet port	Support ring	Central ring
One convolution							
110	4½ x 1	**9109145**	**9109288**	**9109188**	**9109187**	**9109186**	**9109184**
150	6 x 1 (alu.) 6 x 1 (steel)	**9109191** **9109191**	**9109391** **9109391**	**9109070A** **9109070**	**9109075A** **9109075**	**9109080A** **9109080**	**9109098A** **9109098**
200	8 x 1	**9109192**	**9109392**	**9109071**	**9109076**	**9109086**	**9109099**
250	10 x 1	**9109146**	**9109393**	**9109072**	**9109077**	**9109087**	**9109100**
300	12 x 1	**9109195**	**9109395**	**9109073**	**9109078**	**9109088**	**9109101**
370	14½ x 1	**9109197**	**9109397**	**9109074**	**9109178**	**9109089**	**9109170**
Two convolutions							
70	2¾ x 2	**9109152**	**9109303**	**9109065**	**9109181**	**9109193**	**9109209**
110	4½ x 2	**9109189**	**9109289**	**9109188**	**9109187**	**9109186**	**9109184**
150	6 x 2 (alu.) 6 x 2 (steel)	**9109091** **9109091**	**9109291** **9109291**	**9109070A** **9109070**	**9109075A** **9109075**	**9109080A** **9109080**	**9109098A** **9109098**
200	8 x 2	**9109092**	**9109292**	**9109071**	**9109076**	**9109086**	**9109099**
250	10 x 2	**9109093**	**9109293**	**9109072**	**9109077**	**9109087**	**9109100**
300	12 x 2	**9109095**	**9109295**	**9109073**	**9109078**	**9109088**	**9109101**
370	14½ x 2	**9109097**	**9109297**	**9109074**	**9109178**	**9109089**	**9109170**
410	16 x 2	**9109199**	**9109298**	**9109074**	**9109178**	**9109089**	**9109170**
550	21½ x 2	**9109190**	**9109290**	**9109068**	**9109067**	**9109183**	**9109185**
660	26 x 2	**9109198**	**9109302**	**9109155**	**9109157**	**9109183**	**9109185**
Three convolutions							
70	2¾ x 3	**9109090**	**9109304**	**9109065**	**9109181**	**9109193**	**9109209**
110	4½ x 3	**9109147**	**9109287**	**9109188**	**9109187**	**9109186**	**9109184**
150	6 x 3 (alu.) 6 x 3 (steel)	**9109149** **9109149**	**9109286** **9109286**	**9109070A** **9109070**	**9109075A** **9109075**	**9109080A** **9109080**	**9109098A** **9109098**
200	8 x 3	**9109151**	**9109300**	**9109071**	**9109076**	**9109086**	**9109099**
250	10 x 3	**9109094**	**9109294**	**9109072**	**9109077**	**9109087**	**9109100**
300	12 x 3	**9109096**	**9109296**	**9109073**	**9109078**	**9109088**	**9109101**
370	14½ x 3	**9109148**	**9109301**	**9109074**	**9109178**	**9109089**	**9109170**
410	16 x 3	**9109200**	**9109299**	**9109074**	**9109178**	**9109089**	**9109170**

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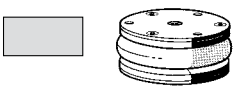
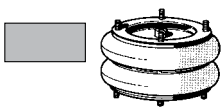
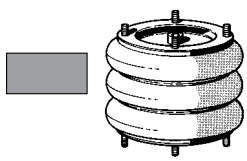
Colour codes for air bellow types



One convolution



Two convolutions



Three convolutions

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Air Bellows

Series SP

Bellows cylinders are single acting. They are made of neoprene rubber reinforced by 2 layers of nylon cord.
The external diameter of the bellows is largest when the cylinder is compressed. When air is introduced, they cylinder extends and the bellows diameter decreases. The longer the stroke, the more the force decreases.

There are two basic types:

Single and double convolution.

Single convolution: maximum stroke length 110 mm.
Double convolution: maximum stroke length 240 mm.
Standard delivery includes fitted end plates for the particular type.

Technical Notes

Force
The force available depends on the stroke length: see the force diagrams in the data sheets.

Maximum permissible length
Depends on the operating pressure and is shown in the force diagrams: it must not be exceeded, to avoid damage to the cylinder. The stroke must therefore be limited by an external stop.

Minimum permissible length
Is shown in the dimension tables and must be observed: be sure to provide an external limit stop.

Medium
Air, Water (with glycol additives) and brake fluid. (No hydraulic fluids)

Oil resistance
The amount of oil necessary for lubricating pneumatic systems and moderate external oil contamination are harmless.

Operating pressure range
Is 2-8 bar for the standard 2 ply cylinder.

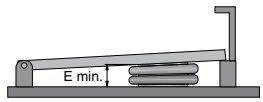
Temperature range
-40 to +70°C

Special versions
Are available on request, e.g. larger diameters, higher temperature ranges, open ended with mounting rings, etc..

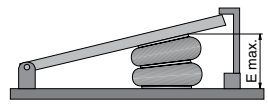
Maximum permissible pitch

The pitch of the end plates must not exceed 30°.
Minimum permissible length (E_{min}) and maximum permissible length (E_{max}), must be observed.

Position at minimum permissible length



Position at maximum permissible length



Installation Size

Series	Port size	Type	Force
	G1/4	SP-1B04	See force diagrams
	G1/4	SP-1B05	
	G1/4	SP-1B07	
	G3/4	SP-1B12	
	G3/4	SP-1B22	
	G3/4	SP-1B34	
	G1/4	SP-2B04	
	G1/4	SP-2B05	
	G1/4	SP-2B05A	
	G1/4	SP-2B07	
	G3/4	SP-2B12	
	G3/4	SP-2B22	
	G3/4	SP-2B34	

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Bellows Cylinder

Series SP-1B..
Single convolution

Characteristics

Characteristics	Symbol	Unit	Description
System			Single acting
Mounting			See drawing
Tube connection			Thread
Ambient temperature range	T_{min} T_{max}	°C °C	- 40 higher temperature ranges on request +70
Installation			Max. pitch of end plates 30°, max. deviation of axes to one another must be less than 10 mm. Both limits of stroke have to be limited by external stops. Return has to be effected by external force.
Medium			Filtered and unlubricated compressed air
Material			End plates of steel, galvanized and chromium anodized; Mounting rings of aluminium. Bellows-neoprene with nylon cord lining.
Operating pressure range	p_{max}	bar	8 (for cushioning duty = 7 bar)

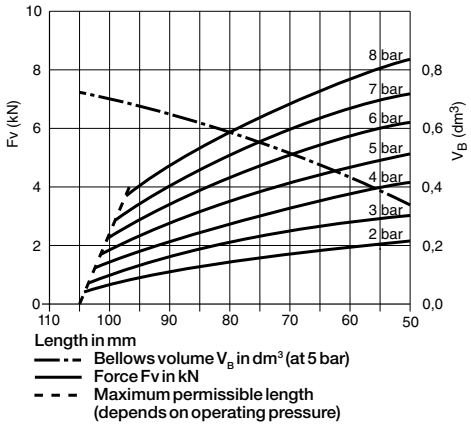
Stroke, Weight, Frequency

Type	Stroke max. (mm)	Weight (mass) (kg)	Frequency[1] (Hz)	
SP-1B04	55	0.85	3	(when E = 80)
SP-1B05	45	1.0	4	(when E = 75)
SP-1B07	90	2.1	2.8	(when E = 90)
SP-1B12	100	2.7	2.4	(when E = 100)
SP-1B22	110	4.5	2.1	(when E = 120)
SP-1B34	110	5.5	2.1	(when E = 120)

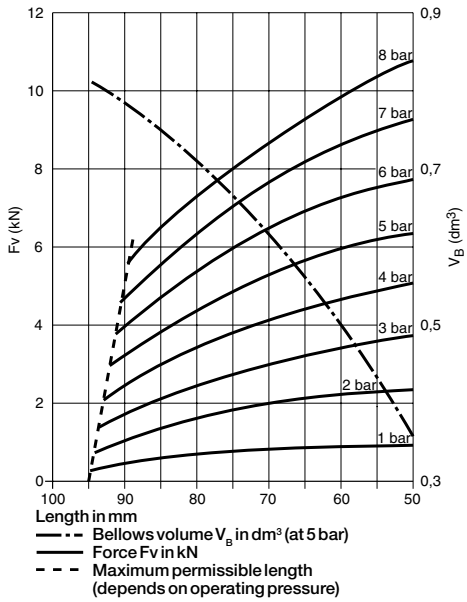
[1] Nominal values at p_{max}

Force Diagrams – Series SP-1B..

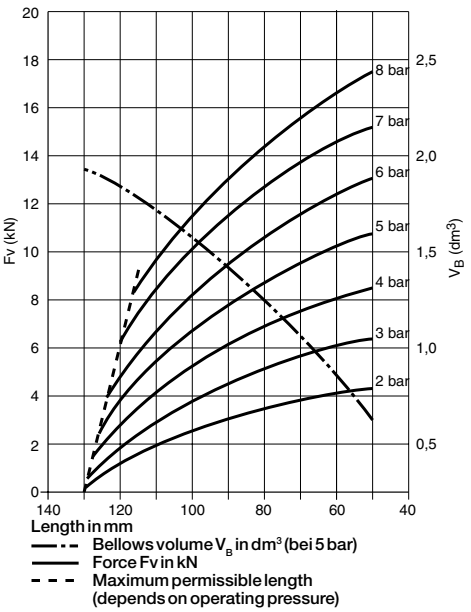
Type: SP-1B04, Stroke: max. 55 mm



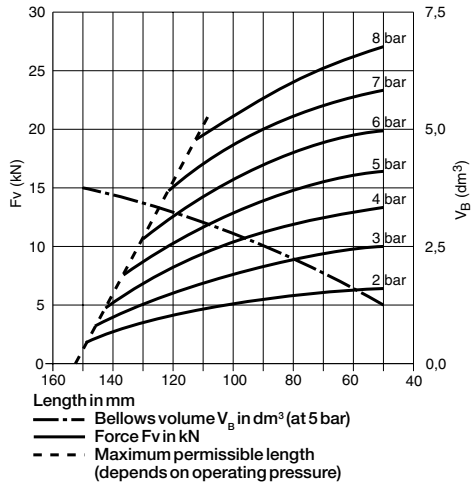
Type: SP-1B05, Stroke: max. 45 mm



Type: SP-1B07, Stroke: max. 90 mm

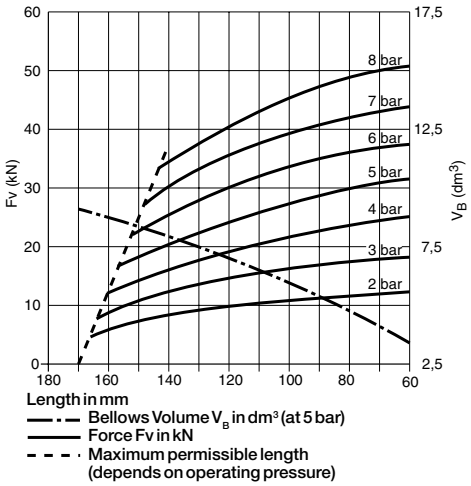


Type: SP-1B12, Stroke: max. 100 mm

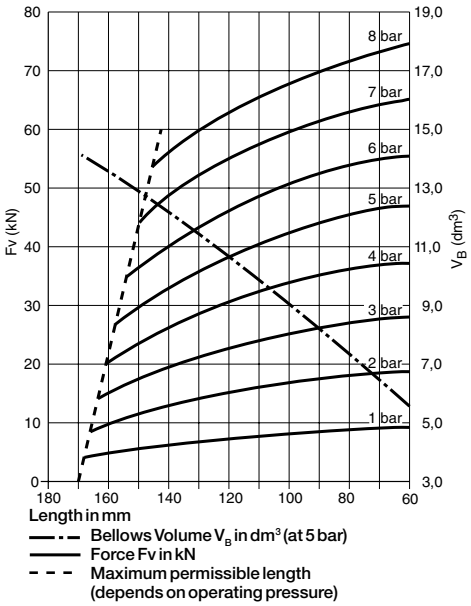


Force Diagrams – Series SP-1B..

Type: SP-1B22, Stroke: max. 110 mm



Type: SP-1B34, Stroke: max. 110 mm



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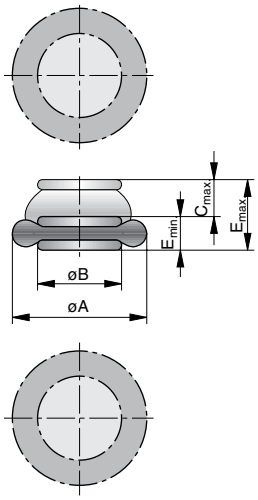
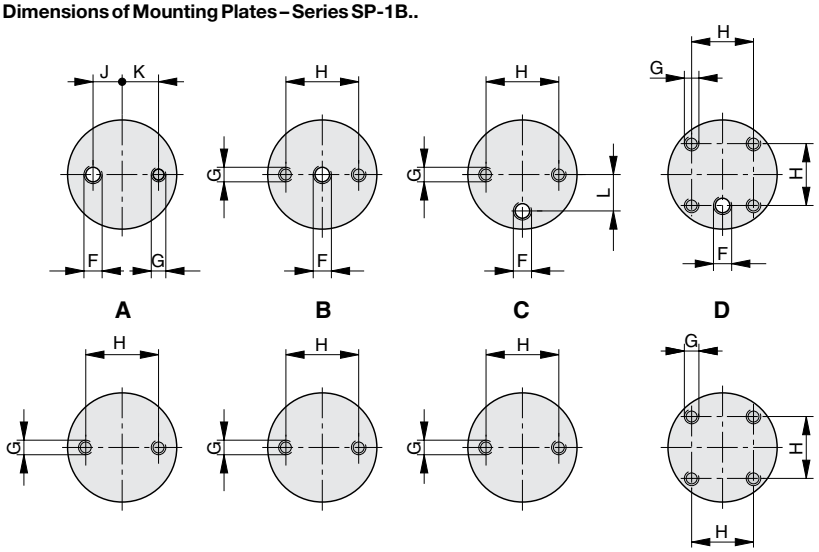
Dimensions Series SP-1B..



Dimensions of Mounting Plates – Series SP-1B..



Dimension Table (mm) and Order Instructions

Type	Order-No.	Mounting plate	ØA at 8 bar	ØB	C_{max}**	E_{max}**	E_{min}	F	G*	H	J	K	L
SP-1B04	KY 9500	A	150	88	55	105	50	G1/4	M8	22	9	11	–
SP-1B05	KY 8401	B	165	110	45	95	50	G1/4	M8	44.5	–	–	–
SP-1B07	KY 9501	C	205	135	80	130	50	G1/4	M8	54	–	–	27
SP-1B12	KY 9502	C	250	160	100	150	50	G3/4	M8	89	–	–	38
SP-1B22	KY 9590	C	350	229	110	170	60	G3/4	M12	157.5	–	–	73
SP-1B34	KY 8010	D	420	288	110	170	60	G3/4	M8	158.8	–	–	–

* 15 deep
**These dimensions depend on the operating pressure: see force diagrams

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Bellows Cylinder

Series SP-2B..
Double convolution

Characteristics

Characteristics	Symbol	Unit	Description
System			Single acting
Mounting			See drawing
Tube connection			Thread
Ambient temperature range	T_{min} T_{max}	°C °C	- 40 higher temperature ranges on request +70
Installation			Max. pitch of end plates 30°, max. deviation of axes to one another must be less than 10 mm. Both limits of stroke have to be limited by external stops. Return has to be effected by external force.
Medium			Filtered and unlubricated compressed air
Material			End plates of steel, galvanized and chromium anodized; Mounting rings of aluminium. Bellows - neoprene with nylon cord lining
Operating pressure range	p_{max}	bar	8 (for cushioning duty = 7 bar)

Stroke, Weight, Frequency

Type	Stroke max. (mm)	Weight (mass) (kg)	Frequency [1] (Hz)
SP-2B04	110	1.1	2.3 (when E = 80)
SP-2B05	80	1.2	2.5 (when E = 120
SP-2B05A	105	1.25	2.3 (when E = 140)
SP-2B07	125	2.6	1.9 (when E = 160)
SP-2B12	150	3.5	1.8 (when E = 180)
SP-2B22	170	4.9	1.7 (when E = 190)
SP-2B34	170	6.8	1.7 (when E = 190)

[1] Nominal values at p_{max}

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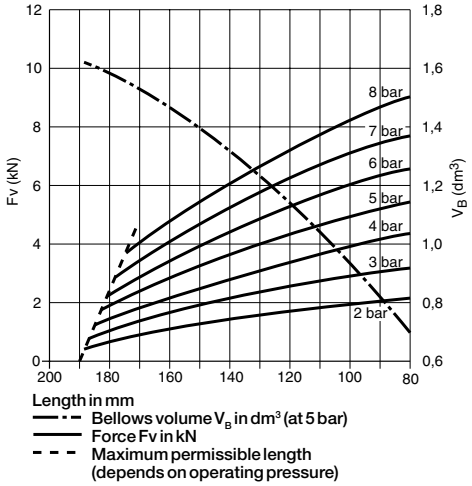
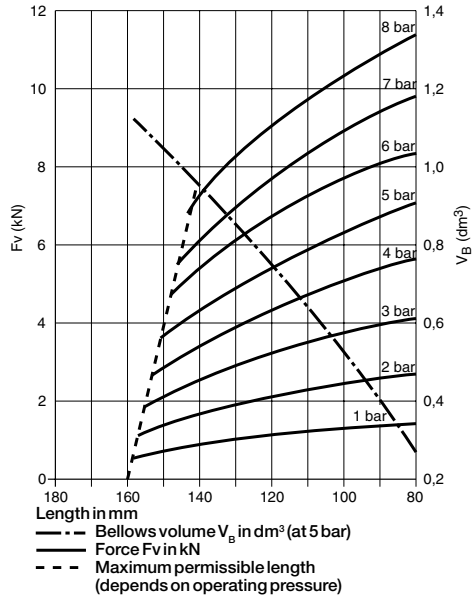
Force Diagrams – Series SP-2B..

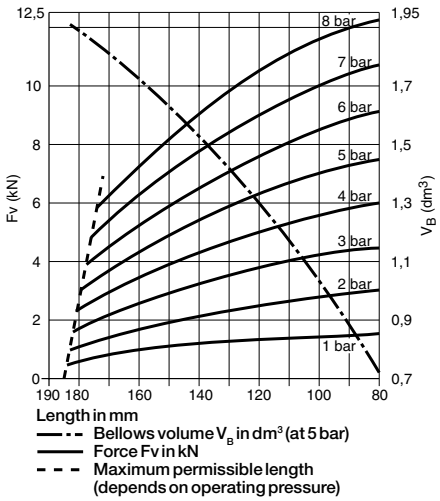
Type: SP-2B04, Stroke: max. 110 mm



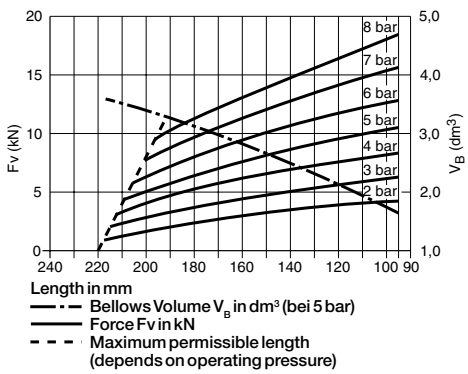
Type: SP-2B05, Stroke: max. 80 mm



Type: SP-2B05A, Stroke: max. 105 mm

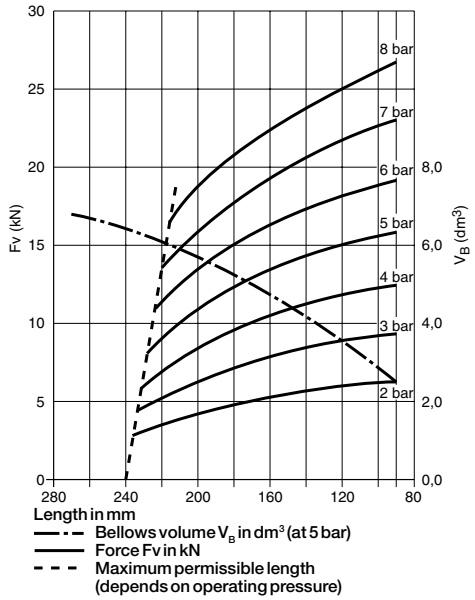


Type: SP-2B07, Stroke: max. 125 mm

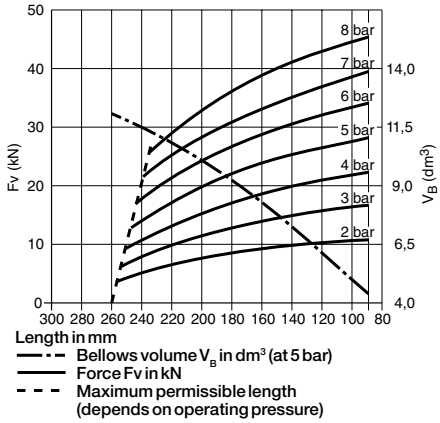


Force Diagrams – Series SP-2B..

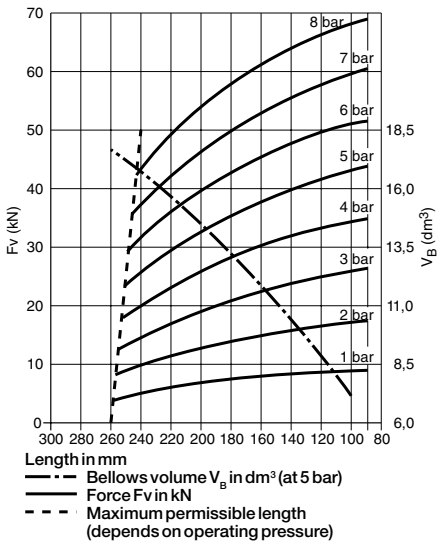
Type: SP-2B12, Stroke: max. 150 mm



Type: SP-2B22, Stroke: max. 170 mm



Type: SP-2B34, Stroke: max. 170 mm



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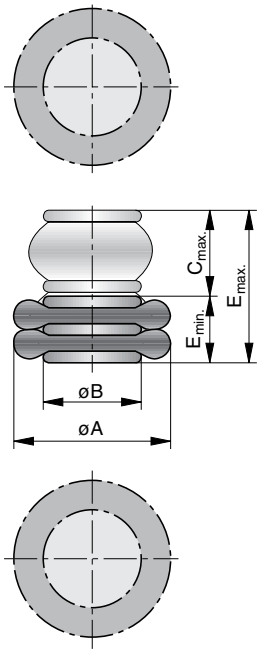
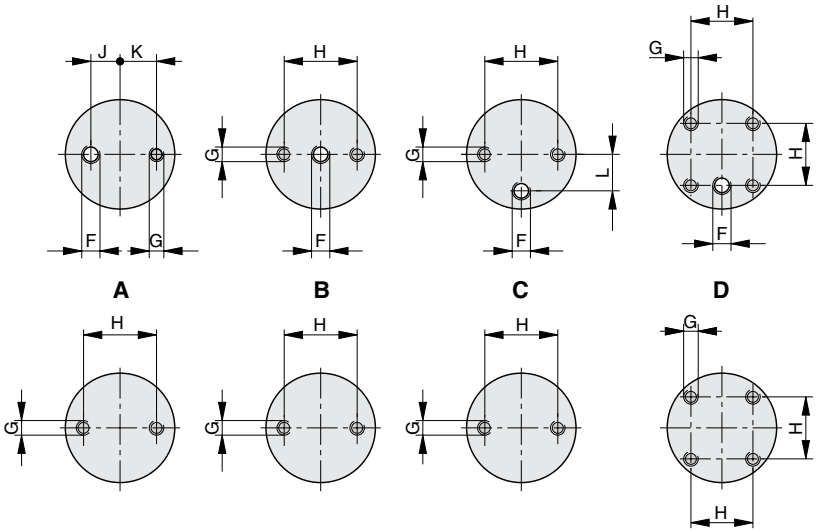
Dimensions
Series SP-2B..



Dimensions of Mounting Plates – Series SP-2B..



Dimension Table (mm) and Order Instructions

Type	Order-No.	Mounting	ØA at 8 bar	ØB	C_{max}**	E_{max}**	E_{min}	F	G*	H	J	K	L
SP-2B04	KY 9612	A	165	82	110	190	80	G1/4	M8	22	9	11	-
SP-2B05	KY 8011	B	165	110	80	160	80	G1/4	M8	44.5	-	-	-
SP-2B05A	KY 8012	B	170	110	105	185	80	G1/4	M8	44.5	-	-	-
SP-2B07	KY 9589	C	215	135	125	220	95	G1/4	M8	54	-	-	27
SP-2B12	KY 9611	C	250	160	150	240	90	G3/4	M8	89	-	-	38
SP-2B22	KY 9591	C	320	229	170	260	90	G3/4	M12	157.5	-	-	73
SP-2B34	KY 8007	D	390	288	170	260	90	G3/4	M8	158.8	-	-	-

*15 deep
**These dimensions depend on the operating pressure: see force diagrams

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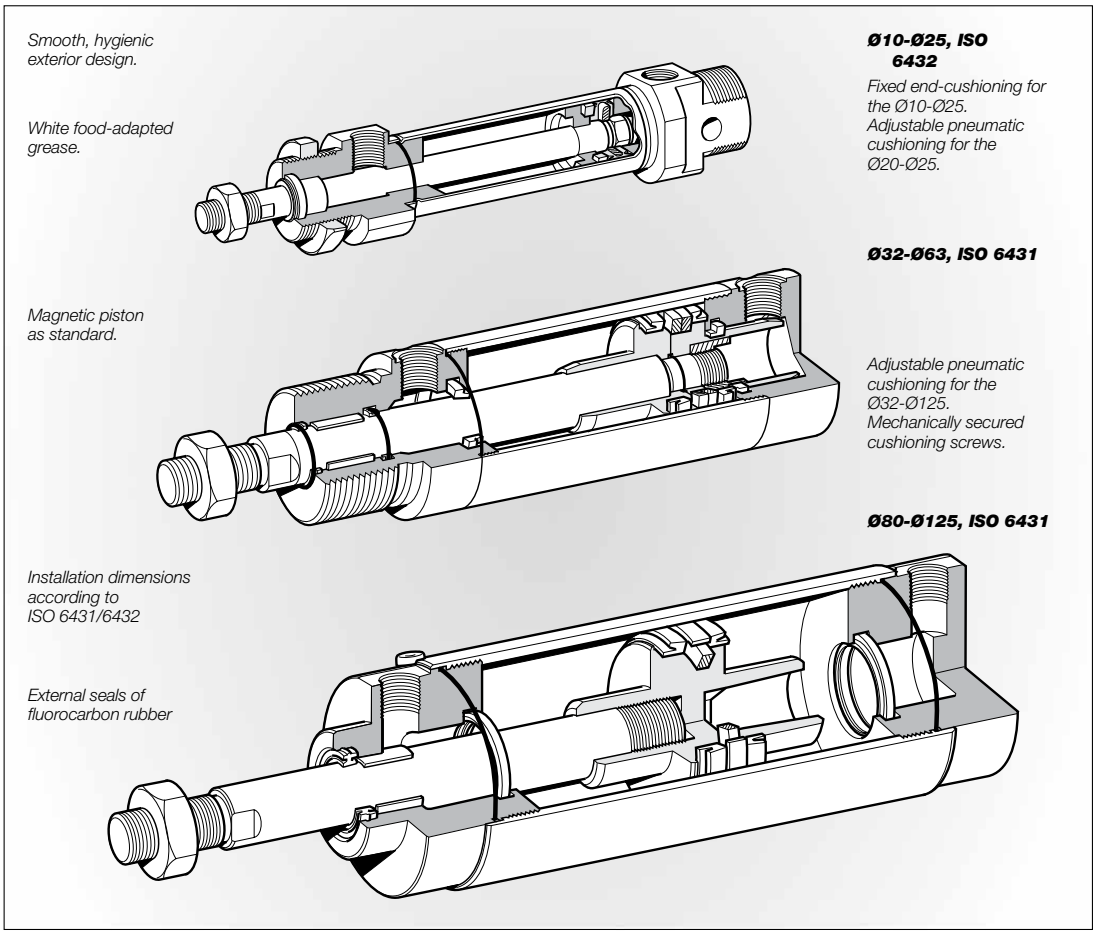
Stainless Steel Cylinders

P1S Series
According to ISO 6431 / 6432



Stainless steel cylinders

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Parker Pneumatic's range of stainless steel cylinders has been specially designed for use in difficult environments. Hygienic design, external seals of fluorianted 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-cylinders

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.

= Products suitable for the food industry.

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

Through piston rods (not Ø32-Ø63)

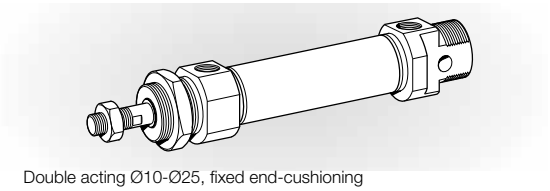
Single-acting cylinders with spring return, (Ø10-Ø25)

High-temperature versions for operation in temperature range Ø10 to Ø16 mm from -10 °C to +120 °C (not magnetic pistons)

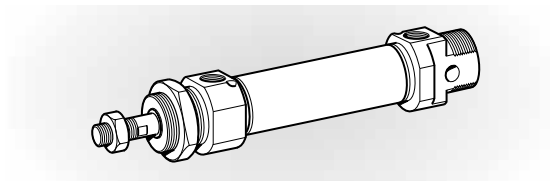
Ø20 to Ø125 mm from -10 °C to +150 °C (not magnetic pistons)

Low-temperature versions for operation in temperature range from -40 °C to +60 °C (not magnetic pistons, not Ø32-Ø63)

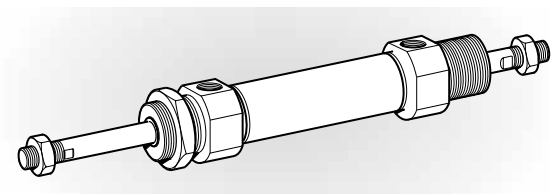
Cylinders with different mounts (Ø32-Ø125)



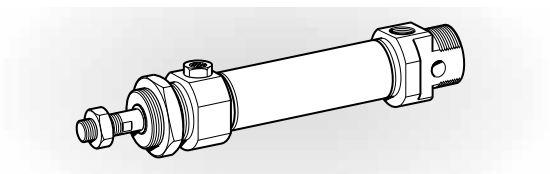
Double acting Ø10-Ø25, fixed end-cushioning



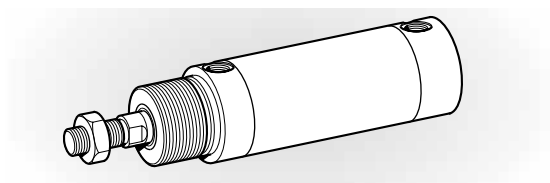
Double acting Ø20-Ø25, adjustable end-cushioning



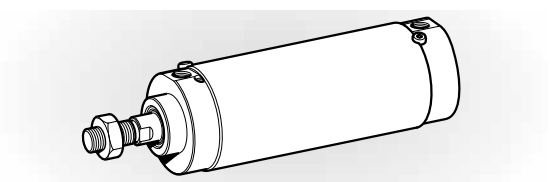
Double acting Ø10-Ø25, through piston rod



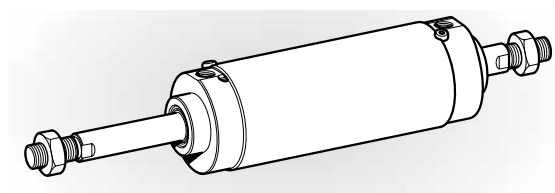
Single acting Ø10-Ø25, spring return



Double acting Ø32-Ø63



Double acting Ø80-Ø125



Double acting Ø80-Ø125, through piston rod

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Guide for selecting suitable tubing

The selection of the correct size of tubing is often based on experience, with no great thought to optimizing energy efficiency and cylinder velocity. This is usually acceptable, but making a rough calculation can result in worthwhile economic gains.

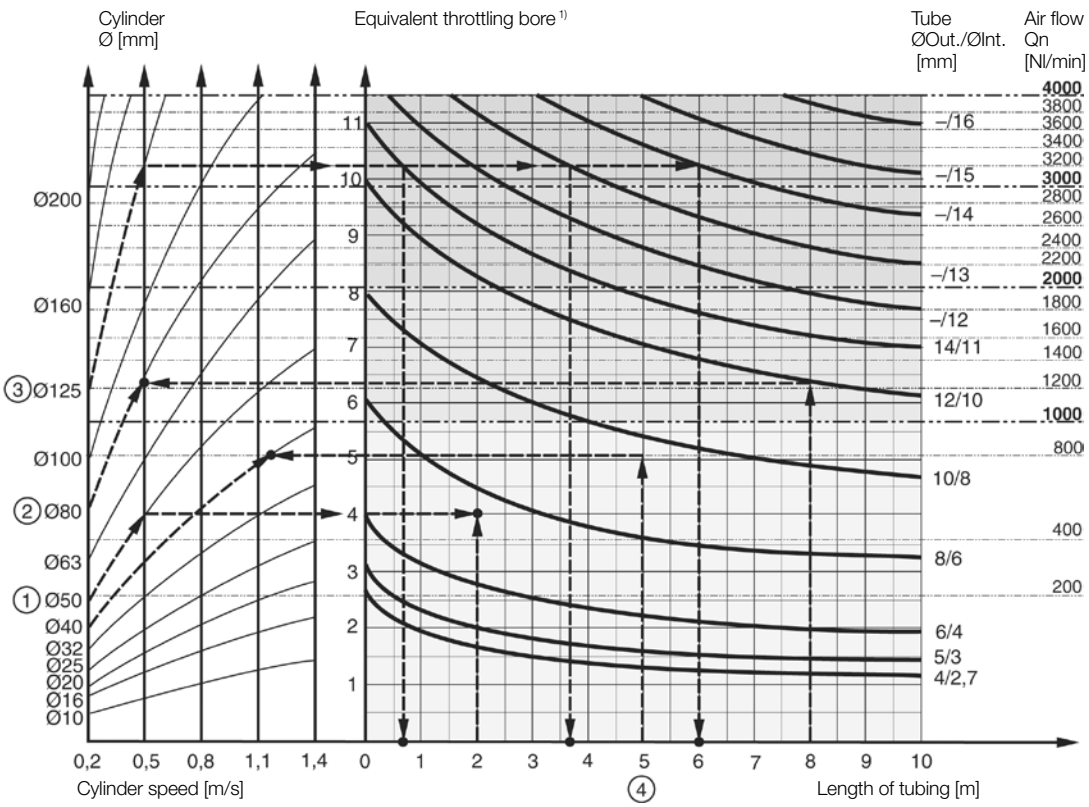
The following is the basic principle:

1. The primary line to the working valve could be over sized (this does not cause any extra air consumption and consequently does not create any extra costs in operation).
2. The tubes between the valve and the cylinder should, however, be optimized according to the principle that an insufficient bore throttles the flow and thus limits the cylinder speed, while an oversized pipe creates a dead volume which increases the air consumption and filling time.

The chart below is intended to help when selecting the correct size of tube to use between the valve and the cylinder.

The following prerequisites apply:

The *cylinder load should be about 50%* of the theoretical force (= normal load). A lower load gives a higher velocity and vice versa. The tube size is selected as a function of the *cylinder bore*, the desired *cylinder velocity* and the *tube length* between the valve and the cylinder.
If you want to use the capacity of the valve to its maximum, and obtain maximum speed, the tubing should be chosen so that they at least correspond with the equivalent restriction diameter (see description below), so that the tubing does not restrict the total flow. This means that a short tubing must have at least the equivalent restriction diameter. If the tubing is longer, choose it from the table below. Straight fittings should be chosen for highest flow rates. (Elbow and banjo fittings cause restriction.)



1) The "equivalent throttling bore" is a long throttle (for example a tube) or a series of throttles (for example, through a valve) converted to a short throttle which gives a corresponding flow rate. This should not be confused with the "orifice" which is sometimes specified for valves. The value for the orifice does not normally take account of the fact that the valve contains a number of throttles.

2) Qn is a measure of the valve flow capacity, with flow measured in litre per minute (l/min) at 6 bar(e) supply pressure and 1 bar pressure drop across the valve.

Example ①: Which tube diameter should be used?

A 50 mm bore cylinder is to be operated at 0.5 m/s. The tube length between the valve and cylinder is 2 m. In the diagram we follow the line from 50 mm bore to 0.5 m/s and get an "equivalent throttling bore" of approximately 4 mm. We continue out to the right in the chart and intersect the line for a 2 m tube between the curves for 4 mm (6/4 tube) and 6 mm(8/6 tube). This means that a 6/4 tube throttles the velocity somewhat, while an 8/6 tube is a little too large. We select the 8/6 tube to obtain full cylinder velocity.

Example ②: What cylinder velocity will be obtained?

A 80 mm bore cylinder will be used, connected by 8 m 12/10 tube to a valve with Qn 1200 Nl/min. What cylinder velocity will we get? We refer to the diagram and follow the line from 8 mm tube length up to the curve for 12/10 tube. From there, we go horizontally to the curve for the Ø80 cylinder. We find that the velocity will be about 0.5 m/s.

Example ③: What is the minimum inner diameter and maximum lenght of tube?

For a application a 125 mm bore cylinder will be used. Maximum velocity of piston rod is 0.5 m/s. The cylinder will be controlled by a valve with Qn 3200 Nl/min. What diameter of tube can be used and what is maximum lenght of tube.

We refer to the diagram. We start at the left side of the diagram cylinder Ø125. We follow the line until the intersection with the velocity line of 0.5 m/s. From here we draw a horizontal line in the diagram. This line shows us we need an equivalent throttling bore of approximately 10 mm. Following this line horizontally we cross a few intersections. These intersections shows us the minimum inner diameter (rightside diagram) in combination with the maximum length of tube (bottomside diagram).

For example:
Intersection one: When a tube (14/11) will be used, the maximum length of tube is 0.7 meter.
Intersection two: When a tube (—/13) will be used, the maximum length of tube is 3.7 meter.
Intersection three: When a tube (—/14) will be used, the maximum length of tube is 6 meter.

Example 4 : Determining tube size and cylinder velocity with a particular cylinder and valve?

For an application using a 40 mm bore cylinder with a valve with Qn=800 Nl/min. The distance between the cylinder and valve has been set to 5 m.
Tube dimension: What tube bore should be selected to obtain the maximum cylinder velocity? Start at pipe length 5 m, follow the line up to the intersection with 800 Nl/min. Select the next largest tube diameter, in this case Ø10/8 mm.
Cylinder velocity: What maximum cylinder velocity will be obtained? Follow the line for 800 Nl/min to the left until it intersects with the line for the Ø40 mm cylinder. In this example, the speed is just above 1.1 m/s.

