

Pneumatic Cylinders

P1P Series

According to ISO 21287

Catalog 0963



ENGINEERING YOUR SUCCESS.

5-Year Extended Warranty, Warning, Offer of Sale

The Parker 5-Year Extended Warranty

Parker Hannifin Corporation will extend its warranty on all pneumatic components to sixty (60) months providing they are correctly installed and protected by Parker pneumatic filters which are properly maintained. Components covered by this warranty include all cylinders, valves, and pneumatic automation components manufactured by Parker in any of our global facilities. This warranty covers our components anywhere in the world you may ship your equipment.

Parker's obligation under this warranty is limited to the replacement or repair of any failed components. The buyer understands that the seller will not be liable for any other costs or damages.

The buyers of quality Parker components and filters benefit by having ONE source for all pneumatic needs - **Parker**.



Jennifer Parmentier
President
Motion Systems Group



WARNING

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

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The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

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The items described in this document are hereby offered for sale by Parker Hannifin Corporation, its subsidiaries or its authorized distributors. This offer and its acceptance are governed by the provisions stated on the separate page of this document entitled "Offer of Sale".

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Features



P1P Compact Cylinder according to ISO 21287

The P1P Series is a complete range of ISO 21287 compact cylinders developed to meet the highest requirements for quality and performance.

Features

- ISO 21287 conformity and global availability throughout the worldwide Parker Hannifin organization.
- Bore sizes 20, 25, 32, 40, 50, 63, 80 and 100mm.
- One of the widest ranges of sizes and versions for a broad range of applications.
- Long service life thanks to proven high quality materials, surfaces and seal technology.
- Compact design and many installation alternatives for flexible use in narrow spaces.
- Efficient elastic cushioning absorbing residual energy facilitates high speeds, short cycle times and reduced noise.
- Flush, drop in global P8SAG sensors on all side faces for flexible and compact assembly and mechanical protection of the sensors.
- P1P is suitable for processing, packaging and handling applications within the food industry thanks to the food approved grease used for the initial greasing.

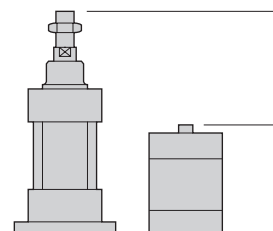
High quality

Reliability and long service life are key qualities of any pneumatic cylinder.

- Proven seal design and materials throughout the cylinder. The expertise for seal technology within Parker Hannifin is the basis for leading and proven tribology solutions for all our pneumatic actuators.
- Body extrusion in anodized aluminum with extra fine and hard internal surface for optimum operational conditions.
- End covers are sand blasted aluminum.

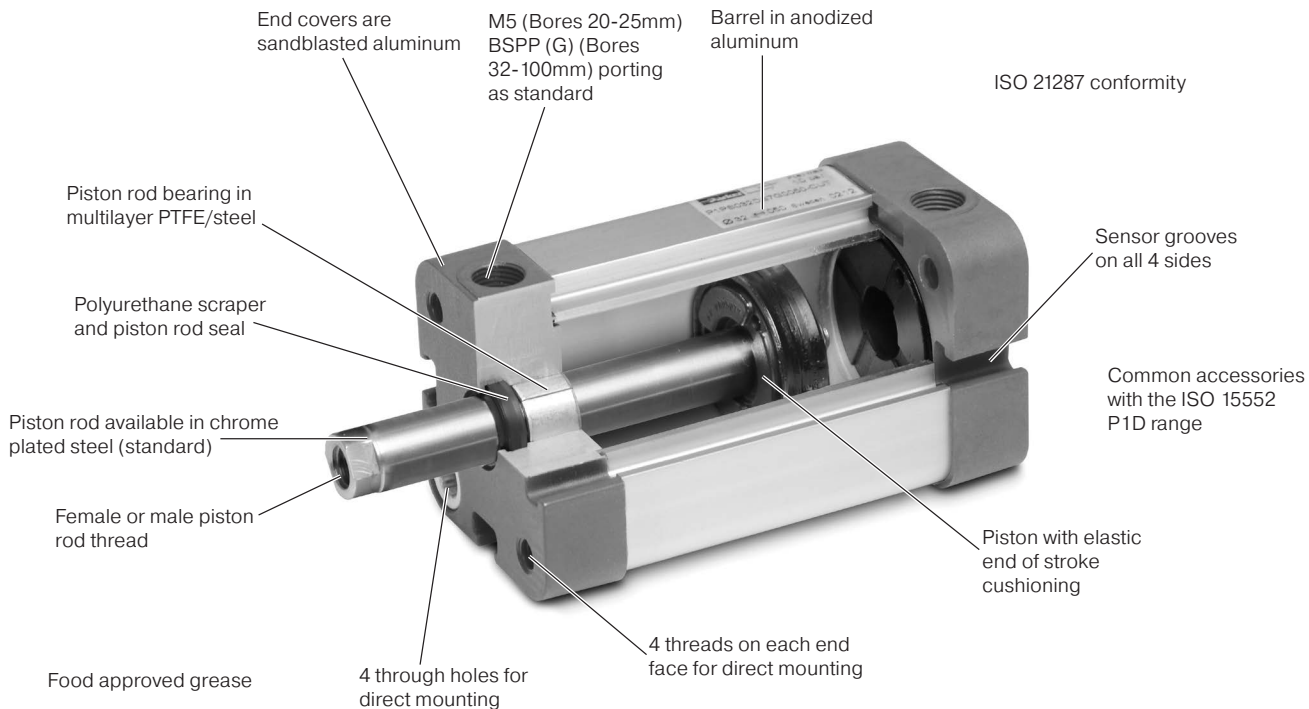
Compact dimensions for versatile use

The very compact axial dimensions makes it possible to use the P1P cylinders in a broad range of applications. Note that the P1P cylinders are up to 50% shorter than ISO 15552 cylinders for the same stroke length. This is highly valuable in narrow spaces in machines or production lines.



Up to 50% shorter than ISO 15552 cylinders for the same stroke length

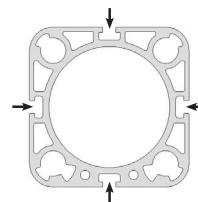
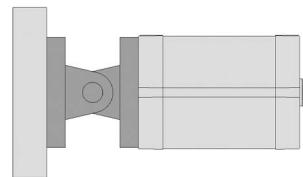
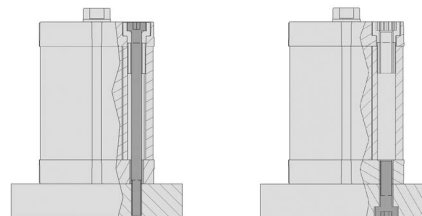
Features



Flexible installation

The new P1P compact cylinder range offers many opportunities for mechanical installation.

- There are holes through the cylinder body. Use these to fix the cylinder with through bolts into threads in the surface behind the cylinder.
- In each end of the same through holes there are female threads. These can be used for flange mounting of the actuator from the rear or front face.
- The wide range of ISO 15552 cylinder mountings are available for use with P1P cylinders bore 20-100 mm. Examples are the foot and flange mountings, as well as MP2 and MP4 mountings for articulated applications.



Global drop-in P8SAG sensor range

The global sensor range P8SAG fits P1P as well as most of our pneumatic cylinder families. This simplifies your ordering, stock and overall service of sensors.

The P8SAG sensors has a drop-in mounting into the sensor grooves facilitating the assembly and commissioning work. There are sensor grooves on all four side faces for maximum flexibility and adaptation to each application.

The wide range of P8SAG sensors includes both reed and solid state sensors, flying lead versions with 3 and 10 meter cable and pig tail versions with M8 and M12 connector.

Technical Information

General technical data

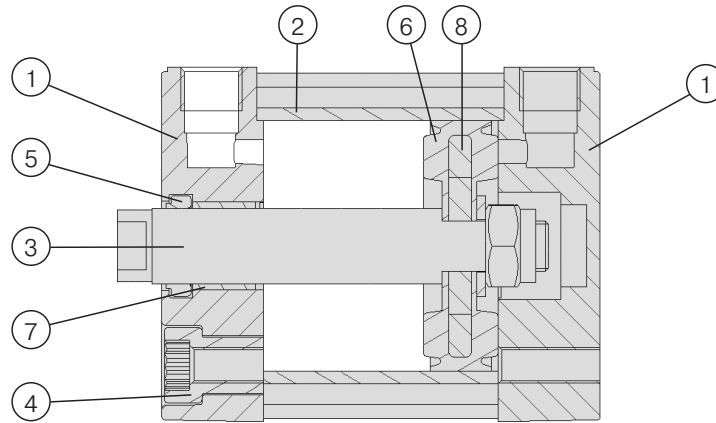
Product Type	Compact cylinder according to ISO 21287	
Bore Size	20 - 100 mm	
Stroke Length	1-500 mm	
Versions	P1PS...DC	Double acting
	P1PG...DC	Double acting with non rotating piston rod
	P1PS...SC	Single acting: Spring return (Bores 20 - 63mm)
	P1PS...TC	Single acting: Spring extended (Bores 20 - 63mm)
	P1PS...KC	Through piston rod
	P1PS...DG	High temperature
	P1PS...DK	Low temperature
Cushioning	Elastic cushioning	
Position Sensing	Proximity sensor	
Installation	Direct	Through holes Female thread on front and rear end face
	Accessories	Cylinder and piston rod mountings
Mounting position	Any	

Operating and environmental data

Operating medium	For best possible service life and trouble-free operation it is recommended to use dry, filtered compressed air to ISO 8573-1:2010 quality class 3.4.3. This specifies a dew point of +30C for indoor operation (a lower dew point should be selected for minus temperature operation and we recommend the use of an inline dryer) and is aligned with the air quality from most standard compressors with a standard filter.	
Operating pressure	0.5 bar to 10 bar	
Ambient temperature	Standard version	-20°C to +80°C
	High temperature	-10°C to +120°C
	Low temperature	-40°C to +80°C
Pre-lubricated	Further lubrication is normally not necessary. If additional lubrication is introduced it must be continued.	
Corrosion resistance	High resistance to corrosion and chemicals. Materials and surface treatment have been selected for industrial applications where solvents and detergents are frequently used.	

Technical Information

Material Specification



General technical data

Pos	Part	Specification
1	End covers	Sandblasted Aluminum
2	Cylinder barrel	Anodized aluminum
3	Piston rod	Chrome plated carbon steel
4	End cover screws	Zinc plated steel
5	Piston rod seal	Standard Polyurethane (PUR)
		High temperature Fluorocarbon rubber (FPM)
		Low temperature Polyurethane (PUR)
6	Piston / piston seal	Standard Aluminum / Nitrile rubber (NBR)
		High temperature Aluminum / Hydrogenated nitrile rubber (HNBR)
		Low temperature Aluminum / Nitrile rubber (NBR)
7	Piston rod bearing	Multilayer PTFE/steel
8	Magnet	Plastic coated magnetic material
	Note on materials	RoHS compliant

Technical Information

Cylinder forces, double acting variants

Cylinder Bore mm	Stroke	Bore mm	Piston Rod mm	Area cm ²	Max Theoretical Force in N (bar)										
					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	
20	Double acting	+	20	10	3,1	31	63	94	126	157	188	220	251	283	314
		-	20	10	2,3	23	46	69	92	115	138	161	184	207	231
25	Double acting	+	25	10	4,9	49	98	147	196	245	295	344	393	442	491
		-	25	10	4,1	41	82	124	165	206	247	289	330	371	412
32	Double acting	+	32	12	8.0	80	161	241	322	402	483	563	643	724	804
		-	32	12	6.9	69	138	207	276	346	415	484	553	622	691
40	Double acting	+	40	12	12.6	126	251	377	503	628	754	880	1005	1131	1257
		-	40	12	11.4	114	229	343	457	572	686	800	915	1029	1144
50	Double acting	+	50	16	19.6	196	393	589	785	982	1178	1374	1571	1767	1963
		-	50	16	17.6	176	352	529	705	881	1057	1234	1410	1586	1762
63	Double acting	+	63	16	31.2	312	623	935	1247	1559	1870	2182	2494	2805	3117
		-	63	16	29.2	292	583	875	1166	1458	1750	2041	2333	2624	2916
80	Double acting	+	80	20	50.3	503	1005	1508	2011	2513	3016	3518	4021	4524	5026
		-	80	20	47.1	471	942	1414	1885	2356	2827	3299	3770	4241	4712
100	Double acting	+	100	25	78.5	785	1571	2356	3142	3927	4712	5498	6283	7069	7854
		-	100	25	73,6	736	1473	2209	2945	3682	4418	5154	5890	6627	7363

+ = Extend stroke

- = Return stroke

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



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Technical Information

Technical Data

Cylinder Designation	Cylinder Bore		Piston Rod		Piston Rod	Total Mass		Air Consumption	Port Size
	Dia. mm	Area cm ²	Dia. mm	Area cm ²	Thread	At 0 mm Stroke	Addition per 10 mm Stroke		
	kg	kg	litres ⁽¹⁾						
P1PS...DC7G Double acting with female piston rod thread									
P1PS020	20	3.1	10	0.78	M6 x 1.0	0.140	0.018	0.0405	M5
P1PS025	25	4.9	10	0.78	M6 x 1.0	0.170	0.022	0.0633	M5
P1PS032	32	8.0	12	1.1	M8 x 1.25	0.291	0.030	0.105	G1/8
P1PS040	40	12.6	12	1.1	M8 x 1.25	0.375	0.036	0.162	G1/8
P1PS050	50	19.6	16	2.0	M10 x 1.5	0.519	0.050	0.253	G1/8
P1PS063	63	31.2	16	2.0	M10 x 1.5	0.743	0.059	0.414	G1/8
P1PS080	80	50.3	20	3.1	M12 x 1.75	1.263	0.081	0.669	G1/8
P1PS100	100	78.5	25	4.9	M12 x 1.75	2.206	0.111	1.043	G1/8

P1PS...DC8G Double acting with male piston rod thread

P1PS020	20	3.1	10	0.78	M8 x 1.25	0.145	0.018	0.0405	M5
P1PS025	25	4.9	10	0.78	M8 x 1.25	0.179	0.022	0.0633	M5
P1PS032	32	8.0	12	1.1	M10 x 1.25	0.308	0.030	0.105	G1/8
P1PS040	40	12.6	12	1.1	M10 x 1.25	0.392	0.036	0.162	G1/8
P1PS050	50	19.6	16	2.0	M12 x 1.25	0.548	0.050	0.253	G1/8
P1PS063	63	31.2	16	2.0	M12 x 1.25	0.772	0.059	0.414	G1/8
P1PS080	80	50.3	20	3.1	M16 x 1.5	1.322	0.081	0.669	G1/8
P1PS100	100	50.3	25	4.9	M16 x 1.5	1.267	0.111	1.043	G1/8

P1PG...DC7G Double acting with guided piston rod

P1PG020	20	3.1	10	0.78	-	0.185	0.022	0.0405	M5
P1PG025	25	4.9	10	0.78	-	0.217	0.027	0.0633	M5
P1PG032	32	8.0	12	1.1	-	0.358	0.033	0.105	G1/8
P1PG040	40	12.6	12	1.1	-	0.455	0.039	0.162	G1/8
P1PG050	50	19.6	16	2.0	-	0.664	0.057	0.253	G1/8
P1PG063	63	31.2	16	2.0	-	0.930	0.067	0.414	G1/8

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

Application Guide - Valves: Moduflex, H Micro and H Series ISO

Selecting Pneumatic System Components

Cylinder to Valve: The below chart contains recommendations for selecting air valve products based on 5.5 bar with a 0.35 bar pressure drop. The values within the chart show the corresponding Cv values.

Moduflex Series

- Stand-alone valves, short-build valve manifold, or large valve manifold configurations available
- Cv range from 0.18 – 0.80
- Peripheral modules available— flow control, pressure regulation, P.O. check valves and vacuum generators/sy



	20	25	32	40	50	63	80	100
50	0.01	0.02	0.03	0.04	0.06	0.10	0.16	0.26
100	0.02	0.03	0.05	0.08	0.13	0.20	0.33	0.51
150	0.03	0.05	0.08	0.12	0.19	0.30	0.49	0.77
200	0.04	0.06	0.10	0.16	0.26	0.41	0.65	1.02
250	0.05	0.08	0.13	0.20	0.32	0.51	0.82	1.28
300	0.06	0.10	0.16	0.25	0.38	0.61	0.98	1.53
350	0.07	0.11	0.18	0.29	0.45	0.71	1.15	1.79
400	0.08	0.13	0.21	0.33	0.51	0.81	1.31	2.04
450	0.09	0.14	0.24	0.37	0.58	0.91	1.47	2.30
500	0.10	0.16	0.26	0.41	0.64	1.01	1.64	2.56
	Size 2					See Larger valve system		

H Micro and H Series ISO

- H Series Micro Cv range 0.30 – 0.35
- IsysNet system fieldbus, Turck system fieldbus, 25 pin D-sub, or low cost Moduflex fieldbus options available
- H Series ISO offers 5 sizes with Cv range 0.55 – 6.0



	20	25	32	40	50	63	80	100
50	0.01	0.02	0.03	0.04	0.06	0.10	0.16	0.26
100	0.02	0.03	0.05	0.08	0.13	0.20	0.33	0.51
150	0.03	0.05	0.08	0.12	0.19	0.30	0.49	0.77
200	0.04	0.06	0.10	0.16	0.26	0.41	0.65	1.02
250	0.05	0.08	0.13	0.20	0.32	0.51	0.82	1.28
300	0.06	0.10	0.16	0.25	0.38	0.61	0.98	1.53
350	0.07	0.11	0.18	0.29	0.45	0.71	1.15	1.79
400	0.08	0.13	0.21	0.33	0.51	0.81	1.31	2.04
450	0.09	0.14	0.24	0.37	0.58	0.91	1.47	2.30
500	0.10	0.16	0.26	0.41	0.64	1.01	1.64	2.56

Valve range

H Series Micro
HB
HA
H1
H2

Order Key Code

Ordering Information

P1P

Cylinder Version	
S	Standard
G	Guided 20-63 mm Bore

S

Cylinder Bore Size	
020	20mm
025	25mm
032	32mm
040	40mm
050	50mm
063	63mm
080	80mm
100	100mm

032

D

Function	
D	Double Acting
S	Single Acting: Spring Return (Bore 20 - 63mm)
T	Single Acting: Spring Extended (Bore 20 - 63mm)
K	Through Piston Rod

NOTE: Single acting only available as 25 mm stroke

C

Piston Rod Thread	
7	Female
8	Male
3	Special rod end

7

G

Cylinder Ports & Magnetic Function	
Magnet	
G	20 - 25mm : M5 Threads 32 - 100mm : BSP Threads

0 0 2 5

Stroke Length	
See table below for standard stroke lengths in mm.	

Piston Rod Material	
Chrome Plated Steel	
Temperature Range	
C	Standard -20°C to +80°C
G	High Temperature Version -10°C to +120°C Non Magnetic Function
K	Low Temperature Version -40°C to +80°C

Standard stroke length

Cylinder Designation	Cylinder Bore	● Standard Stroke Length in mm				■ Non Standard Stroke Length **						
		5	10	15	20	25*	30	40	50*	60*	80*	100*
Double acting:												
P1PS020	20	●	●	●	●	●	●	●	●	●	●	●
P1PS025	25	●	●	●	●	●	●	●	●	●	●	●
P1PS032	32	●	●	●	●	●	●	●	●	●	●	●
P1PS040	40	●	●	●	●	●	●	●	●	●	●	●
P1PS050	50	●	●	●	●	●	●	●	●	●	●	●
P1PS063	63	●	●	●	●	●	●	●	●	●	●	●
P1PS080	80	●	●	●	●	●	●	●	●	●	●	●
P1PS100	100		●	●	●	●	●	●	●	●	●	●
Double Acting with Guided Piston Rod												
P1PG020	20	●	●	●	●	●	●	●	●	●	●	●
P1PG025	25	●	●	●	●	●	●	●	●	●	●	●
P1PG032	32	●	●	●	●	●	●	●	●	●	●	●
P1PG040	40	●	●	●	●	●	●	●	●	●	●	●
P1PG050	50	●	●	●	●	●	●	●	●	●	●	●
P1PG063	63	●	●	●	●	●	●	●	●	●	●	●

* Standard stroke lengths in mm according to ISO 4393

** Max stroke 500 mm

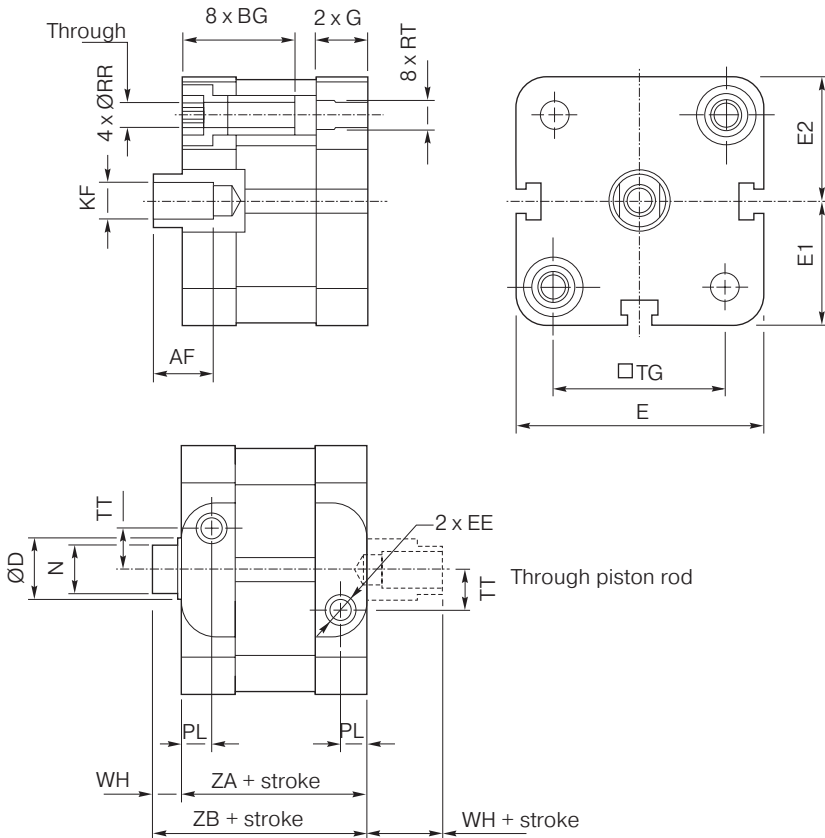
NOTE: G option only available in 020-063 bore sizes



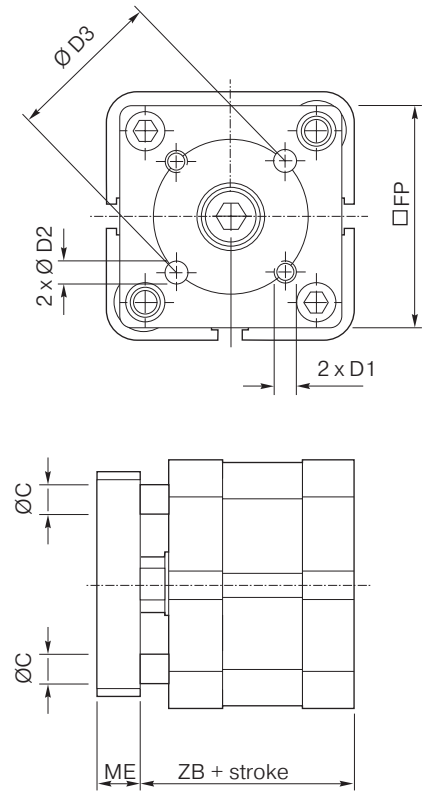
For inventory, lead times, and kit lookup, visit www.pdnplu.com

Dimensions

P1PS...DC7G Double acting with female piston rod thread



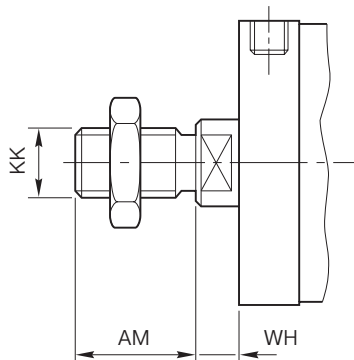
P1PG...DC Double acting with guided piston rod



Bore Size	AF min	BG min	ØC	ØD	D1	ØD2 H8	ØD3	EE	E	E1	E2	FP	G	KF	ME	N h14	PL	ØRR min	RT	TG	TT	WH	ZA ± 0.3	ZB ± 0.6
Ø20	10	15	6	10	M4	4	17	M5	38,0	19,0	19,1	35	11,60	M6	8	8	7,6	4,1	M5	22,0	4,0	6	37	43
Ø25*	10	15	6	10	M5	5	22	M5	41,0	20,5	20,6	38	11,90	M6	8	8	7,5	4,1	M5	26,0	5,5	6	39	45
Ø32	12	16	6	12	M5	5	28	G1/8	49,4	24,7	24,9	45	15,25	M8	10	10	7,8	5,1	M6	32,5	6,5	7	44	51
Ø40	12	16	6	12	M5	5	33	G1/8	56,0	28,0	28,5	50	15,25	M8	10	10	8,0	5,1	M6	38,0	8,0	7	45	52
Ø50	16	16	8	16	M6	6	42	G1/8	67,0	33,5	33,7	60	14,30	M10	12	13	7,7	6,4	M8	46,5	11,0	8	45	53
Ø63	16	16	8	16	M6	6	50	G1/8	79,0	39,5	39,8	70	16,30	M10	12	13	8,0	6,4	M8	56,5	16,0	8	49	57

* Note: 25mm stroke single acting cylinders have the same dimensions as 25mm stroke double acting cylinders.