Valve series with respective flows in Nl/minute

Valve series	Qn in Nl/Min
Valvetronic Solstar	33
Interface PS1	100
Adex A05	173
Moduflex size 1, (2 x 3/2)	220
Valvetronic PVL-B 5/3 closed centre, 6 mm push in	290
Moduflex size 1, (4/2)	320
B43 Manual and mechanical	340
Valvetronic PVL-B 2 x 2/3, 6 mm push in	350
Valvetronic PVL-B 5/3 closed centre, G1/8	370
Compact Isomax DX02	385
Valvetronic PVL-B 2 x 3/2 G1/8	440
Valvetronic PVL-B 5/2, 6 mm push in	450
Valvetronic PVL-B 5/3 vented centre, 6 mm push in	450
Moduflex size 2, (2 x 3/2)	450
Flowstar P2V-A	520
Valvetronic PVL-B 5/3 vented centre, G1/8	540
Valvetronic PVL-B 5/2, G1/8	540
Valvetronic PVL-C 2 x 3/2, 8 mm push in	540
Adex A12	560
Valvetronic PVL-C 2 x 3/2 G1/8	570
Compact Isomax DX01	585
VIKING Xtreme P2LAX	660
Valvetronic PVL-C 5/3 closed centre, 8 mm push in	700
Valvetronic PVL-C 5/3 vented centre, G1/4	700
B3-Series	780
Valvetronic PVL-C 5/3 closed centre, G1/4	780
Moduflex size 2, (4/2)	800
Valvetronic PVL-C 5/2, 8 mm push in	840
Valvetronic PVL-C 5/3 vented centre, 8 mm push in	840
Valvetronic PVL-C 5/2, G1/4	840
Flowstar P2V-B	1090
ISOMAX DX1	1150
B53 Manual and mechanical	1160
B4-Series	1170
VIKING Xtreme P2LBX	1290
B5-Series, G1/4	1440
Airline Isolator Valve VE22/23	1470
ISOMAX DX2	2330
VIKING Xtreme P2LCX, G3/8	2460
VIKING Xtreme P2LDX, G1/2	2660
ISOMAX DX3	4050
Airline Isolator Valve VE42/43	5520
Airline Isolator Valve VE82/83	13680

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Main data: P1S-S, ISO 6432

Cylinder designation	Cylinder bore	area	Piston rod bore	area	thread	Total mass at 0 mm stroke	addition per 10 mm stroke	Air consump-tion	Port thread
	mm	cm^2	mm	cm^2		kg	kg	litres	
Double acting with fixed end-cushioning									
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 with adjustable end-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:									
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

1)Free air consumption per 10 mm stroke length for a double stroke at 600 kPa (6 bar)

Cylinder forces

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

Cylinder designation	Cylinder bore	Theoretical cylinder force at 600 kPa (6 bar) exp. stroke	retraction stroke
	mm	N	N
Double acting			
P1S-S010D	10	47	39
P1S-S012D	12	67	50
P1S-S016D	16	120	103
P1S-S020D	20	188	158
P1S-S025D	25	294	247
P1S-S020M	20	188	158
P1S-S025M	25	294	247

Cylinder designation	Theoretical cylinder force at 600 kPa (6 bar) expanding stroke		spring retraction	
	Nmax	Nmin	Nmax	Nmin
Single acting				
P1S-S010SS-0010	38	36	11	9
P1S-S010SS-0015	38	36	11	9
P1S-S010SS-0025	39	36	11	8
P1S-S010SS-0040	38	34	13	9
P1S-S010SS-0050	39	34	13	8
P1S-S010SS-0080	39	34	13	8
P1S-S012SS-0010	53	51	16	14
P1S-S012SS-0015	53	51	16	14
P1S-S012SS-0025	55	51	16	12
P1S-S012SS-0040	52	48	19	15
P1S-S012SS-0050	53	48	19	14
P1S-S012SS-0080	55	48	19	12
P1S-S016SS-0010	102	99	21	18
P1S-S016SS-0015	103	99	21	17
P1S-S016SS-0025	105	99	21	15
P1S-S016SS-0040	106	95	25	14
P1S-S016SS-0050	108	95	25	12
P1S-S016SS-0080	107	95	25	13
P1S-S020SS-0010	163	161	27	25
P1S-S020SS-0015	164	161	27	24
P1S-S020SS-0025	167	161	27	21
P1S-S020SS-0040	166	159	29	22
P1S-S020SS-0050	168	159	29	20
P1S-S020SS-0080	170	161	27	18
P1S-S025SS-0010	256	253	41	38
P1S-S025SS-0015	258	253	41	36
P1S-S025SS-0025	262	253	41	32
P1S-S025SS-0040	261	250	44	33
P1S-S025SS-0050	264	250	44	30
P1S-S025SS-0080	264	251	43	30

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Additional data

Working pressure	max 1000 kPa (10 bar)
Working temperature	max +80 °C
	min –20 °C
High-temperature version	max +120 °C (Ø10 - Ø 16 mm)
	max +150 °C (Ø20 - Ø 25 mm)
	min –10 °C
Low-temperture version	max +60 °C
	min –40 °C

Prelubricated, further lubrication is not normally necessary.

If additional lubrication is introduced it must be continued.

Cushioning diagram

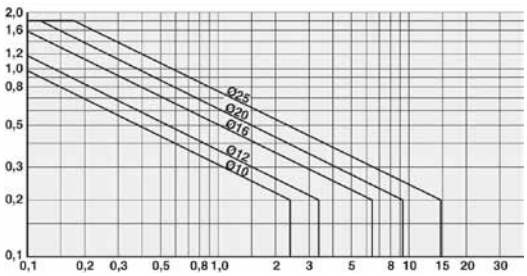
Use the diagram below to determine the necessary size of cylinder to provide the requisite cushioning performance. The maximum cushioning performance, as indicated in the diagram, is based on the following assumptions:

- 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.

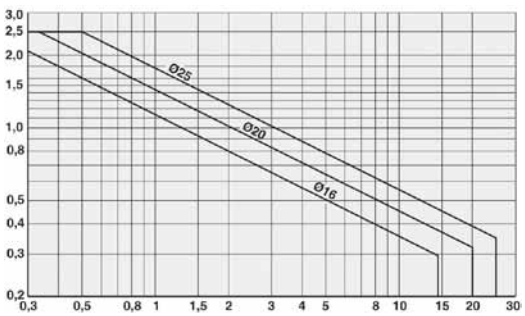
Fixed end-cushioning

Speed [m/s]



Adjustable pneumatic end-cushioning

Speed [m/s]



Material specification Ø10-Ø25

Piston rod	Stainless steel, DIN X 10 CrNiS 18 9
Piston rod seal	Fluorocarbon rubber FPM
Piston rod bearing	Multilayer PTFE/steel
End covers	Stainless steel, DIN X 10 CrNiS 18 9
O-ring, internal	NBR
Cylinder barrel	Stainless steel, DIN X 5 CrNi 18 10
Piston, complete	NBR/steel
Magnet holder	Thermoplastic elastomer
Magnet	Plastic-coated magnetic material
Return spring	Surface-treated steel
Cushioning screw	Stainless steel, DIN X 10 CrNiS 18 9

Variants Ø10-Ø25:

Low-temperature version, type L

Piston rod seal	NBR
Piston, complete	NBR/steel

High-temperature version, type F

Piston rod seal	Fluorocarbon rubber, FPM	
Piston complete,	Ø10-Ø16	HNBR/steel
Piston complete,	Ø20-Ø25	FPM/steel

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 ºC 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.

ISO 8573-1 quality classes

Quality class	Pollution particle size (µm)	Pollution max con-centration (mg/m³)	Water max. press. dew point (°C)	Oil max con-centration (mg/m³)
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	-

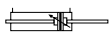
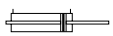
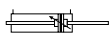
P

Order key

P 1 S – S **0 1 6** **M** **S** **–** **0 0 2 5**

Cylinder bore mm
010
012
016
020
025

	Cylinder version
S	Standard cylinder acc. to Cylinder type/Function

	Cylinder type/Function	
M		Double acting, adjustable cushioning Ø20 - Ø25 Not for sealing material type F and L
D		Double acting, fixed cushioning Ø10 - Ø25
F		Double acting, adjustable cushioning, through piston rod, Ø20 - Ø25 Not for sealing material type F and L
K		Double acting, fixed cushioning, through piston rod, Ø10 - Ø25
H		Double acting, adjustable cushioning, through piston rod (hollow), Ø20 - Ø25, max stroke 125 mm Not for sealing material type F and L
P		Double acting, fixed cushioning, through piston rod (hollow), Ø20 - Ø25, max stroke 125 mm
S		Single acting, fixed cushioning, spring return for retract stroke, Ø10 - Ø25

	Sealing material	
S		Standard, -20 °C to +80 °C Magnetic piston
F		High temperature, -10 °C to +120 °C Ø10 - Ø16 mm -10 °C to +150 °C Ø20 - Ø25 mm Non magnetic piston
L		Low temperature, -40 °C to +60 °C Non magnetic piston

Stroke in mm

E.g. **0025** = 25 mm
For standard stroke length and max length, see table below

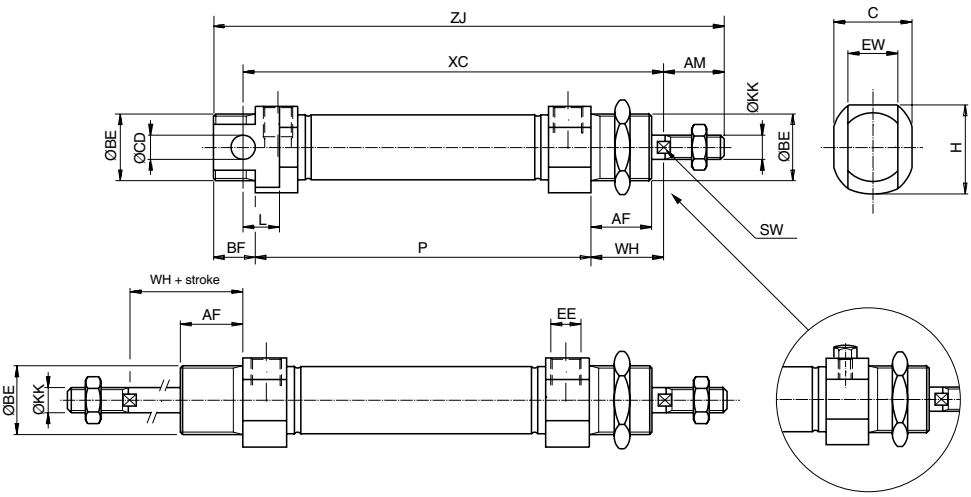
Stroke length

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-S 010 D	10	●	●	●	●	●	●	●	●	●	●								
P1S-S 012 D	12	●	●	●	●	●	●	●	●	●	●	●	●						
P1S-S 016 D	16	●	●	●	●	●	●	●	●	●	●	●	●						
P1S-S 020 D	20	●	●	●	●	●	●	●	●	●	●	●	●	●	●				
P1S-S 025 D	25	●	●	●	●	●	●	●	●	●	●	●	●	●	●				
Double acting with adjustable end-cushioning:																			
P1S-S 020 M	20			●	●	●	●	●	●	●	●	●	●	●	●	●	●		
P1S-S 025 M	25			●	●	●	●	●	●	●	●	●	●	●	●	●	●		
Single acting:																			
P1S-S 010 SS	10	●	●		●		●	●	●										
P1S-S 012 SS	12	●	●		●		●	●	●										
P1S-S 016 SS	16	●	●		●		●	●	●										
P1S-S 020 SS	20	●	●		●		●	●	●										
P1S-S 025 SS	25	●	●		●		●	●	●										

*Standard stroke length in mm according to ISO 4393

CAD drawings on the Internet
Our home page www.parker.com/euro_pneumatic includes the AirCad Drawing Library with 2D and 3D drawings for the main versions.

AirCad™ Drawing Library



Dimensions

Cyl. bore mm	AM 0/-2 mm	BE	AF mm	BF mm	C mm	CDH9 mm	EE	EW mm	H mm	KK	L mm	SW mm	WH±1,2 mm
10	12	M12x1,25	12	10	14	4	M5	8	19	M4	6	–	16
12	16	M16x1,5	18	13	18	6	M5	12	19	M6	9	5	22
16	16	M16x1,5	18	13	18	6	M5	12	19	M6	9	5	22
20	20	M22x1,5	20	14	24	8	G1/8	16	29	M8	12	7	24
25	22	M22x1,5	22	14	28	8	G1/8	16	32	M10x1,25	12	9	28

Double acting cylinders

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

Single acting with spring return, type SS

Stroke/	10	15	25	40	50	80	10	15	25	40	50	80	10	15	25	40	50	80
Cyl. bore	XC	XC	XC	XC	XC	XC	ZJ	ZJ	ZJ	ZJ	ZJ	ZJ	P	P	P	P	P	P
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
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 ±1 mm

Stroke length tolerances +1,5/0 mm

Cylinders are supplied complete with mounting and adjusting nuts.

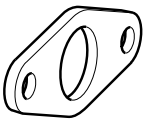
Cylinders with through piston rod are supplied complete with two adjusting nuts and one mounting nut.

Cylinder mountings

Flange-MF8

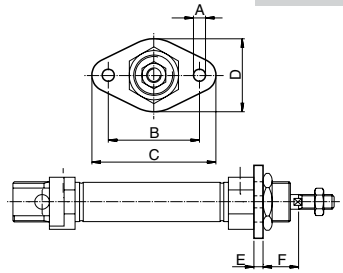
Intended for fixed attachment of the cylinder. The flange is designed for mounting on the front or rear end-covers.

Material:
Stainless steel, DIN X 10 CrNiS 18 9



Cylinder Ø mm	A mm	B mm	C mm	D mm	E mm	F mm
10	4,5	30	40	22	3	13
12-16	5,5	40	52	30	4	18
20	6,6	50	66	40	5	19
25	6,6	50	66	40	5	23

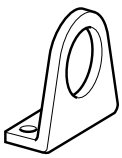
Cyl. bore Ømm	Weight kg	Order code
10	0,012	**P1S-4CMB**
12-16	0,025	**P1S-4DMB**
20-25	0,045	**P1S-4HMB**



Foot-MS3

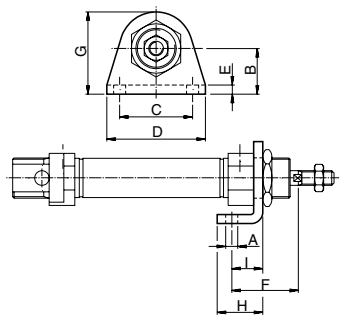
Intended for fixed attachement of the cylinder. The bracket is designed for mounting on the front or rear end-covers.

Material:
Stainless steel, DIN X 10 CrNiS 18 9



Cylinder Ø mm	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	I mm
10	4,5	16	25	35	3	24	26	16	11
12-16	5,5	20	32	42	4	32	32,5	20	14
20	6,5	25	40	54	5	36	45	25	17
25	6,5	25	40	54	5	40	45	25	17

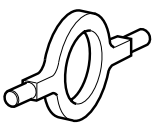
Cyl. bore Ømm	Weight kg	Order code
10	0,020	**P1S-4CMF**
12-16	0,040	**P1S-4DMF**
20-25	0,080	**P1S-4HMF**



Cover trunnion

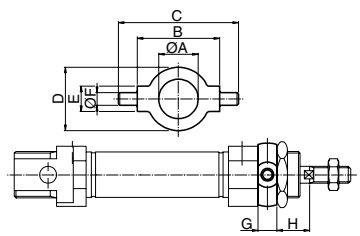
Intended for articulated mounting of the cylinder. The flange is designed for mounting on the front or rear end-covers.

Material:
Stainless steel, DIN X 10 CrNiS 18 9



Cylinder Ø mm	A mm	B h14 mm	C mm	D mm	E e9 mm	F mm	G mm	H mm
10	12,5	26	38	20	8	4	6	10
12-16	16,5	38	58	25	10	6	8	14
20	22,5	46	66	30	10	6	8	16
25	22,5	46	66	30	10	6	8	20

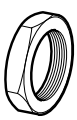
Cyl. bore Ømm	Weight kg	Order code
10	0,014	**P1A-4CMJ**
12-16	0,033	**P1A-4DMJ**
20-25	0,037	**P1A-4HMJ**



Mounting nut

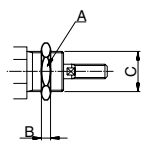
Intended for fixed mounting of the cylinder.
Cylinders are supplied complete with one mounting nut.

Material:
Stainless steel, DIN X 5 CrNi 18 10



Cylinder Ø mm	A mm	B mm	C
10	16	3	M12x1,25
12-16	20	4	M16x1,50
20-25	27	5	M22x1,50

Cyl. bore Ømm	Weight kg	Order code
10	0,009	**9127385111**
12-16	0,018	**9127385112**
20-25	0,042	**9127385113**



P

Cylinder mountings

Clevis bracket

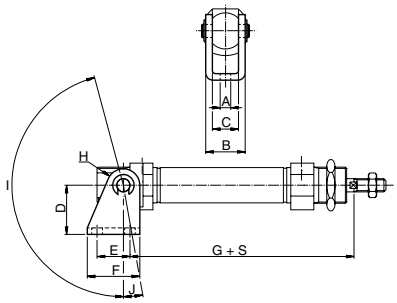
Intended for articulated mounting of the cylinder. Supplied with shaft for mounting on the rear end cover.

Material:
Bracket: stainless steel, DIN X 5 CrNi 18 10
Pin: tempered stainless steel, DIN X 20 Cr 13
Locking rings: stainless steel, DIN X 5 CrNi 18 10

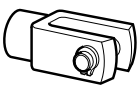
Cylinder Ø mm	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	I °	J °
10	4,5	13	8	24	12,5	20	65,3	5	160	17
12	5,5	18	12	27	15	25	73	7	170	15
16	5,5	18	12	27	15	25	80	7	170	15
20	6,5	24	16	30	20	32	91	10	165	10
25	6,5	24	16	30	20	32	100	10	165	10

S=stroke

Cyl. bore Ømm	Weight kg	Order code
10	0,020	**P1S-4CMT**
12-16	0,040	**P1S-4DMT**
20-25	0,080	**P1S-4HMT**



Clevis

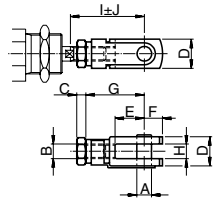


According to ISO 8140
Intended for articulated mounting of the cylinder. This mounting is adjustable in the axial direction. Supplied complete with pin.

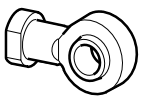
Material:
Stainless steel, DIN X 5 CrNi 18 10

Cylinder Ø mm	A mm	B	C mm	D mm	E mm	F mm	G mm	H mm	I mm	J mm
10	4	M4	2,2	8	8	5	16	4	22	2
12-16	6	M6	3,2	12	12	7	24	6	31	3
20	8	M8	4	16	16	10	32	8	40,5	3,5
25	10	M10x1,25	5	20	20	12	40	10	49	3

Cyl. bore Ømm	Weight kg	Order code
10	0,007	**P1S-4CRD**
12-16	0,022	**P1S-4DRD**
20	0,045	**P1S-4HRD**
25	0,095	**P1S-4JRD**



Swivel rod eye

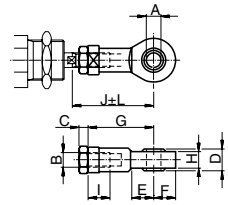


According to ISO 8139
Intended for articulated mounting of the cylinder. This mounting is adjustable in the axial direction.

Material:
Swivel rod eye: stainless steel, DIN X 5 CrNi 18 10
Ball: hardened stainless steel, DIN X 5 CrNi 18 10

Cylinder Ø mm	A mm	B	C mm	D mm	E mm	F mm	G mm	H mm	I mm	J mm	K mm	L mm
10	5	M4	2,2	8	10	9	27	6	8	33	9	2
12-16	6	M6	3,2	9	10	10	30	6,8	9	38,5	11	1,5
20	8	M8	4	12	12	12	36	9	12	46	14	2
25	10	M10x1,25	5	14	14	14	43	10,5	15	52,5	17	2,5

Cyl. bore Ømm	Weight kg	Order code
10	0,017	**P1S-4CRT**
12-16	0,025	**P1S-4DRT**
20	0,045	**P1S-4HRT**
25	0,085	**P1S-4JRT**



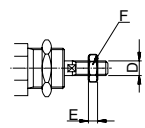
Rod nut

Intended for fixed mounting on the piston rod. Cylinders are supplied complete with one rod nut. (cylinders with through piston rod are supplied with two rod nuts.)

Material:
Stainless steel, DIN X 5 CrNi 18 10

Cylinder Ø mm	D	F mm	E mm
10	M4	7	2,2
12-16	M6	10	3,2
20	M8	13	4
25	M10x1,25	17	5

Cyl. bore Ømm	Weight kg	Order code
10	0,001	**9127385121**
12-16	0,002	**9127385122**
20	0,005	**9127385123**
25	0,007	**9126725404**



P

Main data: ISO 6431

Cylinder designation	Cylinder bore	Piston rod area	Piston rod diam.	Cushioning area	Total mass thread	Moving mass ning distance	at 0 mm stroke	Air addition per 10 mm stroke	Port at 0 mm stroke	addition per 10 mm stroke	consumption	thread
	mm	cm^2	mm	cm^2		mm	kg	kg	kg	kg	litres	
P1S-•032M	32	8,0	12	1,1	M10x1,25	15	0,59	0,026	0,10	0,009	0,105 [1]	G1/8
P1S-•040M	40	12,6	16	2,0	M12x1,25	18	0,99	0,036	0,19	0,016	0,162 [1]	G1/4
P1S-• 050M	50	19,6	20	3,1	M16x1,5	19	1,63	0,057	0,32	0,024	0,253 [1]	G1/4
P1S-•063M	63	31,2	20	3,1	M16x1,5	22	2,75	0,065	0,36	0,024	0,414 [1]	G3/8
P1S-•080M	80	50,3	25	4,9	M20x1,5	24	5,09	0,099	1,11	0,039	0,669 [1]	G3/8
P1S-•100M	100	78,5	25	4,9	M20x1,5	29	8,68	0,115	1,41	0,039	1,043 [1]	G1/2
P1S-•125M	125	122,7	32	8,0	M27x2	32	15,31	0,174	2,90	0,063	1,662 [1]	G1/2

1)Free air consumption per 10 mm stroke length for a double stroke at 600 kPa (6 bar)

Cylinder forces

Indicated cylinder forces are theoretical and should be reduced in relation to working conditions.

Cylinder designation	Theoretical cylinder force at 600 kPa (6 bar) exp. stroke N	return stroke N
P1S-•032M	480	415
P1S-•040M	754	633
P1S-•050M	1180	990
P1S-•063M	1870	1680
P1S-•080M	3016	2721
P1S-•100M	4712	4417
P1S-•125M	7363	6880

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 ºC for indoor operation (a lower dew point should be selected for outdoor operation) and oil concentration 1.0 mg oil/m^3, which is what a standard compressor with a standard filter gives.

ISO 8573-1 quality classes

Quality class	Pollution particle size (µm)	Pollution max concentration (mg/m^3)	Water max. press. dew point (°C)	Oil 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	-

Additional data

Working pressure	max 10bar
Working temperature	max +80°C
	min –20°C
High-temperature version	max +150°C
	min –10°C
Low-temperature version	max +40°C
Ø80 - Ø125	min –40°C

Prelubricated, further lubrication is not normally necessary.

If additional lubrication is introduced it must be continued.

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:

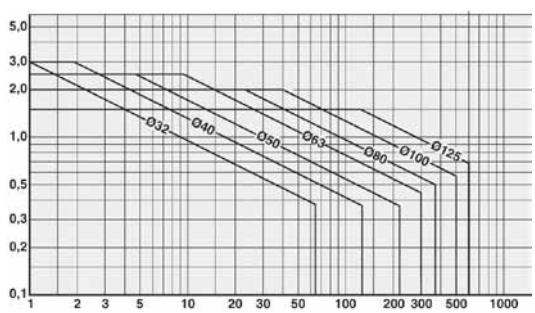
–Low load, i.e. low pressure drop across the piston

–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.

Speed [m/s]

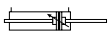


Order key

P1S – D **032** **M** **S** **–** **0025**

	Cylinder version
A	Trunnion pegs in front end cover, only Ø80 - Ø125
B	Trunnion pegs in rear end cover, only Ø80 - Ø125
C	Threaded front end
D	Threaded front end + 4 mounting holes in rear end cover
E	4 mounting holes in front end cover, only Ø80 - Ø125
F	4 mounting holes in rear end cover
J	2 mounting holes in front end cover, only Ø80 - Ø125
K	2 mounting holes in rear end cover
L	4 mounting holes in front and rear end cover, only Ø80 - Ø125
M	4 mounting holes in front and 2 in rear end cover, only Ø80 - Ø125
Q	2 mounting holes in front and 4 in rear end cover, only Ø80 - Ø125
V	2 mounting holes in front and rear end cover, only Ø80 - Ø125

Cylinder bore mm
032
040
050
063
080
100
125

	Cylinder type/Function	
M		Double acting, adjustable cushioning
F		Double acting, adjustable cushioning, through piston rod, only Ø80 - Ø125

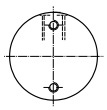
Stroke in mm

E.g. **0025** = 25 mm
For standard stroke length and max length, see table below

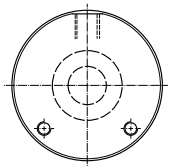
	Sealing material	
S		Standard, -20 °C to +80 °C Magnetic piston
F		High temperature, -10 °C to +150 °C Non magnetic piston
L		Low temperature, -40 °C to +60 °C Non magnetic piston only Ø80 - Ø125
Q		Stainless steel scraper for piston rod -20 °C to +80 °C Magnetic piston only Ø80 - Ø125

Ø32 - Ø63
Ø80 - Ø125

Cylinder version **K**



Cylinder version **J, K, M, Q, V**



Stroke length

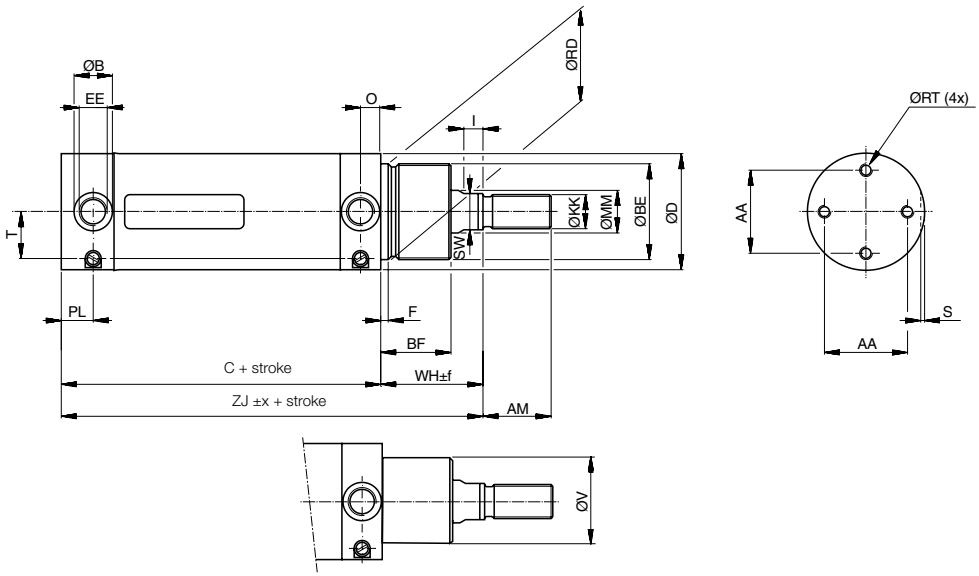
Cylinder designation	Cylinder bore	25	50	80	100	125	160	200	250	320	400	500
P1S-•032M	32	●	●	●	●	●	●	●	●	●	●	●
P1S-•040M	40	●	●	●	●	●	●	●	●	●	●	●
P1S-•050M	50	●	●	●	●	●	●	●	●	●	●	●
P1S-•063M	63	●	●	●	●	●	●	●	●	●	●	●
P1S-•080M	80	●	●	●	●	●	●	●	●	●	●	●
P1S-•100M	100	●	●	●	●	●	●	●	●	●	●	●
P1S-•125M	125	●	●	●	●	●	●	●	●	●	●	●

● Standard stroke length in mm according to ISO 4393 ▭ Non standard stroke length

P

CAD drawings on the Internet
Our home page www.parker.com/euro_pneumatic includes the AirCad Drawing Library with 2D and 3D drawings for the main versions.

AirCad™ Drawing Library



Not threaded front end

Dimensions Ø32-Ø63

Cylinder designation	AA mm	AM mm	B mm	BF mm	BE	C mm	D mm	EE	F mm	I mm	KK	MM mm	O mm	PL mm	RD mm	RT mm
P1S-D032M	24,5	22	15	25	M30x1,5	88	36	G1/8	4,2	6	M10x1,25	12	8	13	30	M5
P1S-D040M	30	24	18	30	M38x1,5	97	44	G1/4	4,5	9	M12x1,25	16	9,5	15	38	M6
P1S-D050M	39	32	18	33	M45x1,5	101	55	G1/4	4,5	9	M16x1,5	20	9,5	15	45	M6
P1S-D063M	49	32	25	33	M45x1,5	117	68	G3/8	4,5	9	M16x1,5	20	13,3	20,5	45	M8

Cylinder designation	S mm	SW mm	T mm	V mm	WH mm	ZJ mm	Mounting tolerances x mm	Mounting tolerances f mm	Stroke length 0-500 mm mm
P1S-D032M	1,5	10	12,2	26	35,5	123,5	1,2	2,5	+2,0
P1S-D040M	1,5	14	16,5	35	44	141	1,0	2,2	+2,0
P1S-D050M	1,5	17	22	41	47	148	0,9	2,3	+2,0
P1S-D063M	1,5	17	26	41	47	164	1,4	2,3	+2,5

P

Material specification Ø32-Ø63

Piston rod	Stainless steel, DIN X 2 CrNiMo 17 13 2
Piston rod nut	Stainless steel, DIN X 5 CrNi 18 10
Piston rod seal	UHMWPE-plastic/NBR
Scraper ring	UHMWPE-plastic/fluorocarbon rubber, FPM
Piston rod bearing	HDPE-plastic
End covers	Stainless steel, DIN X 5 CrNi 18 10
Cushioning screw	Stainless steel, DIN X 10 CrNiS 18 9
Cushioning screw lockings	Stainless steel, DIN X 5 CrNi 18 10
Cushioning sealing	NBR
O-ring, cushioning screw	Fluorocarbon, FPM
O-ring, internal	NBR
Cylinder barrel	Stainless steel, DIN X 5 CrNi 18 10
Piston	POM plastic
Piston seal	NBR
Piston nut	Zinc plated steel
Magnet	Plastic-coated magnetic material

Variants Ø32-Ø63:

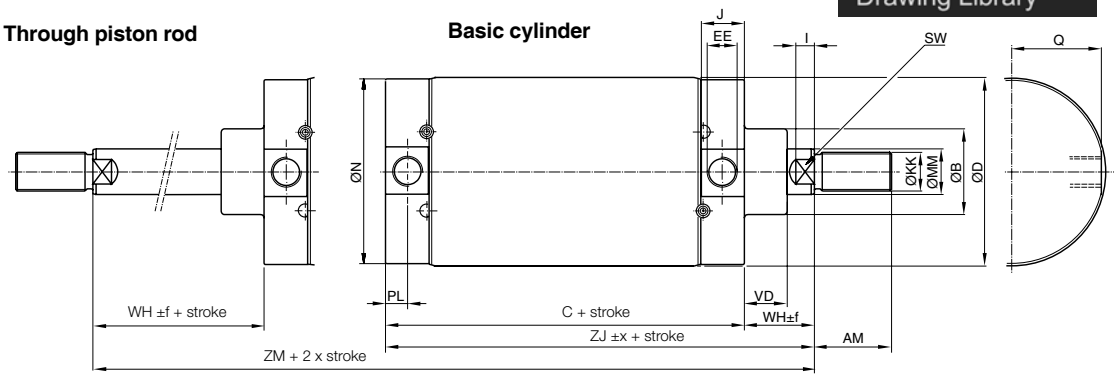
High-temperature version, type F:

Sealings/scraper ring	Fluorocarbon rubber, FPM
Piston	Anodized aluminium

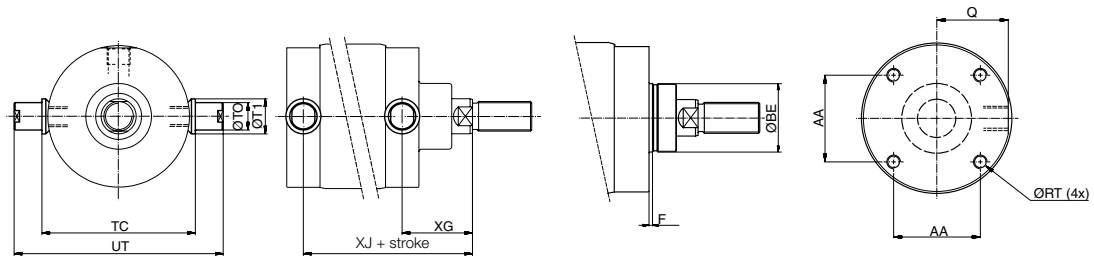
CAD drawings on the Internet
Our home page www.parker.com/euro_pneumatic includes the AirCad Drawing Library with 2D and 3D drawings for the main versions.

AirCad™ Drawing Library

Through piston rod **Basic cylinder**



Trunnion pegs on front or rear end cover **Threaded front end** **Mounting holes in the end covers**



Dimensions Ø80-Ø125

Cylinder designation	AA mm	AM mm	B mm	BE	C mm	D mm	EE	F mm	KK	I mm	J mm	MM mm	N mm	PL mm	Q mm
P1S-•080M	46	40	50	M50x1,5	141	86	G3/8	4	M20x1,5	10	24,5	25	84	12,5	40
P1S-•100M	60	40	50	M50x1,5	158	106	G1/2	4	M20x1,5	8	30	25	104	15,5	49,5
P1S-•125M	76	54	60	M60x2	183	133	G1/2	4	M27x2	13	30	32	129	15,5	62,5

Cylinder designation	RT	SW mm	TC mm	TO mm	T1 mm	UT mm	VD mm	WH mm	XG mm	X3 mm	ZJ mm	ZM mm	Mounting tol. x mm	Mounting tol. f mm	Stroke length 0-500 mm
P1S-•080M	M8	21	98	20	25	125	19	37	49,5	165,5	178	215	1,5	2,5	+2,5
P1S-•100M	M10	21	109	25	32	152	19	35	50,5	177,5	193	228	1,5	2,5	+2,5
P1S-•125M	M12	27	134	25	32	177	24	47	63	214	230	277	2,0	2,5	+4,0

Material specification Ø80-Ø125

Piston rod	Stainless steel, DIN X 2 CrNiMo 17 13 2
Piston rod nut	Acid-proof steel, A4
Piston rod seal	FPM
Scraper ring	PTFE
Piston rod bearing	Multilayer PTFE and steel
End covers	Stainless steel, DIN X 5 CrNi 18 10
Cushioning screw	Stainless steel, DIN X 10 CrNiS 18 9
Cushioning sealing	NBR
O-ring, cushioning screw	Fluorocarbon, FPM
O-ring, internal	NBR
Cylinder barrel	Stainless steel, DIN X 5 CrNi 18 10
Piston	Anodized aluminium
Piston seal	NBR
Piston bearing	UHMWPE-plastic
Magnetic band	Rubber-coated magnetic material

Variants Ø80-Ø125:

Low-temperature version, type L:

Sealings/scraper ring	NBR/PTFE

High-temperature version, type F:

Sealings/scraper ring	Fluorocarbon rubber, FPM/PTFE

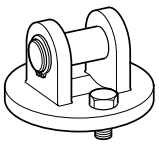
Cylinders with steel scraper ring, type Q:

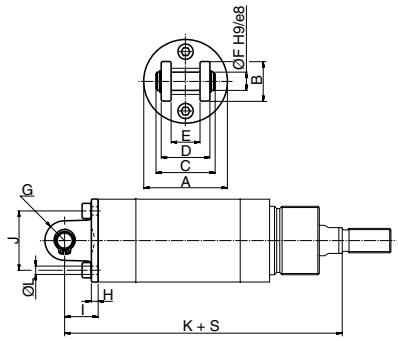
Sealings/scraper ring	NBR/Stainless steel

P

Cylinder mountings Ø32 - Ø63

Type	Description	Cyl. bore Ømm	Weight kg	Order code
Clevis bracket MP4	Intended for articulated mounting of the cylinder versions D, F or K. The bracket is mounted at the rear end cover and is supplied complete with shaft, mounting screw and O-ring for a clean joint between end cover and bracket. Material: Stainless steel, DIN X 5 CrNi 18 10	32	0,09	**P1S-4KME**
		40	0,12	**P1S-4LME**
		50	0,19	**P1S-4MME**
		63	0,34	**P1S-4NME**

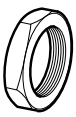


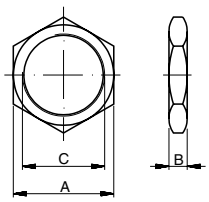


Cylinder Ø mm	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	I mm	J mm	K mm	L mm
32	35,5	20	33	26	15	10	10	4,5	18,5	25	142	5,5
40	43,5	24	35	28	17	12	12	4	19	30	160	6,5
50	54,5	26	39	32	17	12	13	4,5	22	39	170	6,5
63	67,5	34	47	40	22	16	17	6	26	49	190	8,6

S = Stroke

Mounting nut	Intended for fixed mounting of the cylinder via the neck. Material: stainless steel, DIN X 5 CrNi 18 10	32	0,03	**9127294401**
		40	0,06	**9127294402**
		50-63	0,08	**9127294403**

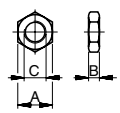




Cylinder Ø mm	A mm	B mm	C
32	36	8	M30x1,5
40	46	10	M38x1,5
50	55	10	M45x1,5
63	55	10	M45x1,5

Cylinder mountings Ø32-Ø125

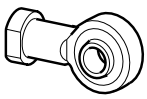
Type	Description	Cyl. bore Ø mm	Weight kg	Order code
Acid-proof rod nut	Intended for fixed mounting on the piston rod. Cylinders are supplied complete with one rod nut. (cylinders with through piston rods are supplied with two rod nuts.) Material: Acid-proof steel A4 (Standard)	32	0,007	**0261109919**
		40	0,010	**0261109920**
		50	0,021	**0261109917**
		63	0,021	**0261109917**
		80	0,040	**0261109916**
		100	0,040	**0261109916**
		125	0,100	**0261109918**
Stainless steel rod nut	Intended for fixed mounting of accessories to the piston rod. Material: Stainless steel, A2	32	0,007	**9126725404**
		40	0,010	**9126725405**
		50	0,021	**9126725406**
		63	0,021	**9126725406**
		80	0,040	**0261109921**
		100	0,040	**0261109921**
		125	0,100	**0261109922**

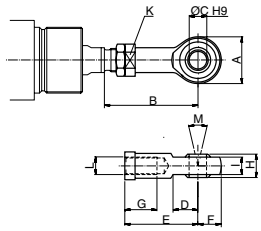


Cylinder Ø mm	A mm	B mm	C
32	17	5	M10x1,25
40	19	6	M12x1,25
50	24	8	M16x1,5
63	24	8	M16x1,5
80	30	10	M20x1,5
100	30	10	M20x1,5
125	41	13,5	M27x2

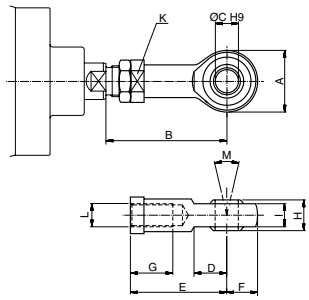
Cylinder mountings Ø32 - Ø125

Type	Description	Cyl. bore Ømm	Weight kg	Order code
Swivel rod eye	According to ISO 8139 Intended for articulated mounting of the cylinder. This mounting is adjustable in the axial direction. Materal: Swivel rod eye: stainless steel, DIN X 5 CrNi 18 10 Ball: hardened stainless steel, DIN X 5 CrNi 18 10	32	0,08	**P1S-4JRT**
		40	0,12	**P1S-4LRT**
		50-63	0,25	**P1S-4MRT**
		80-100	0,46	**P1S-4PRT**
		125	1,28	**P1S-4RRT**

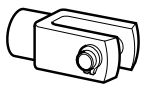


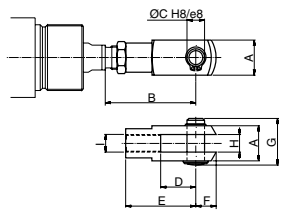


Cyl. Ø mm	A mm	B_{min} mm	B_{max} mm	C mm	D mm	E mm	F mm	G mm	H mm	I mm	K mm	L	M
32	28	50	55	10	15	43	14	15	14	10,5	17	M10x1,25	24°
40	32	56	62	12	17	50	16	22	16	12	19	M12x1,25	24°
50	42	72	80	16	22	64	21	28	21	15	22	M16x1,5	30°
63	42	72	80	16	22	64	21	28	21	15	22	M16x1,5	30°
80	50	87	97	20	26	77	25	33	25	18	32	M20x1,5	30°
100	50	87	97	20	26	77	25	33	25	18	32	M20x1,5	30°
125	70	123,5	137	30	36	110	35	51	37	25	41	M27x2	30°

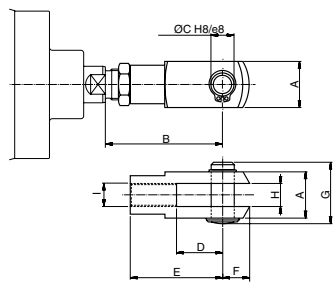


Type	Description	Cyl. bore Ømm	Weight kg	Order code
Clevis	According to ISO 8140 Intended for articulated mounting of the cylinder. This mounting is adjustable in the axial direction. Supplied complete with pin. Material: Clevis: stainless steel, DIN X 10 CrNiS 18 9 Pin: stainless steel, DIN X 5 CrNi 18 10 Locking rings according to DIN 471	32	0,09	**P1S-4JRD**
		40	0,15	**P1S-4LRD**
		50-63	0,35	**P1S-4MRD**
		80-100	0,75	**P1S-4PRD**
		125	2,10	**P1S-4RRD**



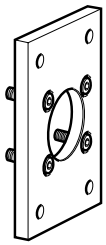


Cylinder Ø mm	A mm	B_{min} mm	B_{max} mm	C mm	D mm	E mm	F mm	G mm	H mm	I
32	20	46	52	10	20	40	12	28	10	M10x1,25
40	24	54	60	12	24	48	19	32	12	M12x1,25
50	32	72	80	16	32	64	25	42	16	M16x1,5
63	32	72	80	16	32	64	25	42	16	M16x1,5
80	40	90	100	20	40	80	32	50	20	M20x1,5
100	40	90	100	20	40	80	32	50	20	M20x1,5
125	55	123,5	137	30	54	110	45	72	30	M27x2



Cylinder mountings

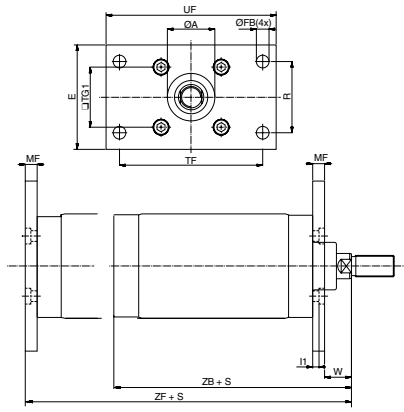
Flange MF1/MF2



Intended for fixed attachment of cylinder version D, E, F, L, M or Q. The flange is designed for mounting on the front or rear end covers.