P1PS...DC8G Double acting with male piston rod thread

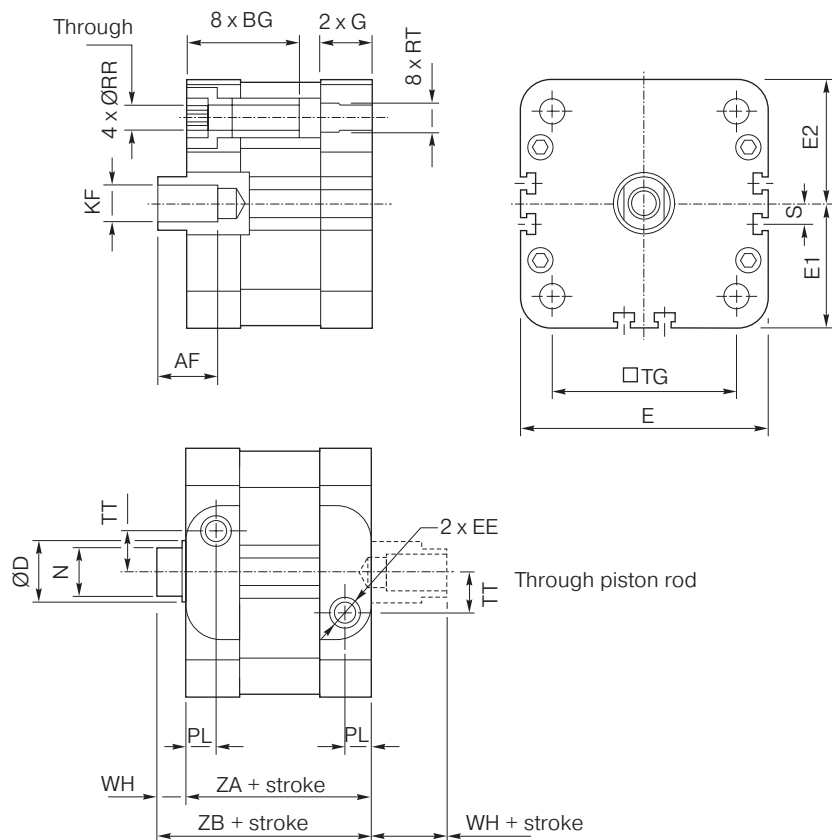


Bore Size	AM +0 -0.5	WH		KK
		Nom.	Tol.	
Ø20	16	6	± 1,6	M8 x 1,25
Ø25	16	6	± 1,6	M8 x 1,25
Ø32	19	7	± 1,6	M10 x 1,25
Ø40	19	7	± 1,6	M10 x 1,25
Ø50	22	8	± 1,6	M12 x 1,25
Ø63	22	8	± 1,6	M12 x 1,25

Note: Cylinders with male piston rod thread are delivered with one piston rod nut in zinc plated steel.

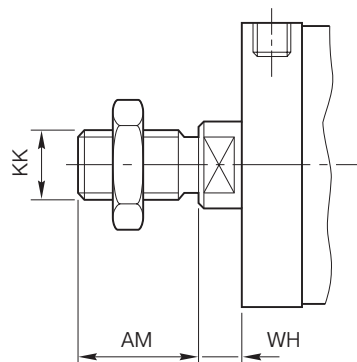
Dimensions

P1PS...DC7G Double acting with female piston rod thread



Bore Size	AF min	BG min	ØC	ØD	D1	ØD2 H8	ØD3	EE	E	E1	E2	FP	G	KF	ME	N h14	PL	ØRR min	RT	S	TG	TT	WH ± 0.3	ZA ± 0.6	ZB
Ø80	20	17	10	20	M8	8	65	G1/8	96	48,0	48,2	90	17,7	M12	14	17	10,5	8,4	M10	8	72	20	10	54	64
Ø100	20	17	10	25	M10	10	80	G1/8	115	57,5	57,7	110	23,0	M12	14	21	12,0	8,4	M10	18,5	89	24	10	67	77

P1PS...DC8G Double acting with male piston rod thread



Bore Size	AM	WH		KK
	+0 -0.5	Nom.	Tol.	
Ø80	28	10	± 1,6	M16 x 1,5
Ø100	28	10	± 1,6	M16 x 1,5

Note: Cylinders with male piston rod thread are delivered with one piston rod nut in zinc plated steel.

Cylinder Mountings



1 - Flange
MF1 / MF2

Ø 20	P1P-4HMB
Ø 25	P1P-4JMB
Ø 32	P1C-4KMB
Ø 40	P1C-4LMB
Ø 50	P1C-4MMB
Ø 63	P1C-4NMB
Ø 80	P1C-4PMB
Ø 100	P1C-4QMB



2 - Foot brackets
MS1

Ø 20	P1P-4HMF
Ø 25	P1P-4JMF
Ø 32	P1C-4KMF
Ø 40	P1C-4LMF
Ø 50	P1C-4MMF
Ø 63	P1C-4NMF
Ø 80	P1C-4PMF
Ø 100	P1C-4QMF



3 - Pivot bracket
with rigid bearing AB7

Ø 20	-
Ø 25	-
Ø 32	P1C-4KMDB
Ø 40	P1C-4LMDB
Ø 50	P1C-4MMDB
Ø 63	P1C-4NMDB
Ø 80	P1C-4PMDB
Ø 100	P1C-4QMDB



4 - Clevis bracket
MP2

Ø 20	P1P-4HME
Ø 25	P1P-4JME
Ø 32	P1C-4KMTB
Ø 40	P1C-4LMTB
Ø 50	P1C-4MMTB
Ø 63	P1C-4NMTB
Ø 80	P1C-4PMTB
Ø 100	P1C-4QMTB



5 - Clevis bracket
MP4

Ø 20	-
Ø 25	-
Ø 32	P1C-4KMEB
Ø 40	P1C-4LMEB
Ø 50	P1C-4MMEB
Ø 63	P1C-4NMEB
Ø 80	P1C-4PMEB
Ø 100	P1C-4QMEB



6 - Clevis bracket
AB6

Ø 20	-
Ø 25	-
Ø 32	P1C-4KMCB
Ø 40	P1C-4LMCB
Ø 50	P1C-4MMCB
Ø 63	P1C-4NMCB
Ø 80	P1C-4PMC
Ø 100	P1C-4QMCB



7 - Pivot bracket w/swivel
bearing CS7

Ø 20	-
Ø 25	-
Ø 32	P1C-4KMAF
Ø 40	P1C-4LMAF
Ø 50	P1C-4MMAF
Ø 63	P1C-4NMAF
Ø 80	P1C-4PMAF
Ø 100	P1C-4QMAF



8 - Swivel eye bracket
MP6

Ø 20	-
Ø 25	-
Ø 32	P1C-4KMSB
Ø 40	P1C-4LMSB
Ø 50	P1C-4MMSB
Ø 63	P1C-4NMSB
Ø 80	P1C-4PMSB
Ø 100	P1C-4QMSB



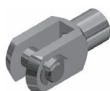
9 - 3 and 4 positions flange
JP1

Ø 20	-
Ø 25	-
Ø 32	P1E-6KB0
Ø 40	P1E-6LB0
Ø 50	P1E-6MB0
Ø 63	P1E-6NB0
Ø 80	P1E-6PB0
Ø 100	P1E-6QB0



10 - Swivel rod eye
AP6

Ø 20	P1A-4HRS
Ø 25	P1A-4HRS
Ø 32	P1C-4KRS
Ø 40	P1C-4KRS
Ø 50	P1C-4LRS
Ø 63	P1C-4LRS
Ø 80	P1C-4MRS
Ø 100	P1C-4MRS



11 - Clevis
AP2

Ø 20	P1A-4HRC
Ø 25	P1A-4HRC
Ø 32	P1C-4KRC
Ø 40	P1C-4KRC
Ø 50	P1C-4LRC
Ø 63	P1C-4LRC
Ø 80	P1C-4MRC
Ø 100	P1C-4MRC



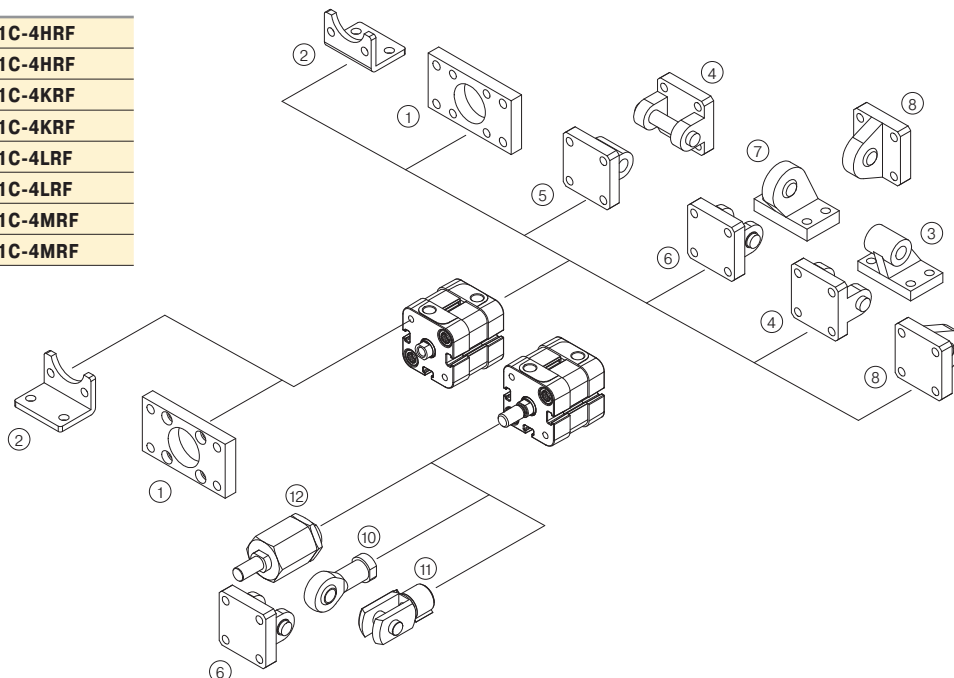
12 - Flexo coupling
PM5

Ø 20	P1C-4HRF
Ø 25	P1C-4HRF
Ø 32	P1C-4KRF
Ø 40	P1C-4KRF
Ø 50	P1C-4LRF
Ø 63	P1C-4LRF
Ø 80	P1C-4MRF
Ø 100	P1C-4MRF



13 - Nut MR9
(Pack of 10 off)

Ø 20	P14-4HRPZ
Ø 25	P14-4HRPZ
Ø 32	P14-4KRPZ
Ø 40	P14-4KRPZ
Ø 50	P14-4LRPZ
Ø 63	P14-4LRPZ
Ø 80	P14-4MRPZ
Ø 100	P14-4MRPZ



Cylinder Mountings

Flange – MF1, MF2

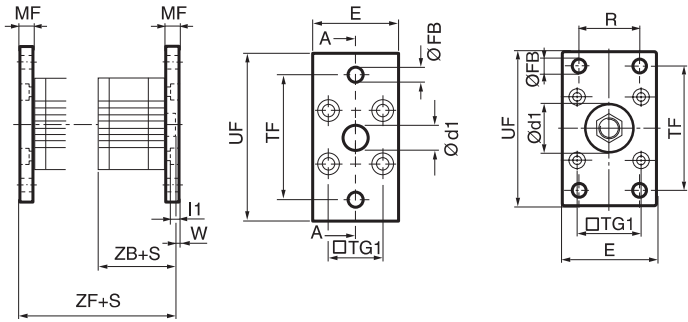


Intended for fixed mounting of cylinder. Flange can be fitted to front- or rear end-plates of cylinder.

Materials:

- Flange: Surface-treated steel
- Mounting screws according to DIN 6912: Zinc-plated steel 8.8

Supplied complete with mounting screws for attachment to cylinder.



Bore Size mm	d1 mm	FB H13 mm	TG1 mm	E mm	R JS14 mm	MF JS14 mm	TF JS14 mm	UF mm	I1 -0.5 mm	W mm	ZF* mm	ZB* mm	Weight kg	Part Number
20	12,0	6,6	22,0	36	-	10,0	55,0	70	5,4	4,0	53,0	43,0	0,17	P1P-4HMB
25	12,0	6,6	26,0	40	-	10,0	60,0	76	5,4	4,0	55,0	45,0	0,20	P1P-4JMB
32	30,0	7,0	32,5	45	32	10,0	64,0	80	5,0	3,0	61,0	41,0	0,23	P1C-4KMB
40	35,0	9,0	38,0	52	36	10,0	72,0	90	5,0	3,0	52,0	52,0	0,28	P1C-4LMB
50	40,0	9,0	46,5	65	45	12,0	90,0	110	6,5	4,0	65,0	53,0	0,53	P1C-4MMB
63	45,0	9,0	56,5	75	50	12,0	100,0	120	6,5	4,0	69,0	57,0	0,71	P1C-4NMB
80	45,0	12,0	72,0	95	63	16,0	126,0	150	8,0	6,0	80,0	64,0	1,59	P1C-4PMB
100	55,0	14,0	89,0	115	75	16,0	150,0	170	8,0	6,0	93,0	77,0	2,19	P1C-4QMB

S = Stroke length

Foot Bracket – MS1

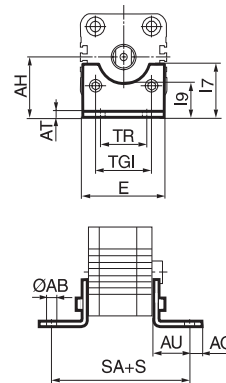


Intended for fixed mounting of cylinder. Foot bracket can be fitted to front and rear end covers of cylinder.

Materials:

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

Supplied in pairs with mounting screws for attachment to cylinder.



Bore Size mm	AB H14 mm	TG1 mm	E mm	TR JS14 mm	AO mm	AU mm	AH JS15 mm	I7 mm	AT mm	I9 JS14 mm	SA** mm	Weight** kg	Part Number
20	6,6	22,0	36	26	6,0	16,0	27	22,0	4,0	17,0	69,0	0,04**	P1P-4HMF
25	6,6	26,0	40	26	6,0	16,0	30	23,0	4,0	19,0	71,0	0,05**	P1P-4JMF
32	7,0	32,5	45	32	10,0	24,0	32	30,0	4,5	17,5	92,0	0,06**	P1C-4KMF
40	9,0	38,0	52	36	8,0	28,0	36	30,0	4,5	18,5	101,0	0,08**	P1C-4LMF
50	9,0	46,5	65	45	13,0	32,0	45	36,0	5,5	25,0	109,0	0,16**	P1C-4MMF
63	9,0	56,5	75	50	13,0	32,0	50	35,0	5,5	27,5	113,0	0,25**	P1C-4NMF*
80	12,0	72,0	95	63	14,0	41,0	63	49,0	6,5	40,5	136,0	0,50**	P1C-4NMF*
100	14,0	89,0	115	75	15,0	41,0	71	54,0	6,5	43,5	149,0	0,85**	P1C-4QMF*

S = Stroke length

**Weight per item



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Cylinder Mountings

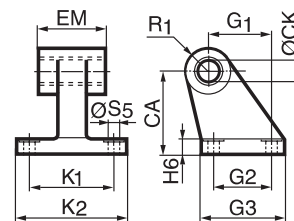
Pivot bracket with rigid bearing AB7



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

Materials:

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



Bore Size mm	CK H9 mm	S5 H13 mm	K1 JS14 mm	K2 mm	G1 JS14 mm	G2 JS14 mm	EM mm	G3 mm	CA JS15 mm	H6 mm	R1 mm	Weight kg	Part Number
32	10	6,6	38	51	21	18	25,5	31	32	8	10	0,06	P1C-4KMDB
40	12	6,6	41	54	24	22	27,0	35	36	10	11	0,08	P1C-4LMDB
50	12	9,0	50	65	33	30	31,0	45	45	12	13	0,15	P1C-4MMDB
63	16	9,0	52	67	37	35	39,0	50	50	12	15	0,20	P1C-4NMDB
80	16	11,0	66	86	47	40	49,0	60	63	14	15	0,33	P1C-4PMDB
100	20	11,0	76	96	55	50	59,0	70	71	15	19	0,49	P1C-4QMDB

S = Stroke length

Clevis bracket MP2

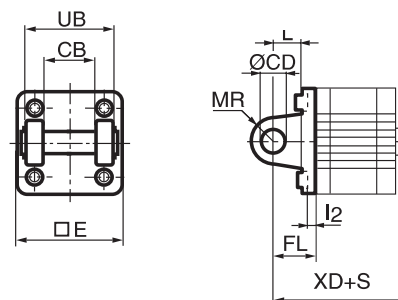


Intended for flexible mounting of cylinder. Clevis bracket MP2 can be combined with clevis bracket MP4.

Materials:

- Clevis bracket: Surface-treated aluminum, 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.



Bore Size mm	E mm	UB h14 mm	CB H14 mm	FL ±0.2 mm	L mm	I2 mm	CD H9 mm	MR mm	XD* mm	Weight** kg	Part Number
32	45,0	45	26,0	22	13	5,5	10	10	73,0	0,08	P1C-4KMTB
40	52,0	52	28,0	25	16	5,5	12	12	77,0	0,11	P1C-4LMTB
50	65,0	60	32,0	27	16	6,5	12	12	80,0	0,14	P1C-4MMTB
63	75,0	70	40,0	32	21	6,5	16	16	89,0	0,29	P1C-4NMTB
80	95,0	90	50,0	36	22	10,0	16	16	100,0	0,36	P1C-4PMTB
100	115,0	110	60,0	41	27	10,0	20	20	118,0	0,64	P1C-4QMTB

S = Stroke length

**Weight per item



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Cylinder Mountings

Clevis bracket MP4

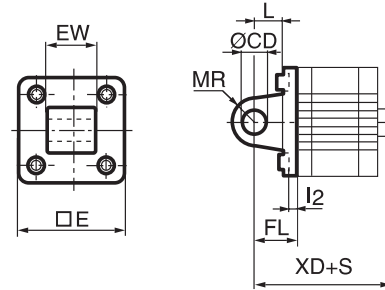


Intended for flexible mounting of cylinder. Clevis bracket MP4 can be combined with clevis bracket MP2.

Materials:

- Clevis bracket: Surface-treated aluminum, black
- Mounting screws according to DIN 912: Zinc-plated steel 8.8

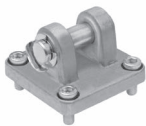
Supplied complete with mounting screws for attachment to cylinder.



Bore Size mm	E mm	EW mm	FL ±0.2 mm	L mm	I2 mm	CD mm	MR mm	XD* mm	Weight kg	Part Number
20	34,0	16,0	20	14	2,6	8	8	63,0	0.04	P1P-4HME
25	38,0	16,0	20	14	2,6	8	8	65,0	0.05	P1P-4JME
32	45,0	26,0	22	13	5,5	10	10	73,0	0,09	P1C-4KMEB
40	52,0	28,0	25	16	5,5	12	12	77,0	0,13	P1C-4LMEB
50	65,0	32,0	27	16	6,5	12	12	80,0	0,17	P1C-4MMEB
63	75,0	40,0	32	21	6,5	16	16	89,0	0,36	P1C-4NMEB
80	95,0	50,0	36	22	10,0	16	16	100,0	0,46	P1C-4PMEB
100	115,0	60,0	41	27	10,0	20	20	118,0	0,83	P1C-4QMEB

S = Stroke length

Clevis bracket AB6

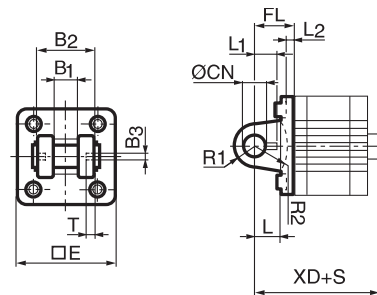


Intended for flexible mounting of cylinder. Clevis bracket GA can be combined with pivot bracket with swivel bearing, swivel eye bracket and swivel rod eye.

Materials:

- Clevis bracket: Surface-treated aluminum, black
- 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.



Bore Size mm	E mm	B2 mm	B1 mm	H14 mm	T mm	B3 mm	R2 mm	L1 mm	FL ±0.2 mm	I2 mm	L mm	F7 mm	R1 mm	XD* mm	Weight** kg	Part Number	Weight** kg	Part Number Stainless Steel
32	45	34	14	3	3,3	17	11,5	22	5,5	12	10	11	73,0	0,09**	P1C-4KMCB	0,05	9301054311	
40	52	40	16	4	4,3	20	12,0	25	5,5	15	12	13	77,0	0,13	P1C-4LMCB	0,06	9301054312	
50	65	45	21	4	4,3	22	14,0	27	6,5	17	16	18	80,0	0,17	P1C-4MMCB	0,07	9301054313	
63	75	51	21	4	4,3	25	14,0	32	6,5	20	16	18	89,0	0,36	P1C-4NMCB	0,07	9301054314	
80	95	65	25	4	4,3	30	16,0	36	10,0	20	20	22	100,0	0,58	P1C-4PMCB	0,17	9301054315	
100	115	75	25	4	4,3	32	16,0	41	10,0	25	20	22	118,0	0,89	P1C-4QMCB	0,31	9301054316	

S = Stroke length

**Weight per item

Stainless steel Pin Set AB6

Materials

- Pin: Stainless steel
- Locking pin: Stainless steel
- Circlips according to DIN 471:
- Stainless steel



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Cylinder Mountings

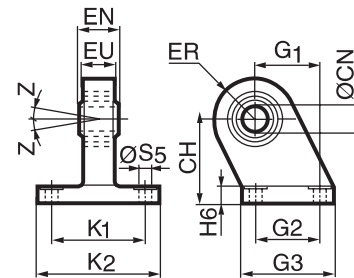
Pivot bracket with swivel bearing CS7



Intended for use together with clevis bracket GA.

Materials:

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



Bore Size 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	Weight kg	Part Number
32	10	6,6	38	51	10,5	21	18	14	31	32	10	16	4	0,18	P1C-4KMAF
40	12	6,6	41	54	12,0	24	22	16	35	36	10	18	4	0,25	P1C-4LMAF
50	16	9,0	50	65	15,0	33	30	21	45	45	12	21	4	0,47	P1C-4MMAF
63	16	9,0	52	67	15,0	37	35	21	50	50	12	23	4	0,57	P1C-4NMAF
80	20	11,0	66	86	18,0	47	40	25	60	63	14	28	4	1,05	P1C-4PMAF
100	20	11,0	76	96	18,0	55	50	25	70	71	15	30	4	1,42	P1C-4QMAF

S = Stroke length

Swivel eye bracket MP6

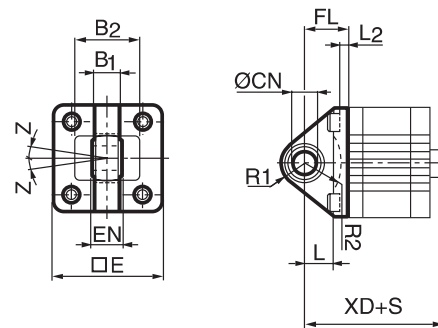


Intended for use together with clevis bracket GA.

Materials:

- Bracket: Surface-treated aluminum, black
- Swivel bearing acc. to DIN 648K: Hardened steel

Supplied complete with mounting screws for attachment to cylinder.



Bore Size mm	E mm	B1 mm	B2 mm	EN mm	R1 mm	R2 mm	FL mm	I2 mm	L mm	CN H7 mm	XD* mm	Z mm	Weight kg	Part Number
32	45	10,5	38	14	16	14	22	5,5	12	10	73,0	4	0,08	P1C-4KMSB
40	52	12,0	44	16	18	16	25	5,5	15	12	77,0	4	0,11	P1C-4LMSB
50	65	15,0	51	21	21	19	27	6,5	15	16	80,0	4	0,20	P1C-4MMSB
63	75	15,0	56	21	23	22	32	6,5	20	16	89,0	4	0,27	P1C-4NMSB
80	95	18,0	-	25	29	-	36	10,0	20	20	100,0	4	0,52	P1C-4PMSB
100	115	18,0	-	25	31	-	41	10,0	25	20	118,0	4	0,72	P1C-4QMSB

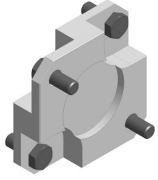
S = Stroke length



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Cylinder Mountings

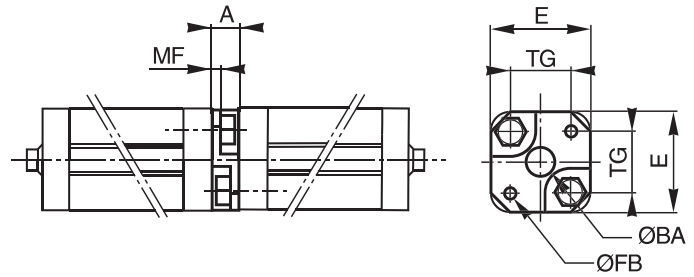
3 and 4 positions flange JP1



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

Materials:

- Mounting: Aluminum
- Mounting screws: Zinc-plated steel 8.8



Bore Size mm	E mm	TG mm	ØFB mm	MF mm	A mm	ØBA mm	Weight kg	Part Number
32	50	32,5	6,5	5	16	30	0,060	P1E-6KB0
40	60	38,0	6,5	5	16	35	0,078	P1E-6LB0
50	66	46,5	8,5	6	20	40	0,162	P1E-6MB0
63	80	56,5	8,5	6	20	45	0,194	P1E-6NB0
80	100	72,0	10,5	8	25	45	0,450	P1E-6PB0
100	118	89,0	10,5	8	25	55	0,672	P1E-6QB0

S = Stroke length

Piston rod mountings

Swivel rod eye AP6



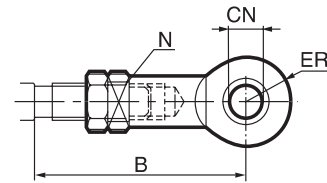
Swivel rod eye AP6

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



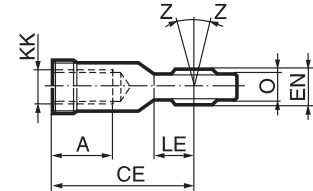
Stainless steel swivel rod eye AP6

Stainless-steel swivel rod eye for articulated mounting of cylinder. Swivel rod eye can be combined with clevis bracket GA.

Maintenance-free.

Materials:

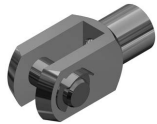
- Swivel rod eye: Stainless steel
- Swivel bearing according to DIN 648K: Stainless steel
- Use stainless steel nut with stainless steel swivel rod eye.



Bore Size mm	A mm	B min mm	B max mm	CE mm	CN H9 mm	EN h12 mm	ER mm	KK	LE mm	N min mm	O mm	Z	Weight kg	Part Number	Weight kg	Part Number Stainless Steel
20 / 25	12	40,0	45	36	8	12	12	M8x1,25	12	13	9,0	12°	0,045	P1A-4HRS	0,045	P1S-4HRT
32 / 40	20	48,0	55	43	10	14	14	M10x1,25	15	17	10,5	12°	0,08	P1C-4KRS	0,08	P1S-4JRT
50 / 63	22	56,0	62	50	12	16	16	M12x1,25	17	19	12,0	12°	0,12	P1C-4LRS	0,12	P1S-4LRT
80 / 100	28	72,0	80	64	16	21	21	M16x1,5	22	22	15,0	15°	0,25	P1C-4MRS	0,25	P1S-4MRT

S = Stroke length

Clevis AP2

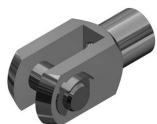
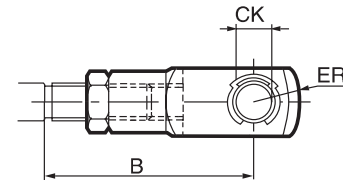


Clevis AP2

Clevis for articulated mounting of cylinder.

Materials:

- Clevis, clip: Galvanized steel
- Pin: Hardened steel



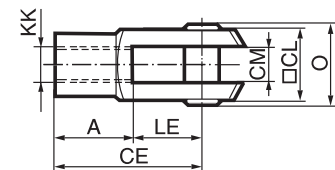
Stainless steel clevis AP2

Stainless-steel clevis for articulated mounting of cylinder.