Material:
Stainless steel, DIN X 5 CrNiMo 17 13 3

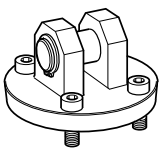
Cyl. bore Ømm	Weight kg	Order code
80	0,97	**P1S-4PMB**
100	1,42	**P1S-4QMB**
125	1,55	**P1S-4RMB**



Cylinder Ø mm	A mm	FB mm	E mm	R mm	TF mm	TG1 mm	UF mm	MF mm	I1 mm	W mm	ZB mm	ZF mm
80	50,2	12	86	63	126	46	150	12	6	25	178	190
100	51	14	106	75	150	60	170	12	6	23	193	205
125	61	16	132	90	180	76	205	15	8	32	230	245

S = Stroke

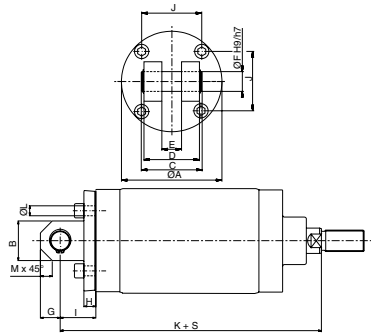
Clevis bracket MP4



Intended for articulated mounting of cylinder versions D, F, L or Q. The bracket is mounted on the rear end cover and is supplied complete with shaft, mounting screw and O-ring for a clean joint between end cover and bracket.

Material:
Bracket: stainless steel, DIN X 5 CrNi 18 10
Pin: stainless steel, DIN X 5 CrNiMo 17 13 3

Cyl. bore Ømm	Weight kg	Order code
80	0,78	**P1S-4PME**
100	1,42	**P1S-4QME**
125	2,06	**P1S-4RME**



Cylinder Ø mm	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	I mm	J mm	K mm	L mm	M mm
80	80	30	57	50	16	16	15	12	32	46	210	8,6	9
100	103	42	67	60	20	20	21	12	37	60	230	10,6	12
125	127	50	77	70	25	25	25	15	45	76	275	12,6	15

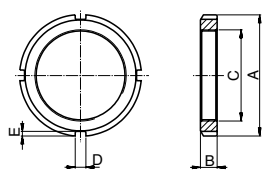
S = Stroke

Mounting nut

Intended for fixed mounting on the front end cover of cylinders according to cylinder version C or D.

Material:
Stainless steel, DIN X 5 CrNi 18 10

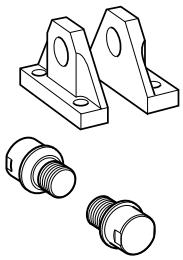
Cyl. bore Ømm	Weight kg	Order code
80-100	0,16	**9126461304**
125	0,19	**9126461305**

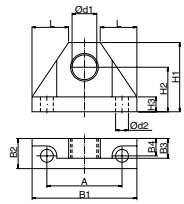


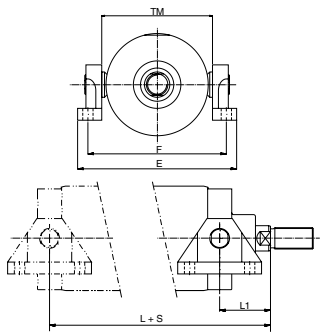
Cylinder Ø mm	A mm	B mm	C	D mm	E mm
80	70	11	M50x1,5	6	2,5
100	70	11	M50x1,5	6	2,5
125	80	11	M60x2	7	3

Cylinder mountings

Type	Description	Cyl. bore Ømm	Weight kg	Order code
Bearing bracket for trunnion pegs	Intended for articulated mounting of the cylinder. The trunnion pegs are factory mounted on the front or rear end cover and are combined with bearing brackets. Supplied in pairs. Material: Bearing brackets: stainless steel, DIN X 5 CrNi 18 10 Journal bearing: stainless steel, DIN X 5 CrNiMo 17 13 3/PTFE	80 100-125	0,90 1,30	**P1S-4PMW** **P1S-4QMW**







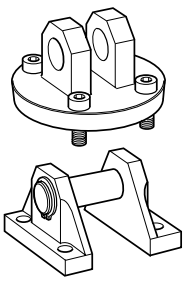
Cylinder Ø mm	A mm	B1 mm	B2 mm	B3 mm	B4 mm	d1 mm	d2 mm	H1 mm	H2 mm	H3 mm	L mm
80	60	90	28	15	15,5	20	11	58	37	12	34,5
100-125	76	106	30	20	17,5	25	13	70	45	15	40

Cylinder Ø mm	E mm	F mm	L1 mm	L2 mm	TM mm
80	154	129	49,5	165,5	98
100	169	144	50,5	177,5	109
125	194	169	63	214	134

S = Stroke

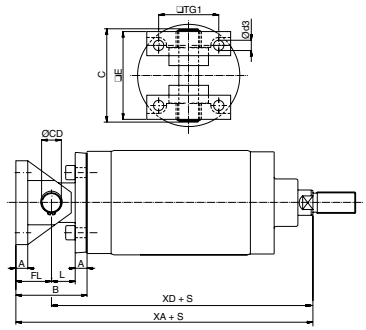
	80	1,29	**P1S-4PML**
	100	2,33	**P1S-4QML**
	125	3,30	**P1S-4RML**

Combinated mounting MP2/MP4



Intended for articulated mounting of cylinder versions D, F, L or Q. The unit is mounted on the rear end cover and is combined with bearing brackets MP2 and is supplied complete with shaft, mounting screw and O-ring for a clean joint between end cover and bracket.

Material:
Bearing brackets: stainless steel, DIN X 5 CrNi 18 10
Journal bearing: stainless steel,
Journal bearing: DIN X 5 CrNiMo 17 13 3/PTFE
Bracket: stainless steel, DIN X 5 CrNi 18 10
Pin: stainless steel, DIN X 5 CrNiMo 17 13 3



Cylinder Ø mm	A mm	B mm	C mm	CD mm	d3 mm	E mm	FL mm	L mm	TG1 mm	XA mm	XD mm
80	12	64	82	16	9	74	32	20	46	242	210
100	12	74	98	20	11	90	37	25	60	267	230
125	15	90	118	25	13	110	45	30	76	320	275

S = Stroke

P

Our global series of sensors

This series of sensors is already being used or will be used in all future ranges in our global product programme involving cylinders/actuators. The sensors have small installation dimensions and either fit into the groove in the case profile or, as shown here, are fastened to the cylinder using a special attachment.

You can choose from electronic or reed sensors with a range of cable lengths fitted with 8 mm or M12 terminals.

Electronic sensors

The new electronic sensors are "Solid State", i.e. they have no moving parts at all. They are provided with short-circuit protection and transient protection as standard. The built-in electronics make the sensors suitable for applications with high on and off switching frequency, and where very long service life is required.

Technical data

Design	GMR (Giant Magnetic Resistance) magneto-resistive function
Installation	Sensor mounting P8S-TMC01
Outputs	PNP, normally open (also available in NPN design, normally closed, on request)
Voltage range	10-30 VDC
	10-18 V DC, ATEX sensor
Ripple	max 10%
Voltage drop	max 2,5 V
Load current	max 100 mA
Internal consumption	max 10 mA
Actuating distance	min 9 mm
Hysteresis	max 1,5 mm
Repeatability accuracy	max 0,2 mm
On/off switching frequency	max 5 kHz
On switching time	max 2 ms
Off switching time	max 2 ms
Encapsulation	IP 67 (EN 60529)
Temperature range	–25 °C to +75 °C
	–20 °C to +45 °C, ATEX sensor
Indication	LED, yellow
Material housing	PA 12
Material screw	Stainless steel
Cable	PVC or PUR 3x0.25 mm^2 see order code respectively

Reed sensors

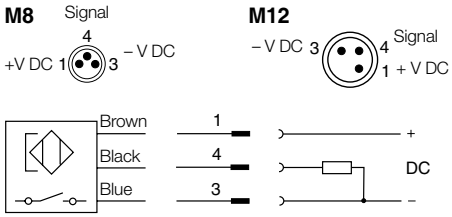
The sensors are based on proven reed switches, which offer reliable function in many applications. Simple installation, a protected position on the cylinder and clear LED indication are important advantages of this range of sensors.

Technical data

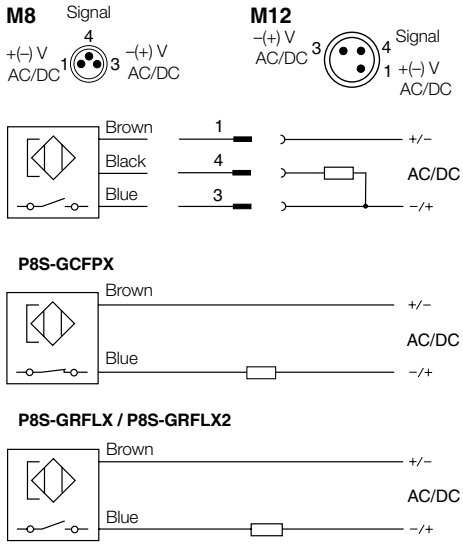
Design	Reed element
Mounting	Sensor mounting P8S-TMC01
Output	Normally open , or normally closed
Voltage range	10-30 V AC/DC or 10-120 V AC/DC
	24-230 V AC/DC
Load current	max 500 mA for 10-30 V or max 100 mA for 10-120 V
	max 30 mA for 24-230 V
Breaking power (resistive)	max 6 W/VA
Actuating distance	min 9 mm
Hysteresis	max 1,5 mm
Repeatability accuracy	0,2 mm
On/off switching frequency	max 400 Hz
On switching time	max 1,5 ms
Off switching time	max 0,5 ms
Encapsulation	IP 67 (EN 60529)
Temperature range	–25 °C to +75 °C
Indication	LED, yellow
Material housing	PA12
Material screw	Stainless steel
Cable	PVC or PUR 3x0.14 mm^2 see order code respectively

P

Electronic sensors

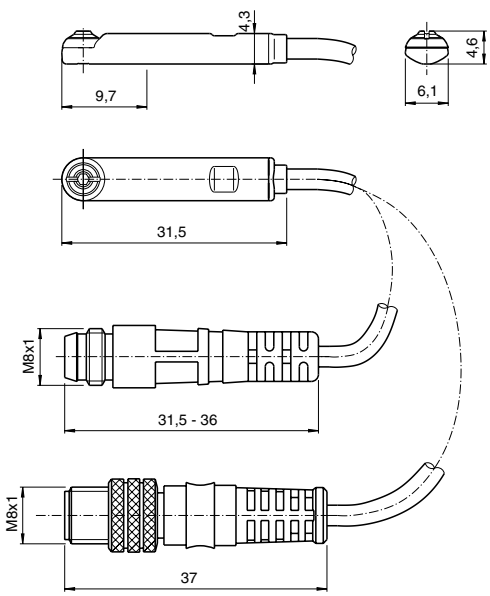


Reed sensors

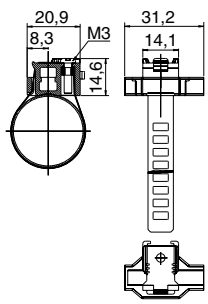


Dimensions

Sensors



Sensor mounting P8S-TMC01



P

Ordering data

Output/function	Cable/connector	Weight kg	Order code
Electronic sensors , 10-30 V DC			
PNP type, normally open	0,27 m PUR-cable and 8 mm snap-in male connector	0,007	**P8S-GPSHX**
PNP type, normally open	1,0 m PUR-cable and 8 mm snap-in male connector	0,013	**P8S-GPSCX**
PNP type, normally open	1,0 m PUR-cable and M8 screw male connector	0,013	**P8S-GPCCX**
PNP type, normally open	0,27 m PUR-cable and M12 screw male connector	0,015	**P8S-GPMHX**
PNP type, normally open	3 m PVC-cable without connector	0,030	**P8S-GPFLX**
PNP type, normally open	10 m PVC-cable without connector	0,110	**P8S-GPFTX**
Electronic sensor 18-30 V DC ATEX-certified			
CE Ex **II3G EEx nA II T4X II3D 135 °C IP67**			
Type PNP , normally open	3 m PVC-cable without connector	0,030	**P8S-GPFLX/EX**
Reed sensors , 10-30 V AC/DC			
Normally open	0,27 m PUR-cable and 8 mm snap-in male connector	0,007	**P8S-GSSHX**
Normally open	1,0 m PUR-cable and 8 mm snap-in male connector	0,013	**P8S-GSSCX**
Normally open	1,0 m PUR-cable and M8 male connector	0,013	**P8S-GSCCX**
Normally open	0,27 m PUR-cable and M12 screw male connector	0,015	**P8S-GSMHX**
Normally open	1,0 m PUR-cable and M12 screw male connector	0,023	**P8S-GSMCX**
Normally open	3 m PVC-cable without connector	0,030	**P8S-GSFLX**
Normally open	10 m PVC-cable without connector	0,110	**P8S-GSFTX**
Normally closed	5m PVC-cable without connector [1]	0,050	**P8S-GCFPX**
Reed sensors, 10-120 V AC/DC			
Normally open	3 m PVC-cable without connector	0,030	**P8S-GRFLX**
Reed sensorer, 24-230 V AC/DC			
Normally open	3 m PVC-cable without connector	0,030	**P8S-GRFLX2**

1) Without LED

Sensor mounting

Description	Weight kg	Order code
Sensor mounting for cylinder P1A cylinder bore Ø10 to Ø25 mm	0,07	**P8S-TMC01**

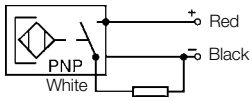
P

Sensors for special applications

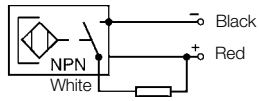
Sensors for applications where the short installation length and the 90 degree cable outlet are important factors. This type of sensor is an good alternative if a cylinder has a short stroke or tight installation, and installation is easier than our global series of sensors.

Electronic sensor symbol

P1A-2XMK



P1A-2XLK

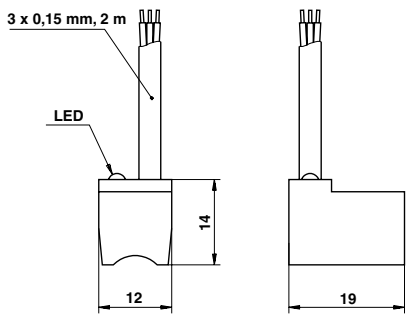


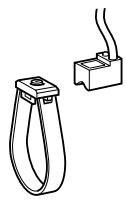
Technical data

Design	Hall element
Output	PNP resp. NPN, N.O.
Voltage range	10-30 VDC
Max permissible ripple	10%
Max voltage drop	≤0,5 V at 100 mA
Max load current, P1A-2XMK, LK	150 mA
P1A-2XHK, EK, JH, FH	100 mA
Max breaking power (resistive)	6 W
Internal consumption	<30 mA at 30 V
Min actuating distance	5 mm
Hysteresis	1,1 - 1,3 mm
Repeatability accuracy	±0,1 mm
Max on/off switching frequency	1 kHz
Max on/off switching time	0,8/3,0 µs
Encapsulation, P1A-2XJH, FH	IP 65
Encapsulation, P1A-2XHK, EK, MK, LK	IP 67
Temperature range	–10 °C to +60 °C
Indication	LED
Shock resistance	40 g
Material, housing	Polyamid 11
Material, mould	Epoxy
Cable	PVC 3x0,15 mm²
Cable incl. female part connector	PVC 3x0,15 mm²
Connector	Diam. 8 mm snap on
Mounting	Mounting yoke
Material, mounting	Acetal/Stainless steel
Material, screw	Stainless steel

Dimensions

P1A-2XMK and P1A-2XLK





Ordering data

Output	Cable length	Weight kg	Order code
Electronic sensors			
PNP, N.O.	2 m	0,040	**P1A-2XMK**
NPN, N.O.	2 m	0,040	**P1A-2XLK**
Mountngs for sensors			
For cylinder Ø10		0,005	**P1A-2CCC**
For cylinder Ø12		0,005	**P1A-2DCC**
For cylinder Ø16		0,008	**P1A-2FCC**
For cylinder Ø20		0,008	**P1A-2HCC**
For cylinder Ø25		0,010	**P1A-2JCC**

P

Connecting cables with one connector

The cables have an integral snap-in female connector.

Type of cable	Cable/connector	Weight kg	Order code
Cables for sensors, complete with one female connector			
Cable, Flex PVC	3 m, 8 mm Snap-in connector	0,07	**9126344341**
Cable, Flex PVC	10 m, 8 mm Snap-in connector	0,21	**9126344342**
Cable, Super Flex PVC	3 m, 8 mm Snap-in connector	0,07	**9126344343**
Cable, Super Flex PVC	10 m, 8 mm Snap-in connector	0,21	**9126344344**
Cable, Polyurethane	3 m, 8 mm Snap-in connector	0,01	**9126344345**
Cable, Polyurethane	10 m, 8 mm Snap-in connector	0,20	**9126344346**
Cable, Polyurethane	5 m, M12 screw connector	0,07	**9126344348**
Cable, Polyurethane	10 m, M12 screw connector	0,20	**9126344349**

Male connectors for connecting cables

Cable connectors for producing your own connecting cables. The connectors can be quickly attached to the cable without special tools. Only the outer sheath of the cable is removed. The connectors are available for M8 and M12 screw connectors and meet protection class IP 65.

Connector	Weight kg	Order code
M8 screw connector	0,017	**P8SCS0803J**
M12 screw connector	0,022	**P8SCS1204J**

P

Connection block Valvetronic 110

The Valvetronic 110 is a connection block that can be used for collecting signals from sensors at various points on a machine and connecting them to the control system via a multicore cable. Valvetronic 110 can also be used for central connection of the multi-core cable to the outputs of a control system, and can be laid to a machine where the output signals can be connected. The connection block has ten 8 mm snap-in circular connectors and a multi-core cable which is available in lengths of 3 or 10 m. The connections on the block are numbered from 1 to 10. Blanking plugs are available for unused connections, as labels for marking the connections of each block.

Technical data

Connections:

Ten 3-pole numbered 8 mm round snap-in female contacts

Input block

Pin 1	Common, +24 VDC
Pin 2	Input signal
Pin 3	Common, 0V

Output block

Pin 1	Common, GND
Pin 2	Output signal
Pin 3	Common, 0V

Electrical data:

Voltage	24 VDC (max. 60 V AC/75 V DC)
Insulation group	according to DIN 0110 class C
Load	max. 1 A per connection total max. 3 A

Cable:

Length	3 m or 10 m
Type of cable LifYY11Y	
Conductor	12
Area	0.34 mm²
Colour marking	According to DIN 47 100

Mechanical data

Enclosure	IP 67, DIN 40050 with fitted contacts and/or blanking plugs.
Temperature	–20 °C to +70 °C

Material

Body	PA 6,6 VD according to UL 94
Contact holder	PBTP
Snap-in ring	LDPE
Moulding mass	Epoxy
Seal	NBR
Screws	Plated steel

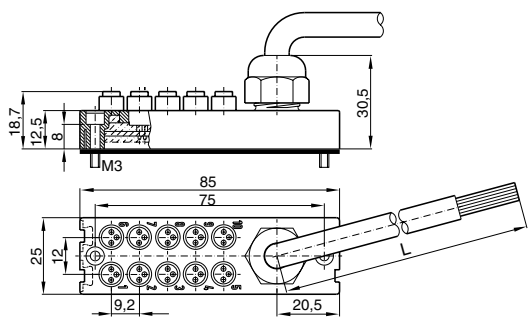
Industrial durability

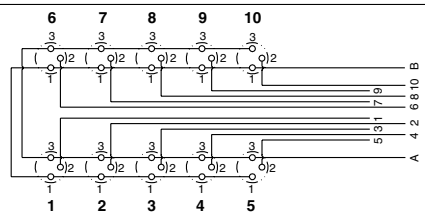
Good chemical and oil resistance. Tests should be performed in aggressive environments.

Ordering data

	Designation	Weight kg	Order code
	Connection block Valvetronic 110 with 3 m cable Connection block Valvetronic 110 with 10 m cable	0,32 0,95	**9121719001** **9121719002**
	Blanking plugs (pack of 10) Use blanking plugs to close unused connections.	0,02	**9121719003**
	Labels (pack of 10) White labels to insert in grooves on the side of the connection	0,02	**9121719004**

Dimensions and wiring diagrams





Conductor	Colour	Input	Output
1	Pink	Signal 1	Signal 1
2	Grey	Signal 2	Signal 2
3	Yellow	Signal 3	Signal 3
4	Green	Signal 4	Signal 4
5	White	Signal 5	Signal 5
6	Red	Signal 6	Signal 6
7	Black	Signal 7	Signal 7
8	Violet	Signal 8	Signal 8
9	Grey-Pink	Signal 9	Signal 9
10	Red-Blue	Signal 10	Signal 10
A	Blue	0 V	0 V
B	Brown	+24 V	PE

P

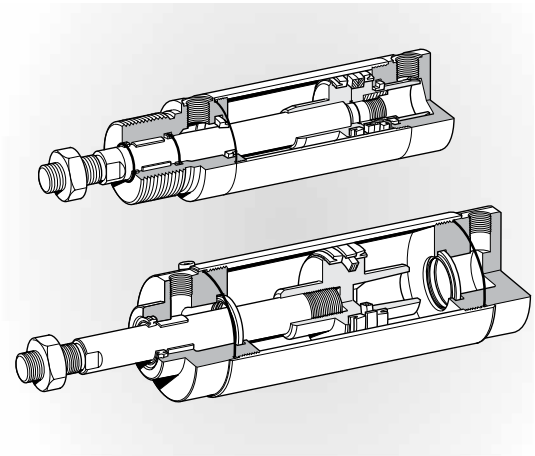
Seal kits for P1S cylinders

Complete seal kits consisting of:

Piston seals

Cushioning seals
Piston rod bearing
Piston rod seal

Scraper ring
O-rings



Standard temperature versions

Cylinder designation	Order code
P1S-•032MS	**9121659195**
P1S-•040MS	**9121659196**
P1S-•050MS	**9121659197**
P1S-•063MS	**9121659198**
P1S-•080MS	**9121718905**
P1S-•100MS	**9121718906**
P1S-•125MS	**9121718907**

High temperature versions

Cylinder designation	Order code
P1S-•032MF	**9121720595**
P1S-•040MF	**9121720596**
P1S-•050MF	**9121720597**
P1S-•063MF	**9121720598**
P1S-•080MF	**9121718925**
P1S-•100MF	**9121718926**
P1S-•125MF	**9121718927**

Low temperature versions

Cylinder designation	Order code
P1S-•080ML	**9121718935**
P1S-•100ML	**9121718936**
P1S-•125ML	**9121718937**

Standard temperature with Through rod

Cylinder designation	Order code
P1S-•080FS	**9121718955**
P1S-•100FS	**9121718956**
P1S-•125FS	**9121718957**

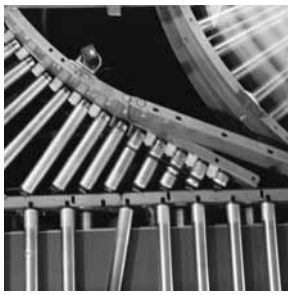
Standard temperature with stainless steel scraper ring

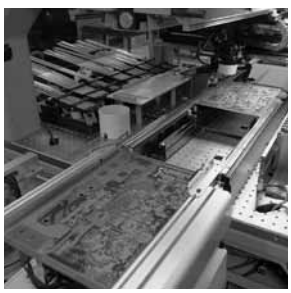
Cylinder designation	Order code
P1S-•080MQ	**9121718915**
P1S-•100MQ	**9121718916**
P1S-•125MQ	**9121718917**

Grease

Version	Weight	Order code
Standard and Low temperature	30 g	**9127394541**
High temperature	30 g	**9127394521**

P

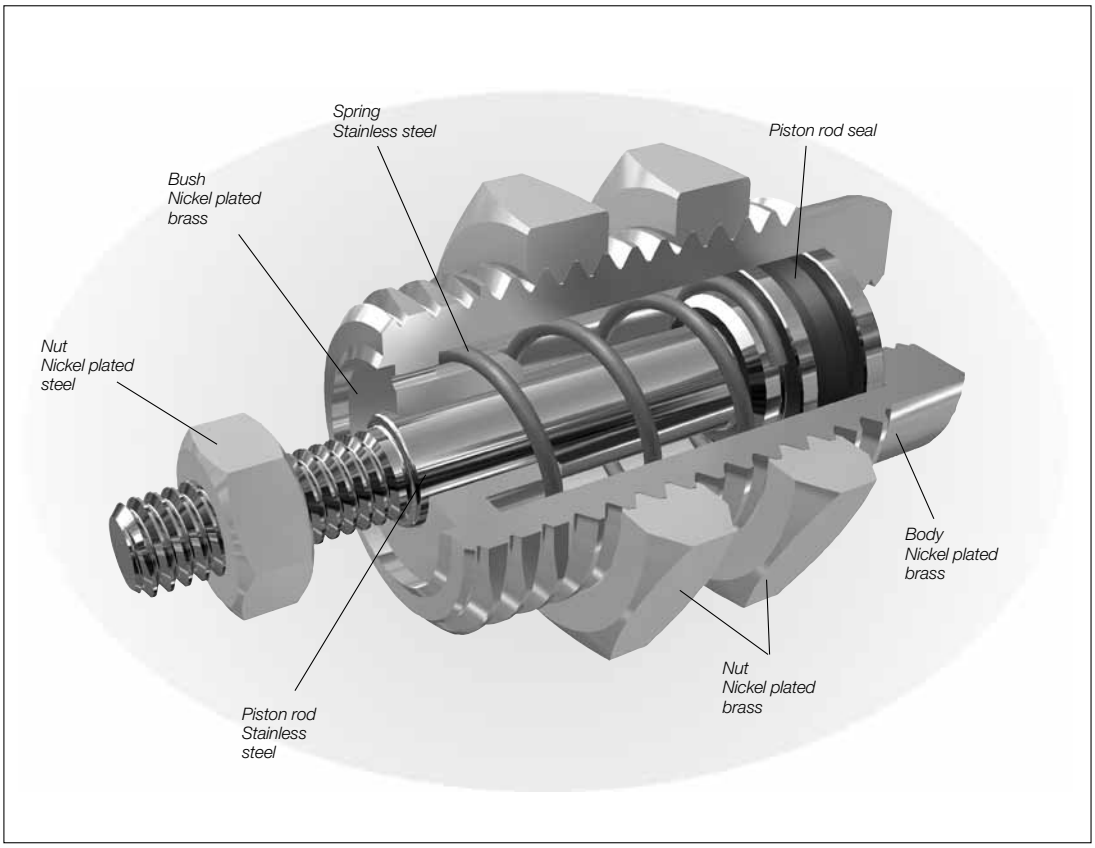




Q

Cartridge Cylinders

P1G Series



Cartridge cylinder P1G

P1G cartridge cylinders are the perfect solution for compact installation requirements. The cylinders are fully threaded on the outside, allowing them to be screwed into bores in tools, machine stands, etc. This means they require no additional space—instead they virtually disappear into the machine/equipment. They are designed for a long service life, and for non-lube operation. P1G cylinders are made of a material that allows them to be used in applications requiring a high level of corrosion resistance. They are all single acting, and are available with 6, 10 and 16 mm bore sizes. Each of the P1G cylinders is available with a choice of stroke length: 5, 10 or 15 mm. P1G cylinders are supplied complete with one piston rod nut and two lock nuts for easy installation.

Q

Cylinder forcess

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

Order code	Theoretical piston force at 6 bar			
			Spring retraction	
	Nmax	Nmin	Nmax	Nmin
Single acting, spring return				
P1G-S006SS-0005	15,0	12,9	3,7	1,6
P1G-S006SS-0010	14,9	12,7	3,9	1,7
P1G-S006SS-0015	15,0	12,7	3,9	1,6
P1G-S010SS-0005	38,8	34,6	11,6	7,4
P1G-S010SS-0010	40,2	34,2	12,0	6,0
P1G-S010SS-0015	39,4	33,4	12,8	6,8
P1G-S016SS-0005	109,6	108,8	9,6	8,8
P1G-S016SS-0010	104,4	100,3	18,1	14,0
P1G-S016SS-0015	104,4	100,3	18,1	14,0

Material specification

Cylinder housing	Stainless steel
Piston rod bearing/ Front end cover	Nickel plated brass
Cylinderhus	Nickel plated brass
Piston seal, Ø6	Nitrilgummi NBR
Piston seal, Ø10 and 16	Polyurethane
Return spring	Stainless steel
Piston rod nut	Nickel plated steel
Mounting nut	Nickel plated brass

Spare part = new cylinder

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 ºC 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.

ISO 8573-1 quality classes

Quality class	**Pollution** particle size (µm)	max con-centration (mg/m³)	**Water** max. press. dew point (°C)	**Oil** max con-centration (mg/m³)
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	-

Additional data

Working pressure	max	7bar
	min	2bar
Working temperature	max	+80°C
	min	–20°C

Prelubricated, further lubrication is not normally necessary.

If additional lubrication is introduced it must be continued.

Q

Order key

P1G – S 016 S S – 0005

Cylinder bore mm
006
010
016

	Cylinder type / function
S	Single-acting, spring return for retract stroke

	Sealing material
S	Standard, -20 °C to +80 °C

Sealing material	
0005	5
0010	10
0015	15

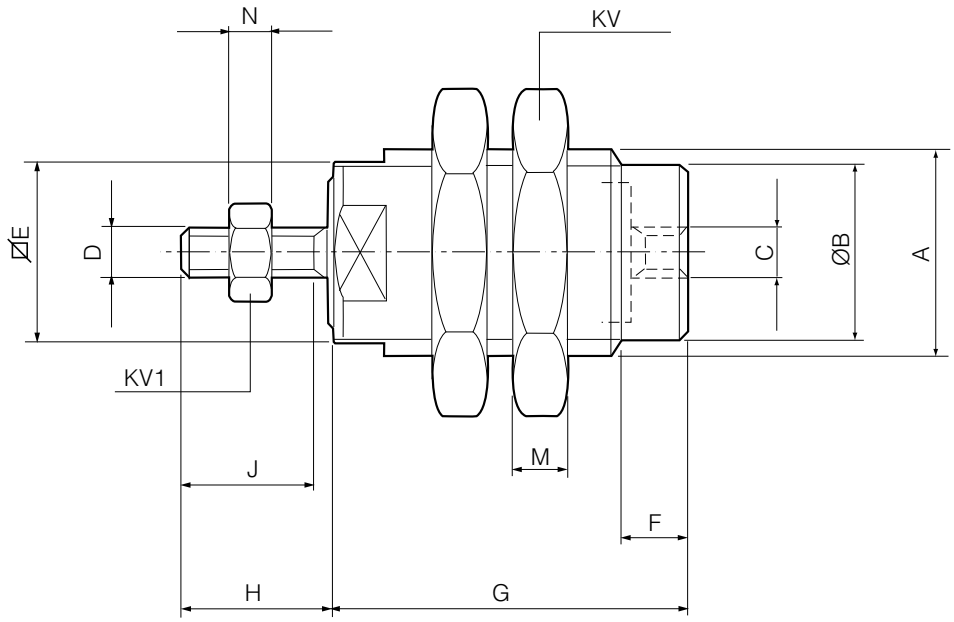
Single-acting spring return

Cyl.bore mm	Stroke mm	Weight g	Order code
6 Conn. M5	5	10	**P1G-S006SS-0005**
	10	13	**P1G-S006SS-0010**
	15	15	**P1G-S006SS-0015**
10 Conn. M5	5	27	**P1G-S010SS-0005**
	10	32	**P1G-S010SS-0010**
	15	36	**P1G-S010SS-0015**
16 Conn. M5	5	70	**P1G-S016SS-0005**
	10	78	**P1G-S016SS-0010**
	15	87	**P1G-S016SS-0015**

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

Q

Dimensions



Cylinder bore	A	ØB	C	D	E	F	G			H	J	KV	KV1	M	N
							5[1]	10[1]	15[1]						
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
6	M10x1	8,5	M5	M3x0,5	9	5	18,5	25,5	32,5	9	9	14	5,5	3	2,4
10	M15x1,5	13	M5	M4x0,7	14	5	20,5	27	34	11,5	11	19	7	4	3,2
16	M22x1,5	19	M5	M5x0,8	20	6	23,5	29,5	36	14	12	27	8	5	4

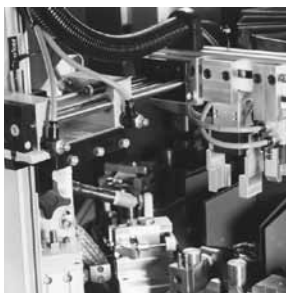
1) Stroke length in mm

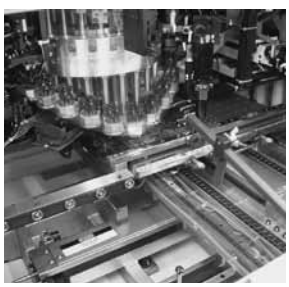
Caution

Avoid side loads on the piston rod
Avoid loading the piston rod during retraction
Do not operate the cylinders with excessive inertia.

Q

Q





R

Hydraulic Clamp

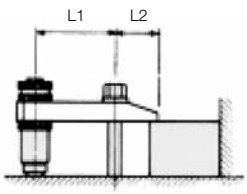
VB Series

Description

Clamp cylinders are single acting pneumatic cylinders with built-in oleo-pneumatic intensifiers
They can be used to solve most clamping, tightening, etc problems :

- Compact size for large forces exerted (up to 2700 daN depending on the model and air pressure)
- Operating using a compressed air supply (no special installation required)
- Easy adjustement thanks to a fully threaded body
- Simple and rapid installation

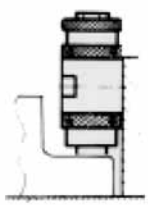
Clamping examples



Clamping with intensified force L1/L2<2

Horizontal clamping

Clamping of cylindrical component using V groove clamp



Vertical clamping

R

Order codes

Model No.	Max stroke (mm)	Ø external	Weight - g
VB363C	3	36	570
VB366C	6	36	640
VB369C	9	36	890
VB483C	3	48	1050
VB486C	6	48	1350
VB489C	9	48	1152
VB4812C	12	48	1840
VBH483C	3	48	1240
VB606C	6	60	2360
VB609C	9	60	3120
VB6012C	12	60	3810
VBH603C	3	60	2360
VBH606C	6	60	3700

Mounting accessories

Mounting for VB	Mounting block	Rouded end	V groove end
Ø 36	**FVA36-1**	**BVA36-16**	**BVA36-17**
Ø 48	**FVA48-1**	**BVA48-16**	**BVA48-17**
Ø 60	**FVA60-1**	**BVA60-16**	**BVA60-17**

Maintenance

For all operations see our maintenance instructions.

All safety requirements must be observed.

Seal kit for	VB Ø 36	VB Ø 48	VBH Ø 48	VB Ø 60	VBH Ø 60
Ø 36	**JJVB36**	**JJVB48**	**JJVBH48**	**JJVB60**	**JJVBH60**

Oil container suitable fo all types of cylinder (250ml capacity)

Model No. : **BH680VB**

Technical Information

Operation

Temperature range:	+5°C to +50°C (41°F to 22°F)
Storage temperature:	-20°C to +60°C (-4°F to 140°F)
Pressure range:	1 to 9 bar (15 to 130 psi) (except
	VBH603 and VBH606 : 7 bar (101psa max.)
Air condition:	Filtered air 40 µ lubricated or non lubricated

Material specification

Body	Nickel plated steel
Piston rod	Hardened steel
Locking rings	Zinc plated steel
End cap	Zinc plated steel
Seals	Nitrile

R

Technical Information

Cylinder forces

Note: The clamping time is given from the moment the clamp cylinder is pressurised to the time at when 90% of the clamping force is obtained, the cylinder completing a full stroke.

The release time is given from the moment the clamp cylinder starts to exhaust until the rod is fully retracted.

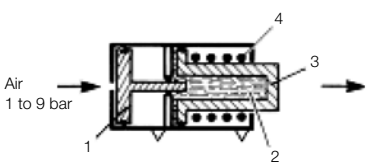
When the cylinder remains pressurised for more than 10 min. add 0,20 sec. to the release time.

These average times are given for information only. They will vary depending on the application and the cylinder inlet and exhaust circuit.

Model No.	Max stroke (mm)	Force at 6 bar daN (lbs)	Clamping time (s)	Release time (s)
VB363C	3	240 (540)	0,10	1,00
VB366C	6	240 (540)	0,15	1,30
VB369C	9	240 (540)	0,20	1,50
VB483C	3	530 (1190)	0,30	1,30
VB486C	6	530 (1190)	0,40	1,60
VB489C	9	530 (1190)	0,50	1,90
VB4812C	12	530 (1190)	0,60	2,20
VBH483C	3	1060 (2380)	0,50	0,70
VB606C	6	1140 (2560)	0,50	1,90
VB609C	9	1140 (2560)	0,60	2,30
VB6012C	12	1140 (2560)	0,70	2,50
VBH603C	3	1800 (400)	0,50	0,70
VBH606C	6	1800 (400)	0,60	1,05

Priciple of operation

R



Air pressure applied to the pneumatic piston (1) causes the plunger to displace the enclosed oil in the hydraulic section of the cylinder (2). A high-pressure stroke results at the hydraulic piston (3) due to the differential areas of the two pistons.

The return of pistons (1) and (3) is caused by a return spring (4) when the air pressure is removed.

Technical Information

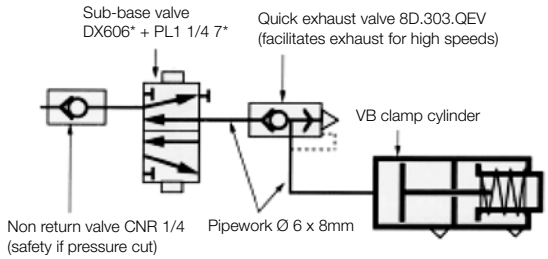
Working conditions

Clamp cylinders must be installed so that the force is directed along the axis. (Take care that the exhaust ports are not blocked and that they are protected from swarf, cutting oil, dust, etc.)

Do not operate the cylinder at no-load. The clamp cylinder must always be operated in conjunction with a clamping fixture (clamp or block) to limit the stroke to within the maximum length specified in the ordering reference table.

We recommend an effective stroke equal to the max length minus 1mm.

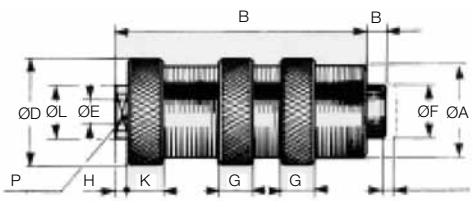
Please contact us for applications requiring force during part of the stroke (marking, crimping, punching, etc) and high speeds.