Materials:

- Clevis: Stainless steel
- Pin: Stainless steel
- Circlips according to DIN 471: Stainless steel

Use stainless steel nut with stainless steel swivel rod eye.



Bore Size 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	Weight kg	Part Number	Weight kg	Part Number Stainless Steel
20 / 25	16	36,0	41	32	8	16	8	-	M8x1,25	16	24,0	0,045	P1A-4HRC	0,045	P1S-4HRT
32 / 40	20	45,0	52	40	10	20	10	16	M10x1,25	20	28,0	0,09	P1C-4KRC	0,08	P1S-4JRT
50 / 63	24	54,0	60	48	12	24	12	19	M12x1,25	24	32,0	0,15	P1C-4LRC	0,12	P1S-4LRT
80 / 100	32	72,0	80	64	16	32	16	25	M16x1,5	32	41,5	0,35	P1C-4MRC	0,25	P1S-4MRT

S = Stroke length



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Piston rod mountings

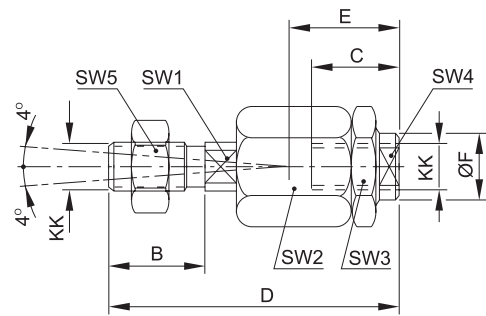
Flexo coupling PM5



Flexo coupling for articulated mounting of piston rod. Flexo fitting is intended to take up axial angle errors within a range of $\pm 4^\circ$.

Materials:

- Flexo coupling, nut: Zinc-plated steel
- Supplied complete with galvanized adjustment nut.



Bore Size mm	KK mm	B mm	C mm	D mm	E mm	ØF mm	SW1 mm	SW2 mm	SW3 mm	SW4 mm	SW5 mm	Weight kg	Part Number
20 / 25	M8x1.25	16	14	55	20	12.4	7	17	17	10	13	0,06	P1C-4HRF
32 / 40	M10x1.25	20	23	73	31	21	12	30	30	19	17	0,23	P1C-4KRF
50 / 63	M12x1.5	24	23	77	31	21	12	30	30	19	19	0,23	P1C-4LRF
80 / 100	M16x1.5	32	32	108	45	33.5	19	41	41	30	24	0,65	P1C-4MRF

Nut MR9



Nut MR9

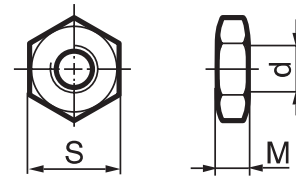
Intended for fixed mounting of accessories to the piston rod.

Materials:

- Zinc-plated steel

All P1P cylinders are delivered with a zinc-plated steel piston rod nut.

Supplied as pack of 10 off



Stainless steel nut MR9

Intended for fixed mounting of accessories to the piston rod.

Materials:

- Stainless steel A2

All P1P cylinders are delivered with a zinc-plated steel piston rod nut.

Supplied as pack of 10 off

Bore Size mm	d	M mm	S mm	Weight kg	Part Number	Weight kg	Part Number Stainless Steel
20 / 25	M8x1,25	4.0	13	0,005	P14-4HRPZ	0,005	P14-4HRPS
32 / 40	M10x1,25	5.0	17	0,007	P14-4KRPZ	0,007	P14-4KRPS
50 / 63	M12x1,25	6.0	19	0,021	P14-4LRPZ	0,021	P14-4LRPS
80 / 100	M16x1,5	10.0	30	0,040	P14-4MRPZ	0,040	P14-4MRPS



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Kits

P1P Repair Kits

Complete seal kits consist of:

Piston (complete)

Piston rod seal

O rings

Material specification, see page 7



Seal Kit Part Numbers

Bore Size	P1P Cylinder Version		
	Std. Temp	High Temp	Low Temp
20	P1P-6HRN	P1P-6HRF	P1P-6HRL
25	P1P-6JRN	P1P-6JRF	P1P-6JRL
32	P1P-6KRN	P1P-6KRF	P1P-6KRL
40	P1P-6LRN	P1P-6LRF	P1P-6LRL
50	P1P-6MRN	P1P-6MRF	P1P-6MRL
63	P1P-6NRN	P1P-6NRF	P1P-6NRL
80	P1P-6PRN	P1P-6PRF	P1P-6PRL
100	P1P-6QRN	P1P-6QRF	P1P-6QRL

Grease Part Numbers

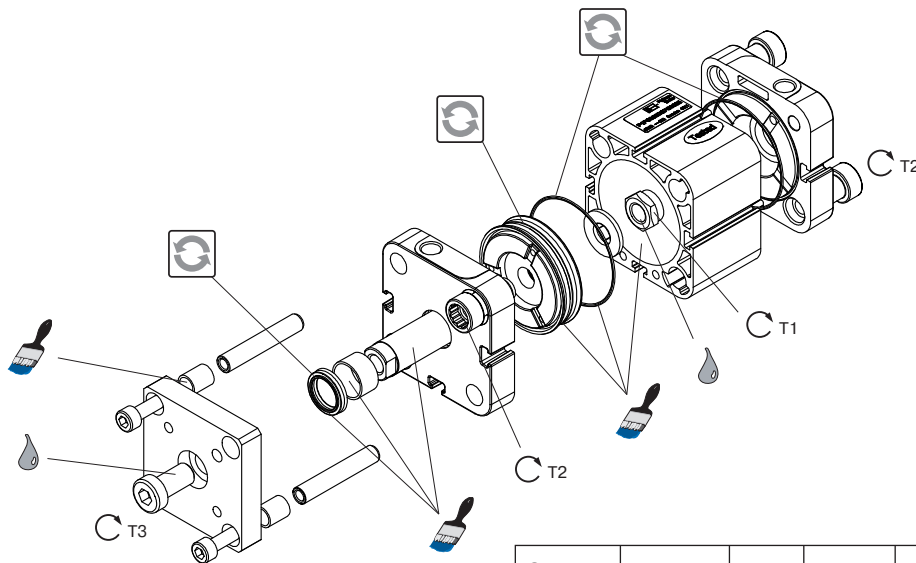
Standard temperature	30g	9127394541
High temperature	30g	9127394521
Low temperature	30g	9127394541



For through rods variants, order two seal kits.

Example: For a P1PS...KS Ø63 through rod, standard temperature version, order 2 x P1P-6NRN

Seal Kit



= Included in seal kit



= Lubricated with grease



= Socket head



= Locking fluid



= Tightening torque

Loctite 243 must be used for standard and low temperature versions.
Loctite 270 must be used for high temperature versions

Cyl.-dia mm	Plastic Piston T1 Nm	AF mm	C T2 Nm	AF mm	C T3 Nm	AF mm
20	3,5	8	14	7	8	4
25	3,5	8	14	7	8	4
32	8	10	20	7	20	5
40	12	13	20	7	20	5
50	20	17	40	10	40	7
63	20	17	40	10	40	7
80	35	19	14	5	70	8
100	80	24	28	6	70	8



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Air Quality Specifications

Specifying air quality (purity) in accordance with ISO8573-1:2010, the international standard for Compressed Air Quality

ISO8573-1 is the primary document used from the ISO8573 series as it is this document which specifies the amount of contamination allowed in each cubic meter of compressed air.

ISO8573-1 lists the main contaminants as Solid Particulate, Water and Oil. The purity levels for each contaminant are shown separately in tabular form, however for ease of use, this document combines all three contaminants into one easy to use table.

ISO8573-1:2010 CLASS	Solid Particulate			Mass Concentration mg/m3	Water		Oil
	Maximum number of particles per m3				Vapor Pressure Dewpoint	Liquid g/m3	Total Oil (aerosol liquid and vapor) mg/m3
	0.1 - 0.5 micron	0.5 - 1 micron	1 - 5 micron				
0	As specified by the equipment user or supplier and more stringent than Class 1						
1	≤ 20,000	≤ 400	≤ 10	-	≤ -70°C	-	0.01
2	≤ 400,000	≤ 6,000	≤ 100	-	≤ -40°C	-	0.1
3	-	≤ 90,000	≤ 1,000	-	≤ -20°C	-	1
4	-	-	≤ 10,000	-	≤ +3°C	-	5
5	-	-	≤ 100,000	-	≤ +7°C	-	-
6	-	-	-	≤ 5	≤ +10°C	-	-
7	-	-	-	5 - 10	-	≤ 0.5	-
8	-	-	-	-	-	0.5 - 5	-
9	-	-	-	-	-	5 - 10	-
X	-	-	-	> 10	-	> 10	> 10

Specifying air purity in accordance with ISO8573-1:2010

When specifying the purity of air required, the standard must always be referenced, followed by the purity class selected for each contaminant (a different purity class can be selected for each contamination if required).

An example of how to write an air quality specification is shown below:

ISO 8573-1:2010 Class 1.2.1

ISO 8573-1:2010 refers to the standard document and its revision, the three digits refer to the purity classifications selected for solid particulate, water and total oil. Selecting an air purity class of 1.2.1 would specify the following air quality when operating at the standard's reference conditions:

Class 1 - Particulate

In each cubic meter of compressed air, the particulate count should not exceed 20,000 particles in the 0.1 - 0.5 micron size range, 400 particles in the 0.5 - 1 micron size range and 10 particles in the 1 - 5 micron size range.

Class 2 - Water

A pressure dewpoint (PDP) of -40°C or better is required and no liquid water is allowed.

Class 1 - Oil

In each cubic meter of compressed air, not more than 0.01mg of oil is allowed. This is a total level for liquid oil, oil aerosol and oil vapor.

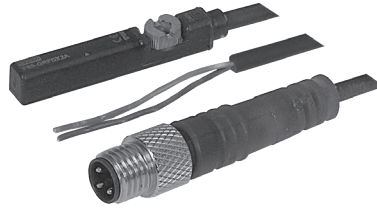
ISO8573-1:2010 Class zero

- Class 0 does not mean zero contamination.
- Class 0 requires the user and the equipment manufacturer to agree contamination levels as part of a written specification.
- The agreed contamination levels for a Class 0 specification should be within the measurement capabilities of the test equipment and test methods shown in ISO8573 Pt 2 to Pt 9.
- The agreed Class 0 specification must be written on all documentation to be in accordance with the standard.
- Stating Class 0 without the agreed specification is meaningless and not in accordance with the standard.
- A number of compressor manufacturers claim that the delivered air from their oil-free compressors is in compliance with Class 0.
- If the compressor was tested in clean room conditions, the contamination detected at the outlet will be minimal. Should the same compressor now be installed in typical urban environment, the level of contamination will be dependent upon what is drawn into the compressor intake, rendering the Class 0 claim invalid.
- A compressor delivering air to Class 0 will still require purification equipment in both the compressor room and at the point of use for the Class 0 purity to be maintained at the application.
- Air for critical applications such as breathing, medical, food, etc typically only requires air quality to Class 2.2.1 or Class 2.1.1.
- Purification of air to meet a Class 0 specification is only cost effective if carried out at the point of use.



P8S Electronic and Reed Sensors

The P8S Series magnetic cylinder sensor enables quick, precise and contactless sensing of the piston's position in cylinders. It is easy to mount, can be used in numerous applications and offers an outstanding price-performance ratio.



Product Overview

As the term magnetic switch suggests, these are operated by magnetic fields; another description widely used is magnetic "SENSOR". As our eyes sense change of light, our ears sense the change of sound, magnetic sensors / switches sense the change of magnetic flux in pneumatic and hydraulic cylinders. When magnetic sensors sense a magnetic field it will give a switching signal, through a control circuit, allowing sensing or control operation to be achieved.

Because of the characteristics of magnetic sensors they can sense a change of magnetic field relative to the position of the magnet, such as in a pneumatic or hydraulic cylinder, whereby the magnet is attached to a moving piston and thus the position of the moving part (ie Piston) can be detected.

The magnet is mounted on the piston of the cylinder and thus moves with the piston.

The magnetic sensor (switch) is fixed either directly to the cylinder or with an additional mounting bracket. When the piston (magnet) moves to the position under a magnetic sensor, the switch will operate due to the change of the magnetic field and give a switching signal.

Thus the position of the piston can be identified and a resulting signal generated to continue the sequence of a circuit.

Magnetic sensors available can be classified into two different groups, they are sensors with contacts which are called mechanically operated or reed sensors and the other type is sensors without contacts and are called solid state type or electronic.

Parker P8S Series sensors are suitable for use with a large range of actuators. They can either be inserted directly into the cylinder tube extrusion or mounted using additional brackets. For direct mounting the sensor is positioned within the cylinder sensor groove, offering mechanical protection, then securely clamped into position by a simple turn of a screw. For other cylinder versions there are a number of optional sensors brackets that clamp to the cylinder and offer other mounting positions.

For easy installation there are several cable lengths available with either M8 connector or flying lead. The electronic sensors are "Solid State", i.e. they have no moving parts. 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 where long service life is required.

Please note that for low temperature applications sensors are normally specified for full performance down to -30°C only. High temperature cylinders do not have a magnetic piston and therefore cannot be used with sensors.