Connection

For correct use of clamp cylinders, we recommend application of the circuit diagram opposite:

Dimensions



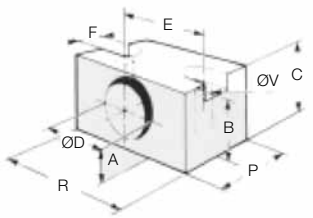
Model No.	ØA	B	ØD	ØE	ØF	G	H	K	ØL	P
VB363C	M36 x 1,5	98,0	42	G1/8	22	12	4	13	22	17
VB366C	M36 x 1,5	127,5	42	G1/8	22	12	4	13	22	17
VB369C	M36 x 1,5	185,0	42	G1/8	22	12	4	13	22	17
VB483C	M48 x 1,5	111,0	56	G1/8	32	12	4	13	22	17
VB486C	M48 x 1,5	148,0	56	G1/8	32	12	4	13	22	17
VB489C	M48 x 1,5	148,0	56	G1/8	32	12	4	13	22	17
VB4812C	M48 x 1,5	188,0	56	G1/8	32	12	4	13	22	17
VBH483C	M48 x 1,5	234,0	56	G1/8	32	12	4	13	22	17
VB606C	M60 x 2	175,0	70	G1/4	40	14	5	17	25	22
VB609C	M60 x 2	175,0	70	G1/4	40	14	5	17	25	22
VB6012C	M60 x 2	290,0	70	G1/4	40	14	5	17	25	22
VBH603C	M60 x 2	249,0	70	G1/4	40	14	5	17	25	22
VBH606C	M60 x 2	314,0	70	G1/4	40	14	5	17	25	22

Dimensions

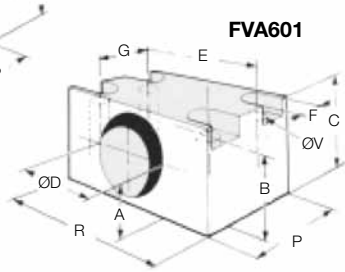
Mounting accessories

Mounting block

For VB	Model No.	A	B	C	ØD	E	F	G	P	R	ØV
Ø36	**FVA36-1**	24,0	38,0	50,0	36,2	54,0	18,0	-	40,0	70,0	11,0
Ø48	**FVA48-1**	30,0	47,0	60,0	48,2	70,0	20,0	-	50,0	90,0	13,5
Ø48	**FVA60-1**	36,0	57,0	70,0	60,2	90,0	20,0	36,0	60,0	110,0	13,5

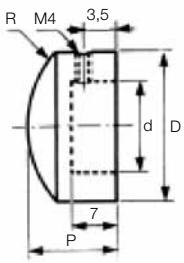


FVA361
FVA481

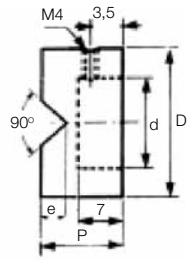


FVA601

Rounded clamp piston end



V groove clamp piston end



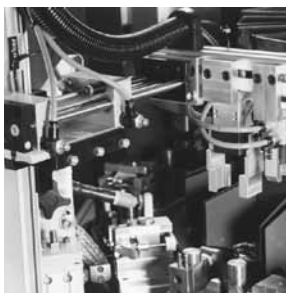
Dimensions (mm)

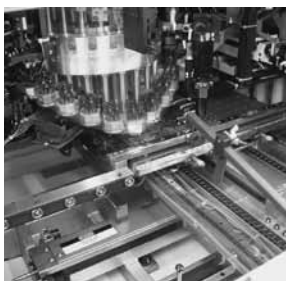
For VB	Model No.	d	R	P	D
Ø36	**FVA36-1**	22	25	15	30
Ø48	**FVA48-1**	32	40	15	40
Ø48	**FVA60-1**	40	50	18	50

Dimensions (mm)

For VB	Model No.	d	e	P	D
Ø36	**FVA36-1**	22	5	15	30
Ø48	**FVA48-1**	32	5	15	40
Ø48	**FVA60-1**	40	8	18	50

R

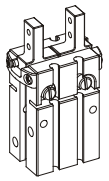




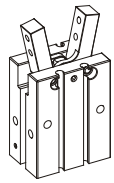
S

Universal Grippers

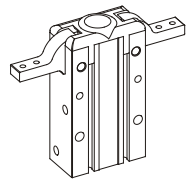
P5GC Series



Parallel gripper
P5GCM H



Angular gripper
P5GCM K



180° Radial gripper
P5GCM B

Size	**10**	**16**	**20**	**25**	**10**	**16**	**20**	**25**	**10**	**16**	**20**	**25**
Total stroke (mm) (±0.2 mm)	4,4	6,6	10,2	14								
Total opening angle (°) (±1°)							2x20					2x92
Clamping torque* (Nm) →←					0,16	0,72	1,56	3,20	0,56	2,12	4,56	9,26
Max. clamping force* (N) →←	28	86	186	254	8	36	78	160	28	106	228	463
Ø piston bore (mm)	10	16	20	25	10	16	20	25	10	16	20	25
Ø port size	M3	M5	M5	M5	M3	M5	M5	M5	M5	M5	M5	M5
Air consumption (cm3/cycle)* *	0,7	3	7	14	0,7	3	6	11	2	7	14	28
Repeatability (mm)	±0,02	±0,02	±0,02	±0,07								
Repeatability (°)					±0,04	±0,04	±0,04	±0,04	±0,06	±0,06	±0,06	±0,06
Max. work frequency (Hz)	3	3	2	2	3	3	2	2	2	2	2	2
Min. closing time (s)	0,01	0,02	0,05	0,07	0,005	0,005	0,02	0,02	0,1	0,1	0,15	0,15
Mass (kg)	0,045	0,098	0,207	0,365	0,039	0,088	0,171	0,293	0,072	0,148	0,309	0,559
Max. jaw length (mm)	40	60	80	100	40	60	80	100	40	60	80	100
Max. temperature (°C)		5 to 60				5 to 60				5 to 60		
Max. pressure (bar)		2,5 to 8				2,5 to 8				2,5 to 8		
Operation		Dry air, lubricated or unlubricated				Dry air, lubricated or unlubricated				Dry air, lubricated or unlubricated		

* At 6 bar at closing
** Cycle = opening + closing (without jaws)

Spring function

Size	**10**	**16**	**20**	**25**	**10**	**16**	**20**	**25**	**10**	**16**	**20**	**25**
At closing*	●	●	●	●	●	●	●	●	—	—	—	–
At opening **	●	●	●	●	●	●	●	●	—	—	—	–

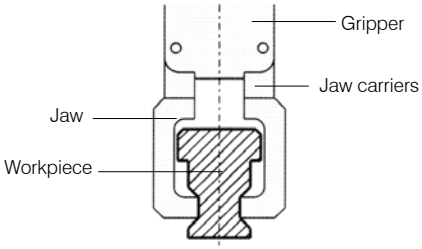
* In case of air supply failure the gripper will be closed

** In case of air supply failure the gripper will be opened

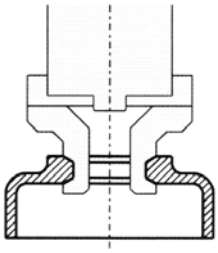
In case of air failure, the retention force is equal to the clamping force divided by 4.

Choice of gripper

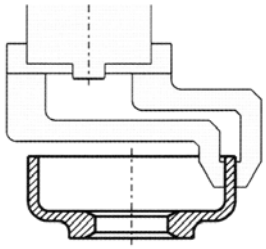
Type of grip



Internal grip

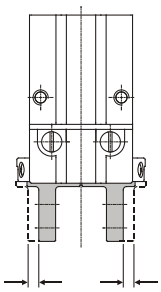


External grip

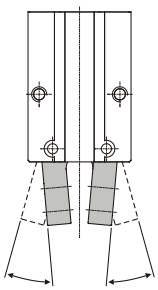


Internal External grip

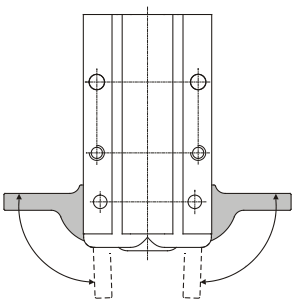
Types of clamping



Parallel clamping
Workpieces of different diameter or thickness

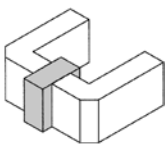


Angular clamping
Jaw release
Longer jaws

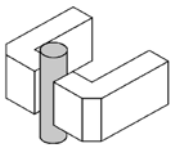


180° clamping
Total jaw release

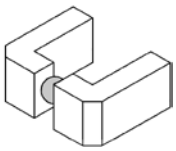
Contact between workpiece/jaw



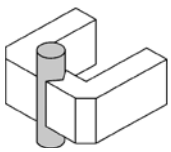
Surface/surface



Line/surface



Point/surface



Double line/surface

Main points to note in selecting grippers :

the weight of the workpiece to be moved
geometry and volume of the workpiece
the type of gripper (parallel or angular)
dynamic movement of gripper and workpiece combination
environment (shocks, additional external forces...)
coefficient of friction between workpiece and jaws (see chart below)

Workpiece material	Jaw material	Coefficient of friction μ
Steel	Steel	0,25
Steel	Aluminium	0,35
Steel	Plastic	0,50
Aluminium	Aluminium	0,49
Aluminium	Plastic	0,70
Plastic	Plastic	1

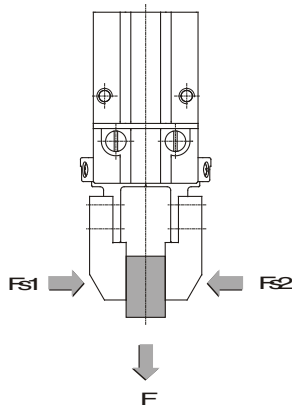
S

Formula of calculation of clamping force

For internal or external clamping

Fs1 = Fs2

$$Fs = Fs1 + Fs2 = \frac{F}{\mu} \times So$$



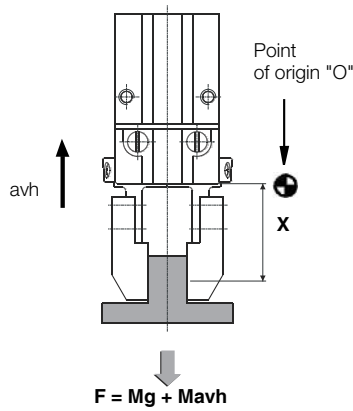
Fs : clamping force (N)
F : force acting on jaws (N)
(when static F corresponds to the weight of the workpiece in N)
μ : coefficient of friction between the workpiece and jaws (μ < 1)
So : safety factor (between 2 and 4, refer to chart below)

Safety factor So	Type of use
2	normal use
3	movement in several directions (slow acceleration or decelerations)
4	shocks, fast accelerations or decelerations

Examples

Parallel gripper in vertical position

Data	
Length of jaws X (mm)	20
Mass of the workpiece to grip M (kg)	0,06
Pressure (bar)	6
Safety factor So	2
Coefficient of friction μ	0,2
Mass acceleration g (m/s²)	9,81
Ascending vertical acceleration avh (m/s²)	5



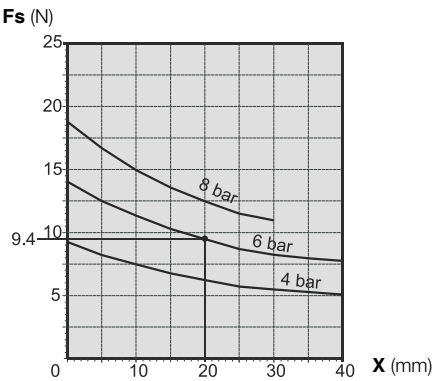
Calculation of clamping force :

$$Fs = \frac{0,06 \times 9,81 + 0,06 \times 5}{0,2} \times 2$$

$$= 8,9 \text{ N}$$

Verification of clamping force Fs :
At P = 6 bar and X = 20 mm the clamping force read on the graph opposite is Fs = 9,4 N.
As 2 x 9,4 N > 8,9 N
a size 10 is sufficient.

Clamping force per jaw (N) / jaw length (mm)



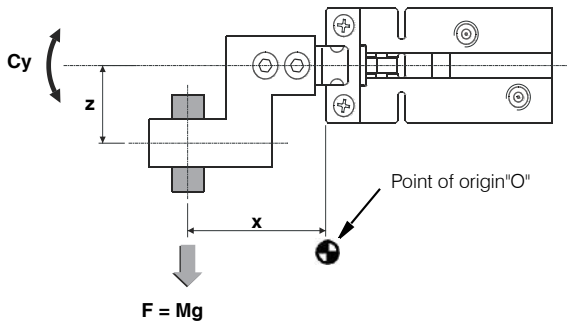
Verification of tractive force FX on jaw carriers :

F= Mg + Mavh = 0,06 x 9,81 + 0,06 x 5 = 0,90 N
For a parallel gripper size 10, Fx = 2 x 25 = 50N
As 50 N > 0,90 N
The selection of a size 10 is correct.

S

Parallel gripper in horizontal position

Data	
Length of jaws X (mm)	30
Offset distance Z (mm)	18
Mass of the workpiece to grip M (kg)	0,15
Pressure (bar)	6
Safety factor So	2
Coefficient of friction μ	0,15
Mass acceleration (m/s²)	9,81



Calculation of the clamping force :

$$Fs = \frac{0,15 \times 9,81}{0,15} \times 2$$
$$= 19,6 \text{ N}$$

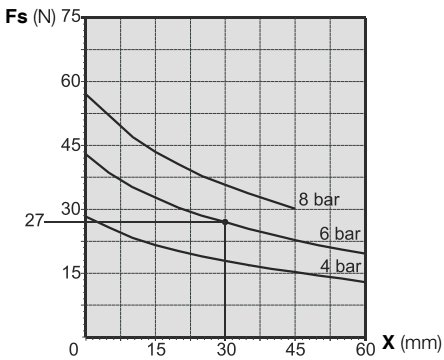
Verification of clamping force Fs :

At P = 6 bar and X = 30 mm the clamping force read from the graph opposite is Fs = 27 N.
As 2 x 27 N > 19,6 N
Size 16 is sufficient.

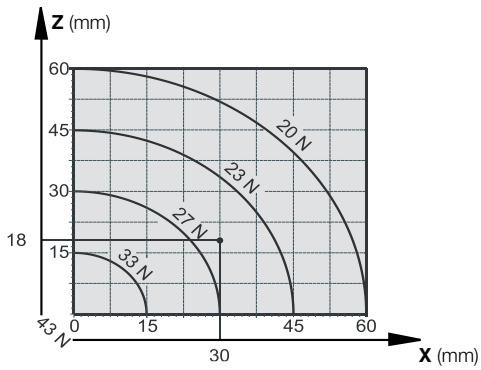
Verification of offset Z :
At P = 6 bar ; X = 30 mm and offset Z = 18 mm,
Fs calculated should be < max. clamping force
Fs read from the graph opposite.
As 2 x 26 N > 19,6 N
Size16 is sufficient.

Verification of torque My exerted on the jaw carriers :
The torque around the axis "Cy" is :
Cy = F x x = 0,15 x 9,81 x 0,03
= 0,044 Nm
Cy should be < max. torque
As 0,044 Nm < 2 x 1,5 Nm
The selection of size 16 is correct.

Clamping force per jaw (N) / jaw length (mm)



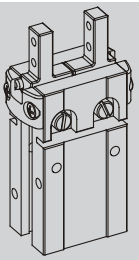
Clamping force per jaw (N) / jaw length and / offset (mm) (at 6 bar)



Points ignored in selecting the grippers :

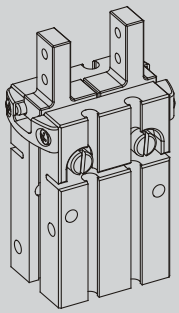
- the weight of jaws
- the geometry and the position of jaw mass of inertia
- the additional forces and torques (shocks, ...)
- the dynamic movement of the gripper and workpiece combination
- the opening and closing times requested
- the environmental conditions of use

S



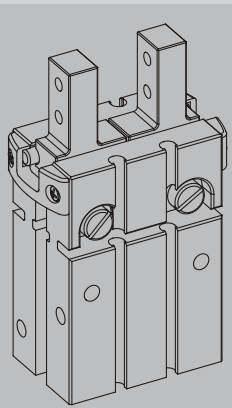
Size 10

Fsf = 28 N
s = 4,4 mm
m = 0,045 kg
Fso = 36 N



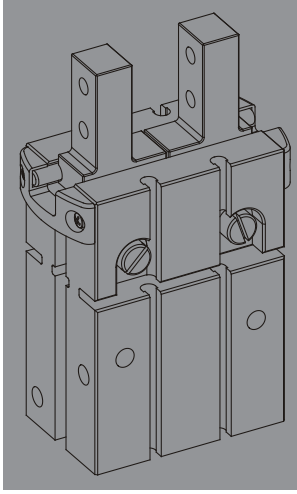
Size 16

Fsf = 86 N
s = 6,6 mm
m = 0,098 kg
Fso = 100 N



Size 20

Fsf = 186 N
s = 10,2 mm
m = 0,207 kg
Fso = 212 N

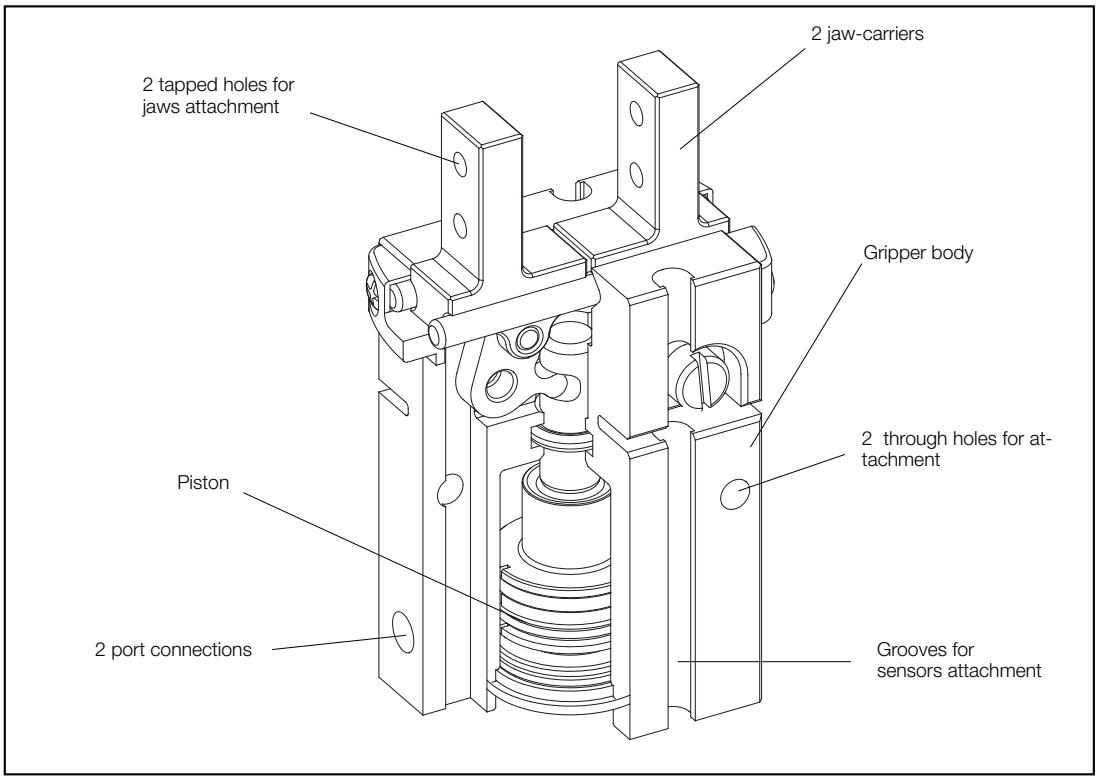


Size 25

Fsf = 254 N
s = 14 mm
m = 0,365 kg
Fso = 282 N

s : stroke
m : weight
Fsf : clamping force at closing
Fso : clamping force at opening

S



Parallel grippers

These grippers, which are used for material handling and precision assembly, are part of the Parker Pneumatic automation product range.
4 sizes are available and can be used in most applications.

Versions and sensors

There is one version : with 2 square jaw carriers.
One or two magnetic sensors can be mounted on all sizes to provide a signal to monitor gripper opening and closing.

Protection

The gripper body is made of hard anodised aluminium and the two jaw carriers are made of stainless steel.

Safety

In the standard version, no internal spring ensures that the gripper remains closed if the air supply fails.

Fixing

By tapped holes on 3 sides of the gripper.
By tapped holes ot the rear of the gripper.
Accurate positioning of gripper through centring and dowel pin holes.

Air supply

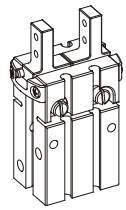
Port connections on one side of the gripper.

Reliability

Grippers have been designed for 10^7 operations in normal working conditions.

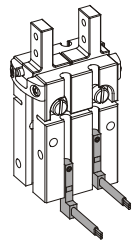
S

Standard version



Double acting, square jaw carriers
Gripper is opened and closed by pneumatic pressure.
No grip retention at closing.
4 sizes available.

Options

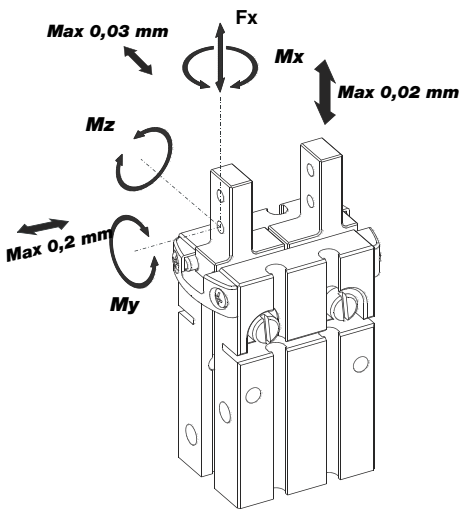


Sensors
Check on closing and opening ot gripper by means of magnetic sensors.

Spring function
Self-locking in closed or opened position by internal spring.

In case of air failure, the retention force is equal to the clamping force divided by 4

Permissible forces on each jaw carrier



Static

Size	10	16	20	25
Fx	25N	50N	75N	125N
Mx	0,4Nm	1,5 Nm	5 Nm	8 Nm
My	0,4Nm	1,5 Nm	5 Nm	8 Nm
Mz	0,4Nm	1,5 Nm	5 Nm	8 Nm

Mz at 6 bar

Dynamic*

Size	10	16	20	25
Fxd	0,4N	0,8N	1,5N	2,5N
Mxd	0,4Ncm	1,5 Ncm	5 Ncm	8 Ncm
Myd	0,4Ncm	1,5 Ncm	5 Ncm	8 Ncm
Mzd	0,4Ncm	1,5 Ncm	5 Ncm	8 Ncm

Mzd at 6 bar

* Jaw-carrier in motion, clamping at opening or at closing

Mass of one of the 2 jaws (g) / closing and opening time (s) :

Size	10	16	20	25
m 0,2s	40g	80g	150g	250g
m 0,07s	25g	45g	75g	100g
m 0,05s	20g	35g	50g	–
m 0,02s	15g	25g	–	–
m 0,01s	10g	–	–	–

m is the permissible mass of the jaw for using gripper without flow controllers. If the mass of jaw is higher, use flow controllers to reduce the jaw-carriers speed.
m 0,2s gives the max. mass of jaw to fix on one of the jaw-carriers for a 0,2 s closing time.

These indications must not be exceeded if :

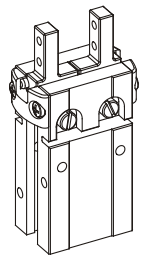
- any extra forces are exerted on the workpiece or the jaws, in addition to the force of the clamping torque.
- handling forces (acceleration, shocks..) must also be added.

These values are cumulative if the forces act in different directions at the same time.

S

Technical informations

Total stroke (mm) (±0,2)	4,4
Clamping force per jaw at opening at 6 bar (N)	18
Max. clamping force at opening at 6 bar (N)	36
Clamping force per jaw at closing at 6 bar (N)	14
Max. clamping force at closing at 6 bar (N)	28
Ø piston bore (mm)	10
Ø port sizes	M3
Air consumption at 6 bar (cm^3 / cycle)	0,70
Repeatability (mm)	0,02
Max. operation frequency (Hz)	3
Min. closing time (s)	0,01
Max. jaw length (mm)	40
Mass (kg)	0,045



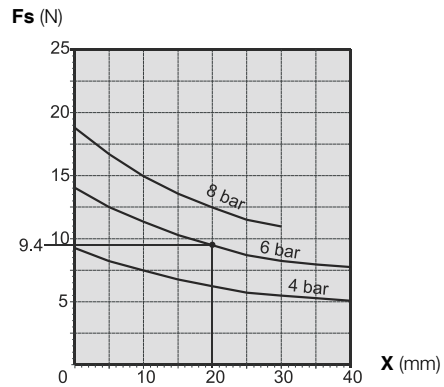
Material

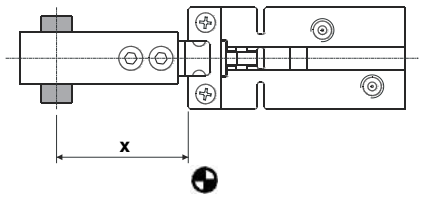
Body	hard anodised aluminium
Jaw-carriers	stainless steel
Seals	nitrile butadiene rubber (NBR)

Operating information

Pressure (bar)	2,5 to 8
Working temperature (°C) (with or without sensors)	5 to +60
Operation	dry air, lubricated or unlubricated

Clamping force per jaw (N) / jaw length (mm)

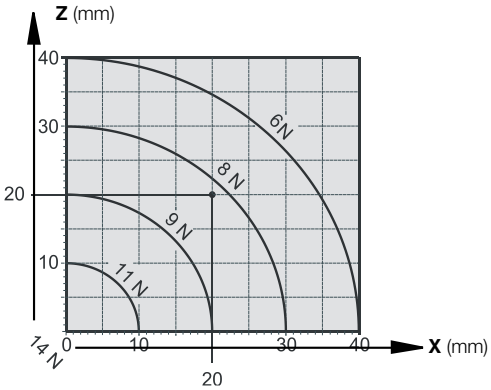


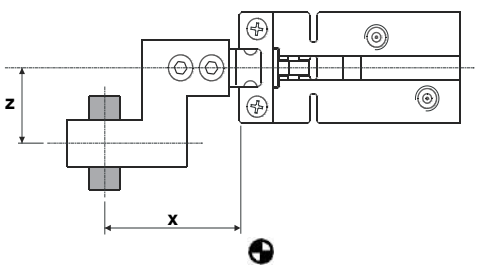


Example : for X = 20 mm, Fs = 2 x9,4 N

Clamping force per jaw (N) / jaw length and / jaw offset (mm)

(at 6 bar)

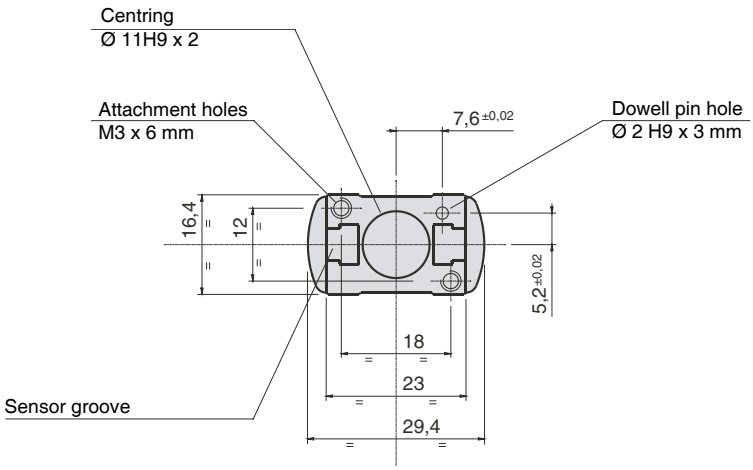


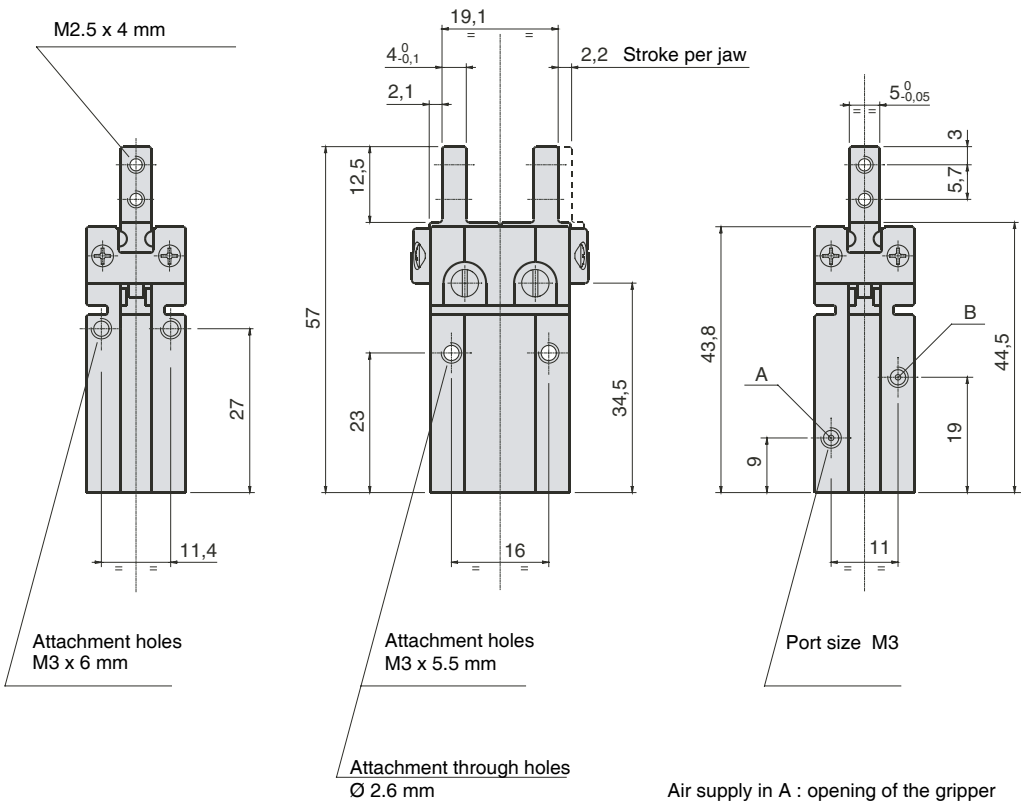


Example : for X = 20 mm and Z = 20 mm Fs = 2 x 8,2 N

S

Dimensions (mm)





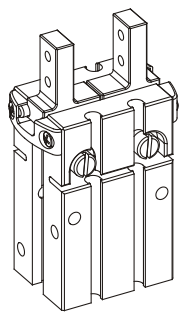
Air supply in A : opening of the gripper

Air supply in B : closing of the gripper

S

Technical informations

Total stroke (mm) (±0,2)	6,6
Clamping force per jaw at opening at 6 bar (N)	50
Max. clamping force at opening at 6 bar (N)	100
Clamping force per jaw at closing at 6 bar (N)	43
Max. clamping force at closing at 6 bar (N)	86
Ø Piston bore (mm)	16
Ø Port sizes	M5
Air consumption at 6 bar (cm^3 / cycle)	3
Repeatability (mm)	0,02
Max. operation frequency (Hz)	3
Min. closing time (s)	0,02
Max. jaw length (mm)	60
Mass (kg)	0,098



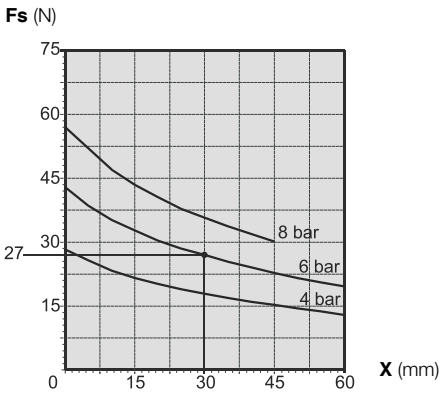
Material

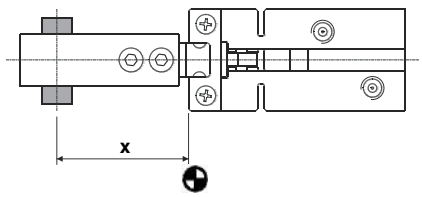
Body	hard anodised aluminium
Jaw-carriers	Stainless steel
Seals	nitrile butadiene rubber (NBR)

Operating information

Pressure (bar)	2,5 to 8
Working temperature (°C) (with or without sensors)	5 to +60
Operating	dry air, lubricated or unlubricated

Clamping force per jaw (N) / jaw length (mm)

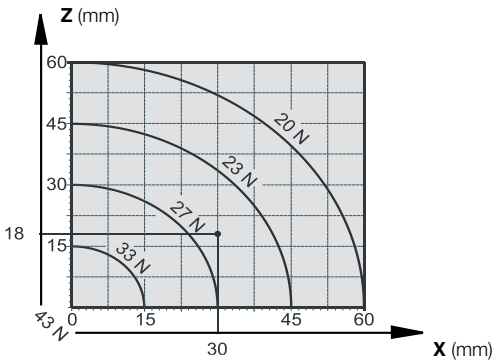


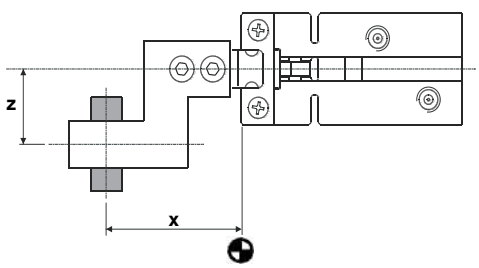


Example : for X = 30 mm, Fs = 2 x 27 N

Clamping force per jaw (N) / jaw length and/ jaw offset (mm)

(at 6 bar)

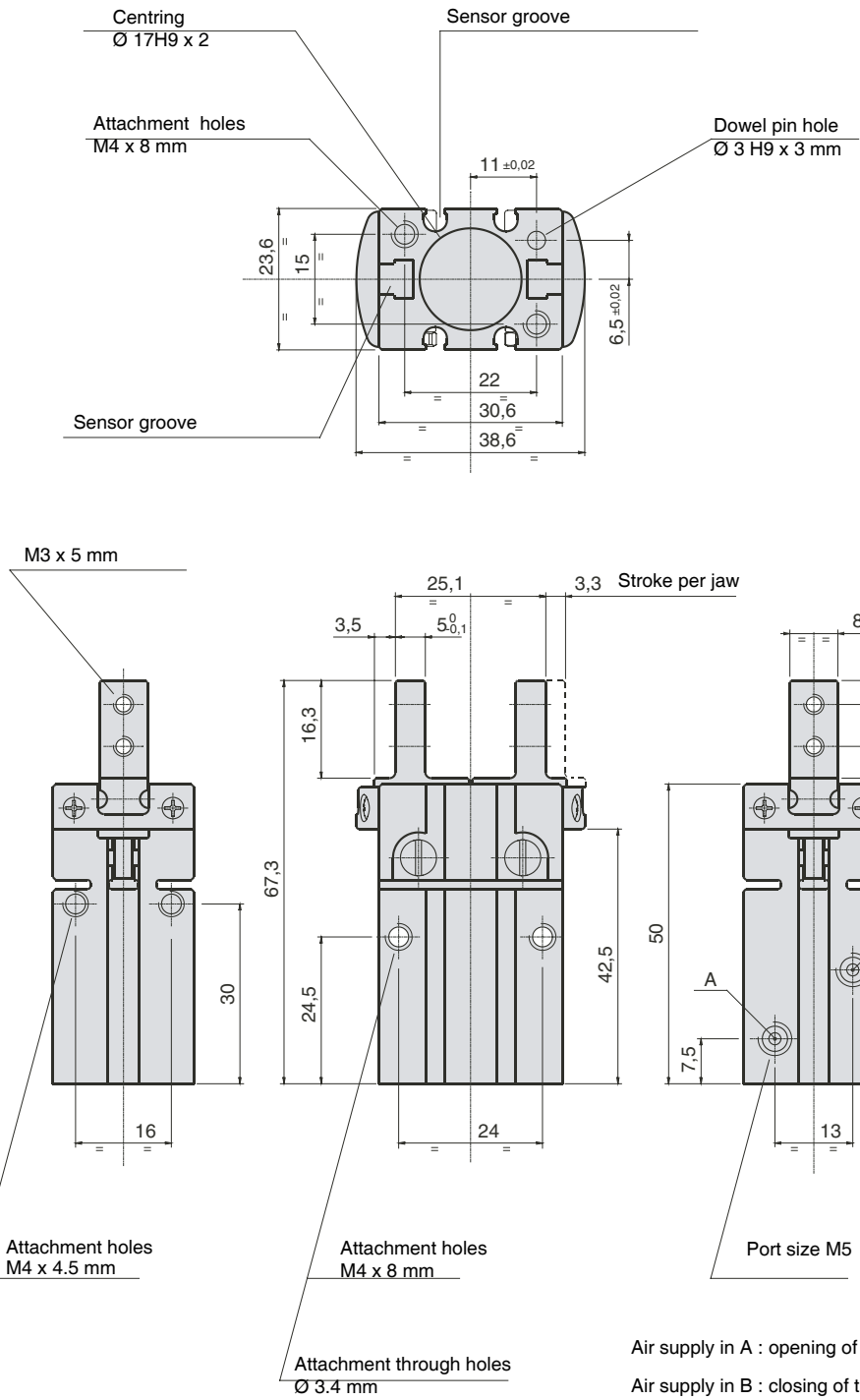




Example : for X = 30mm and Z = 18 mm Fs = 2 x 25,2 N

S

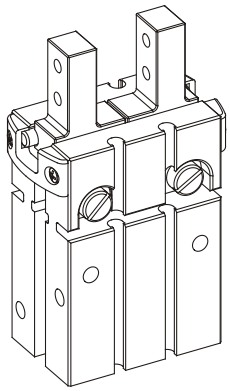
Dimensions (mm)



S

Technical informations

Total stroke (mm) (±0,2)	10,2
Clamping force per jaw at opening at 6 bar (N)	106
Max. clamping force at opening at 6 bar (N)	212
Clamping force per jaw at closing at 6 bar (N)	93
Max. clamping force at closing at 6 bar (N)	186
Ø Piston bore (mm)	20
Ø Port sizes	M5
Air consumption at 6 bar (cm^3 / cycle)	7
Repeatability (mm)	0,02
Ma. operation frequency (Hz)	2
Min. closing time (s)	0,05
Max. jaw length (mm)	80
Mass (kg)	0,207



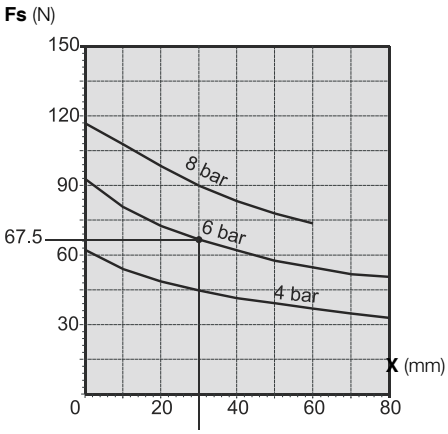
Material

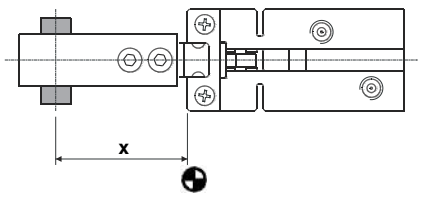
Body	hard anodised aluminium
Jaw-carriers	stainless steel
Seals	nitrile butadiene rubber (NBR)

Operating information

Pressure (bar)	2,5 to 8
Working temperature (°C) (with or without sensor)	5 to +60
Operation	dry air, lubricated or unlubricated

Clamping force per jaw (N) / jaw length (mm)

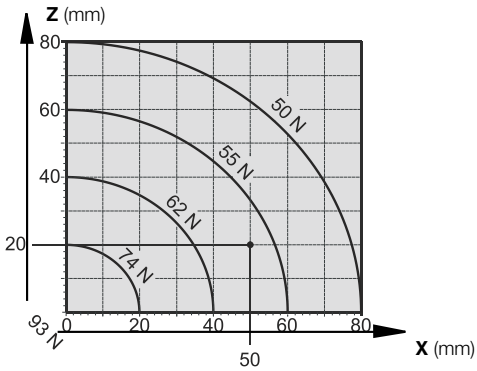


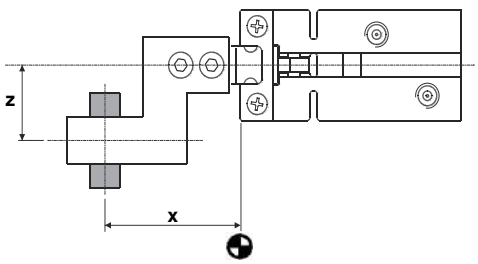


Example : for X = 30 mm, Fs = 2 x 67,5 N

Clamping force per jaw (N) / jaw length and / jaw offset (mm)

(at 6 bar)

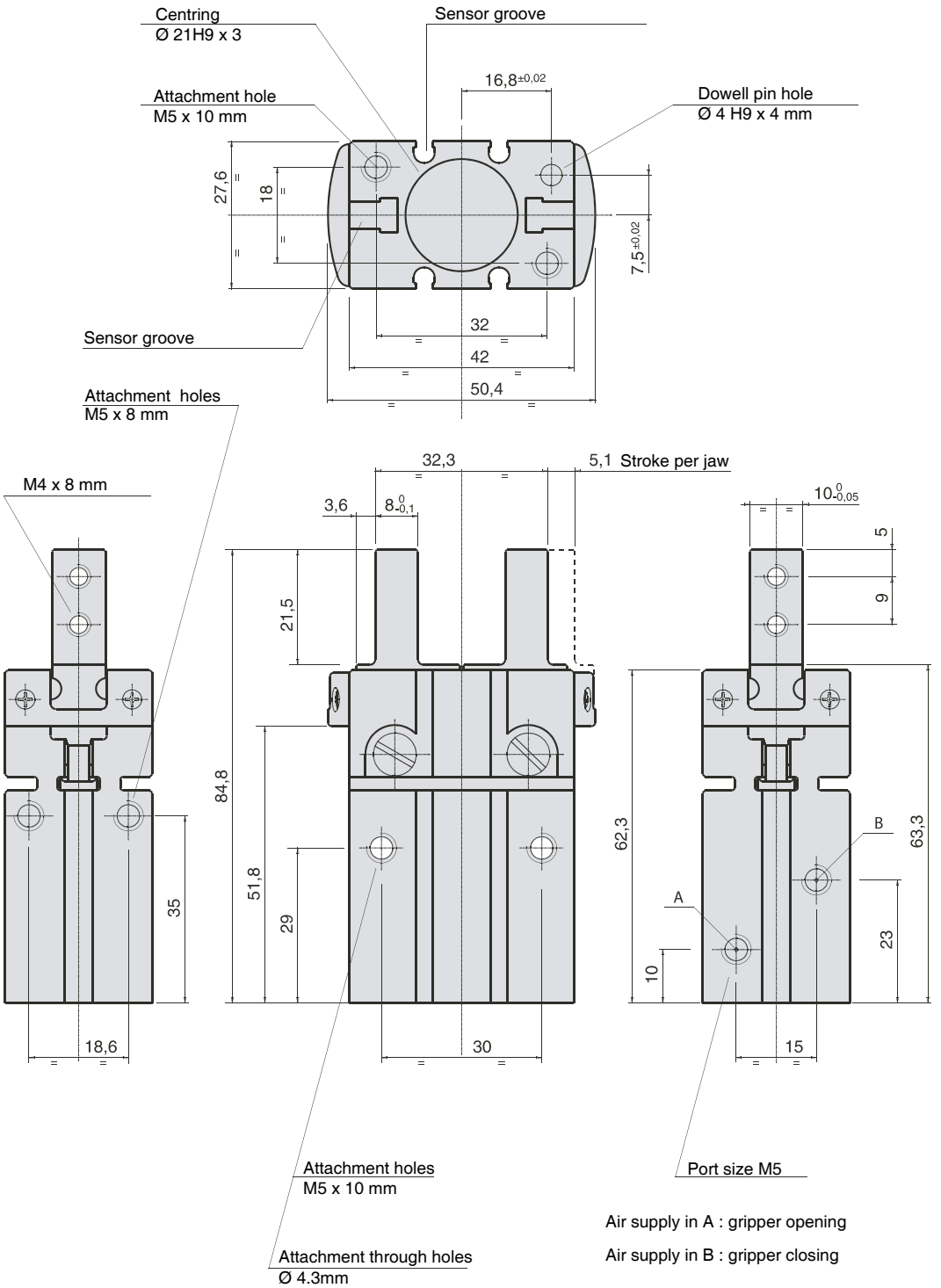




Example : for X = 50mm and Z = 20 mm Fs = 2 x 58 N

S

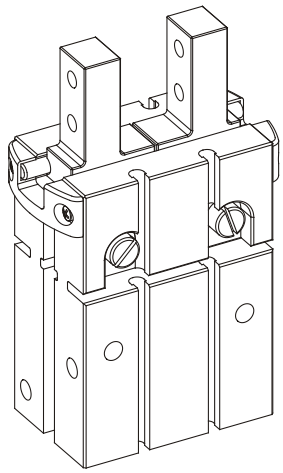
Dimensions (mm)



S

Technical informations

Total stroke (mm) (±0,2)	14
Clamping force per jaw at opening at 6 bar (N)	141
Max. clamping force at opening at 6 bar (N)	282
Clamping force per jaw at closing at 6 bar (N)	127
Max. clamping force at closing at s 6 bar (N)	254
Ø piston bore (mm)	25
Ø Port sizes	M5
Air consumption at 6 bar (cm^3 / cycle)	14
Repeatability (mm)	0,02
Max. operation frequency(Hz)	2
Min. closing time (s)	0,07
Max. jaw length (mm)	100
Mass (kg)	0,365



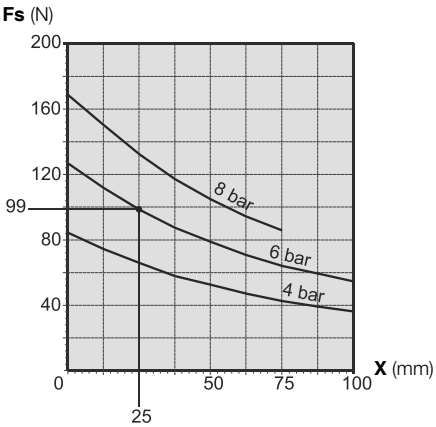
Material

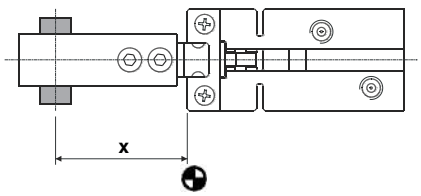
Body	har anodised aluminium
Jaw-carriers	stainless steel
Seals	nitrile butadiene rubber (NBR)

Operating information

Pressure (bar)	2,5 to 8
Working temperature (°C) (with or without sensor)	5 to +60
Operation	dry air, lubricated or unlubricated

Clamping force per jaw (N) / Jaw length (mm)

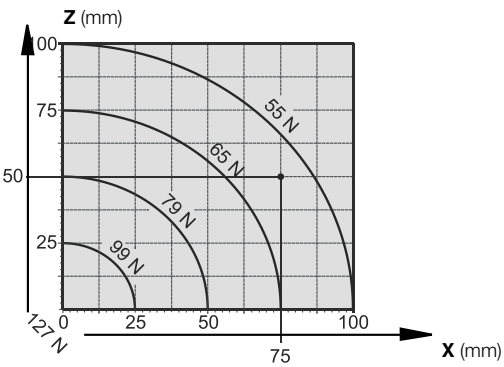


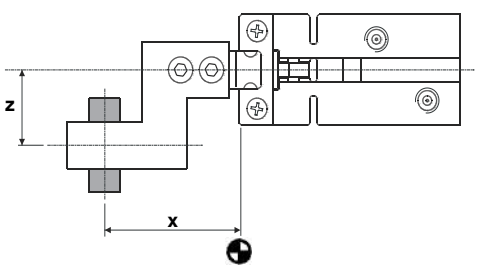


Example : for X = 25 mm, Fs = 2 x 99 N

Clamping force per jaw (N) / jaw length and / jaw offset (mm)

(at 6 bar)

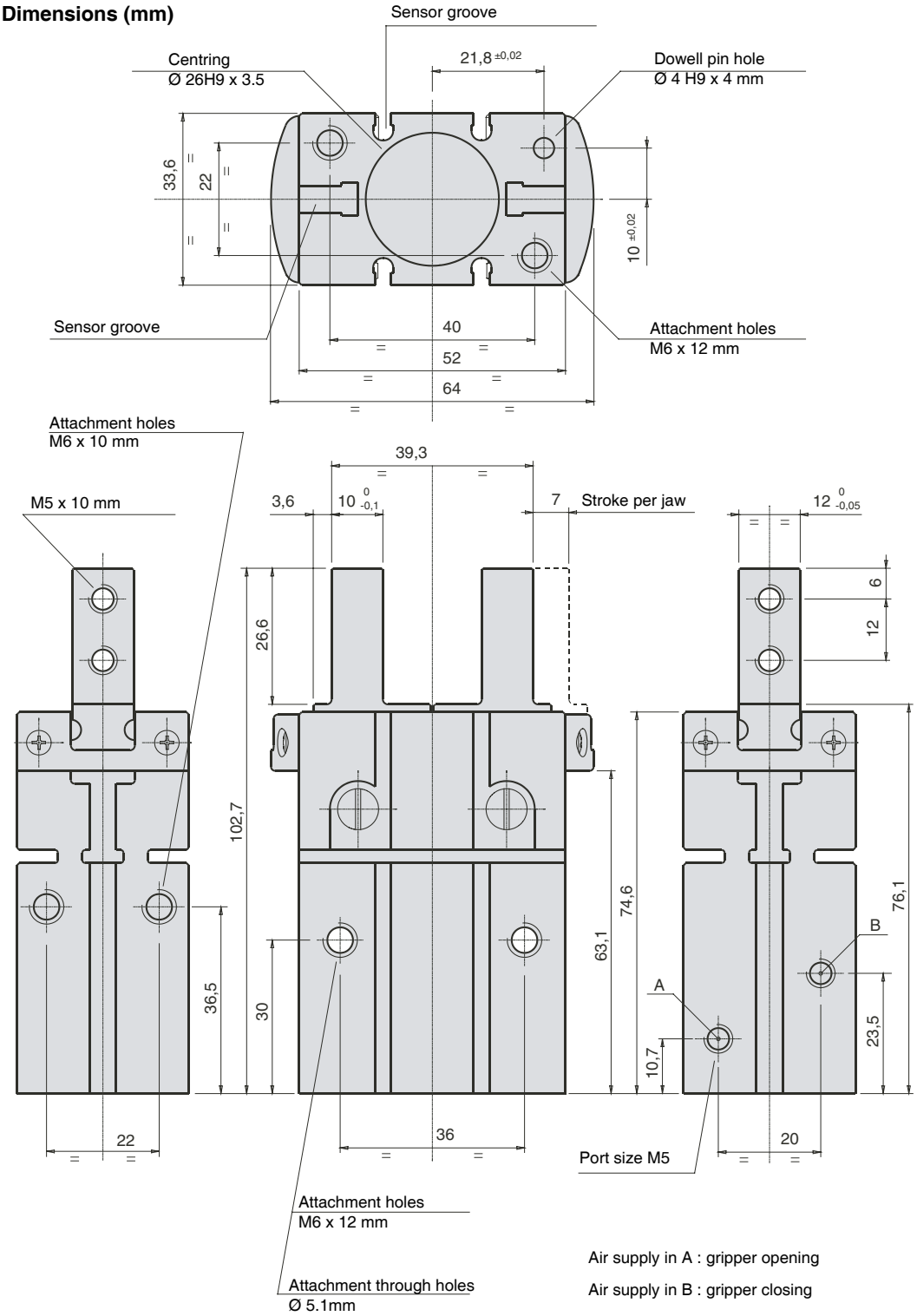




Example : for X = 75mm and Z = 50 mm Fs = 2 x 60 N

S

Dimensions (mm)



S

Order key

Standard gripper (15 digits)

P	5	G	C	M	1	0	H	M	N	0	0	0	4	B

Size	
Ø 10 mm	**10**
Ø 16 mm	**16**
Ø 20 mm	**20**
Ø 25 mm	**25**

	Function
M	Without spring
B	Spring at opening
D	Spring at closing

	Stroke
0004	4,4 mm size10
0006	6,6 mm size 16
0010	10,2 mm size 20
0014	14 mm size 25

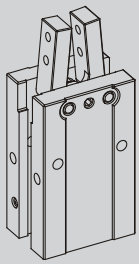
Note : all grippers are equipped with a magnet for sensing.

Example :

Parallel gripper, size16 without spring :

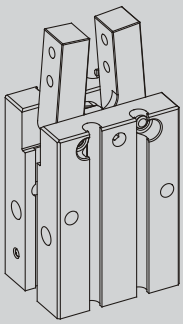
Order code : **P5GCM16HMN0006B**

S



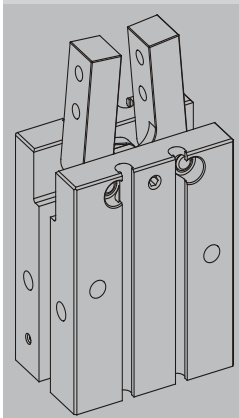
Size 10

Csf = 0,16 Nm
Fsf = 8 N
s = 40°
m = 0,039 kg
Cso = 0,22 Nm
Fso = 11 N



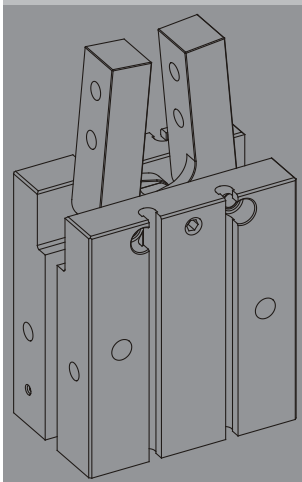
Size 16

Csf = 0,72 Nm
Fsf = 36 N
s = 40°
m = 0,88 kg
Cso = 0,90 Nm
Fso = 45 N



Size 20

Csf = 1,56 Nm
Fsf = 78 N
s = 40°
m = 0,171 kg
Cso = 1,78 Nm
Fso = 89 N

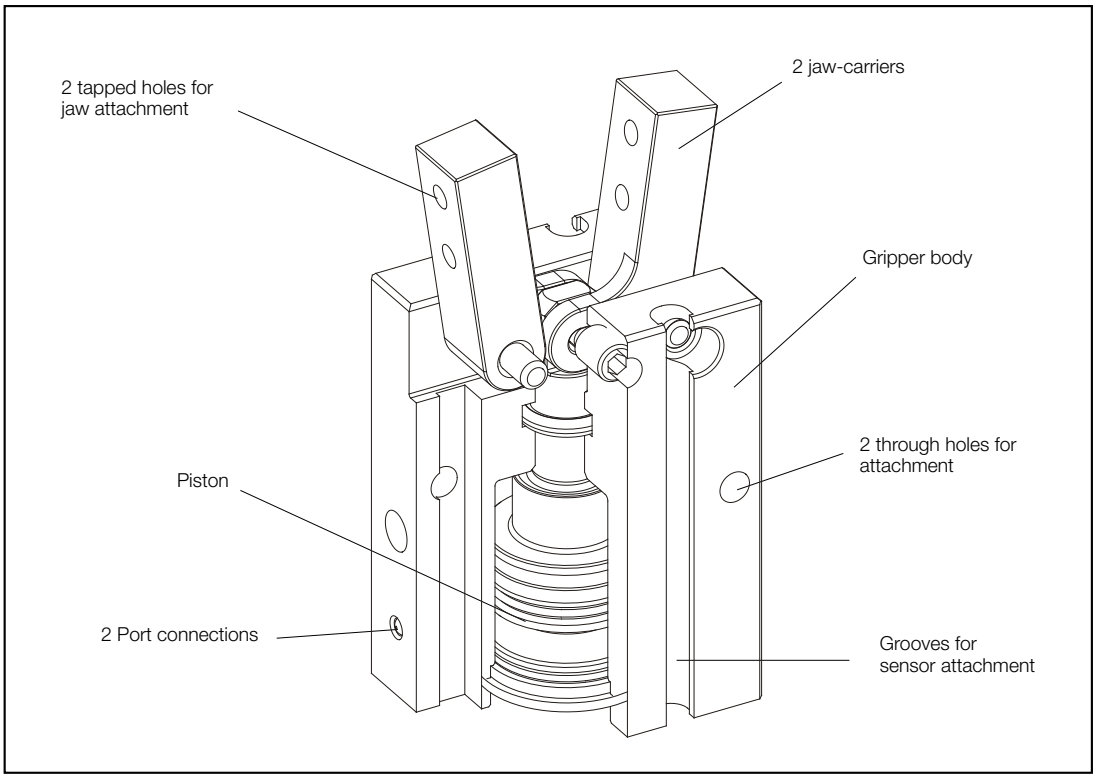


Size 25

Csf = 3,20 Nm
Fsf = 160 N
s = 40°
m = 0,293 kg
Cso = 3,56 Nm
Fso = 178 N

s : stroke
m : weight
Csf : clamping torque at closing
Cso : clamping torque at opening
Fsf : clamping force at closing
Fso : clamping force at opening

S



Angular grippers

These grippers, which are used for material handling and precision assembly, are part of the Parker Pneumatic automation product range.
4 sizes are available and and can be used in most applications.

Versions and sensors

There is one version : with 2 square jaw carriers.
One or two magnetic sensors can be mounted on all sizes, to provide a signal to monitor opening and closing of the grippers

Protection

The gripper body is made of hard anodised aluminium and the two jaw-carriers are made of stainsless steel.

Safety

In the standard version, no internal spring ensures that the grippers remain closed if the air supply fails.

Fixing

By tapped holes on 3 sides of the gripper.
By tapped holes on the rear of the gripper.
Precise location of the gripper through centring holes.

Air supply

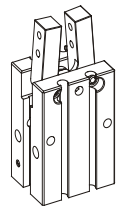
Port connections on one of the sides of the gripper.

Reliability

The grippers have been designed for 10^7 cycles in normal working conditions.

S

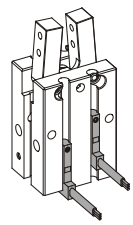
Standard version



Double acting, square jaw-carriers

Gripper is opened and closed by pneumatic pressure.
No self-locking in closed position.
4 sizes available.

Options



Sensors

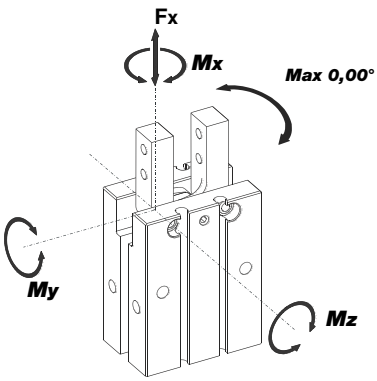
Check on opening and closing of the gripper by means of magnetic sensors.

Spring function

Self-locking in closed or opened position by internal spring.

In case of air failure, the retention force is equal to the clamping force divided by 4.

Permissible forces on each jaw-carrier



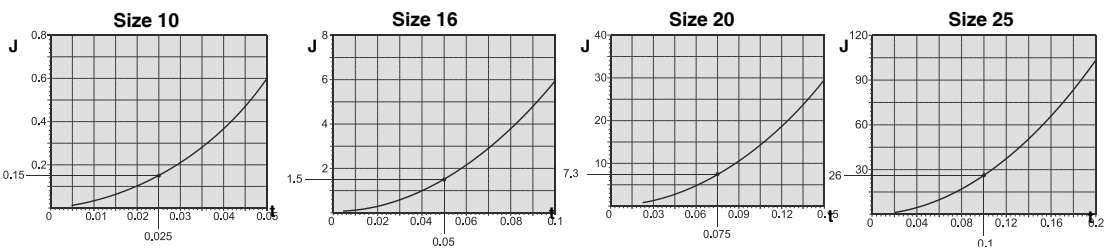
Static

Size	10	16	20	25
Fx	40N	60N	100N	100N
Mx	0,5Nm	0,9 Nm	2,2 Nm	2,2 Nm
My	0,5Nm	0,9 Nm	2,2 Nm	2,2 Nm
Mz	0,4Nm	1,2 Nm	1,5 Nm	2,2 Nm

MZ at 6 bar

Dynamic

Inertia of one of the jaws (kgcm²)/ closing or opening time (s) :



$J = 240 \times t^2$ $J = 600 \times t^2$ $J = 1300 \times t^2$ $J = 2600 \times t^2$

For a 0,15 kgcm² inertia one of the 2 jaws, the closing or opening time of the gripper is 0,025s for a **size 10**.

These indications must not be exceeded if :

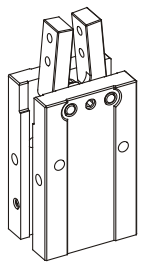
- any extra forces are exerted on the workpiece or on the jaws, in addition to the force or the clamping torque.
- handling forces (acceleration, shocks, ...) must also be added.

These values are cumulative if the forces act in different directions at the same time.

S

Technical informations

Opening angle (°) (±1°)	2x20
Clamping torque per jaw at opening at 6 bar (Nm)	0,11
Max. clamping torque per jaw at opening at 6 bar (Nm)	0,22
Clamping torque per jaw at closing at 6 bar (Nm)	0,08
Max. clamping torque per jaw at closing at 6 bar (Nm)	0,16
Ø piston bore (mm)	10
Ø port sizes	M3
Air consumption at 6 bar (cm^3 / cycle)	0,70
Repeatability (°)	±0,04
Max. working frequency (Hz)	3
Min. closing time (s)	0,005
Max. jaw length (mm)	40
Mase (kg)	0,039



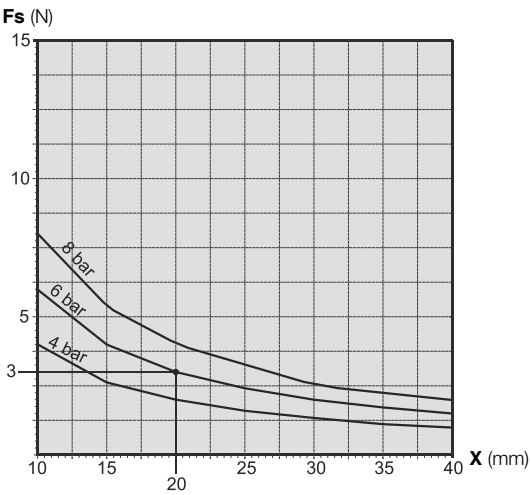
Material

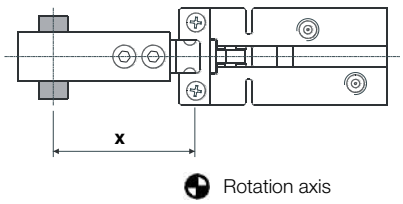
Body	hard anodsed aluminium
Jaw-carrier	stainless steel
Seals	nitrile butadiene rubber (NBR)

Opering information

Pressure (bar)	2,5 to 8
Working temperature (°C)	5 to +60
(with or without sensor)	
Operation	dry air lubricated or unlubricated

Clamping force per jaw (N) / jaw length (mm)



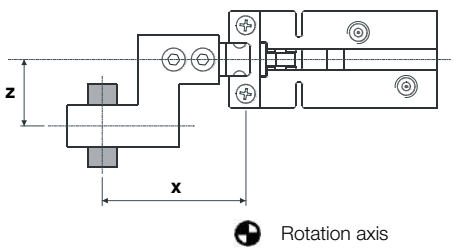


Example : for X = 20 mm, Fs = 2 x 3 N

Clamping force per jaw (N) / jaw length and / jaw offset (mm)

Use the above graph ignoring the jaw offset values Z.

Don't overrun value : Z maxi. = X maxi./ 2



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Dimensions (mm)

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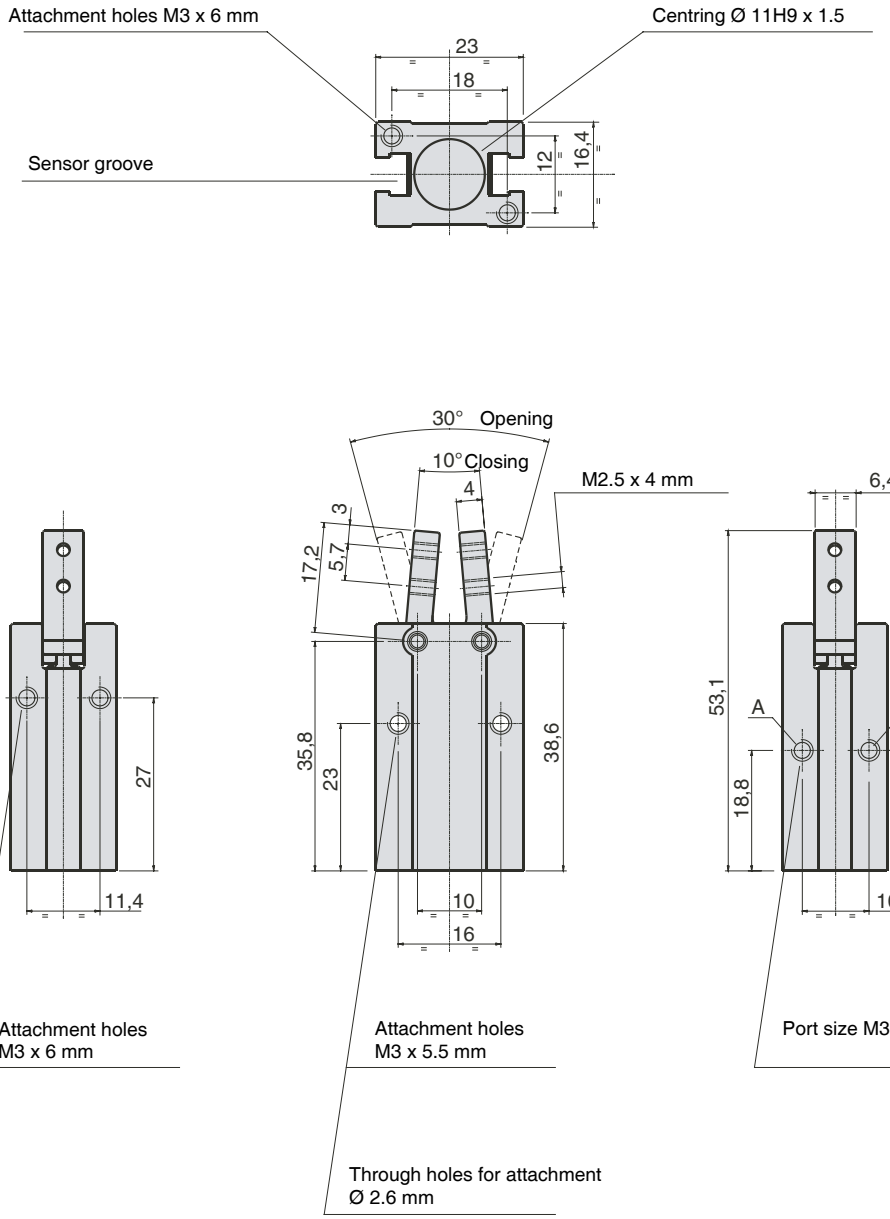


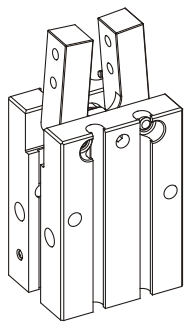
Air supply in A : gripper opening

Air supply in B : gripper closing

S

Technical informations

Opening angle (°) (±1°)	2x20
Clamping torque per jaw at opening at 6 bar (Nm)	0,45
Max. clamping torque at opening at 6 bar (Nm)	0,90
Clamping torque per jaw at closing at 6 bar (Nm)	0,36
Max. clamping torque at closing at 6 bar (Nm)	0,72
Ø piston bore (mm)	16
Ø port sizes	M5
Air consumption at 6 bar (cm^3 / cycle)	3
Repeatability (°)	±0,04
Max. operation frequency (Hz)	3
Min. closing time (s)	0,005
Max. jaw length (mm)	60
Mass (kg)	0,088



Material

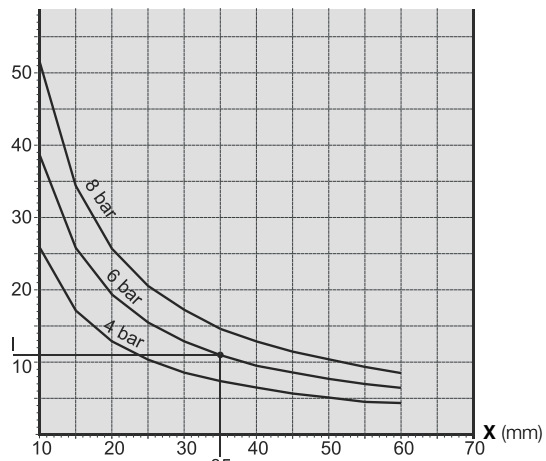
Body	hard anodised aluminium
Jaw carriers	stainless steel
Seals	nitrile butadiene rubber (NBR)

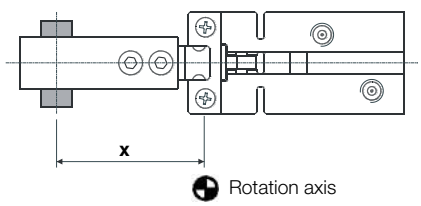
Operating information

Pressure (bar)	2,5 to 8
Working temperature (°C) (with or without sensor)	5 to +60
Operation	dry air, lubricated or unlubricated

Clamping force per jaw (N) / jaw length (mm)

Fs (N)



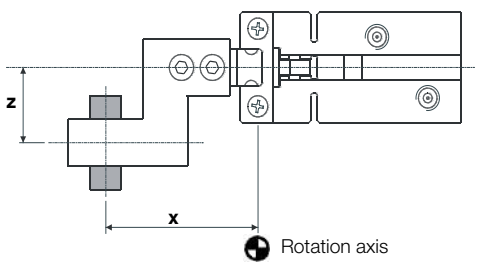


Example : for X= 35 mm, Fs = 2 x 11 N

Clamping force per jaw (N) / jaw length and / jaw offset (mm)

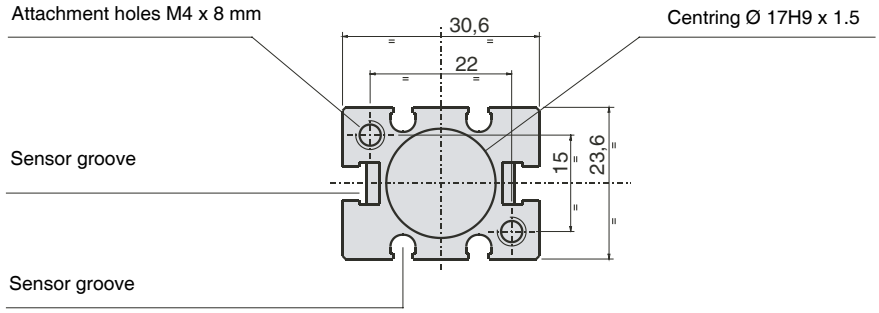
Use the above graph ignoring the jaw offset value Z.

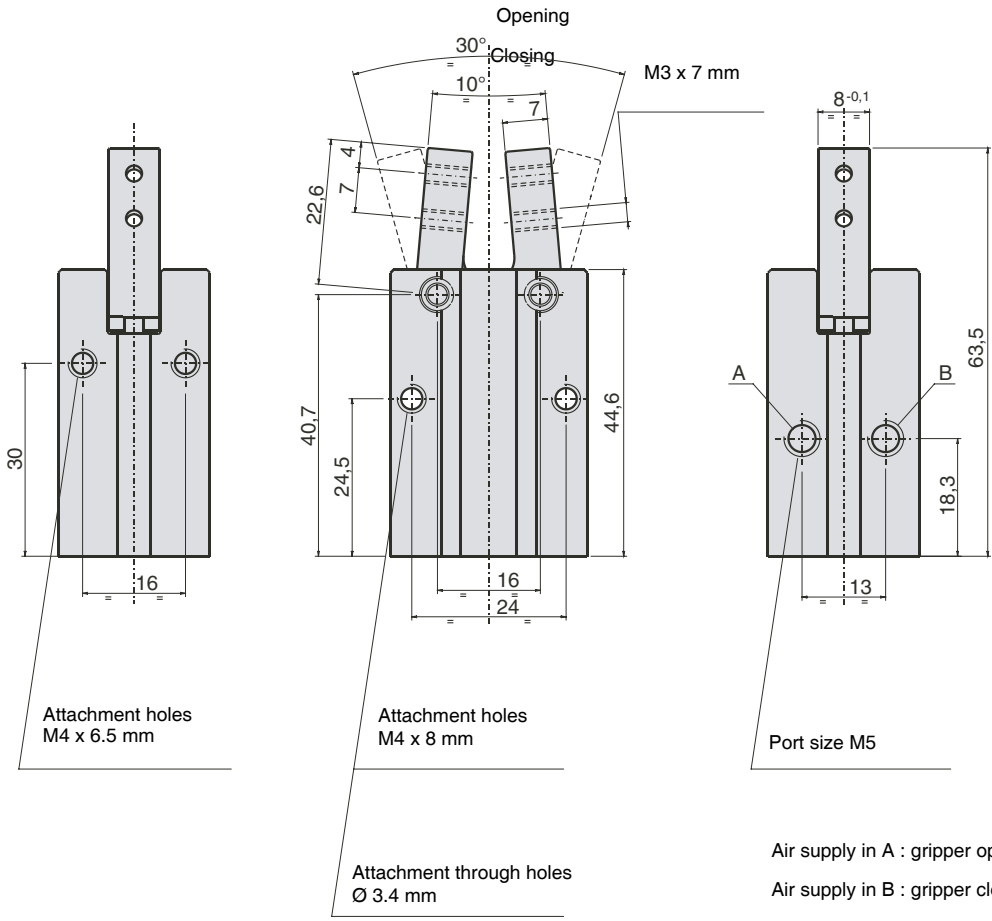
Don't overrun value : Z maxi. = X maxi./ 2



S

Dimensions (mm)





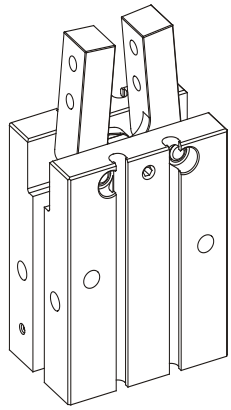
Air supply in A : gripper opening

Air supply in B : gripper closing

S

Technical information

Opening angle (°) (±1°)	2x20
Clamping torque per jaw at opening at 6 bar (Nm)	0,89
Max. opening torque at opening at 6 bar (Nm)	1,78
Clamping torque per jaw at closing at 6 bar (Nm)	0,78
Max. clamping torque at closing at 6 bar (Nm)	1,56
Ø piston bore (mm)	20
Ø port sizes	M5
Air consumption at 6 bar (cm^3 / cycle)	6
Repeatability (°)	±0,04
Max. working frequency (Hz)	2
Min. closing timei (s)	0,02
Max. jaw length (mm)	80
Mass (kg)	0,171



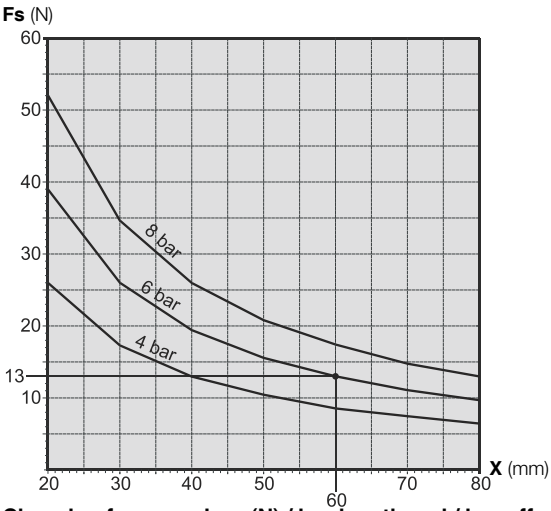
Material

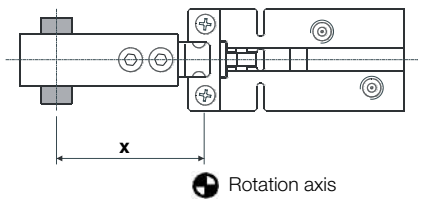
Body	hard anodised aluminium
Jaw-carriers	stainless steel
Seals	nitrile butadiene rubber (NBR)

Operating information

Pressure (bar)	2,5 to 8
Working temperature (°C) (with or without sensor)	5 to +60
Operation	dry air, lubricated or unlubricated

Clamping force per jaw (N) / jaw length (mm)



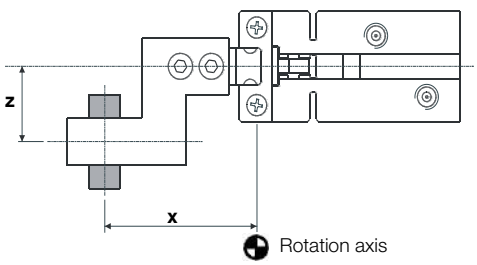


Example : for X = 60 mm, Fs = 2 x 13 N

Clamping force per jaw (N) / jaw length and / jaw offset (mm)

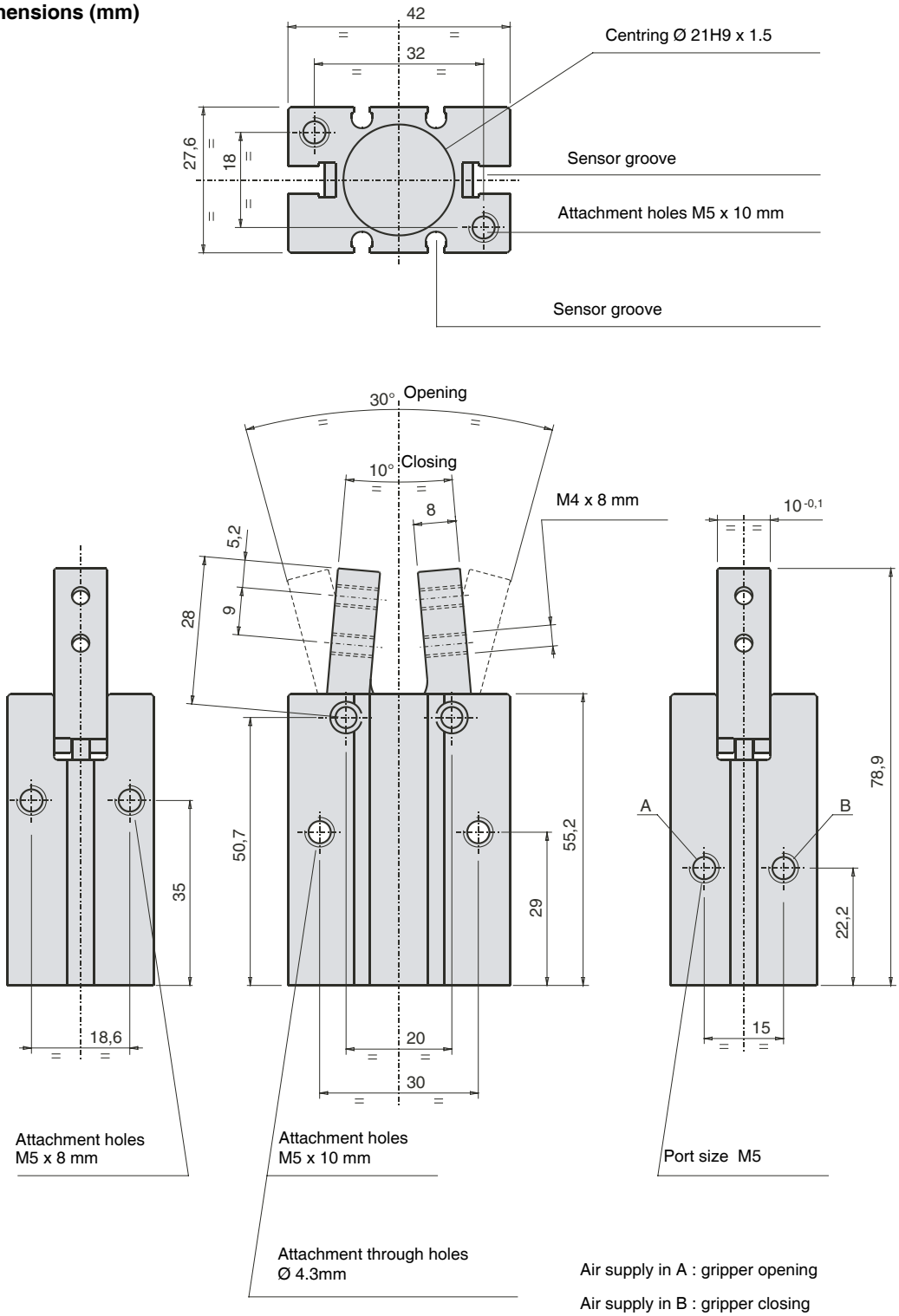
Use the above graph ignoring the jaw offset value Z.