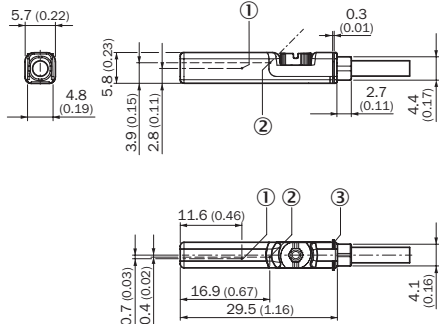
Technical Data - Square body design, insert straight in T-slot, screw 1/4 turn

	Electronic PNP NPN	Electric Reed
Cylinder type:	Profile with T-slot	
Cylinder type with adapter:	Profile with S-slot (dovetail) Tie rods Round cylinders	
Installation:	Quarter turn, fixed by allen key 2.5 mm or flathead screwdriver	
Housing length:	29.5 mm	29.5 mm 5 - 30 V AC/DC
	24 mm (NAMUR ATEX)	29.5 mm 5 - 120 V AC/DC
		32.5 mm 5 - 230 V AC/DC
Output Type:	PNP NPN	Reed
Switching (on/off) switching frequency:	± 1,000 Hz	± 400 Hz
Output Function:	Normally Open (NO) Normally Closed (NC) 3-wire	Normally Open (NO) Normally Closed (NC) 2-wire Normally Open (NO) 3-wire
Enclosure rating:	IP67	
	IP67 (NAMUR ATEX)	
Supply Voltage:	10 to 30 V DC	
	8.2 to 20 V DC (NAMUR 1GD) 10 to 26 V DC (ATEX 3GD)	5 to 30 5 to 120 5 to 230 V AC/DC 2-wire, 3-wire depending on type
Power consumption:	<= 8 mA	
	<= 10 mA (NAMUR, ATEX)	-
Voltage drop:	<= 2 V	
	<= 2.2 V (NAMUR, ATEX)	<= 3.5 V 2-wire <= 0.1 V 3-wire
Continuous output current Ia:	<= 100 mA	
	<= 60 mA (NAMUR) <= 50 mA (ATEX)	<= 100 mA 3-wire
Switching capacity:	-	
		<= 6 W
Protection class:	III	
		III II 2-wire depending on type III 3-wire
Response sensitivity:	2.6 to 3.3 mT	
	2.8 mT (NAMUR, ATEX)	2.1 to 3.4 mT
Overrun distance:	10 mm	
	9 mm (NAMUR, ATEX)	-
Hysteresis:	<= 0.8 mT	
	<= 0.5 mT (NAMUR, ATEX)	-
Repeatability:	<= 0.1 mT	
Reverse polarity protection:	Yes	
	-	No 2-wire Yes 3-wire
Short circuit protection:	Yes	
Power-up pulse protection:	Yes (NAMUR, ATEX)	
Ambient operating temperature range:	-30 to +80 °C (PUR cable) -30 to +70°C (PVC cable)	
	-25 to +80 °C (NAMUR 1GD) -20 to +50°C (ATEX 3GD)	
Shock and vibration resistance:	30 g 11 ms / 10 ... 55 Hz, 1 mm	
EMC:	According to EN 60947-5-2	
International standard:	CE C UL US RoHs Ex IEC IEC Ex	
Housing material:	Plastic polyamid PA12	
Screw material:	Stainless steel	
Cable material:	PUR (Polyurethane) PVC (Polyvinyl Chloride)	
Conductor cross-section:	0.14 mm² 0, 12 mm² depending on type 0.14 mm² (NAMUR, ATEX)	
Indication LED color:	Yellow, no LED reed NC	
Connector:	M8R (knurled nuts) None (Flying lead)	



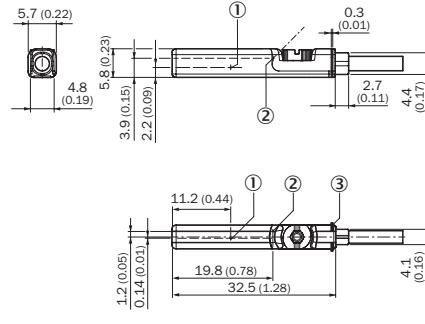
Dimensions, mm (inch)

PNP, NPN Output 10 to 30 V DC



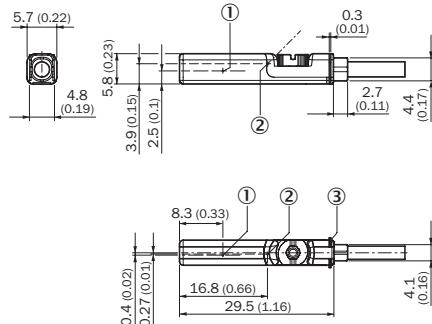
- ① Position sensor element
- ② Indication LED
- ③ Retaining ribs

Reed Output 5 to 230 V AC/DC



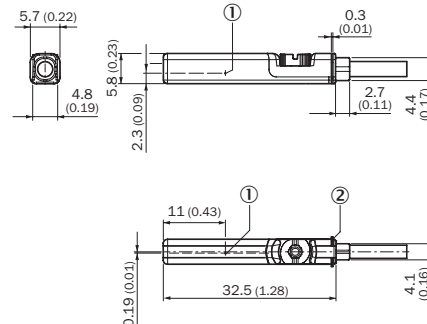
- ① Position sensor element
- ② Indication LED
- ③ Retaining ribs

Reed Output 5 to 30 V AC/DC



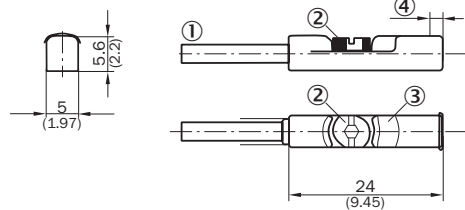
- ① Position sensor element
- ② Indication LED
- ③ Retaining ribs

Reed Output 5 to 120 V AC/DC



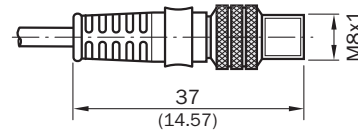
- ① Position sensor element
- ② Retaining ribs

NAMUR ATEX 1G, 1D, ATEX 3G, 3D



- ① Connection
- ② Fixing screw
- ③ Indication LED
- ④ Position of sensor element; short overrun distance: 2 mm; long overrun distance: 1.7 mm

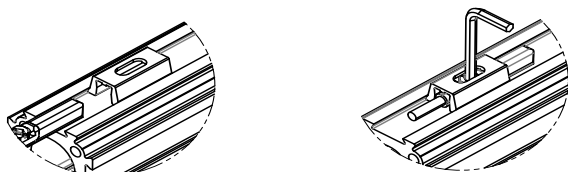
Connector M8R



Installation

Square body design, Insert straight in T-slot, screw 1/4 turn

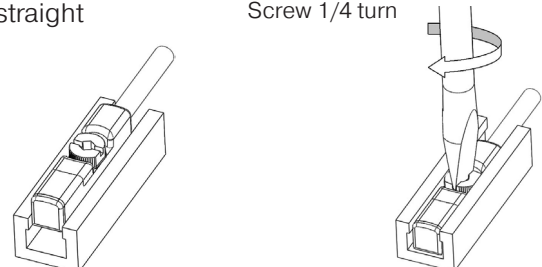
With Adapter in S-Dovetail Slot



Note:
The adapter is delivered with each sensor.

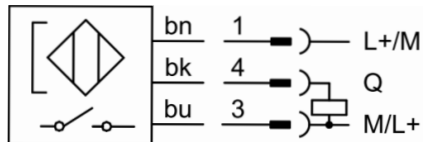
Without Adapter directly in T-Slot

Put-in straight Screw 1/4 turn

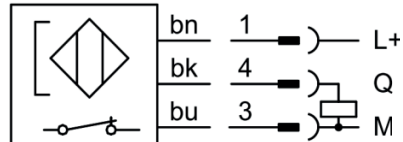


Connection Type and Diagram

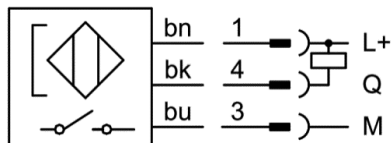
PNP NO



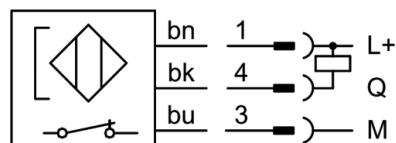
PNP NC



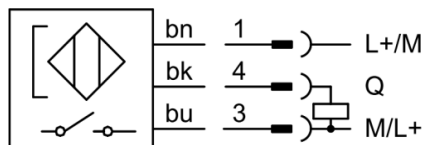
NPN NO



NPN NC

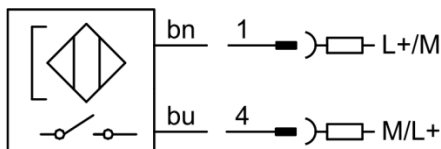


Reed NO 3-wire

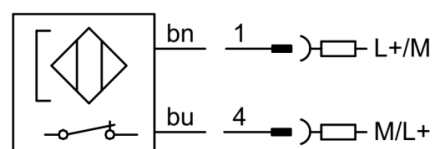


bn: brown
bk: black
bu: blue
Q: load
M: Mass
L+: Power

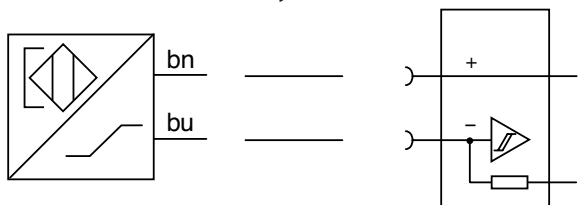
Reed NO 2-wire



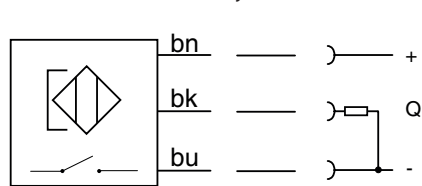
Reed NC 2-wire



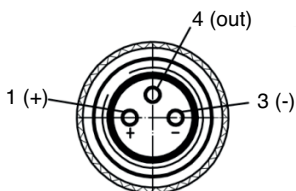
NAMUR NO ATEX 1G, 1D



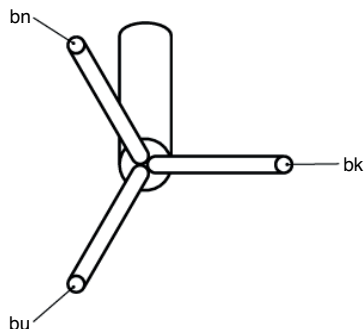
PNP NO ATEX 3G, 3D



Pin assignment, M8 with knurled nut



Flying leads



Ordering Information

Square body design, insert straight in T-slot, screw 1/4 turn

NPN NORMALLY CLOSED	VOLTAGE	CONNECTION	CABLE	Part Number
NPN-NC, with LED, 3-wire	10-30 V DC	3 m Flying Lead	PUR IP67	P8SAGMFAFX
NPN-NC, with LED, 3-wire	10-30 V DC	10 m Flying Lead	PUR IP67	P8SAGMFDX
NPN-NC, with LED, 3-wire	10-30 V DC	0.3 m M8	PUR IP67	P8SAGMCHX

NPN NORMALLY OPEN	VOLTAGE	CONNECTION	CABLE	Part Number
NPN-NO, with LED, 3-wire	10-30 V DC	3 m Flying Lead	PUR IP67	P8SAGNFAFX
NPN-NO, with LED, 3-wire	10-30 V DC	10 m Flying Lead	PUR IP67	P8SAGNFDX
NPN-NO, with LED, 3-wire	10-30 V DC	0.3 m M8	PUR IP67	P8SAGNCHX

PNP NORMALLY CLOSED	VOLTAGE	CONNECTION	CABLE	Part Number
PNP-NC, with LED, 3-wire	10-30 V DC	3 m Flying Lead	PUR IP67	P8SAGQFAFX
PNP-NC, with LED, 3-wire	10-30 V DC	3 m Flying Lead	PVC IP67	P8SAGQFLX
PNP-NC, with LED, 3-wire	10-30 V DC	10 m Flying Lead	PUR IP67	P8SAGQFDX
PNP-NC, with LED, 3-wire	10-30 V DC	0.3 m M8	PUR IP67	P8SAGQCHX

PNP NORMALLY OPEN	VOLTAGE	CONNECTION	CABLE	Part Number
PNP-NO, with LED, 3-wire	10-30 V DC	3 m Flying Lead	PUR IP67	P8SAGPFAFX
PNP-NO, with LED, 3-wire	10-30 V DC	3 m Flying Lead	PVC IP67	P8SAGPFLX
PNP-NO, with LED, 3-wire	10-30 V DC	10 m Flying Lead	PUR IP67	P8SAGPFDX
PNP-NO, with LED, 3-wire	10-30 V DC	10 m Flying Lead	PVC IP67	P8SAGPFTX
PNP-NO, with LED, 3-wire	10-30 V DC	0.3 m M8	PUR IP67	P8SAGPCHX

REED NORMALLY CLOSED	VOLTAGE	CONNECTION	CABLE	Part Number
Reed-NC, No LED, 2-wire	5-30 V AC/DC	10 m Flying Lead	PUR IP67	P8SAGEFRX
Reed-NC, No LED, 2-wire	5-120 V AC/DC	10 m Flying Lead	PUR IP67	P8SAGEFRX1
Reed-NC, No LED, 2-wire	5-30 V AC/DC	0.3 m M8	PUR IP67	P8SAGECNX