Don't overrun value : Z maxi. = X maxi./ 2



S

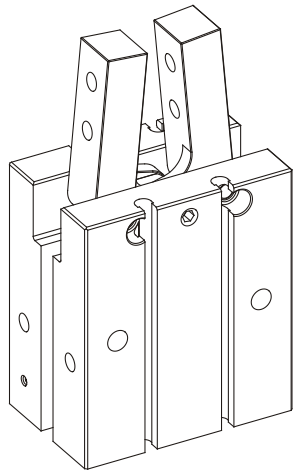
Dimensions (mm)



S

Technical informations

Opening angle (°) (±1°)	2x20
Calmping torque per jaw at opening at 6 bar (Nm)	1,78
Max. clamping torque at opening at 6 bar (Nm)	3,56
Clamping torque per jaw at closing at 6 bar (Nm)	1,60
Max. clamping torque at closing at 6 bar (Nm)	3,20
Ø piston bore (mm)	25
Ø port sizes	M5
Air consumption at 6 bar (cm^3 / cycle)	11
Repeatability (°)	±0,04
Max. working frequency (Hz)	2
Min. closing time (s)	0,02
Max. jaw length (mm)	100
Mass (kg)	0,293



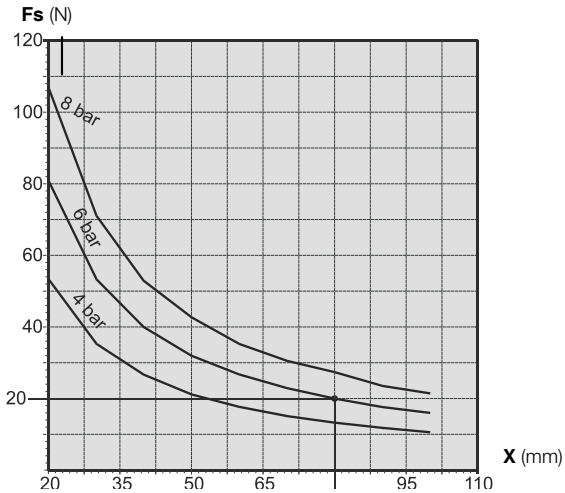
Material

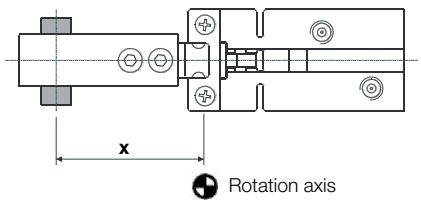
Body	hard anodised aluminium
Jaw-carriers	stainless steel
Seals	nitrile butadiene rubber (NBR)

Operating information

Pressure (bar)	2,5 to 8
Working temperature °C) (with or without sensor)	5 to +60
Operation	dry air, lubricated or unlubricated

Clamping force per jaw (N) / jaw length (mm)



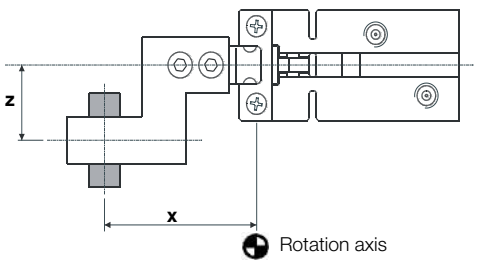


Example : for X = 80 mm, Fs = 2 x 20 N

Clamping force per jaw (N) / jaw length and / jaw offset (mm)

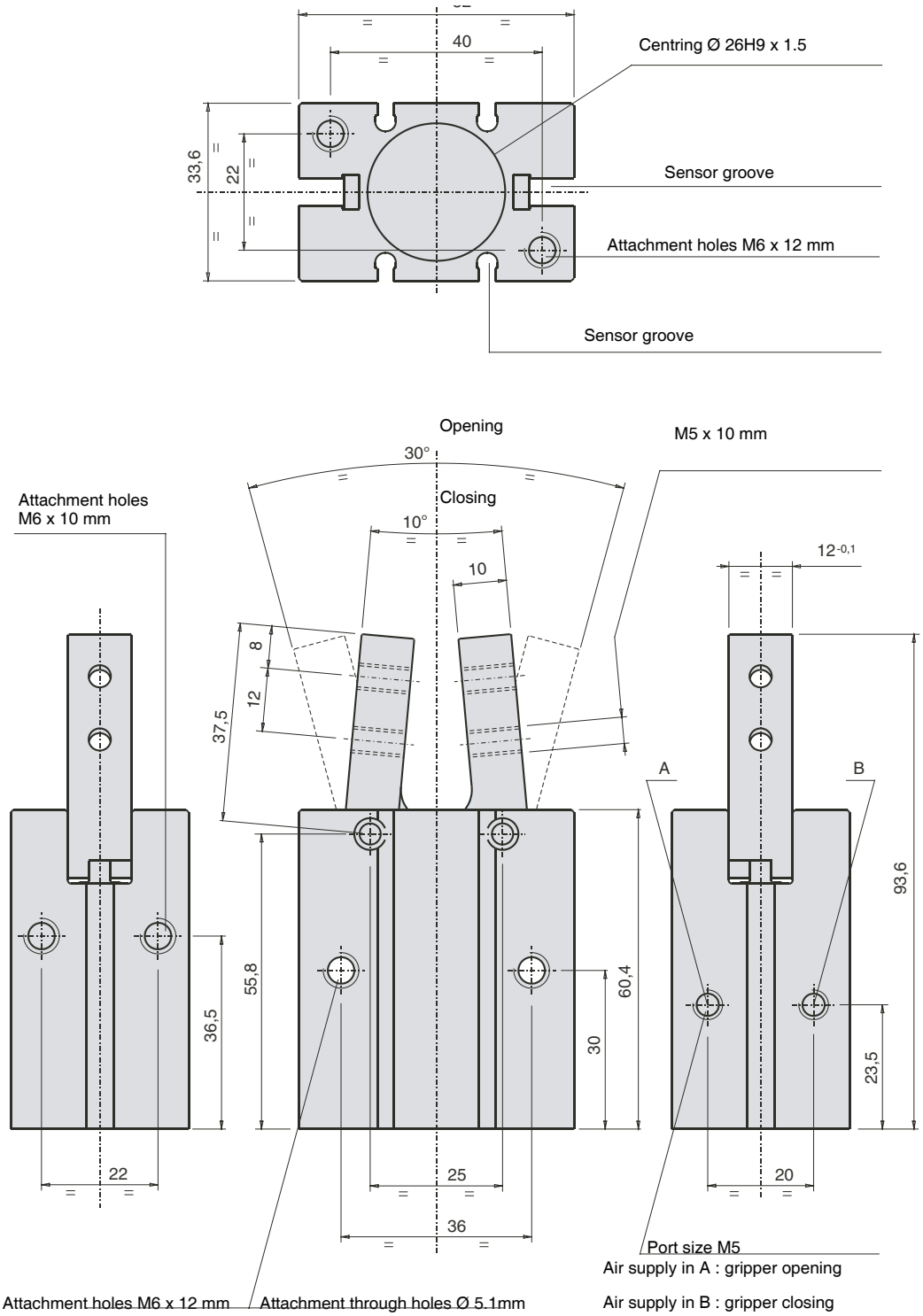
Use the above graph ignoring the jaw ofsset value Z.

Don't overrun value : Z maxi. = X maxi./ 2



S

Dimensions (mm)



S

Order key

Standard gripper (15 digits)

P	5	G	C	M	1	0	K	M	N	0	0	4	0	B

Size	
Ø 10 mm	**10**
Ø 16 mm	**16**
Ø 20 mm	**20**
Ø 25 mm	**25**

	Function
M	Without spring
B	Spring at opening
D	Spring at closing

	Total opening angle
0040	40° sizes 10 to 25

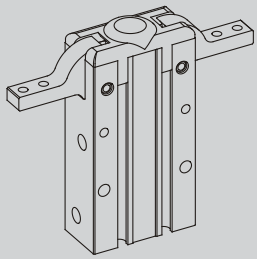
Note : All grippers are equipped with a magnet for sensing.

Example :

Angular gripper, size 16 without spring :

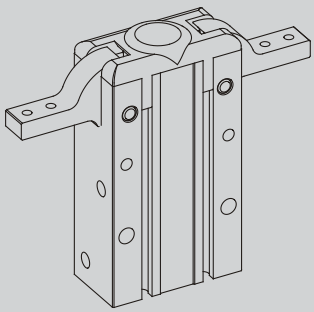
Order code : **P5GCM16KMN0040B**

S



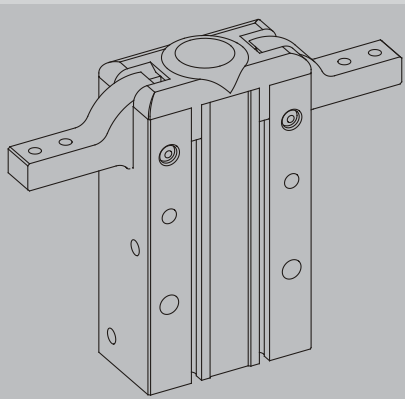
Size 10

Csf = 0,56 Nm
Fsf = 28 N
s = 180°
m = 0,072 kg
Cso = 0,74 Nm
Fso = 37 N



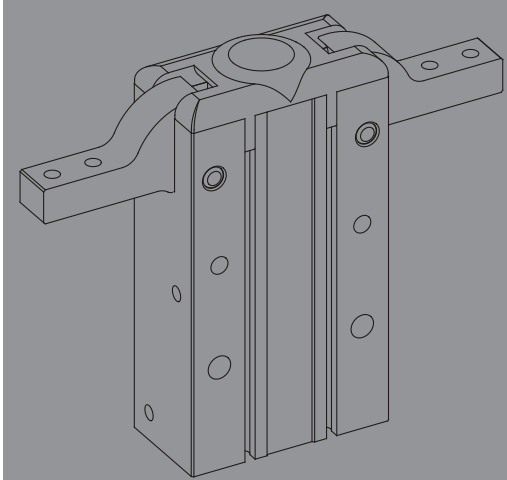
Size 16

Csf = 2,12 Nm
Fsf = 106 N
s = 180°
m = 0,148 kg
Cso = 2,48 Nm
Fso = 124 N



Size 20

Csf = 4,56 Nm
Fsf = 228 N
s = 180°
m = 0,309 kg
Cso = 5,20 Nm
Fso = 260 N

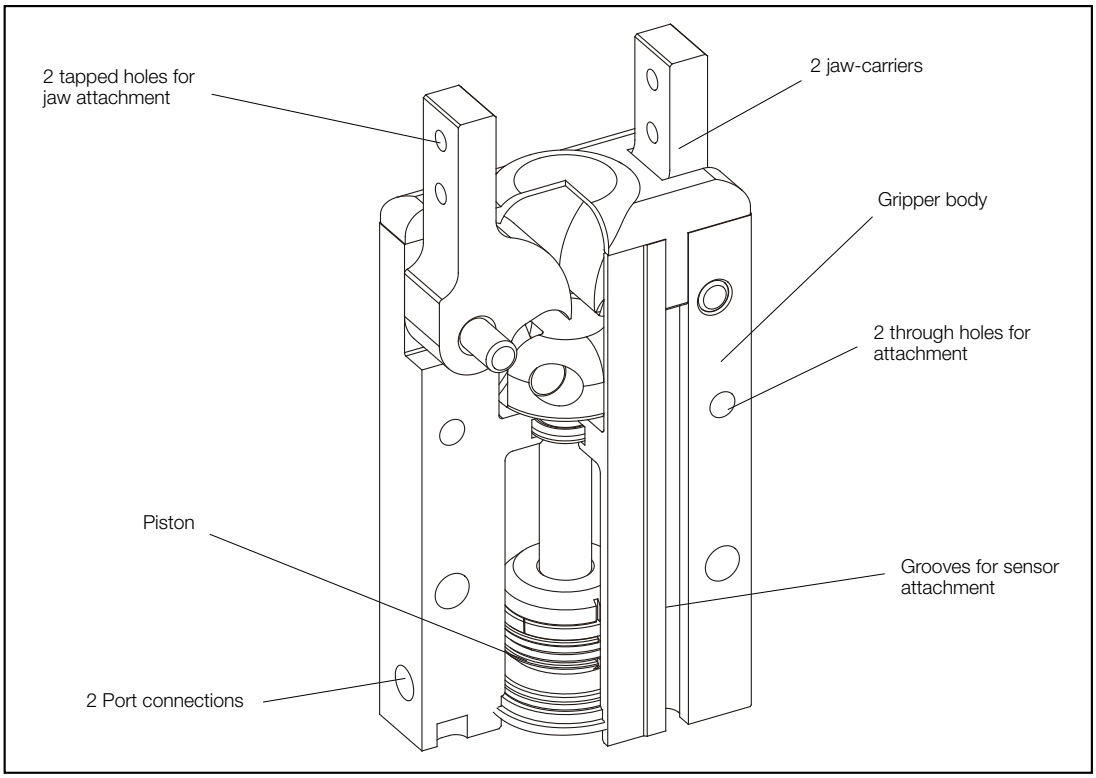


Size 25

Csf = 9,26 Nm
Fsf = 463 N
s = 180°
m = 0,559 kg
Cso = 10,32 Nm
Fso = 516 N

s : stroke
m : weight
Csf : clamping torque at closing
Cso : clamping torque at opening
Fsf : clamping force at closing
Fso : clamping force at opening

S



Radial grippers

Theses grippers, which are used for material handling and precision assembly, are part of the Parker Pneumatic automation product range.
4 sizes are available, and can be used in most applications.

Versions et detection

There is one version : with 2 square jaw-carriers.
One or two magnetic sensors can be mounted on all sizes to provide signal to monitor opening and closing of the jaws.

Protection

The gripper body is made of hard anodised aluminium and the two jaw-carriers are made of stainless steel.

Safety

A mechanical system ensures that the grippers remain closed if the air supply fails in the last degrees of movement.

Fixing

By tapped holes on 3 sides of the gripper.
By tapped holes on the rear of the gripper.
Precise location of the gripper through centring and dowel pin holes.

Air supply

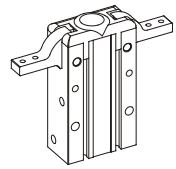
Port connection ons one of the sides of the gripper.

Reliability

The grippers have been designed for 10^7 operations in normal working conditions.

S

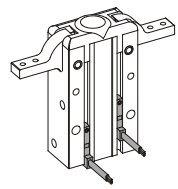
Standard version



Double acting, square jaw carriers

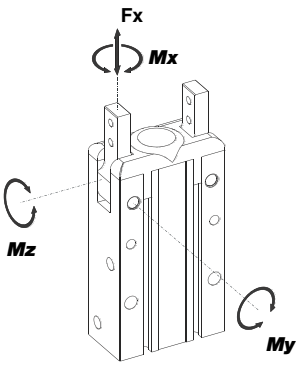
Gripper is opened and closed by pneumatic pressure.
Automatic grip retention by mechanical system.
4 sizes available.

Options



Detection
Check on opening and closing of the gripper by means of magnetic sensors.

Permissible forces on each jaw carrier



Static

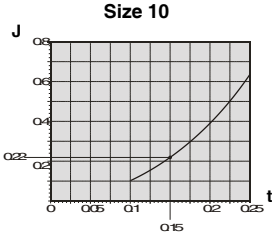
Size	10	16	20	25
Fx	35N	60N	100N	140N
Mx	0,5Nm	2 Nm	4 Nm	7 Nm
My	0,5Nm	2 Nm	4 Nm	7 Nm
Mz	0,5Nm	1 Nm	2 Nm	7 Nm

MZ at 6 bar .

Dynamic

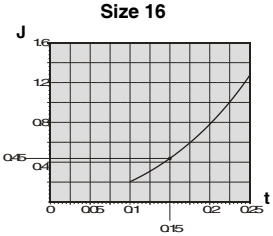
Inertia of one of the 2 jaws (kgcm²)/ closing or opening time (s) :

Size 10



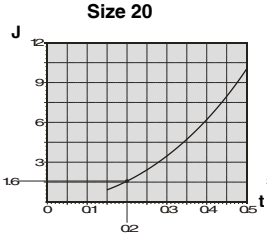
J = 10 x t²

Size 16



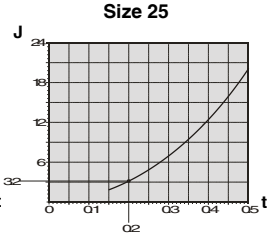
J = 20 x t²

Size 20



J = 40 x t²

Size 25



J = 80 x t²

For a inertia of one of the 2 jaws of 0,22 kgcm², the opening or closing time of the gripper is 0,15 s for **a size 10.**

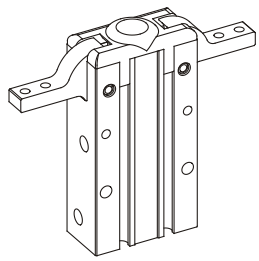
These indications must not be exceeded if :
- any extra forces are exerted on the workpiece or on the jaws, in addition to the force or to the clamping torque.
- handling forces (acceleration, shocks, ...) must also be added.

These values are cumulative if the forces act in different directions at the same time.

S

Technical informations

Opening angle (°) (±1°)	2x92
Clamping torque per jaw at opening at 6 bar (Nm)	0,37
Max. clamping torque at opening at 6 bar (Nm)	0,74
Clamping torque per jaw at closing at 6 bar (Nm)	0,28
Max. clamping torque at closing at 6 bar (Nm)	0,56
Ø piston bore (mm)	10
Ø port sizes	M5
Air consumption at 6 bar (cm^3 / cycle)	2
Repeatability (°)	±0,06
Max. working frequency (Hz)	3
Min. closing time (s)	0,1
Max. jaw length (mm)	40
Mass (kg)	0,072



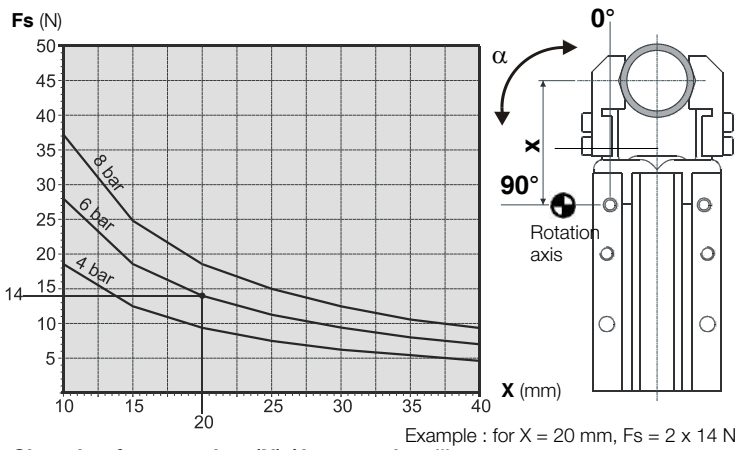
Material

Body	hard anodised aluminium
Jaw-carriers	stainless steel
Seals	nitrile butadiene rubber (NBR)

Operating information

Pressure (bar)	2,5 to 8
Working temperature (°C) (with or without sensor)	5 to +60
Operation	dry air, lubricated or unlubricated

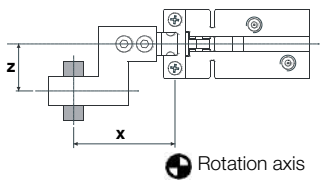
Clamping force per jaw (N) / jaw length (mm)



Example : for X = 20 mm, Fs = 2 x 14 N

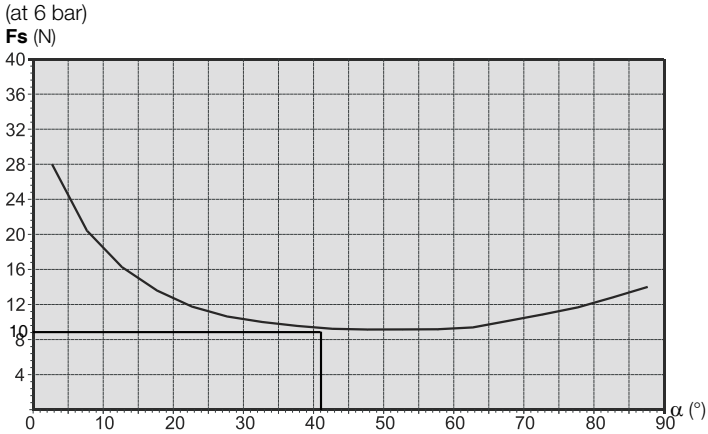
Clamping force per jaw (N) / jaw length and / jaw offset (mm)

Use the opposite graph ignoring the jaw offset value Z.
Don't overrun value : Z maxi. = X maxi./ 2



Clamping force per jaw (N) / jaw opening (°)

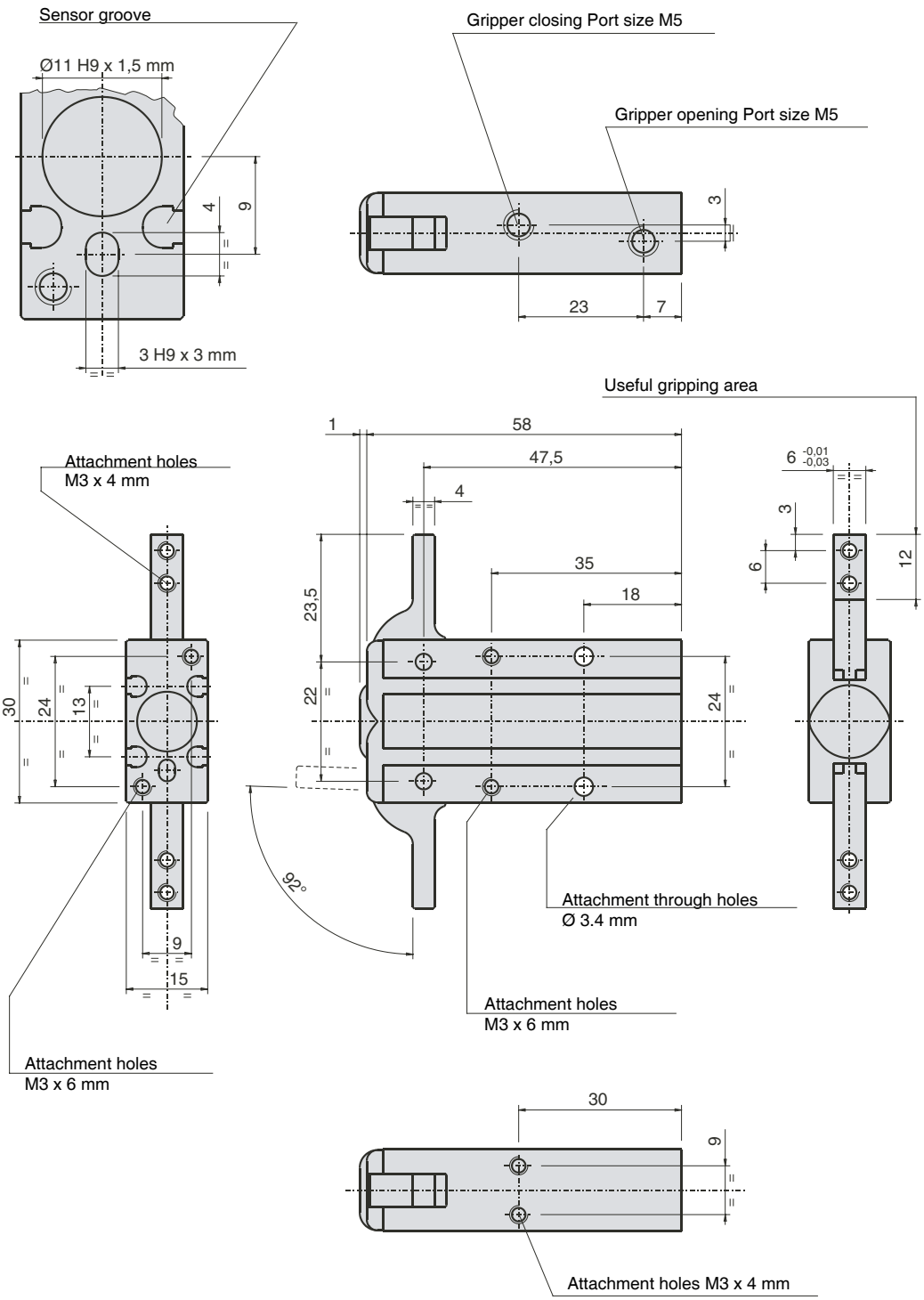
(at 6 bar)



Example : for α = 40° , Fs = 2 x 10 N

S

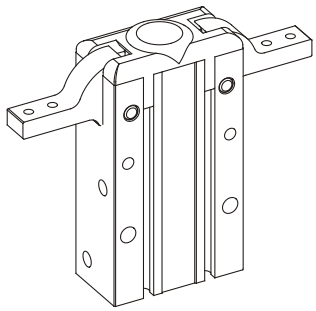
Dimensions (mm)



S

Technical informations

Opening angle (°) (±1°)	2x92
Clamping torque per jaw at opening at 6 bar (Nm)	1,24
Max. clamping torque at opening at 6 bar (Nm)	2,48
Clamping torque per jaw at closing at 6 bar (Nm)	1,06
Max. clamping torque at closing at 6 bar (Nm)	2,12
Ø piston bore (mm)	16
Ø port size	M5
Air consumption at 6 bar (cm^3 / cycle)	7
Repeatability (°)	±0,06
Max. working frequency (Hz)	2
Min. closing time (s)	0,1
Max. jaw length (mm)	60
Masse (kg)	0,148



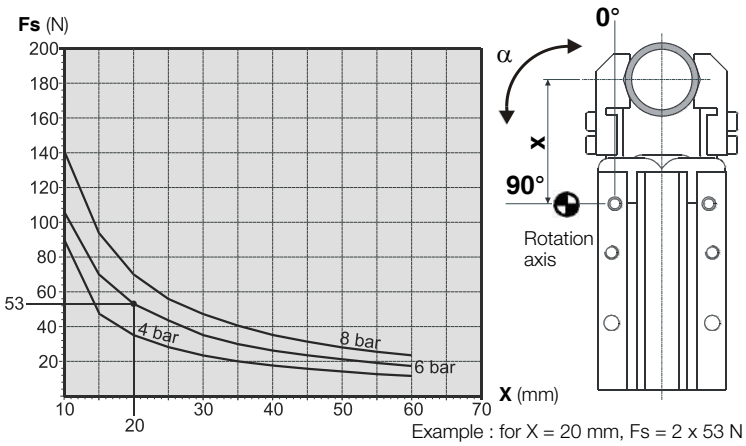
Material

Body	hard anodised aluminium
Jaw-carriers	stainless steel
Seals	nitrile butadiene rubber (NBR)

Operating information

Pressure (bar)	2,5 to 8
Working temperature (°C) (with or without sensor)	5 to +60
Operation	dry air, lubricated or unlubricated

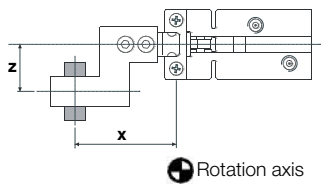
Clamping force per jaw (N) / jaw length (mm)



Example : for X = 20 mm, Fs = 2 x 53 N

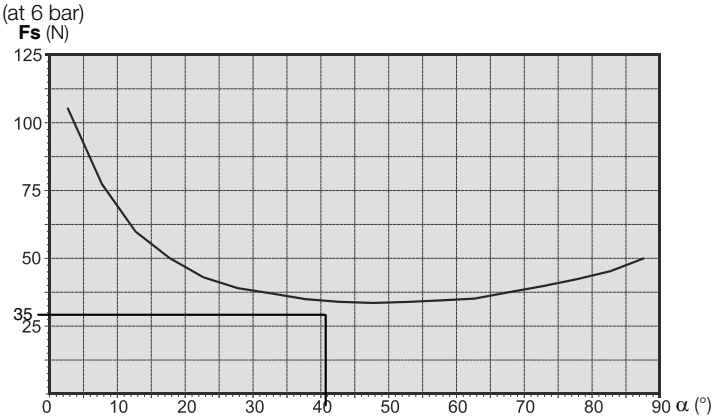
Clamping force per jaw (N) / jaw length and / jaw offset (mm)

Use the opposite graph ignoring the jaw offset value Z.
Don't overrun value : Z maxi. = X maxi./ 2



Clamping force per jaw (N) / jaw opening (°)

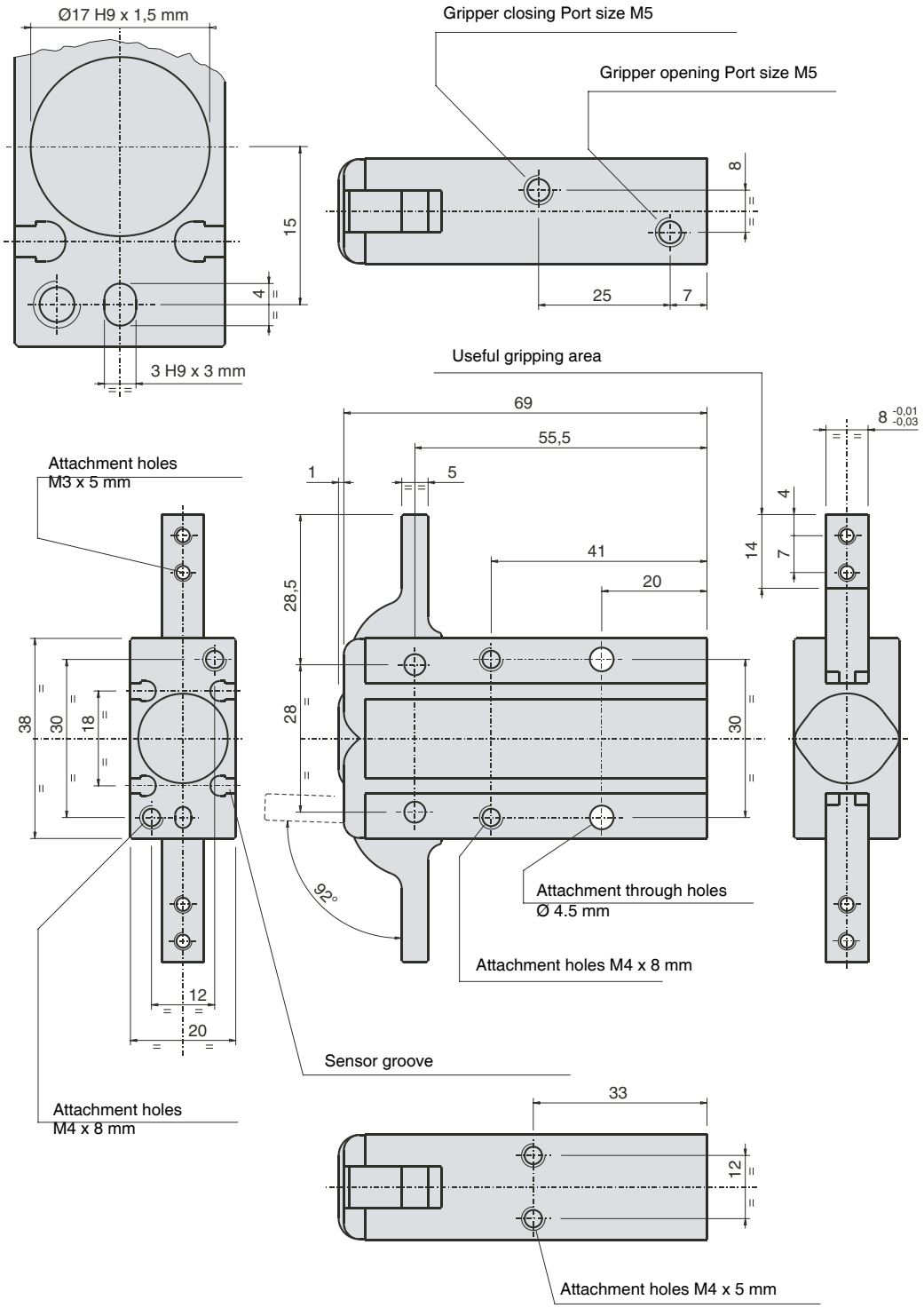
(at 6 bar)



Example : for α = 40° , Fs = 2 x 35 N

S

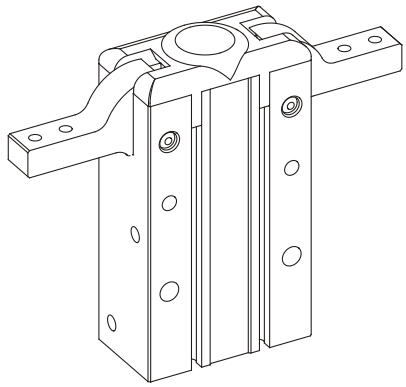
Dimensions (mm)



S

Technical information

Opening angle (°) (±1°)	2x92
Clamping torque per jaw at opening at 6 bar (Nm)	2,60
Max. clamping torque at opening at 6 bar (Nm)	5,20
Clamping torque per jaw at closing at 6 bar (Nm)	2,28
Max. clamping torque at closing at 6 bar (Nm)	4,56
Ø piston bore (mm)	20
Ø port size	M5
Air consumption at 6 bar (cm^3 / cycle)	14
Repeatability (°)	±0,06
Max. working frequency (Hz)	2
Min. closing time (s)	0,15
Max. jaw length (mm)	80
Mass (kg)	0,309



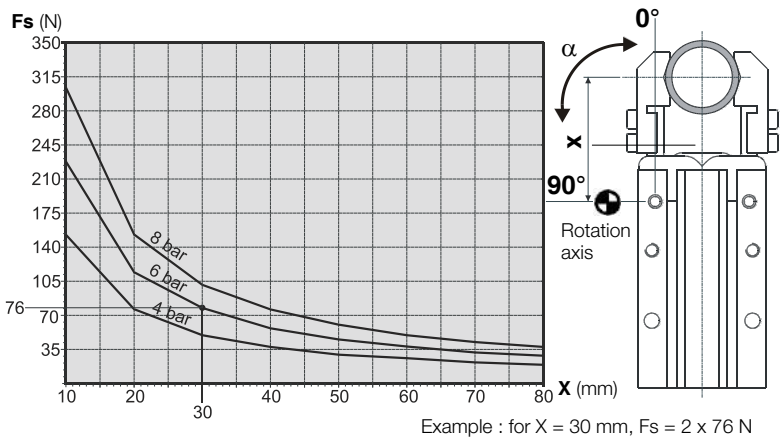
Material

Body	hard anodised aluminium
Jaw-carriers	stainless steel
Seals	nitrile butadiene rubber (NBR)

Operating information

Pressure (bar)	2,5 to 8
Working temperature (°C) (with or without sensor)	5 to +60
Operation	dry air, lubricated or unlubricated

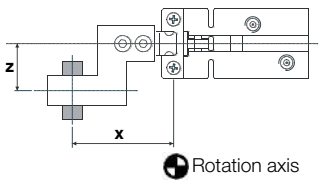
Clamping force per jaw (N) / jaw length (mm)



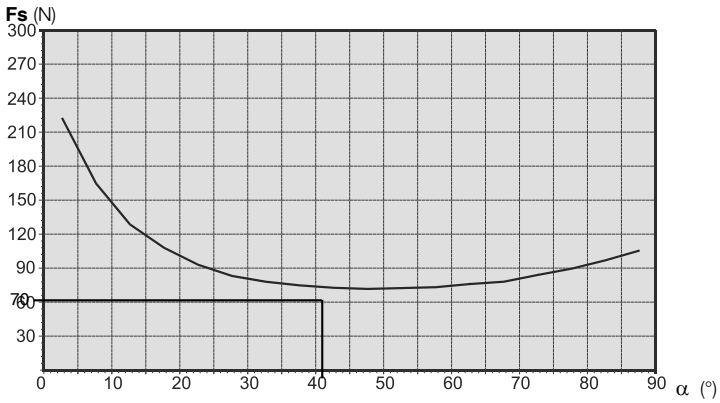
Example : for X = 30 mm, Fs = 2 x 76 N

Clamping force per jaw (N) / jaw length and / jaw offset (mm)

Use the opposite graph ignoring the jaw offset value Z.
Don't overrun value : Z maxi.= X maxi./ 2



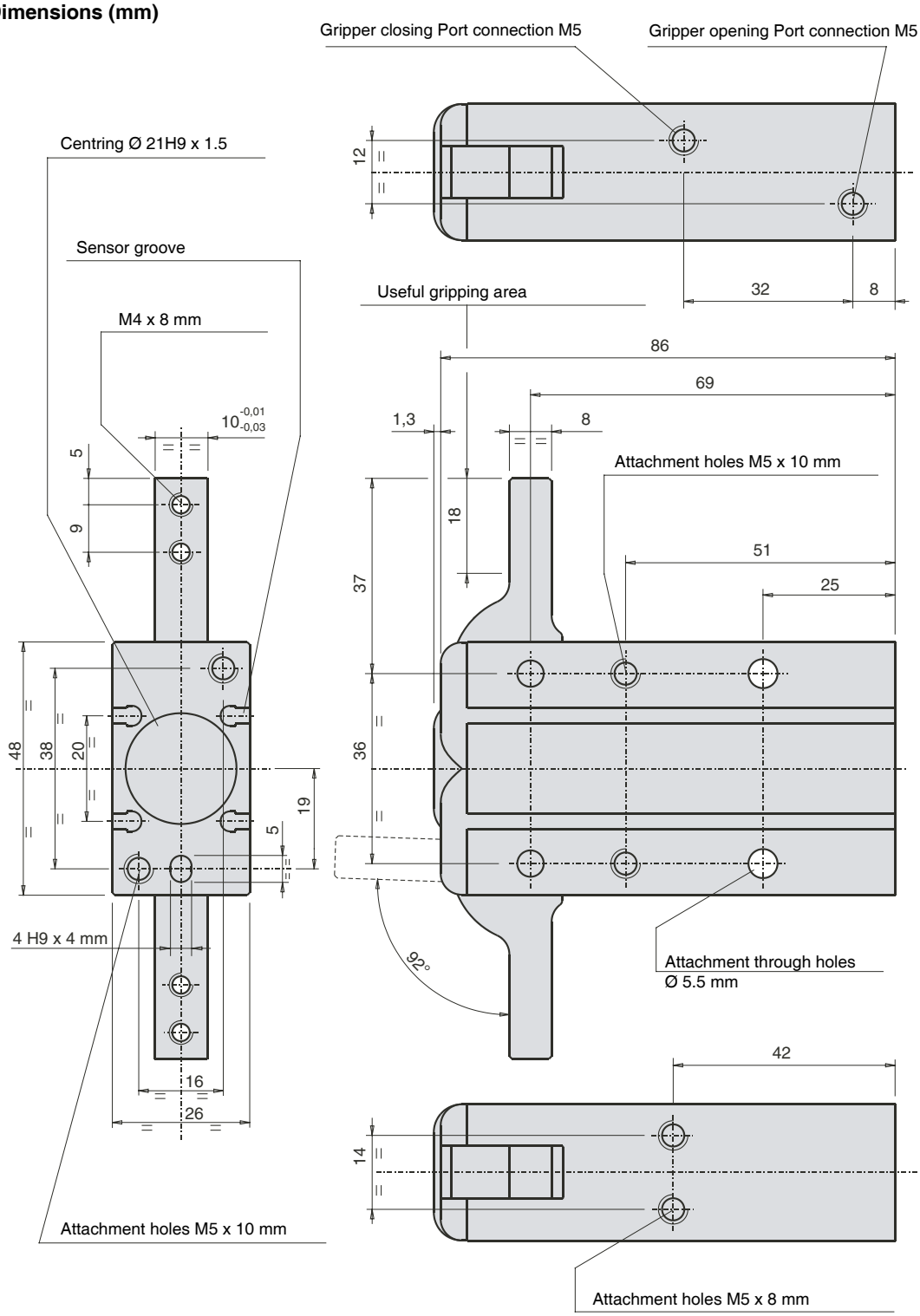
Clamping force per jaw (N) / jaw opening (°)
(at 6 bar)



Example : for α = 40° , Fs = 2 x 70 N

S

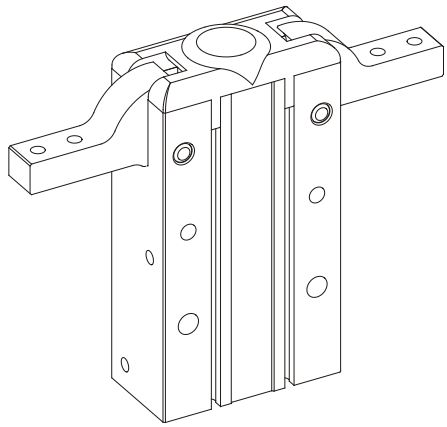
Dimensions (mm)



S

Technical information

Opening angle (°) (±1°)	2x92
Clamping torque per jaw at opening at 6 bar (Nm)	5,16
Max. clamping torque at opening at 6 bar (Nm)	10,32
Clamping torque per jaw at closing at 6 bar (Nm)	4,63
Max. clamping torque at closing at 6 bar (Nm)	9,26
Ø piston bore (mm)	25
Ø port size	M5
Air consumption at 6 bar (cm^3 / cycle)	28
Repeatability (°)	±0,06
Max. working frequency (Hz)	2
Min. closing time (s)	0,15
Max. jaw length (mm)	100
Mass (kg)	0,554



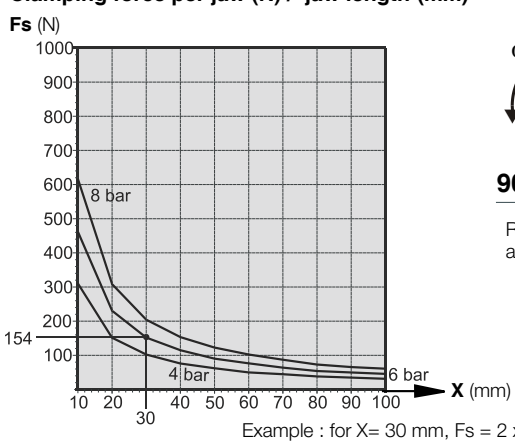
Material

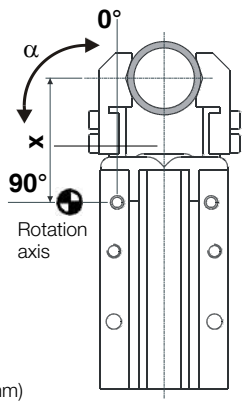
Body	hard anodised aluminium
Jaw-carriers	stainless steel
Seals	nitrile butadiene rubber (NBR)

Operating information

Pressure (bar)	2,5 to 8
Working temperature (°C) (with or without sensor)	5 to +60
Operation	dry air, lubricated or unlubricated

Clamping force per jaw (N) / jaw length (mm)

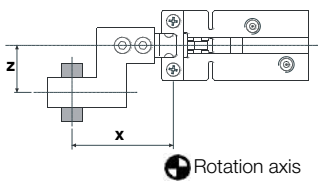




Example : for X= 30 mm, Fs = 2 x 154 N

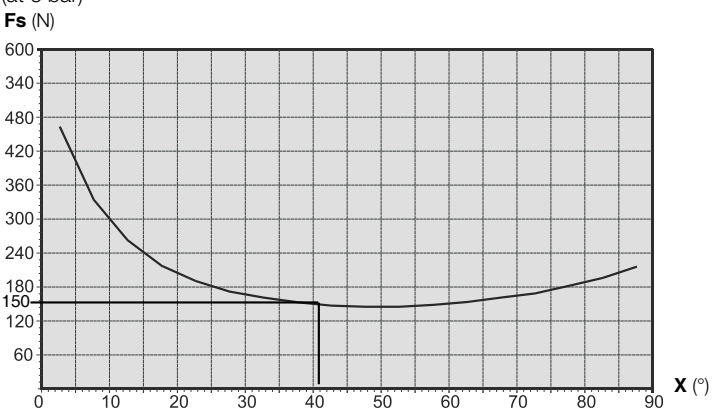
Clamping force per jaw (N) / jaw length and / jaw offset (mm)

Use the opposite graph ignoring the jaw offset value Z.
Don't overrun value : Z maxi. = X maxi./ 2



Clamping force per jaw (N) / jaw opening (°)

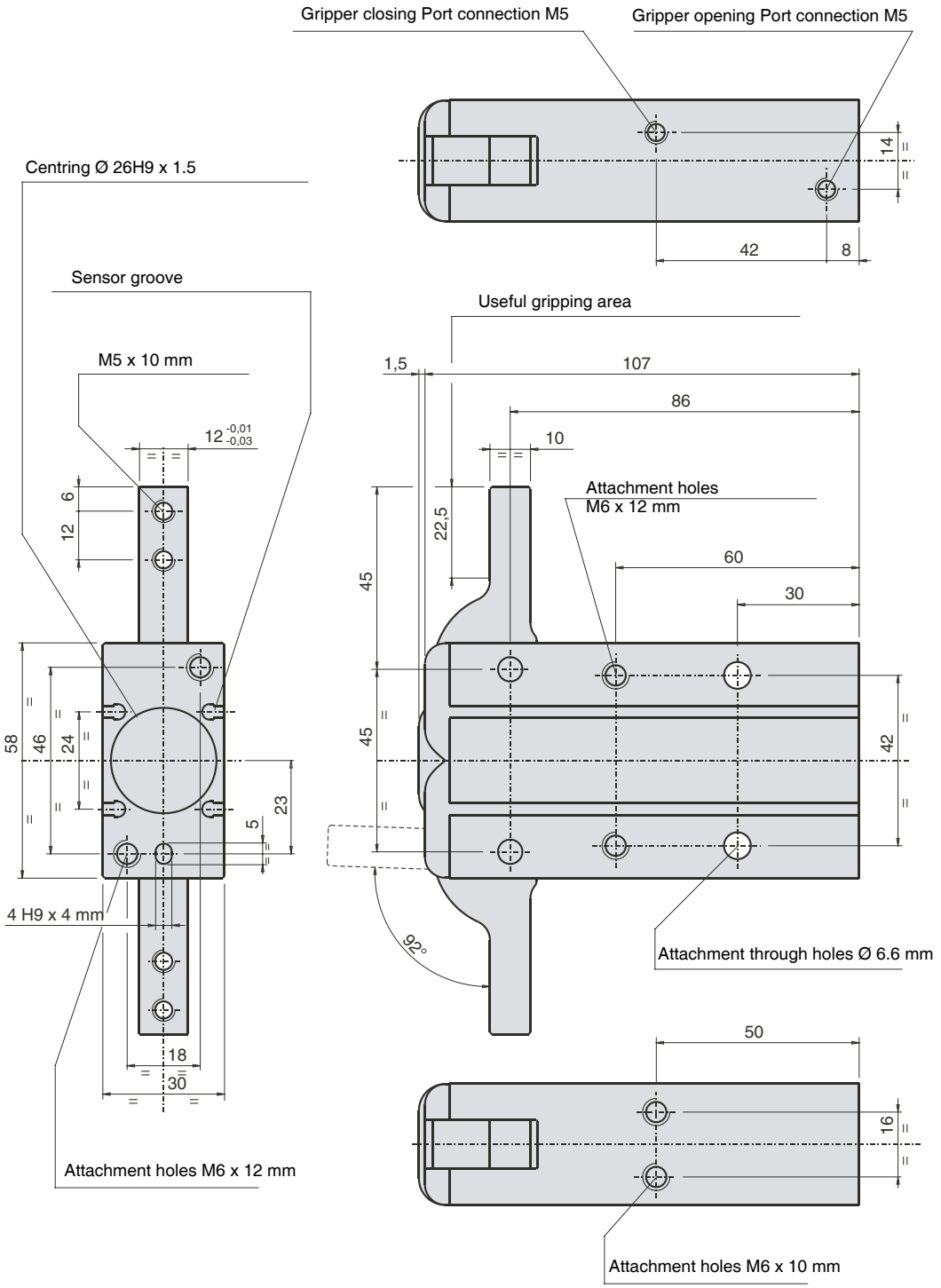
(at 6 bar)



Example : for α = 40° , Fs = 2 x 150 N

S

Dimensions (mm)



Order key

Standard gripper (15 digits)

P	5	G	C	M	1	6	B	M	N	0	1	8	0	B

Size	
Ø 10 mm	**10**
Ø 16 mm	**16**
Ø 20 mm	**20**
Ø 25 mm	**25**

	Total opening angle
0180	180° sizes 10 to 25

Note : All grippers are equipped with a magnet for sensing.

Example :

Radial griper, size 16 :

Order code : **P5GCM16BMN0180B**

S

Sensors for P5GC gripper

Sensors can be adjusted along grooves

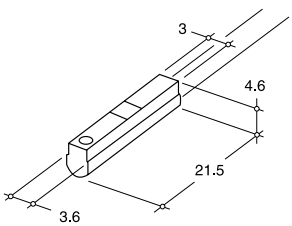
			Size 10	Size 16	Size 20	Size 25
P8S-SPFL3	PNP	2.5m cable	☑ (1)	☑ ☑ (1)	☑ ☑ (1)	☑ ☑ (1)
P8S-SNFL3	NPN	2.5m cable	☑ (1)	☑ ☑ (1)	☑ ☑ (1)	☑ ☑ (1)
P8S-SPSH3	PNP	M8 connector	☑ (1)	☑ ☑ (1)	☑ ☑ (1)	☑ ☑ (1)
P8S-SNSH3	NPN	M8 connector	☑ (1)	☑ ☑ (1)	☑ ☑ (1)	☑ ☑ (1)
P8S-SPTH2	PNP	M8 connector	☐	☑ ☐	☑ ☐	☑ ☐

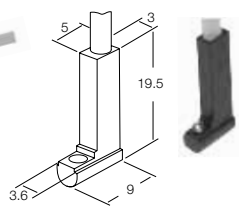
(1) By using the adaptor provided with the sensor

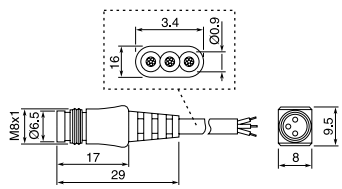
Technical data

Order code	**P8S-SPFL3**	**P8S-SNFL3**	**P8S-SPSH3**	**P8S-SNSH3**	**P8S-SPTHZ**
Cable length (m)	2.5	2.5	0.3	0.3	0.3
Connector	Flying cable	Flying cable	Plug-in male M8	Plug-in male M8	Plug-in male M8
Type	PNP N.O.	NPN N.O.	PNP N.O.	NPN N.O.	PNP N.O.
Supply voltage (Vdc)	3+ max 30				6 + max 30
Switching frequency (kHz)	200				
Switching current (A)	0.2				
Power (W)	max. 6				
Switching voltage (Vdc)	< 1				
Response time 'ON' (µs)	0.8				
Response time 'OFF' (µs)	0.3				
Working temperature (°C)	-10 to +70				
Inverse polarity protection	Yes				
Short circuit protection	Yes				
Life time (imp.)	10^9				
Protection	IP67				
Body	Polyamid PA12				
Cable	Flat in PUR CEI20/22 II				

Dimensions (mm)

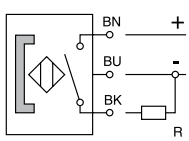




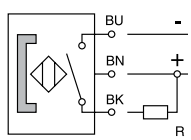


Wiring diagram

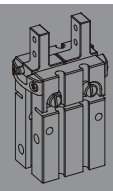
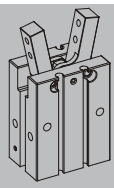
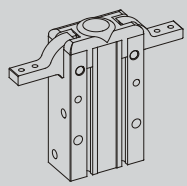
PNP



NPN



Repair kits

Size	Parallel gripper	Angular gripper	Radial gripper
10	P5GCM10H6RM	P5GCM10K6RM	P5GCM10B6RM
16	P5GCM16H6RM	P5GCM16K6RM	P5GCM16B6RM
20	P5GCM20H6RM	P5GCM20K6RM	P5GCM20B6RM
25	P5GCM25H6RM	P5GCM25K6RM	P5GCM25B6RM

The kit contains seals.

Spare parts

Size	Parallel gripper	Angular gripper	Radial gripper
10	P5GCM10H6PS	P5GCM10K6PS	P5GCM10B6PS
16	P5GCM16H6PS	P5GCM16K6PS	P5GCM16B6PS
20	P5GCM20H6PS	P5GCM20K6PS	P5GCM20B6PS
25	P5GCM25H6PS	P5GCM25K6PS	P5GCM25B6PS

The kit contains the levers and their spindles.

Jaw-carriers

Size	Parallel gripper	Angular gripper	Radial gripper
10	P5GCM10H6P	P5GCM10K6P	P5GCM10B6P
16	P5GCM16H6P	P5GCM16K6P	P5GCM16B6P
20	P5GCM20H6P	P5GCM20K6P	P5GCM20B6P
25	P5GCM25H6P	P5GCM25K6P	P5GCM25B6P

The kit contains the jaw-carriers and their spindles.

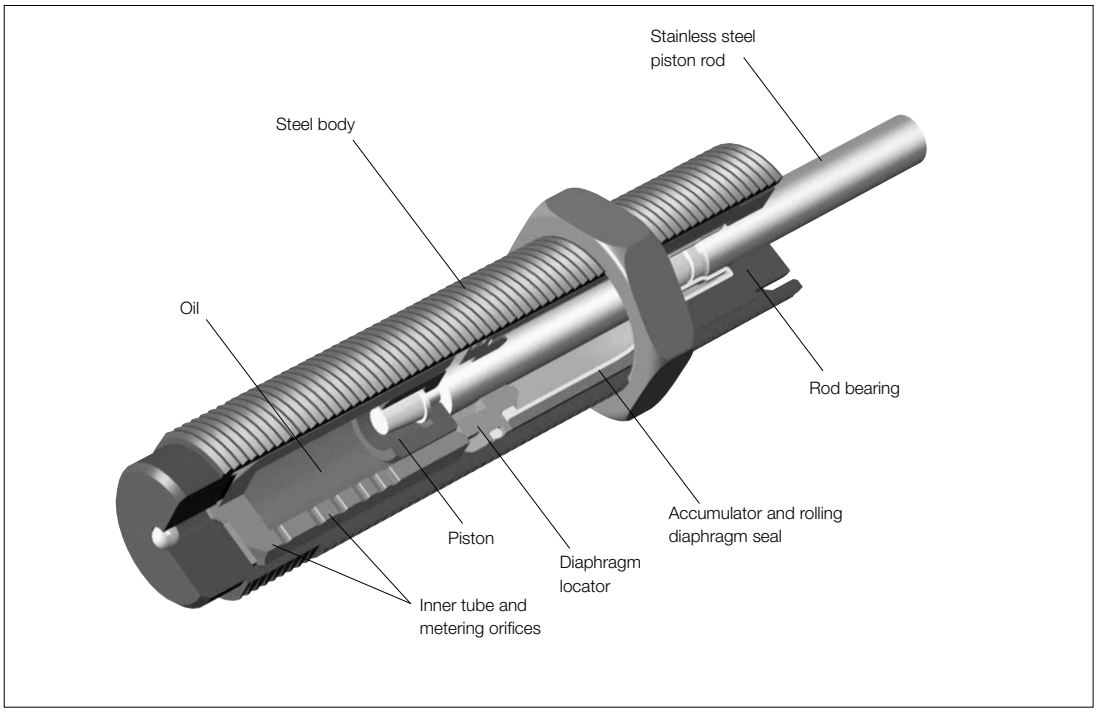
Connectors and Flow controllers

Connection	Order code	Description
M3	C68PK4M3	Swivel elbow compact connector M3
	F28PB4M3	Straight male connector M3
	— —	Swivel fflow controller M3
M5	F28PB4M5	Straight male connector M5
	C68PK4M5	Swivel elbow compact connector M5
	PTFL8PB4M5	Swivel flow controller M5

S

Shock Absorbers

Series MC-SC



Virtually all manufacturing process involve movement of some kind. In production machinery this can involve linear transfers, rotary index motions, fast feeds, etc..
At some points these motions change direction or come to a stop.

Any moving object possesses kinetic energy as a result of its motion and if the object changes direction or is brought to rest, the dissipation of this kinetic energy can result in destructive shock forces within the structural and operating parts of the machine.

The kinetic energy increases such as an exponential function of velocity. Heaver the object is or the faster it travels, the more energy it has. An increase of production rates is only possible by dissipating this kinetic energy smoothly and thereby eliminating destructive deceleration forces.

Other methods of energy absorption such as rubber buffers, springs, hydraulic dashpots do not provide this required smooth deceleration characteristic.They are non linear and produce high peak forces at some point during their stroke.

The optimum solution is achieved by **Parker shock absorbers.**

Description

Shock absorbers are hydraulic units which allow to bring a moving load to rest, quickly and safely, without rebound nor backward movement.

They provide a constant linear deceleration with the lowest possible reaction force in the shortest possible stopping time.

During the impact the piston is pushed in the shock absorber. The oil pushed back through the rolling orifices is absorbed in the accumulator. Proportionnally with the stroke achieved, the quantity of metering orifices decreases. This generates the slowing down of the mass and of the impact velocity.

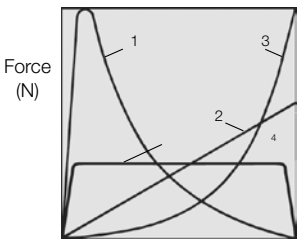
The installation of these shock absorbers on machines :

- Increases : *productivity
  *operating life of machines

- Reduces : *construction costs of the machine
  *maintenance cost
  *noise

A full range of accessories is available for mounting the shock absorbers.

Comparison of Damping Systems



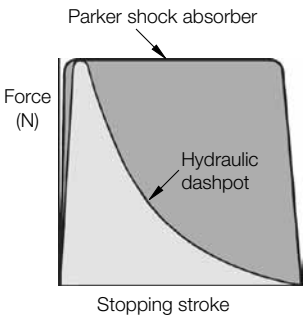
1.Hydraulic dashpot (High stopping force at start of the stroke)
With only one metering orifice the moving load is abruptly slowed down at the start of the stroke. The braking force rises to a very high peak at the start of the stroke (giving high shock loads).

2.Springs and Rubber Buffers (high stopping forces at end of stroke)
at full compression. Also they store energy rather than dissipating it, causing the load to rebound back again.

3.Air buffers, Pneumatic cylinder cushions (high stopping force at end of stroke)
Due to the compressibility of air they have a sharply rising force towards the end of stroke. The majority of energy is absorbed near the end of stroke.

4. Parker industrial shock absorbers (uniform stopping force through the entire stroke)
The moving load is smoothly brought to rest by a constant resisting force throughout the entire shock absorber stroke. The load is decelerated with the lowest possible force in the shortest possible time eliminating damaging force peaks and shock damage to machines or equipment.

Energy capacity



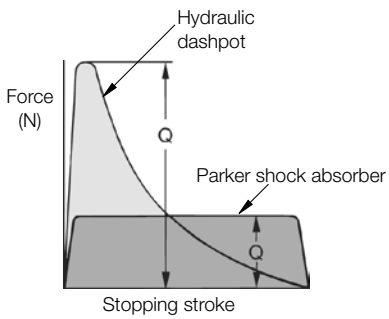
Assumption :
Same maximum reaction force

Result :

Parker shock absorber can absorb considerably more energy (represented by the area under the curve)

Benefit :
By installing a Parker shock absorber production rates can be more than **doubled without increasing deceleration forces or reaction forces on the machine.**

Reaction force (stopping force)



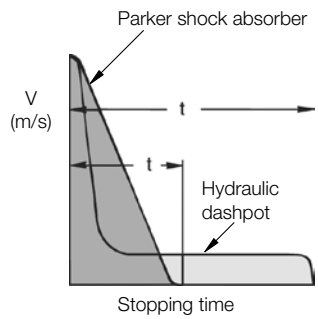
Assumption :
Same energy absorption

Result :

The reaction of the force transmitted by the Parker shock absorber is very much slower.

Advantage :
By installing a Parker shock absorber, **the machine wear and maintenance can be drastically reduced.**

Stopping time



Assumption :
Same energy absorption

Result :

The Parker shock absorber stops the moving load in a much shorter time.

Advantage :
By installing a Parker shock absorber cycle times are **reduced giving much more higher production rates.**

Range

Series MC 9 M to MC 600 M

Compact and versatile, the MC series offers many advantages. Its small size allows for high energy absorption in confined spaces, while the self-compensating design accomodate a variety of load conditions. With threaded outer body and numerous accessories, MC models can be mounted in a number of configurations.

Serie SC 925

These innovative miniature shock absorbers provide dual performance characteristics and benefits in a single package. Soft contact is suggested when a low initial reaction force is required at impact. Self-compensating is utilized to obtain maximum energy absorption capacity.

Serie MC 33 to MC 64

These models complete the range of medium bore shock absorbers. With their compact design and threaded outer body the MC units can be mounted in a wide variety of configurations.
The standard self-compensating models offer three ranges of effective weights providing linear deceleration throughout varying applications without adjustment.

Shock absorber selection

To select the best shock absorber for your application, follow these steps :

1/ *Determine the application :* use the examples **pages 7 and 8**.

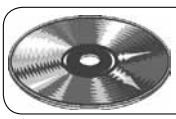
2/ *Use formulae of chosen examples to calculate :*
energy per cycle : **W_3**
energy per hour : **W_4**
effective weight : **me**

These values help to find the closest shock absorber matching your application.

3/ *Choose in capacity chart* **pages 10 and 11** the shock absorber with greater values than **W_3, W_4** and **me.**
For best results, choose a shock absorber working between 50 and 80% of max. energy **(W_3)**.
Check that the effective weight **me** lies within the values of the chosen shock absorber.

4/ *Check the shock absorber stroke* : if it matches the stroke of your application, the shock absorber you have selected can handle your application.

Note : When using more than one shock absorber on an application, divide **me, W3 and W4** by the quantity of shock absorbers



A CD Rom for shock absorber selection is available on web site : www.parker.com/euro _ pneumatic

Formulae and calculation examples

It is easy to calculate around 90% of applications knowing only the 4 opposite parameters :

Key to symbols used

W_1	Kinetic energy per cycle	Nm
W_2	Propelling force energy per cycle	Nm
W_3	Total energy per cycle ($W_1 + W_2$)	Nm
W_4	Total energy per hour ($W_3 . x$)	Nm/h
me	Effective weight	kg
m	Mass to be decelerated	kg
n	Number of shock absorbers	
*V	Velocity of moving mass	m/s
*V_D	Impact velocity at shock absorber	m/s
ω	Angular velocity	1/s
F	Propelling force	N
x	Cycles per hour	/hr
P	Motor power	kW

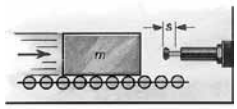
*v et V_D is the final impact velocity of the mass.
With accelerating motion the final velocity can be1,5 to 2 times higher than the average.

1. Mass to be decelerated	**m**	**(kg)**
2. Impact velocity at shock absorber	**V_D**	**(m/s)**
3. Propelling force	**F**	**(N)**
4. Cyles per hour	**C**	**(1/h)**

HM	Stall torque factor (normally 2,5)	1 to 3
M	Propelling torque	Nm
J	Moment of inertia	kgm^2
g	Acceleration due to gravity = 9,81	m/s^2
h	Drop height excl. shock absorber stroke	m
s	Shock absorber stroke	m
L/R/r	Radius	m
Q	Reaction force	N
μ	Coefficient of friction	
t	Deceleration time	s
a	Deceleration	$m/s^{2?}$
α	Side load angle	°
ß	Angle of incline	°

In all the following examples, the choice of shock absorbers made from the capacity chart is based upon the values (W_3), (W_4), me and the desired shock absorber stroke (s).

1 Mass without propelling force



Formulae

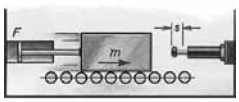
$W_1 = m . v^2 . 0,5$
$W_2 = 0$
$W_3 = W_1 + W_2$
$W_4 = W_3 . x$
$v_D = v$
$me = m$

Example

m	= 100	kg
v	= 1,5	m/s
x	= 500	/hr
s	= 0,05	m (chosen)

$W_1 = 100 . 1,5^2 . 0,5$ = **113 Nm**
$W_2 = 0$
$W_3 = 113 + 0$ = **113 Nm**
$W_4 = 113 . 500$ = **56 500 Nm/h**
me = m = **100 kg**
Chosen from capacity chart :
Model **MC 3350 M-2 self-compensating**

2 Mass with propelling force



Formulae

$W_1 = m . v^2 . 0,5$
$W_2 = F . s$
$W_3 = W_1 + W_2$
$W_4 = W_3 . x$
$v_D = v$
$me = \frac{2 . W}{v_D}$

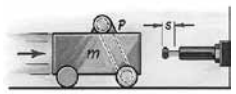
2..1 for vertical motion upwards ——— $W_2 = (F - m . g) . s$
2..2 for vertical motion downwards ——— $W_2 = (F + m . g) . s$

Example

m	= 36	kg
*v	= 1,5	m/s
F	= 400	N
x	= 1000	/hr
s	= 0,025	m (chosen)

$W_1 = 36 . 1,5^2 . 0,5$ = **41 Nm**
$W_2 = 400 . 0,025$ = **10 Nm**
$W_3 = 41 + 10$ = **51 Nm**
$W_4 = 51 . 1000$ = **51 000 Nm/h**
$me = 2 . 51 / 1,5^2$ = **45 kg**
Chosen from capacity chart :
Model **MC 600 M self-compensating**
***v is the final impact velocity of the mass. With pneumatically propelled systems this can be1,5 to 2 times higher the average velocity. Please take this into account when calculating energy.**

3 Mass with motor drive



Formulae

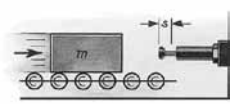
$W_1 = m . v^2 . 0,5$
$W_2 = \frac{1000 . P . HM . s}{v}$
$W_3 = W_1 + W_2$
$W_4 = W_3 . x$
$v_D = v$
$me = \frac{2 . W_3}{v_D^2}$

Example

m	= 800	kg
v	= 1,2	m/s
HM	= 2,5	
P	= 4	kW
x	= 100	/hr
s	= 0,1	m (chosen)

$W_1 = 800 . 1,2^2 . 0,5$ = **576 Nm**
$W_2 = 1000 . 4 . 2,5 . 0,1 / 1,2$ = **834 Nm**
$W_3 = 576 + 834$ = **1 410 Nm**
$W_4 = 1410 . 100$ = **141 000 Nm/h**
$me = 2 . 1410 / 1,2^2$ = **1 958 kg**
Chosen from capacity chart :
Model **MC 64100 M-2 self-compensating**
Do not forget to include the rotational energy of motor, coupling and gearbox into calculation for W_1.

4 Mass on driven rollers



Formulae

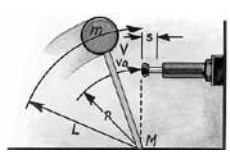
$W_1 = m . v^2 . 0,5$
$W_2 = m . \mu . g . s$
$W_3 = W_1 + W_2$
$W_4 = W_3 . x$
$v_D = v$
$me = \frac{2 . W_3}{v_D^2}$

Example

m	= 250	kg
v	= 1,5	m/s
x	= 180	/hr
(steel/steel)		μ = 0,2
s	= 0,05	m (chosen)

$W_1 = 250 . 1,5^2 . 0,5$ = **281 Nm**
$W_2 = 250 . 0,2 . 9,81 . 0,05$ = **25 Nm**
$W_3 = 281 + 25$ = **306 Nm**
$W_4 = 306 . 180$ = **55 080 Nm/h**
$me = 2 . 306 / 1,5^2$ = **272 kg**
Chosen from capacity chart :
Model **MC 4550 M-2 self-compensating**

5 Swinging mass with propelling force



Formulae

$W_1 = m.v^2.0,5 = 0,5.J\ \omega^2$
$W_2 = \frac{M . s}{R}$
$W_3 = W_1 + W_2$
$W_4 = W_3 . x$
$v_D = \frac{v . R}{L} = \omega . R$
$me = \frac{2 . W_3}{v_D^2}$

Example

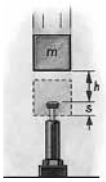
m	= 20	kg
v	= 1	m/s
M	= 50	Nm
R	= 0,5	m
L	= 0,8	m
x	= 1500	/hr
s	= 0,0125	m (chosen)

Check the side load angle, tan α = s/R (see example 6.2)

$W_1 = 20 . 1^2 . 0,5$ = **10 Nm**
$W_2 = 50 . 0,0125 / 0,5$ = **1,3 Nm**
$W_3 = 10 + 1,3$ = **11,3 Nm**
$W_4 = 11,3 . 1500$ = **16 950 Nm/h**
$v_D = 1 . 0,5 / 0,8$ = **0,63 m/s**
$me = 2 . 11,3 / 0,63^2$ = **57 kg**
Chosen from capacity chart :
Model **MC 150 MH self-compensating**

Formulae and calculation examples

6 Free falling mass



Formulae

$W_1 = m \cdot g \cdot h$
$W_2 = m \cdot g \cdot s$
$W_3 = W_1 + W_2$
$W_4 = W_3 \cdot x$
$v_D = \sqrt{2 \cdot g \cdot h}$
$me = \frac{2 \cdot W_3}{V_D^2}$

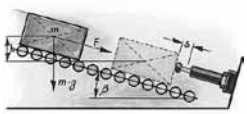
Example

m	= 30	kg
h	= 0,5	m
x	= 400	/hr
s	= 0,05	m (chosen)

$W_1 = 30 \cdot 0,5 \cdot 9,81 = 147$ Nm
$W_2 = 30 \cdot 9,81 \cdot 0,05 = 15$ Nm
$W_3 = 147 + 15 =$ **162 Nm**
$W_4 = 162 \cdot 400 =$ **64 800 Nm/h**
$v_D = \sqrt{2 \cdot 9,81 \cdot 0,5} = 3,13$ m/s
$me = \frac{2 \cdot 162}{3,13^2} =$ **33 kg**

Chosen from capacity chart :Model **MC 3350 M-1 self-compensating**

6.1 Mass rolling / sliding down incline



6.1 a propelling force up incline

6.1 b propelling force down incline

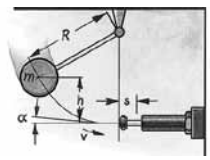
Formulae

$W_1 = m \cdot g \cdot h = m \cdot v_D^2 \cdot 0,5$
$W_2 = m \cdot g \cdot \sin\beta \cdot s$ $W_3 = W_1 + W_2$
$W_4 = W_3 \cdot x$
$v_D = \sqrt{2 \cdot g \cdot h}$
$me = \frac{2 \cdot W_3}{V_D^2}$
$W_2 = (F - m \cdot g \cdot \sin\beta) \cdot s$
$W_2 = (F + m \cdot g \cdot \sin\beta) \cdot s$

6.2 Mass free falling about a pivot point

Check side load angle from shock absorber axis

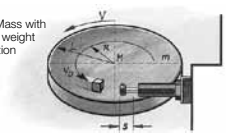
Calculation as per example 6.1 excepted $W_2 = 0$



$\tan\alpha = \frac{s}{R}$

7 Rotary index table with propelling torque

Note : Mass with uniform weight distribution



Formulae

$W_1 = m.v^2.0,25 = 0,5.J.\omega^2$
$W_2 = \frac{M \cdot s}{R}$
$W_3 = W_1 + W_2$
$W_4 = W_3 \cdot x$
$v_D = \frac{v \cdot R}{L} = v \cdot R$
$me = \frac{2 \cdot W_3}{v_D^2}$

Example

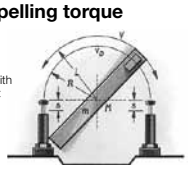
m	= 1000	kg
v	= 1,1	m/s
M	= 1000	Nm
s	= 0,05	m (chosen)
L	= 1,25	m
R	= 0,8	m
x	= 100	/hr

$W_1 = 1000 \cdot 1,1^2 \cdot 0,25 = 303$ Nm
$W_2 = 1000 \cdot 0,05 / 0,8 = 63$ Nm
$W_3 = 303 + 63 =$ **366 Nm**
$W_4 = 366 \cdot 100 =$ **36 600 Nm/h**
$v_D = 1,1 \cdot 0,8 / 1,25 = 0,7$ m/s
$me = 2 \cdot 366 / 0,7^2 =$ **1 494 kg**

Chosen from capacity chart :
Model **MC 4550 M-3 self-compensating**

8 Swinging arm with propelling torque

Note : Mass with uniform weight distribution



Formulae

$W_1 = m \cdot v^2 \cdot 0,18 = 0,5.J.\omega^2$
$W_2 = \frac{M \cdot s}{R}$
$W_3 = W_1 + W_2$
$W_4 = W_3 \cdot x$
$v_D = \frac{v \cdot R}{L} = \omega \cdot R$
$me = \frac{2 \cdot W_3}{v_D^2}$

Example

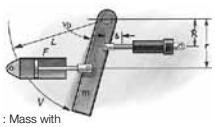
J	= 56	kgm²
ω	= 1	rad/s
M	= 300	Nm
s	= 0,025	m (chosen)
L	= 1,5	m
R	= 0,8	m
x	= 1200	/hr

$W_1 = 0,5 \cdot 56 \cdot 1^2 = 28$ Nm
$W_2 = 300 \cdot 0,025 / 0,8 = 9$ Nm
$W_3 = 28 + 9 =$ **37 Nm**
$W_4 = 37 \cdot 1200 =$ **44 400 Nm/h**
$v_D = 1 \cdot 0,8 = 0,8$ m/s
$me = 2 \cdot 37 / 0,8^2 =$ **116 kg**

Chosen from capacity chart :

Model **MC 600 M self-compensating**

9 Swinging arm with propelling force



Note : Mass with uniform weight distribution

Formulae

$W_1 = m \cdot v^2 \cdot 0,18 = 0,5.J.\omega^2$
$W_2 = \frac{F \cdot r \cdot s}{R} = \frac{M \cdot s}{R}$
$W_3 = W_1 + W_2$
$W_4 = W_3 \cdot x$
$v_D = \frac{v \cdot R}{L} = \omega \cdot R$
$me = \frac{2 \cdot W_3}{v_D^2}$

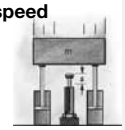
Example

m	= 100	kg
v	= 1,5	m/s
F	= 3000	N
M	= 1800	Nm
s	= 0,025	m (chosen)
r	= 0,6	m
R	= 0,8	m
L	= 1,2	m
x	= 100	/hr

$W_1 = 100 \cdot 1,5^2 \cdot 0,18 = 40,5$ Nm
$W_2 = 3000.0,6.0,025 / 0,8 = 56,5$ Nm
$W_3 = 40,5 + 56,5 =$ **97 Nm**
$W_4 = 97 \cdot 100 =$ **9700 Nm/h**
$v_D = 1,5 \cdot 0,8 / 1,2 = 1$ m/s
$me = 2 \cdot 97 / 1^2 =$ **194 kg**

Chosen from capacity chart :
Modele **MC 3325 M-3 self-compensating**

10 Mass lowered at controlled speed



Formulae

$W_1 = m \cdot v^2 \cdot 0,5$
$W_2 = m \cdot g \cdot s$
$W_3 = W_1 + W_2$
$W_4 = W_3 \cdot x$
$v_D = v$
$me = \frac{2 \cdot W_3}{v_D^2}$

Example

m	= 1000	kg
v	= 1,5	m/s
s	= 0,1	m (chosen)
x	= 60	/hr

$W_1 = 1000 \cdot 1,5^2 \cdot 0,5 = 1125$Nm
$W_2 = 1000 \cdot 9,81 \cdot 0,1 = 981$ Nm
$W_3 = 1125 + 981 =$ **2106 Nm**
$W_4 = 2106 \cdot 60 =$ **126 360 Nm/h**
$me = 2 \cdot 2106 / 1,5^2 =$ **1872 kg**

Chosen from capacity chart :
Modele **MC 64100 M-2 self-compensating**

Reaction force Q (N)

$\mathbf{Q} = \frac{1,5 \cdot W_3}{s}$

Stopping time (s)

$\mathbf{t} = \frac{2,6 \cdot s}{V_D}$

Deceleration (m/s^2)

$\mathbf{a} = \frac{0,75 \cdot V_D^2}{s}$

Approximate values assuming correct adjustment. Add safety margin if necessary.

Effective weight

It is an imaginery factor, given in kg, which allow to check the efficiency of a shock absorber taking into account of :
- the total of kinetic energy and propelling force (Nm)
- the impact velocity (m/s)

For each shock absorber a range of effective weight is shown in the capacity chart. If the effective weight **me** is within the indicated range of the unit, the deceleration will be *linear and so of good quality.*

Examples:

Mass without propelling force

Formula

me = m

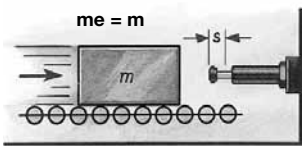


Figure A

Example:

m = 100 kg
v_D = v = 2 m/s
$W_1 = W_3$ = 200 Nm
me = $\frac{2 \cdot 200}{4}$ = **100 kg**

me = m

Low effective weight

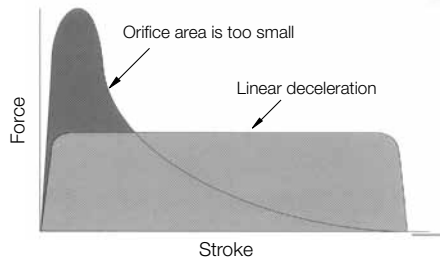


Figure B

A 100 kg weight travelling at 2 m/s has a 200 Nm of kinetic energy (fig A). On this basis alone, a MC 3350 M-3 model would be selected. However, the effective weight for this application (100 kg) is below the effective weight range of the standard of this unit (210 to 840 kg). The result is a high on-set force at the start of the stroke due to a low effective weight range of the load (fig. B). For a good deceleration, the best solution is to chose the unit **MC 3350 M-2**, which matches perfectly the application.

Mass with propelling force

Formula

me = $\frac{2 \cdot W_3}{v_D^2}$

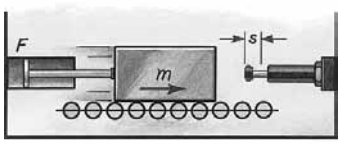


Figure C

Example:

m = 100 kg
F = 2000 N
v_D = v = 2 m/s
s = 0,1 m
W_1 = 200 Nm
W_2 = 200 Nm
W_3 = 400 Nm
me = $\frac{2 \cdot 400}{4}$ = **200 kg**

High effective weight

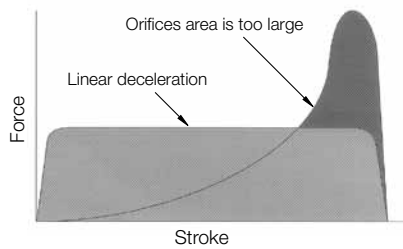


Figure D

A 100 kg weight travelling at 2 m/s, propelled by a 2000 N of propelling force has a 400 Nm of energy (fig C). A MC 4550 M-1 would be selected in that case. However, the effective weight is 200 kg above the effective weight range of this unit. The result is a high set-down force at the end of stroke (fig. D). In that case the best solution is to use a larger shock absorber. The **MC 4550 M-2** unit matches perfectly this application.

Selection:

Determine first your application before selecting a Parker shock absorber. Use the formulae from examples for calculating the energy per cycle and per hour. Determine the effective weight then select the shock absorber which can handle your application.

Capacity chart

Part No	Stroke (mm)	Max. Energy (Nm) Per cycle W3	Max. Energy (Nm) Per hour W4	Effective weight (kg) Min. me	Effective weight (kg) Max. me	Impact Velocity (m/s)	Return Force (N) Min.	Return Force (N) Max.	Return Time (s)	Max.Side load angle (°)	Weight (kg)
MC 9 M1-B	5	1,0	2000	0,6	3,2	from 0,15 to 1,8	1,38	3,78	0,3	2	0,005
MC 9 M2-B	5	1,0	2000	0,8	4,1	from 0,15 to 1,8	1,38	3,78	0,3	2	0,005
MC 10 ML-B	5	0,5	4000	0,3	2,7	from 0,15 to 5	2	4	0,6	3	0,01
MC 10 MH-B	5	0,8	4000	0,7	5	from 0,15 to 5	2	4	0,6	3	0,01
MC 25 ML	6,6	2,8	22500	0,7	2,2	from 0,15 to 5	3	6	0,3	2	0,02
MC 25 M	6,6	2,8	22500	1,8	5,4	from 0,15 to 5	3	6	0,3	2	0,02
MC 25 MH	6,6	2,8	22500	4,6	13,6	from 0,15 to 5	3	6	0,3	2	0,02
MC 75 M-1	10	9	28200	0,3	1,1	from 0,15 to 5	4	9	0,3	2	0,03
MC 75 M-2	10	9	28200	0,9	4,8	from 0,15 to 5	4	9	0,3	2	0,03
MC 75 M-3	10	9	28200	2,7	36,2	from 0,15 to 5	4	9	0,3	2	0,03
MC 150 M	12,5	17	34000	0,9	10	from 0,08 to 6	3	5	0,4	4	0,06
MC 150 MH	12,5	17	34000	8,6	86	from 0,08 to 6	3	5	0,4	4	0,06
MC 150 MH2	12,5	17	34000	70	200	from 0,08 to 6	3	5	0,4	4	0,06
MC 225 M	12,5	25	45000	2,3	25	from 0,08 to 6	4	6	0,3	4	0,15
MC 225 MH	12,5	25	45000	23	230	from 0,08 to 6	4	6	0,3	4	0,15
MC 225 MH2	12,5	25	45000	180	910	from 0,08 to 6	4	6	0,3	4	0,15
MC 600 M	25,4	68	68000	9	136	from 0,08 to 6	5	9	0,6	2	0,26
MC 600 MH	25,4	68	68000	113	1130	from 0,08 to 6	5	9	0,6	2	0,26
MC 600 MH2	25,4	68	68000	400	2300	from 0,08 to 6	5	9	0,6	2	0,26

Part No	Stroke (mm)	Max. Energy (Nm) Per cycle W3	Max. Energy (Nm) Per hour W4	Effective weight (kg) Soft contact Min. me	Effective weight (kg) Soft contact Max. me	Effective weight (kg) Self compensating Min. me	Effective weight (kg) Self compensating Max. me	Impact Velocity (m/s)	Return Force (N) Min.	Return Force (N) Max.	Return Time (s)	Max.Side load angle (°)	Weight (kg)
SC 925 M-1	40	110	90000	22	72	14	90	0,15 to 3,7	11	32	0,40	5	0,39
SC 925 M-2	40	110	90000	59	208	40	272	0,15 to 3,7	11	32	0,40	5	0,39
SC 925 M-3	40	110	90000	181	612	113	726	0,15 to 3,7	11	32	0,40	5	0,39

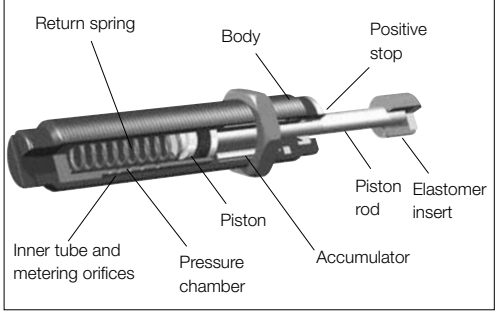
Capacity chart

Part No	Stroke (mm)	Max. Energy (Nm) Per cycle **W3**	Max. Energy (Nm) Per hour **W4**	Effective weight (kg) Min. **me**	Effective weight (kg) Max. **me**	Impact Velocity (m/s)	Return Force (N) Min.	Return Force (N) Max.	Return Time (s)	Max.Side load angle (°)	Weight (kg)
MC 3325 M-1	25	155	75000	9	40	from 0,15 to 5	45	90	0,03	4	0,45
MC 3325 M-2	25	155	75000	30	120	from 0,15 to 5	45	90	0,03	4	0,45
MC 3325 M-3	25	155	75000	100	420	from 0,15 to 5	45	90	0,03	4	0,45
MC 3350 M-1	50	310	85000	18	70	from 0,15 to 5	45	135	0,06	3	0,54
MC 3350 M-2	50	310	85000	60	250	from 0,15 to 5	45	135	0,06	3	0,54
MC 3350 M-3	50	310	85000	210	840	from 0,15 to 5	45	135	0,06	3	0,54
MC 4525 M-1	25	340	107000	20	90	from 0,15 to 5	70	100	0,03	4	1,13
MC 4525 M-2	25	340	107000	80	310	from 0,15 to 5	70	100	0,03	4	1,13
MC 4525 M-3	25	340	107000	260	1050	from 0,15 to 5	70	100	0,03	4	1,13
MC 4550 M-1	50	680	112000	45	180	from 0,15 to 5	70	145	0,08	3	1,36
MC 4550 M-2	50	680	112000	150	620	from 0,15 to 5	70	145	0,08	3	1,36
MC 4550 M-3	50	680	112000	520	2090	from 0,15 to 5	70	145	0,08	3	1,36
MC 4575 M-1	75	1020	146000	70	270	from 0,15 to 5	50	180	0,11	2	1,59
MC 4575 M-2	75	1020	146000	230	930	from 0,15 to 5	50	180	0,11	2	1,59
MC 4575 M-3	75	1020	146000	790	3140	from 0,15 to 5	50	180	0,11	2	1,59
MC 6450 M-1	50	1700	146000	140	540	from 0,15 to 5	90	155	0,12	4	2,90
MC 6450 M-2	50	1700	146000	460	1850	from 0,15 to 5	90	155	0,12	4	2,90
MC 6450 M-3	50	1700	146000	1600	6300	from 0,15 to 5	90	155	0,12	4	2,90
MC 64100 M-1	100	3400	192000	270	1100	from 0,15 to 5	105	270	0,34	3	3,70
MC 64100 M-2	100	3400	192000	930	3700	from 0,15 to 5	105	270	0,34	3	3,70
MC 64100 M-3	100	3400	192000	3150	12600	from 0,15 to 5	105	270	0,34	3	3,70
MC 64150 M-1	150	5100	248000	410	1640	from 0,15 to 5	75	365	0,48	2	5,10
MC 64150 M-2	150	5100	248000	1390	5600	from 0,15 to 5	75	365	0,48	2	5,10
MC 64150 M-3	150	5100	248000	4700	18800	from 0,15 to 5	75	365	0,48	2	5,10

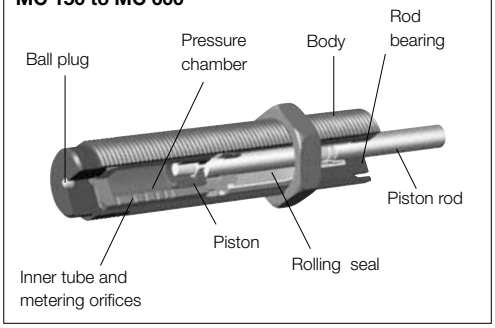
General features

Series MC 9 to MC 600

MC 9 to MC 75



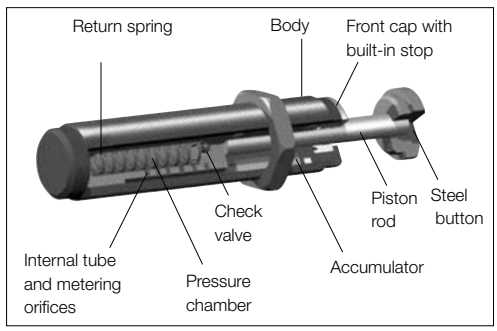
MC 150 to MC 600



Series	MC 9	MC 10	MC 25	MC 75	MC 150	MC 225	MC 600
Thread (mm)	M6 x 0,5	M8 x 1	M10 x 1	M12 x 1	M14 x 1,5	M20 x 1,5	M25 x 1,5
Type	Self-compensating				Self-compensating		
Mechanical stop	Built-in end of stroke				A mechanical stop must be provided*		
Impact velocity (m/s)	0,15 to 1,8	0,15 to 5			0,08 to 6		
Stroke (mm)	5	5	6,6	10	12,5	12,5	25,4
Max. capacity per cycle (Nm)	1,0 0,8 2,8	9 17 25		68			
Temperature (°C)	0 to 65				0 à 65		

* A mechanical stop must be provided at about 1 mm before the shock absorber end of stroke.
For MC 150, 225 and 600 series do not twist or turn the piston rod.