REED NORMALLY OPEN	VOLTAGE	CONNECTION	CABLE	Part Number
Reed-NO, with LED, 2-wire	5-30 V AC/DC	3 m Flying Lead	PUR IP67	P8SAGRFAFX
Reed-NO, with LED, 2-wire	5-120 V AC/DC	3 m Flying Lead	PVC IP67	P8SAGRFLX1
Reed-NO, with LED, 2-wire	5-230 V AC/DC	3 m Flying Lead	PVC IP67	P8SAGRFLX2
Reed-NO, with LED, 2-wire	5-230 V AC/DC	10 m Flying Lead	PUR IP67	P8SAGRFDX2
Reed-NO, with LED, 2-wire	5-120 V AC/DC	10 m Flying Lead	PVC IP67	P8SAGRFTX1
Reed-NO, with LED, 2-wire	5-30 V AC/DC	0.3 m M8	PUR IP67	P8SAGRCHX

REED NORMALLY OPEN	VOLTAGE	CONNECTION	CABLE	Part Number
Reed-NO, with LED, 3-wire	5-30 V AC/DC	3 m Flying Lead	PUR IP67	P8SAGSFAFX
Reed-NO, with LED, 3-wire	5-30 V AC/DC	3 m Flying Lead	PVC IP67	P8SAGSFLX
Reed-NO, with LED, 3-wire	5-30 V AC/DC	10 m Flying Lead	PUR IP67	P8SAGSFDX
Reed-NO, with LED, 3-wire	10-30 V AC/DC	10 m Flying Lead	PVC IP67	P8SAGSFTX
Reed-NO, with LED, 3-wire	5-30 V AC/DC	0.3 m M8	PUR IP67	P8SAGSCHX

ATEX IP67	VOLTAGE	CONNECTION	CABLE	Order Code
PNP-NO, with LED, 3-wire	10-26 V DC	3 m Flying lead	PUR IP67	P8SAGPFAFXS
NAMUR-NO, with LED, 2-wire	8.2-20 V DC	5 m Flying Lead	PVC IP67	P8SAGDFMXW *
NAMUR-NO, with LED, 2-wire	8.2-20 V DC	10 m Flying Lead	PVC IP67	P8SAGDFTXW *

Note:

-30 to +80 °C (PUR cable) | -30 to +70 °C (PVC cable) | -25 to +80 °C (NAMUR 1GD) | -20 to +50 °C (ATEX 3GD)

All sensors come with an adapter for S-dovetail Parker type OSP grooves.

* with an aluminum adapter

For inventory, lead times, and kit
lookup, visit www.pdnplu.com

P8S Continuous Position Sensors

Many applications require more than just end of stroke sensing of an actuator, but traditional methods of continuous sensing are expensive to implement. Parker's CPS (Continuous Position Sensor) enables quick, precise and contactless continuous position sensing of a magnetic piston.

CPS sensors continuously supply data via analog outputs or IO-Link. Analog position sensors have a voltage output of 0 V ... 10 V as well as a current output of 4 mA ... 20 mA. CPS enables flexible machine concepts, making it possible to solve tasks in areas such as quality monitoring and process control in conjunction with pneumatic cylinders. This continuous transfer of position data upgrades the functionality of the pneumatic cylinders by making them more intelligent, and as a result, more versatile. CPS settings can be adjusted during or after installation using a teach button or using IO-Link.

CPS can be mounted directly in standard T-slots without the need for additional accessories. Mounting on other cylinder types, (round, tie rod) is possible with adapters.

- Continuous position sensing
- IO-Link communication with M12 connector
- No modification to the actuator
- Analog version with M8 connector
- 5 sizes with sensing ranges from 32 mm to 256 mm
- IP67 design suitable for any industrial application
- Yellow teach button for easy set-up



Technical specification:

1 ms sampling rate
 0.03% full scale resolution
 0.06% full scale repeatability
 0.3 mm Linearity error

How it works:

The CPS product detects the position of an actuator via the magnet on the piston. The sensor settings can easily be adjusted during installation using the yellow teach button or during operation over the IO-Link communication. This upgrades the functionality of the pneumatic actuator by making it more intelligent and versatile in support of the Industry 4.0 initiative.

How it connects:

Analog version has a M8 connector and a voltage output of 0-10V as well as a current output of 4-20mA. IO-Link version has a M12 connector and transmits position via 2 bytes of process input data and also allows for parameter control of measuring range and locking of the teach button.

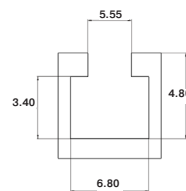
It can be controlled by Class A or Class B IO-Link Masters.

How it installs:

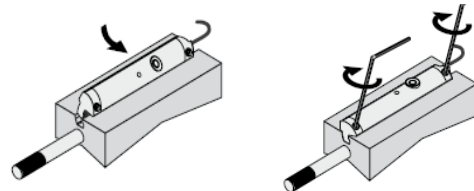
The Parker CPS requires the use of a magnetic piston. The product will fit T-slot cylinders without any additional mounting hardware.

Without Adapter:

Direct drop-in T-slot
 T-slot dimensions [mm ± 0.1]



1. Pivot sensor into the slot
2. Teach the CPS unit the desired measuring range
3. Tighten set screws



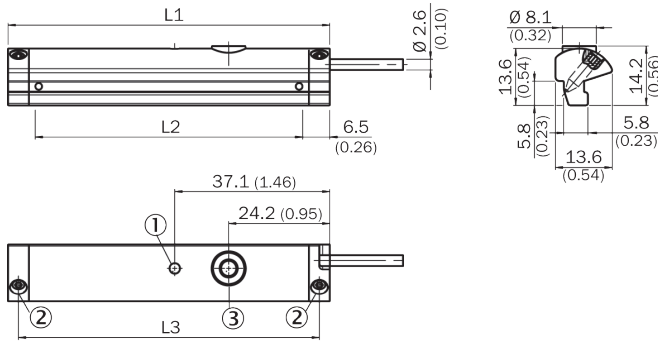
Technical Data

Cylinder type:	Profile with T-slot
Installation:	Drop in, fixed by allen key 1.5 mm
Measuring range:	32 to 256 mm depending on type ¹⁾
Housing length:	45 to 269 mm depending on type
Output Function:	Analog IO-Link
Analog output (voltage):	0 to 10 V -
Analog output (current):	4 to 20 mA -
Teach-in:	Yes
Enclosure rating:	IP 67 (according to EN 60529)
Supply Voltage: ²⁾	15 to 30 V DC
Power consumption: ³⁾	<= 22 mA (analog) <= 25 ma (IO-Link)
Max load resistance: ⁴⁾	<= 500 Ω
Min load resistance: ⁵⁾	<= 2 kΩ
Protection class:	III
Time delay before availability:	1.5 s
Required magnetic field sensitivity:	3 mT / 2 mT (analog) 3 mT (IO-Link)
Resolution: ⁶⁾	0.03% full scale range (max >=0.05 mm)
Linearity error: ⁷⁾	0.3 mm
Repeat accuracy: ⁸⁾	0.06% full scale range (>= 0.1 mm)
Sampling rate: ⁹⁾	1 ms
Indication LED color:	Yellow (analog)
Reserve polarity protection:	Yes (analog)
Short circuit protection:	Yes (analog)
Ambient operating temperature range:	-20 to +70 °C (PUR cable)
Shock and vibration resistance:	30 g 11 ms / 10 ... 55 Hz, 1 mm
EMC: ¹⁰⁾	According to EN 60947-5-2
International standard:	CE C UL US CCC (not applicable) RoHs IO-Link
UL file No:	On request
Housing material:	Plastic polyamid PA12
Screw material:	Stainless steel
Cable material:	PUR (Polyurethane)
Conductor cross-section:	0.08 mm ²
Connector:	M12 (IO-Link) or M8 (analog)



- ¹⁾ ± 1 mm
- ²⁾ Reverse-polarity protected, operation in short-circuit protected network: max. 8 A.
- ³⁾ Without load
- ⁴⁾ Power output, at 24 V
- ⁵⁾ Voltage output
- ⁶⁾ FSR: Full Scale Range; max. measuring range.
- ⁷⁾ At 25°C, linearity error (maximum deviation) depending on response curve and minimal deviation function.
- ⁸⁾ At 25°C, repeatability magnet movement in one direction.
- ⁹⁾ Only in standard mode, not in IO-Link mode.
- ¹⁰⁾ The analogue measured value can deviate under transient conditions.

Dimensions, mm (inch)



- ① Function indicator
- ② Fixing screw
- ③ Teach-in button

			Part Number	
L1	L2 *	L3	Analog	IO-Link
45	32	40	P8SAGACHA	P8SAGHMHA
77	64	72	P8SAGACHB	P8SAGHMHB
141	128	136	P8SAGACHD	P8SAGHMHD
205	192	200	P8SAGACHF	P8SAGMHF
269	256	264	P8SAGACHH	P8SAGMHH

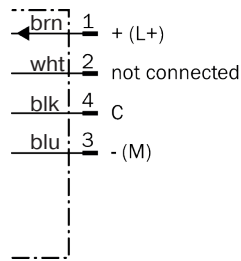
*L2 equal to the measuring range.

Note:

PUR cable with M12 (IO-Link) or M8 (Analog) male connector knurled nut, 4-pin, 0,3 meter length.
 Please consult for measuring range 96, 160 & 224 mm.

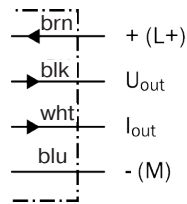
Connection Type and Diagram

IO Link version



PUR 0.3 meter length
 with M12 male connector
 knurled nut, 4-pin

Analog version



PUR 0.3 meter length
 with M8 male connector
 knurled nut, 4-pin

Ordering Information, Drop-in T-slot

Output	Measuring Length	Configuration Option	Part Number	Weight [g]	For Product Series
Analog	32 mm		P8SAGACHA	16	
	64 mm		P8SAGACHB	26	
	128 mm	Teach Button	P8SAGACHD	46	With T-slot groove *
	192 mm		P8SAGACHF	66	
	256 mm		P8SAGACHH	86	
IO-Link	32 mm		P8SAGHMHA	20	
	64 mm		P8SAGHMHB	30	
	128 mm	Teach Button or IO-Link parameter	P8SAGHMHD	50	With T-slot groove *
	192 mm		P8SAGMHF	70	
	256 mm		P8SAGMHH	90	

* Required magnetic field sensitivity: 3mT / -2 mT (Analog) / 3mT (IO-Link)

Note:

PUR cable with M12 (IO-Link) or M8 (Analog) male connector knurled nut, 4-pin, 0,3 meter length.
 Please consult for measuring range 96, 160 & 224 mm.

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 screw connector and meet protection class IP65.

Technical Data

Operating voltage:	max. 32 V AC/DC
Operating current per contact:	max. 4 A
Connection cross section:	0.25... 0.5 mm ² (conductor diameter min 0.1 mm)
Protection class:	IP65 and IP67 when plugged and screwed down (EN 60529)
Temperature range:	- 25... + 85°C

Connector	Weight [kg]	Part Number
M8 screw connector		P8CS0803J
M12 screw connector	0.022	P8CS1204J



Cables to extend cable sensor lengths with M8*

Description	Part Number	Weight [g]	For Product Series
Cable flex PVC 3 meter with 8mm snap-in connector / flying leads	9126344341	70	P8S Sensors with M8
Cable flex PVC 10 meter with 8mm snap-in connector / flying leads	9126344342	210	P8S Sensors with M8
Cable PUR 3 meter with 8mm snap-in female connector / flying leads	9126344345	70	P8S Sensors with M8
Cable flex PUR 10 meter with 8mm snap-in connector / flying leads	9126344346	210	P8S Sensors with M8
Cable PVC 5 meter with M8 screw female connector / flying leads	4041	120	P8S Sensors with knurled M8

*Note: not applicable for P8S CPS Sensors as no cable available

Safety Guide For Selecting And Using Pneumatic Division Products And Related Accessories



WARNING:

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF PNEUMATIC DIVISION PRODUCTS, ASSEMBLIES OR RELATED ITEMS (“PRODUCTS”) CAN CAUSE DEATH, PERSONAL INJURY, AND PROPERTY DAMAGE. POSSIBLE CONSEQUENCES OF FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THESE PRODUCTS INCLUDE BUT ARE NOT LIMITED TO:

- Unintended or mistimed cycling or motion of machine members or failure to cycle
- Work pieces or component parts being thrown off at high speeds.
- Failure of a device to function properly for example, failure to clamp or unclamp an associated item or device.
- Explosion
- Suddenly moving or falling objects.
- Release of toxic or otherwise injurious liquids or gasses.

Before selecting or using any of these Products, it is important that you read and follow the instructions below.

1. GENERAL INSTRUCTIONS

- 1.1. **Scope:** This safety guide is designed to cover general guidelines on the installation, use, and maintenance of Pneumatic Division Valves, FRLs (Filters, Pressure Regulators, and Lubricators), Vacuum products and related accessory components.
- 1.2. **Fail-Safe:** Valves, FRLs, Vacuum products and their related components can and do fail without warning for many reasons. Design all systems and equipment in a fail-safe mode, so that failure of associated valves, FRLs or Vacuum products will not endanger persons or property.
- 1.3. **Relevant International Standards:** For a good guide to the application of a broad spectrum of pneumatic fluid power devices see: ISO 4414:1998, Pneumatic Fluid Power – General Rules Relating to Systems. See www.iso.org for ordering information.
- 1.4. **Distribution:** Provide a copy of this safety guide to each person that is responsible for selection, installation, or use of Valves, FRLs or Vacuum products. Do not select, or use Parker valves, FRLs or vacuum products without thoroughly reading and understanding this safety guide as well as the specific Parker publications for the products considered or selected.
- 1.5. **User Responsibility:** Due to the wide variety of operating conditions and applications for valves, FRLs, and vacuum products Parker and its distributors do not represent or warrant that any particular valve, FRL or vacuum product is suitable for any specific end use system. This safety guide does not analyze all technical parameters that must be considered in selecting a product. The user, through its own analysis and testing, is solely responsible for:
 - Making the final selection of the appropriate valve, FRL, Vacuum component, or accessory.
 - Assuring that all user's performance, endurance, maintenance, safety, and warning requirements are met and that the application presents no health or safety hazards.
 - Complying with all existing warning labels and / or providing all appropriate health and safety warnings on the equipment on which the valves, FRLs or Vacuum products are used; and,
 - Assuring compliance with all applicable government and industry standards.
- 1.6. **Safety Devices:** Safety devices should not be removed, or defeated.
- 1.7. **Warning Labels:** Warning labels should not be removed, painted over or otherwise obscured.
- 1.8. **Additional Questions:** Call the appropriate Parker technical service department if you have any questions or require any additional information. See the Parker publication for the product being considered or used, or call 1-800-CPARKER, or go to www.parker.com, for telephone numbers of the appropriate technical service department.