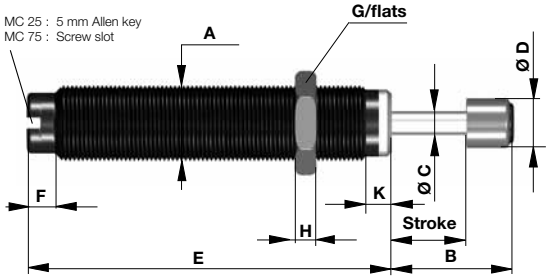
Series SC 925



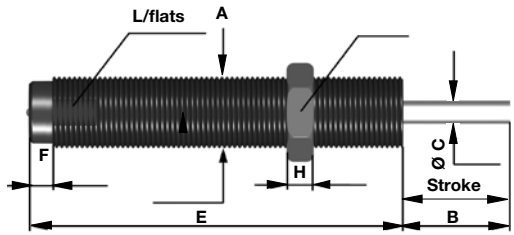
Series	SC 925
Thread (mm)	M25 x 1,5
Type	Self-compensating/Soft contact
Mechanical stop	Built-in end of stroke
Impact velocity (m/s)	0,15 to 3,7
Stroke (mm)	40
Max. capacity per cycle (Nm)	110
Temperature (°C)	-12 to 90

Dimensions (mm)

Series MC 9 M to MC 75 M

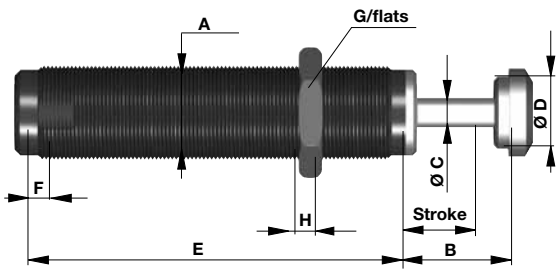


Series MC 150 M to MC 600 M



Part No	Stroke (mm)	A	B	C	D	E	F	G	H	K	L
MC 9 M-1-B	5	M6 x 0,5	10	2	4,8	26	2,5	8	2,5	1	-
MC 9 M-2-B	5	M6 x 0,5	10	2	4,8	26	2,5	8	2,5	1	-
MC 10 ML-B	5	M8 x 1	10	2	6,4	28,5	5	11	3	2	-
MC 10 MH-B	5	M8 x 1	10	2	6,4	28,5	5	11	3	2	-
MC 25 ML	6,6	M10 x 1	14,6	3,2	7,6	43,4	5	13	3	5	-
MC 25 M	6,6	M10 x 1	14,6	3,2	7,6	43,4	5	13	3	5	-
MC 25 MH	6,6	M10 x 1	14,6	3,2	7,6	43,4	5	13	3	5	-
MC 75 M-1	10	M12 x 1	18	3,2	7,6	52	5	14	4	3	-
MC 75 M-2	10	M12 x 1	18	3,2	7,6	52	5	14	4	3	-
MC 75 M-3	10	M12 x 1	18	3,2	7,6	52	5	14	4	3	-
MC 150 M	12,5	M14 x 1,5	17,5	4,8	-	70	8,5	17	5	-	12
MC 150 MH	12,5	M14 x 1,5	17,5	4,8	-	70	8,5	17	5	-	12
MC 150 MH2	12,5	M14 x 1,5	17,5	4,8	-	70	8,5	17	5	-	12
MC 225 M	12,5	M20 x 1,5	17,5	6,3	-	80	8,5	24	6	-	18
MC 225 MH	12,5	M20 x 1,5	17,5	6,3	-	80	8,5	24	6	-	18
MC 225 MH2	12,5	M20 x 1,5	17,5	6,3	-	80	8,5	24	6	-	18
MC 600 M	25,4	M25 x 1,5	32	8	-	111	9	30	8	-	23
MC 600 MH	25,4	M25 x 1,5	32	8	-	111	9	30	8	-	23
MC 600 MH2	25,4	M25 x 1,5	32	8	-	111	9	30	8	-	23

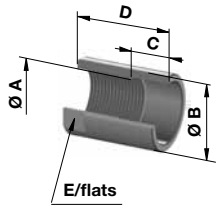
Series SC 925



Part No	Stroke (mm)	A	B	C	D	E	F	G	H
SC 925 M-1	40	M25 x 1,5	51	6,3	23	138	7	30	8
SC 925 M-2	40	M25 x 1,5	51	6,3	23	138	7	30	8
SC 925 M-3	40	M25 x 1,5	51	6,3	23	138	7	30	8

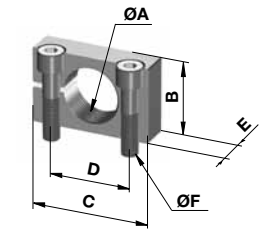
Accessories

Stop collar



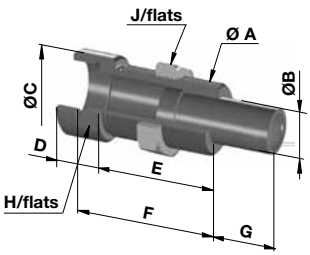
Part No	Used with series	ØA	ØB	C	D	E
AH6	MC 9 M	M 6 x 0,5	8	6	12	-
AH8	MC 10 M	M 8 x 1	11	6	12	-
AH10	MC 25 M	M 10 x 1	14	10	20	-
AH12	MC 75 M	M 12 x 1	16	10	20	-
AH14	MC 150 M	M 14 x 1,5	18	12	20	15
AH20	MC 225 M	M 20 x 1,5	25	12	25	22
AH25	MC 600 M	M 25 x 1,5	32	16	32	27
	SC 925 M	M 25 x 1,5	32	16	32	27

Clamp



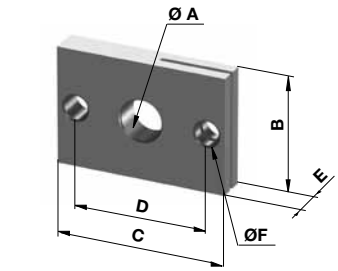
Part No	Used with series	ØA	B	C	D	E	ØF
MB6	MC 9 M	M 6 x 0,5	10	20	12	8	M3
MB8	MC 10 M	M 8 x 1	12	25	16	10	M4
MB10	MC 25 M	M 10 x 1	14	25	16	10	M4
MB12	MC 75 M	M 12 x 1	16	32	20	12	M5
MB14	MC 150 M	M 14 x 1,5	20	32	20	12	M5
MB20	MC 225 M	M 20 x 1,5	25	40	28	20	M6
MB25	MC 600 M	M 25 x 1,5	32	46	34	25	M6
	SC 925 M	M 25 x 1,5	32	46	34	25	M6

Side load adaptor



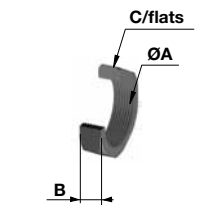
Part No	Used with series	ØA	ØB	ØC	D	E	ØF	G	H	J
BV8	MC 10 M	M 8 x 1	4	11	10	10	12	5	9	11
BV10	MC 25 M	M 10 x 1	6	13	11	12	15	6,5	11	13
BV12	MC 75 M	M 12 x 1	7	15	12	18	22	10	14	14
BV14	MC 150 M	M 14 x 1,5	9	18	12	20	24	12,5	16	17
BV20	MC 225 M	M 20 x 1,5	12	24	14	20	24	12,5	22	24
BV25	MC 600 M	M 25 x 1,5	16	30	16	38	44	25	27	30
	SC 925 M	M 25 x 1,5	16	30	16	38	44	25	27	30

Rectangular flange



Part No	Used with series	ØA	B	C	D	E	ØF
RF6	MC 9 M	M 6 x 0,5	10	20	14	5	3,4
RF8	MC 10 M	M 8 x 1	14	25	18	6	4,5
RF10	MC 25 M	M 10 x 1	14	28	20	6	4,5
RF12	MC 75 M	M 12 x 1	20	32	24	6	5,5
RF14	MC 150 M	M 14 x 1,5	20	34	26	6	5,5
RF20	MC 225 M	M 20 x 1,5	32	46	36	8	6,5
RF25	MC 600 M	M 25 x 1,5	32	52	42	8	6,5
	SC 925 M	M 25 x 1,5	32	52	42	8	6,5

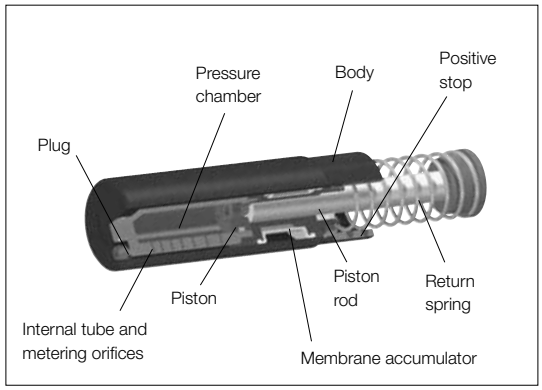
Lock nut



Part No	Used with series	A	B	C
KM6	MC 9 M	M6 x 0,5	2,5	8
KM8	MC 10 M	M 8 x 1	3	11
KM10	MC 25 M	M 10 x 1	3	13
KM12	MC 75 M	M 12 x 1	4	14
KM14	MC 150 M	M 14 x 1,5	5	17
KM20	MC 225 M	M 20 x 1,5	6	24
KM25	MC 600 M	M 25 x 1,5	8	30
	SC 925 M	M 25 x 1,5	8	30

General features

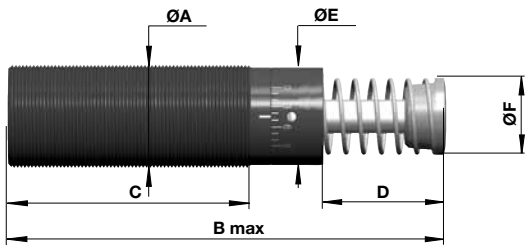
Series MC 33 to MC 64



Series MC 3325 M	MC 3350 M	MMC 4525 M	MMC 4550 M	MMC 4575 M	MMC 6450 M	MC 64100 M	MC 64150 M
Thread (mm)	M33 x 1,5	M33 x 1,5	M45 x 1,5	M45 x 1,5	M45 x 1,5	M64 x 2	M64 x 2	M64 x 2
Type	Self-compensating							
Mechanical stop	Built-in end of stroke							
Impact velocity (m/s)	0,15 to 5							
Stroke (mm)	25	50	25	20	75	50	100	150
Max. capacity per cycle (Nm)	155	310	340	680	1020	1700	3400	5100
Temperature (°C)	- 12 to 70							

Dimensions (mm)

Series MC 33 to MC 64

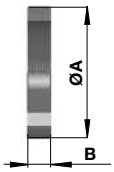


For the 3 ranges of effective weight

Part No	Stroke	A (mm)	B	C	D	E	F
MC 3325 M	25	M33 x 1,5	138	83	23	30	25
MC 3350 M	50	M33 x 1,5	189	108	48,5	30	25
MC 4525 M	25	M45 x 1,5	145	95	23	42	35
MC 4550 M	50	M45 x 1,5	195	120	48,5	42	35
MC 4575 M	75	M45 x 1,5	246	145	74	42	35
MC 6450 M	50	M64 x 2	225	140	48,5	60	48
MC 64100 M	100	M64 x 2	326	191	99,5	60	48
MC 64150 M	150	M64 x 2	450	241	150	60	48

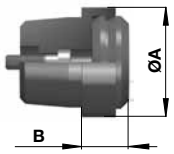
Accessories

Locking Ring



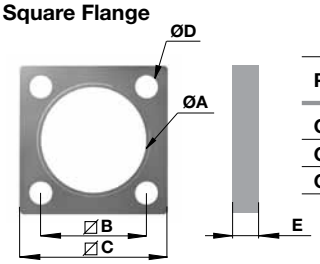
Part No	Used with series	ØA	B
NM33	MC 3325 M & MC 3350 M	40	6
NM45	MC 4525 M & MC 4550 M & MC 4575 M	57	10
NM64	MC 6450 M & MC 64100 M & MC 64150 M	76	10

Nylon Button



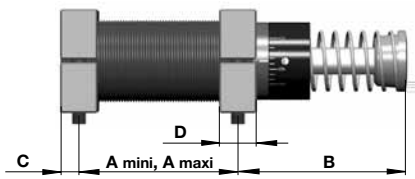
Part No	Used with series	ØA	B
PP33	MC 3325 M & MC 3350 M	29	12
PP45	MC 4525 M & MC 4550 M & MC 4575 M	42	18
PP64	MC 6450 M & MC 64100 M & MC 64150 M	60	18

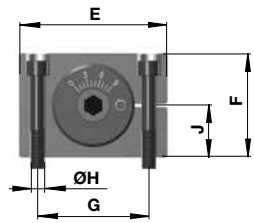
Square Flange



Part No	Used with series	ØA	ØD	⍁B	⍁C	E
QF33	MC 3325 M & MC 3350 M	M33 x 1,5	6,6	32	44	12
QF45	MC 4525 M & MC 4550 M & MC 4575 M	M45 x 1,5	9	42	56	15
QF64	MC 6450 M & MC 64100 M & MC 64150 M	M64 x 2	11	58	80	20

Side foot Mounting Kit





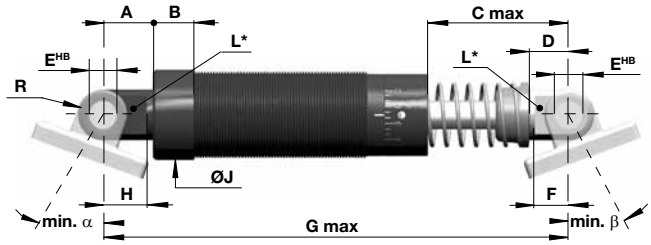
S33 = 2 flanges + 4 screws M6 x40
S45 = 2 flanges + 4 screws M8 x50
S64 = 2 flanges + 4 screws M10 x80

Tightening torque
S33 =11 Nm **S45** = 27 Nm **S64** = 50 Nm

Removing torque
S33 > 90 Nm **S45** > 350 Nm **S64** >350Nm

Part No	Used with series	A min.	A max.	B	C	D	E	F	G	ØH	J
S33	MC 3325 M	25	60	68	10	20	56	40	42	6,6	20
S33	MC 3350 M	32	86	93	10	20	56	40	42	6,6	20
S45	MC 4525 M	32	66	66	12,5	25	80	56	60	9	28
S45	MC 4550 M	40	92	91	12,5	25	80	56	60	9	28
S45	MC 4575 M	50	118	116	12,5	25	80	56	60	9	28
S64	MC 6450 M	50	112	100	12,5[2]	25	100	80	78	11	40
S64	MC 64100 M	64	162	152	12,5	25	100	80	78	11	40
S64	MC 64150 M	80	212	226	12,5	25	100	80	78	11	40

Clevis Mounting Kit

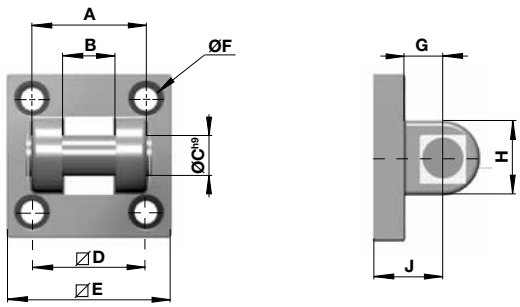


S33 =
S45 = 2 clevis shipped fitted onto shock absorber
S64 =

Part No	Used with series	A	B	Cmax	D	E^HB	F	G max	H	ØJ	L*	R	min. α	min. β
C33	MC 3325 M	14	14	39	14	10	13	168	13	38	13	10	20°	0°
C33	MC 3350 M	14	14	64	14	10	13	218	13	38	13	10	20°	0°
C45	MC 4525 M	28	20	43	18	16	17	200	20	53	20	14	15°	15°
C45	MC 4550 M	28	20	68	18	13	17	250	20	53	20	14	15°	15°
C45	MC 4575 M	28	20	93	18	13	17	300	20	53	20	14	15°	15°
C64	MC 6450 M	35	25	85	35	20	30	310	30	74	24	20	20°	10°
C64	MC 64100 M	35	25	136	35	20	30	410	30	74	24	20	20°	10°
C64	MC 64150 M	35	25	187	35	20	30	530	30	74	24	20	20°	10°

L* indicates the width of front and rear clevis

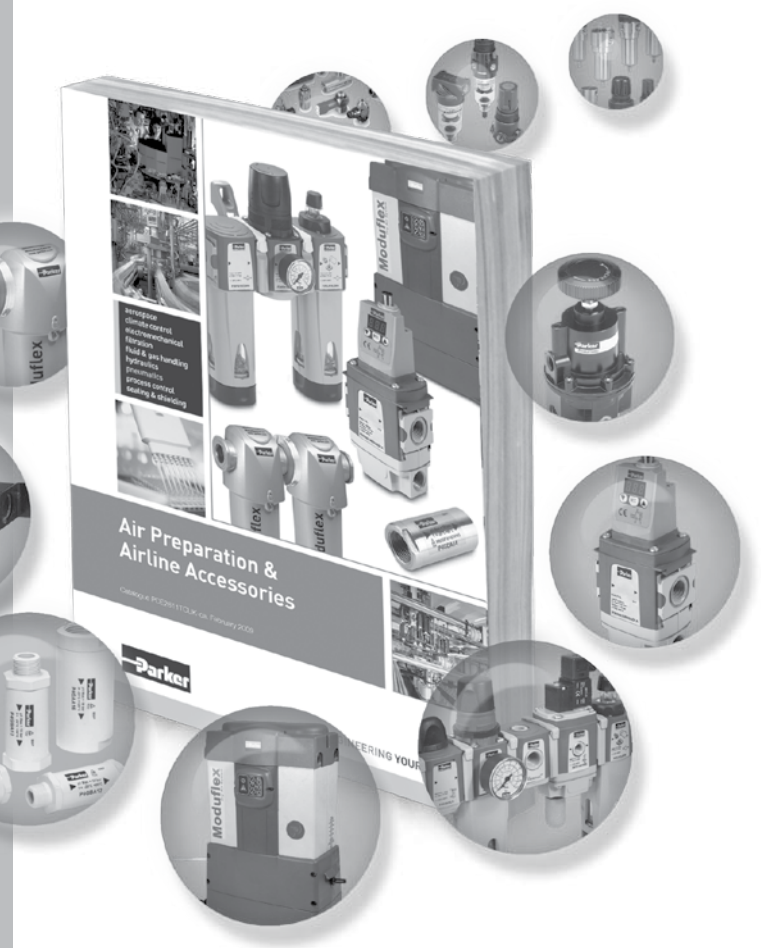
Female Fitting



Supplied with 4 mounting screws

Part No	Used with serie	A	B	ØC^h9	⍁D	⍁E	Ø F	G	H	J
P1C-4KMCA	MC 3325 M , MC 3350 M	34	14	10	32	48	7	13	23	22
P1C-4MMCA	MC 4525 M, MC 4550 M, MC 4575 M	45	21	16	46	65	9	15	29	27
P1C-4PMCA	MC 6450 M, MC 64100 M, MC 64150 M	65	25	20	72	95	11	22	45	36

Air Preparation & Airline Accessories



Parker is the world leader in motion and control technologies, providing systematic, precision-engineered solutions for a wide variety of, industrial markets. Throughout the world, Parker Hannifin is working together with companies to make their machines more reliable and more productive. Parker products are in operation on satellites orbiting the earth: in machine tools and mobile plant; on oil rigs and refineries; in hospitals and laboratories. In fact, wherever there are machines that depend on motion or fluid control, you will find innovative and reliable Parker components and systems.

Global Air Preparation System

- Space saving integral gauge (P31 size only)
- Manifold style regulators available
- OSHA compliant shut-off valves
- Soft-Start & Quick Dump valves
- Electronic Proportional Regulator

Moduflex Dry Air System

- Designed in accordance with ASME VIII Div.1, approved to CSA/UL/CRN and fully CE Marked
- (PED, EMC, LVD) as standard.
- Flexible installation utilising the multiple in-line inlet & outlet connection ports.
- Can be Floor, Bench or Wall/Canopy mounted.
- Noise level less than 70dB(A).

Stainless Steel FRLs

- 316 Stainless steel FRL design to withstand harsh, corrosive environments
- Suitable for Marine & Offshore applications
- Chemical / Petroleum and process industries
- Coalescing filters are designed for removing oil and water aerosols down to 0.01µ

Moduflex Propotional Technology

- Very fast response times
- Accurate output pressure
- Micro parameter settings
- Selectable I/O parameters
- Quick, full flow exhaust.
- LED display indicates output pressure
- Auto enable function

Moduflex AirGuard Protection System

- Maintenance friendly, Repair possible while plant is still operating.
- Reliable and tamperproof, No adjustment necessary.
- Complies with EU current standard EN 983 - § 5.3.4.3.2.
- Complies with the 2009 ISO4414 (5.4.5.11.1)

P3N 1" Modular Hi Flow FRLs

- Self relieving feature plus balanced poppet provides quick response and accurate pressure regulation.
- Port blocks available to provide G3/4 and G11/2 port extension to G1 ported bodies.
- Proportional oil delivery over a wide range of air flows

Moduflex Compressed Air Filters

- Tested in accordance with ISO 8573.9
- High liquid removal efficiencies at all flow conditions
- Low pressure losses for low operational costs
- Multiple port sizes for a given flow rate provides increased flexibility during installation
- Suitable for variable flow compressors

Miniature FRL Series

- Compact body ported units.
- Port sizes G^{1}/8 and G^{1}/4.
- Unique deflector plate ensuring maximum water and particulate removal.
- Solid control piston with lip seal for extended life.
- Proportional oil delivery over a wide range of air flows.

High Precision Regulators

- High repeatability
- High relief capacity on R220 model
- High flow capacity on R230 model

Vacuum Products

A complete range of vacuum products and accessories

Parker is the world leader in motion and control technologies, providing systematic, precision-engineered solutions for a wide variety of, industrial markets. Throughout the world, Parker Hannifin is working together with companies to make their machines more reliable and more productive. Parker products are in operation on satellites orbiting the earth: in machine tools and mobile plant; on oil rigs and refineries; in hospitals and laboratories. In fact, wherever there are machines that depend on motion or fluid control, you will find innovative and reliable Parker components and systems.

The Parker Convum range of vacuum products is one of the mostcompre-hensive in the market. The product range incliudes vacuum cups in wide variety os styles and materials, ejectors and generators from mini units to fully integrated units along with sensors and a wide selection of accessories.

Wide choice of styles and materials

Vacuum Pads

- Flat & Bellow Pads
- Male & Female Connections
- Different Materials
- Range of Diameters

High performance accessories

Vacuum Accessories

- High performance silencers and vacuum filters
- Electronic cables with M8 connector 4 pin

Vacuum generators to suit most applications

Vacuum Ejectors

- Basic Ejectors
- Basic Ejectors with electro-mechanical Switch
- In-line Ejectors
- Integrated Ejectors small & large

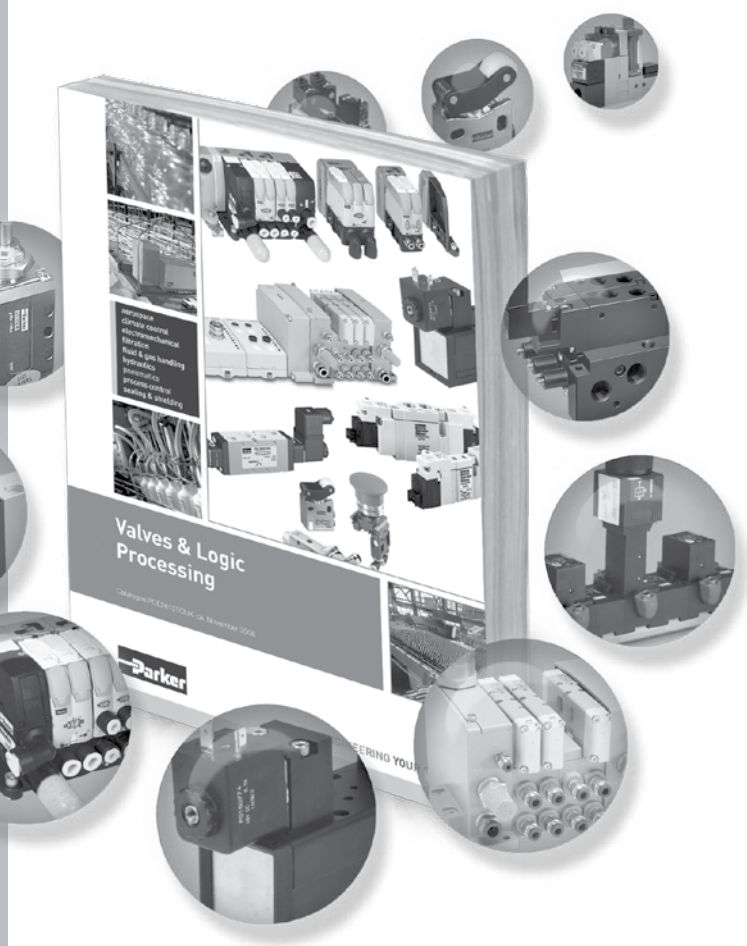
Digital or analog output

Vacuum Sensors

- -1 to +10 bar
- Analog and/or Digital Outputs
- With display

Control Devices

A complete range of pneumatic valves



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The Parker range of control devices is much more than just valves, we have within our product programme field bus enabled valve systems , limit switches, logic process components, two hand control units, metal valves for arduous applications and ultra lightweight plastic valves.

General Lightweight Applications & Individual/ Multiple Field Bus Connections

P2M Moduflex Valves

- High flow, compact size.
- Mixable valve sizes.
- Stand alone valves, modular islands with individual, multiconnector or bus connections.
- Integrated selectable internal or external pilot supply and exhaust.
- Optional peripheral modules.
- Push-in connection.

Valve Islands

PVL-C10

- Compact lightweight, high flow valves
- 2 x 3/2,5/2 or 5/3 configuration
- Push-in Ø8mm or G1/4 threaded connections
- High performance 15mm solenoids
- Stacking type modules with DIN rail mounting
- Bus protocols: Interbus S, Profibus DP, Devicenet, ASI.

Miniature Valves

ADEX Directional Control Valves

- 2 sizes: M5 and 1/8"
- Compact body with large flow
- Quick response time, faster than 10ms
- Expected life time more than 50,000,000 cycles
- Low power consumption only 0.6W
- Optional multipin connector manifold
- Manual override

Stackable Inline Lightweight Valve

Interface 2000

- 3/2 or 4/2 configuration
- Push-in connections Ø4mm and Ø6mm
- High performance 15mm solenoids
- Electrical connection : Cable gland, Sub D25 or Industrial connector
- Bus protocols: Interbus S, Profibus DP, Devicenet, ASI.

Poppet Valve for Enclosures

PS1 Interface

- High speed poppet valve
- Push-in connection
- Built-in terminal block
- Pneumatic output indicator
- DIN rail mounting

Industrial Applications

B Series Valves

- 2 sizes: 1/8" and 1/4"
- Compact size
- Inlet-exhaust-mounting facility
- Fast response, high flow
- Integrated mounting holes
- Wear compensating seal system
- DIN rail mountable manifolds

Valve Islands

PVL-B10

- Compact lightweight, high flow valves
- 2 x 3/2,5/2 or 5/3 configuration
- Push-in Ø6mm or G1/8 threaded connections
- High performance 15mm solenoids
- Stacking type modules with DIN rail mounting
- Bus protocols: Interbus S, Profibus DP, Devicenet, ASI.

Stackable Inline Lightweight Valve

PVL Compact Valves

- High flow, compact size
- Push-in or threaded connection
- DIN rail or block mounting
- Light weight construction

Heavy Duty Applications / Mobile

Viking Xtreme Metal Spool Valves

- 4 sizes: G1/8, G1/4, G3/8 and G1/2.
- Wide operating temperature range
- Compact design with good corrosion resistance.
- Wide range of 5/2 and 5/3 versions.
- High and low temperature versions available for transport applications.

Heavy Duty Applications / Multiple Connection and Plug-in

Isomax Valves - ISO 15407 / ISO 5599

- Size 1, 2 and 3 ISO 5599-1
- Size 01 and 02 (26 and 18 mm) ISO 15407-1
- Ceramic technology for long live operation
- From vacuum up to 12 bar applications
- Internal or external pilot supply with same valves
- Pressure supply possible on exhaust port

ISYS Valves - ISO 15407 / ISO 5599

- Size 1, 2 and 3 ISO 5599-1 / 2
- Size 01 and 02 ISO 15407-1 / 2
- Excellent reliability, long life in excess of 30 million operations.
- Complete range, plug-in and non-plug-in
- WCS Spool technology

Hi Flow Valves

P2V Flowstar Valves ISO 15407-1

- Compact high flow design
- To VDMA 24563, ISO 15407-1 standard
- 5/2 & 5/3 configurations
- 18mm & 26mm body widths
- Single sub-base or manifold mounted
- Air pilot and solenoid actuators
- Suitable for Food Industry applications.

Ceramic Valves

PVD Everdure

- Available in 3 sizes
- 4/2 Directional control valves
- 3/2 dump valves & 2/2 slow start valves
- Stand alone or manifolds.
- Built-in manual override
- Ceramic slide provides extremely long life
- DIN rail mounting.

Metal Spool Valves

Midget Spool Valves

- G1/8 body ported
- Rugged die cast body
- 3/2 & 5/2 configurations
- Stainless steel spool
- Viton body seals as standard
- Integral mounting holes
- Manual, mechanical and automatic actuators.

Metal Spool Valves

Intermediate Spool Valves

- G1/4 body ported
- Rugged die cast body
- 3/2, 5/2 & 5/3 configurations
- Stainless steel spool
- Viton body seals as standard
- Integral mounting holes
- Manual, mechanical and automatic actuators.

Push Button Actuators

PXB Push Buttons

- Facia mounted operators
- 3/2 NO or NC versions
- Pneumatic valves combinable with electrical switches
- Modular construction
- Wide choice of actuators.

Heavy Duty Applications

VA - Brass bodied spool valves

- Rugged valves for heavy duty applications
- Large and robust actuators for easy operation
- Excellent corrosion resistance
- Integral mounting holes
- Panel mounting versions

Limit Switches

PXC Limit Switches

- 3/2 Nc spring return as standard
- Ø4mm, M5 & G1/8 ported versions
- Miniature and Compact designs
- Wide choice of actuators include levers, rollers & ultra light whisker types.

Metal Poppet Valves

Mini Poppet Valves

- M5 body ported
- 3/2 NC spring return as standard
- Manual and mechanical actuators
- Light actuation forces.

Midget Poppet Valves

- G1/8 body ported poppet design
- 3/2 NC spring return as standard
- Manual, mechanical and air pilot actuators
- Light actuation forces
- Integral mounting holes.

Heavy Duty Poppet Valves

- G3/8 & G1/2 body ported
- 2/2 & 3/2 NC spring return as standard
- High flow poppet design
- Manual and mechanical and solenoid actuators
- Light actuation forces
- Integral mounting holes.

Heavy Duty Valves

VE Heavy Duty Isolator Valves

- G1/4, G1/2 & G1 versions
- 2/2 or 3/2 option
- Inline installation
- High flow
- Suitable as a remotely controlled main shut off valve.
- Air or solenoid pilot

Lockout Valves

LV Series Lockout Valves

- G1/4 - G1 Ported emergency shut-off valves
- High flow G1 exhaust port
- Manually operated
- High visibility, rugged aluminium body
- Detented spool with padlock 'lockout' facility.

Processing Modules

Two Hand Control Units

- Ergonomic design
- Robust polymer or metal enclosure
- Meets requirements for protection against accidental operation and tampering
- Metal enclosure features a wrist rest bar which prevents illness due to repetative actions
- Conforms to EN574 and EN954-1 requirements

Shut Off Valves

Ball Valves and Sliding Sleeve Valves

Ball Valves

- 3 distinct series
- Vented and non vented
- Bubble tight shut-off
- Positive 90 ° movement
- Wide variety of fluids

Sliding sleeve valves

- Linear sleeve operated
- 3/2 valve
- Simple airline isolation
- Compact
- Minimum space for valve operation

Processing Modules

Logic Control

- Complete range of logic processing modules
- Stand alone or stackable and combinable units
- Ultra fast response times
- Visual indication
- DIN rail mounting.

At Parker, we're guided by a relentless drive to help our customers become more productive and achieve higher levels of profitability by engineering the best systems for their requirements. It means looking at customer applications from many angles to find new ways to create value. Whatever the motion and control technology need, Parker has the experience, breadth of product and global reach to consistently deliver. No company knows more about motion and control technology than Parker. For further info call 00800 27 27 5374.

AEROSPACE

Key Markets
- Aircraft engines
- Business & general aviation
- Commercial transports
- Land-based weapons systems
- Military aircraft
- Missiles & launch vehicles
- Regional transports
- Unmanned aerial vehicles

Key Products
- Flight control systems & components
- Fluid conveyance systems
- Fluid metering delivery & atomization devices
- Fuel systems & components
- Hydraulic systems & components
- Inert nitrogen generating systems
- Pneumatic systems & components
- Wheels & brakes

CLIMATE CONTROL

Key Markets
- Agriculture
- Air conditioning
- Food, beverage & dairy
- Life sciences & medical
- Precision cooling
- Processing
- Transportation

Key Products
- CO² controls
- Electronic controllers
- Filter driers
- Hand shut-off valves
- Hose & fittings
- Pressure regulating valves
- Refrigerant distributors
- Safety relief valves
- Solenoid valves
- Thermostatic expansion valves

ELECTROMECHANICAL

Key Markets
- Aerospace
- Factory automation
- Food & beverage
- Life science & medical
- Machine tools
- Packaging machinery
- Paper machinery
- Plastics machinery & converting
- Primary metals
- Semiconductor & electronics
- Textile
- Wire & cable

Key Products
- AC/DC drives & systems
- Electric actuators
- Controllers
- Gantry robots
- Gearheads
- Human machine interfaces
- Industrial PCs
- Inverters
- Linear motors, slides and stages
- Precision stages
- Stepper motors
- Servo motors, drives & controls
- Structural extrusions

FILTRATION

Key Markets
- Food & beverage
- Industrial machinery
- Life sciences
- Marine
- Mobile equipment
- Oil & gas
- Power generation
- Process
- Transportation

Key Products
- Analytical gas generators
- Compressed air & gas filters
- Condition monitoring
- Engine air, fuel & oil filtration & systems
- Hydraulic, lubrication & coolant filters
- Process, chemical, water & microfiltration filters
- Nitrogen, hydrogen & zero air generators

FLUID & GAS HANDLING

Key Markets
- Aerospace
- Agriculture
- Bulk chemical handling
- Construction machinery
- Food & beverage
- Fuel & gas delivery
- Industrial machinery
- Mobile
- Oil & gas
- Transportation
- Welding

Key Products
- Brass fittings & valves
- Diagnostic equipment
- Fluid conveyance systems
- Industrial hose
- PTFE & PFA hose, tubing & plastic fittings
- Rubber & thermoplastic hose & couplings
- Tube fittings & adapters
- Quick disconnects

HYDRAULICS

Key Markets
- Aerospace
- Aerial lift
- Agriculture
- Construction machinery
- Forestry
- Industrial machinery
- Mining
- Oil & gas
- Power generation & energy
- Truck hydraulics

Key Products
- Diagnostic equipment
- Hydraulic cylinders & accumulators
- Hydraulic motors & pumps
- Hydraulic systems
- Hydraulic valves & controls
- Power take-offs
- Rubber & thermoplastic hose & couplings
- Tube fittings & adapters
- Quick disconnects

PNEUMATICS

Key Markets
- Aerospace
- Conveyor & material handling
- Factory automation
- Food & beverage
- Life science & medical
- Machine tools
- Packaging machinery
- Transportation & automotive

Key Products
- Air preparation
- Compact cylinders
- Field bus valve systems
- Grippers
- Guided cylinders
- Manifolds
- Miniature fluidics
- Pneumatic accessories
- Pneumatic actuators & grippers
- Pneumatic valves and controls
- Rodless cylinders
- Rotary actuators
- Tie rod cylinders
- Vacuum generators, cups & sensors

PROCESS CONTROL

Key Markets
- Chemical & refining
- Food, beverage & dairy
- Medical & dental
- Microelectronics
- Oil & gas
- Power generation

Key Products
- Analytical sample conditioning products & systems
- Fluoropolymer chemical delivery fittings, valves & pumps
- High purity gas delivery fittings, valves & regulators
- Instrumentation fittings, valves & regulators
- Medium pressure fittings & valves
- Process control manifolds

SEALING & SHIELDING

Key Markets
- Aerospace
- Chemical processing
- Consumer
- Energy, oil & gas
- Fluid power
- General industrial
- Information technology
- Life sciences
- Military
- Semiconductor
- Telecommunications
- Transportation

Key Products
- Dynamic seals
- Elastomeric o-rings
- EMI shielding
- Extruded & precision-cut, fabricated elastomeric seals
- Homogeneous & inserted elastomeric shapes
- High temperature metal seals
- Metal & plastic retained composite seals
- Thermal management

ENGINEERING YOUR SUCCESS.

Need something ?

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