2. PRODUCT SELECTION INSTRUCTIONS

- 2.1. **Flow Rate:** The flow rate requirements of a system are frequently the primary consideration when designing any pneumatic system. System components need to be able to provide adequate flow and pressure for the desired application.
- 2.2. **Pressure Rating:** Never exceed the rated pressure of a product. Consult product labeling, Pneumatic Division catalogs or the instruction sheets supplied for maximum pressure ratings.
- 2.3. **Temperature Rating:** Never exceed the temperature rating of a product. Excessive heat can shorten the life expectancy of a product and result in complete product failure.
- 2.4. **Environment:** Many environmental conditions can affect the integrity and suitability of a product for a given application. Pneumatic Division products are designed for use in general purpose industrial applications. If these products are to be used in unusual circumstances such as direct sunlight and/or corrosive or caustic environments, such use can shorten the useful life and lead to premature failure of a product.
- 2.5. **Lubrication and Compressor Carryover:** Some modern synthetic oils can and will attack nitrile seals. If there is any possibility of synthetic oils or greases migrating into the pneumatic components check for compatibility with the seal materials used. Consult the factory or product literature for materials of construction.
- 2.6. **Polycarbonate Bowls and Sight Glasses:** To avoid potential polycarbonate bowl failures:
 - Do not locate polycarbonate bowls or sight glasses in areas where they could be subject to direct sunlight, impact blow, or temperatures outside of the rated range.
 - Do not expose or clean polycarbonate bowls with detergents, chlorinated hydro-carbons, ketones, esters or certain alcohols.
 - Do not use polycarbonate bowls or sight glasses in air systems where compressors are lubricated with fire resistant fluids such as phosphate ester and di-ester lubricants.
- 2.7. **Chemical Compatibility:** For more information on plastic component chemical compatibility see Pneumatic Division technical bulletins Tec-3, Tec-4, and Tec-5



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- 2.7. **Chemical Compatibility:** For more information on plastic component chemical compatibility see Pneumatic Division technical bulletins Tec-3, Tec-4, and Tec-5
- 2.8. **Product Rupture:** Product rupture can cause death, serious personal injury, and property damage.
 - Do not connect pressure regulators or other Pneumatic Division products to bottled gas cylinders.
 - Do not exceed the maximum primary pressure rating of any pressure regulator or any system component.
 - Consult product labeling or product literature for pressure rating limitations.

3. PRODUCT ASSEMBLY AND INSTALLATION INSTRUCTIONS

- 3.1. **Component Inspection:** Prior to assembly or installation a careful examination of the valves, FRLs or vacuum products must be performed. All components must be checked for correct style, size, and catalog number. DO NOT use any component that displays any signs of nonconformance.
- 3.2. **Installation Instructions:** Parker published Installation Instructions must be followed for installation of Parker valves, FRLs and vacuum components. These instructions are provided with every Parker valve or FRL sold, or by calling 1-800-CPARKER, or at www.parker.com.
- 3.3. **Air Supply:** The air supply or control medium supplied to Valves, FRLs and Vacuum components must be moisture-free if ambient temperature can drop below freezing

4. VALVE AND FRL MAINTENANCE AND REPLACEMENT INSTRUCTIONS

- 4.1. **Maintenance:** Even with proper selection and installation, valve, FRL and vacuum products service life may be significantly reduced without a continuing maintenance program. The severity of the application, risk potential from a component failure, and experience with any known failures in the application or in similar applications should determine the frequency of inspections and the servicing or replacement of Pneumatic Division products so that products are replaced before any failure occurs. A maintenance program must be established and followed by the user and, at minimum, must include instructions 4.2 through 4.9. Failure to follow routine maintenance can lead to a reduction in the expected service life of the product and can result in damage to the system, personal injury and/or property damage.
- 4.2. **Installation and Service Instructions:** Before attempting to service or replace any worn or damaged parts consult the appropriate Service Bulletin for the valve or FRL in question for the appropriate practices to service the unit in question. These Service and Installation



Offer of Sale**PARKER-HANNIFIN CORPORATION**
OFFER OF SALE

1. Definitions. As used herein, the following terms have the meanings indicated.

Buyer:	means any customer receiving a Quote for Products.
Goods:	means any tangible part, system or component to be supplied by Seller.
Products:	means the Goods, Services and/or Software as described in a Quote.
Quote:	means the offer or proposal made by Seller to Buyer for the supply of Products.
Seller:	means Parker-Hannifin Corporation, including all divisions and businesses thereof.
Services:	means any services to be provided by Seller.
Software:	means any software related to the Goods, whether embedded or separately downloaded.
Terms:	means the terms and conditions of this Offer of Sale.

2. Terms. All sales of Products by Seller are expressly conditioned upon, and will be governed by the acceptance of, these Terms. These Terms are incorporated into any Quote provided by Seller to Buyer. Buyer's order for any Products whether communicated to Seller verbally, in writing, by electronic data interface or other electronic commerce, shall constitute acceptance of these Terms. Seller objects to any contrary or additional terms or conditions of Buyer. Reference in Seller's order acknowledgement to Buyer's purchase order or purchase order number shall in no way constitute an acceptance of any of Buyer's terms or conditions of purchase. No modification to these Terms will be binding on Seller unless agreed to in writing and signed by an authorized representative of Seller.

3. Price; Payment. The Products set forth in the Quote are offered for sale at the prices indicated in the Quote. Unless otherwise specifically stated in the Quote, prices are valid for thirty (30) days and do not include any sales, use, or other taxes or duties. Seller reserves the right to modify prices at any time to adjust for any raw material price fluctuations. Unless otherwise specified by Seller, all prices are F.C.A. Seller's facility (INCOTERMS 2020). All sales are contingent upon credit approval and full payment for all purchases is due thirty (30) days from the date of invoice (or such date as may be specified in the Quote). Unpaid invoices beyond the specified payment date incur interest at the rate of 1.5% per month or the maximum allowable rate under applicable law.

4. Shipment; Delivery; Title and Risk of Loss. All delivery dates are approximate, and Seller is not responsible for damages resulting from any delay. Regardless of the manner of shipment, delivery occurs and title and risk of loss or damage pass to Buyer, upon placement of the Products with the carrier at Seller's facility. Unless otherwise agreed prior to shipment and for domestic delivery locations only, Seller will select and arrange, at Buyer's sole expense, the carrier and means of delivery. When Seller selects and

arranges the carrier and means of delivery, freight and insurance costs for shipment to the designated delivery location will be prepaid by Seller and added as a separate line item to the invoice. Buyer shall be responsible for any additional shipping charges incurred by Seller due to Buyer's acts or omissions. Buyer shall not return or repackage any Products without the prior written authorization from Seller, and any return shall be at the sole cost and expense of Buyer.

5. Warranty. The warranty for the Products is as follows: (i) Goods are warranted against defects in material or workmanship for a period of twelve (12) months from the date of delivery or 2,000 hours of use, whichever occurs first; (ii) Services shall be performed in accordance with generally accepted practices and using the degree of care and skill that is ordinarily exercised and customary in the field to which the Services pertain and are warranted for a period of six (6) months from the date of completion of the Services; and (iii) Software is only warranted to perform in accordance with applicable specifications provided by Seller to Buyer for ninety (90) days from the date of delivery or, when downloaded by a Buyer or end-user, from the date of the initial download. All prices are based upon the exclusive limited warranty stated above, and upon the following disclaimer: **EXEMPTION CLAUSE; DISCLAIMER OF WARRANTY, CONDITIONS, REPRESENTATIONS: THIS WARRANTY IS THE SOLE AND ENTIRE WARRANTY, CONDITION, AND REPRESENTATION, PERTAINING TO PRODUCTS. SELLER DISCLAIMS ALL OTHER WARRANTIES, CONDITIONS, AND REPRESENTATIONS, WHETHER STATUTORY, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THOSE RELATING TO DESIGN, NONINFRINGEMENT, MERCHANTABILITY, AND FITNESS FOR A PARTICULAR PURPOSE. SELLER DOES NOT WARRANT THAT THE SOFTWARE IS ERROR-FREE OR FAULT-TOLERANT, OR THAT BUYER'S USE THEREOF WILL BE SECURE OR UNINTERRUPTED. UNLESS OTHERWISE AUTHORIZED IN WRITING BY SELLER, THE SOFTWARE SHALL NOT BE USED IN CONNECTION WITH HAZARDOUS OR HIGH RISK ACTIVITIES OR ENVIRONMENTS. EXCEPT AS EXPRESSLY STATED HEREIN, ALL PRODUCTS ARE PROVIDED "AS IS".**

6. Claims; Commencement of Actions. Buyer shall promptly inspect all Products upon receipt. No claims for shortages will be allowed unless reported to Seller within ten (10) days of delivery. Buyer shall notify Seller of any alleged breach of warranty within thirty (30) days after the date the non-conformance is or should have been discovered by Buyer. Any claim or action against Seller based upon breach of contract or any other theory, including tort, negligence, or otherwise must be commenced within twelve (12) months from the date of the alleged breach or other alleged event, without regard to the date of discovery.

7. LIMITATION OF LIABILITY. IN THE EVENT OF A BREACH OF WARRANTY, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE THE NON-CONFORMING PRODUCT, RE-PERFORM THE SERVICES, OR REFUND THE PURCHASE PRICE PAID WITHIN A REASONABLE PERIOD OF TIME. **IN NO EVENT IS SELLER LIABLE FOR**

08/20



For inventory, lead times, and kit lookup, visit www.pdnplu.com

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ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES INCLUDING ANY LOSS OF REVENUE OR PROFITS, WHETHER BASED IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE PAID FOR THE PRODUCTS.

8. Confidential Information. Buyer acknowledges and agrees that any technical, commercial, or other confidential information of Seller, including, without limitation, pricing, technical drawings or prints and/or part lists, which has been or will be disclosed, delivered or made available, whether directly or indirectly, to Buyer ("Confidential Information"), has been and will be received in confidence and will remain the property of Seller. Buyer further agrees that it will not use Seller's Confidential Information for any purpose other than for the benefit of Seller.

9. Loss to Buyer's Property. Any tools, patterns, materials, equipment or information furnished by Buyer or which are or become Buyer's property ("Buyer's Property"), will be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer ordering the Products manufactured using Buyer's Property. Furthermore, Seller shall not be responsible for any loss or damage to Buyer's Property while it is in Seller's possession or control.

10. Special Tooling. "Special Tooling" includes but is not limited to tools, jigs, fixtures and associated manufacturing equipment acquired or necessary to manufacture Goods. Seller may impose a tooling charge for any Special Tooling. Such Special Tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in the Special Tooling, even if such Special Tooling has been specially converted or adapted for manufacture of Goods for Buyer and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller has the right to alter, discard or otherwise dispose of any Special Tooling or other property owned by Seller in its sole discretion at any time.

11. Security Interest. To secure payment of all sums due from Buyer, Seller retains a security interest in all Products delivered to Buyer and, Buyer's acceptance of these Terms is deemed to be a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect Seller's security interest.

12. User Responsibility. Buyer, through its own analysis and testing, is solely responsible for making the final selection of the Products and assuring that all performance, endurance, maintenance, safety and warning requirements of the application of the Products are met. Buyer must analyze all aspects of the application and follow applicable industry standards, specifications, and any technical information provided with the Quote or the Products, such as Seller's instructions, guides and specifications. If Seller provides options of or for Products based upon data or specifications provided by Buyer, Buyer is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products. In the event Buyer is not the end-user

of the Products, Buyer will ensure such end-user complies with this paragraph.

13. Use of Products, Indemnity by Buyer. Buyer shall comply with all instructions, guides and specifications provided by Seller with the Quote or the Products. **Unauthorized Uses.** If Buyer uses or resells the Products in any way prohibited by Seller's instructions, guides or specifications, or Buyer otherwise fails to comply with Seller's instructions, guides and specifications, Buyer acknowledges that any such use, resale, or non-compliance is at Buyer's sole risk. Further, Buyer shall indemnify, defend, and hold Seller harmless from any losses, claims, liabilities, damages, lawsuits, judgments and costs (including attorney fees and defense costs), whether for personal injury, property damage, intellectual property infringement or any other claim, arising out of or in connection with: (a) improper selection, design, specification, application, or any misuse of Products; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, tools, equipment, plans, drawings, designs, specifications or other information or things furnished by Buyer; (d) damage to the Products from an external cause, repair or attempted repair by anyone other than Seller, failure to follow instructions, guides and specifications provided by Seller, use with goods not provided by Seller, or opening, modifying, deconstructing, tampering with or repackaging the Products; or (e) Buyer's failure to comply with these Terms. Seller shall not indemnify Buyer under any circumstance except as otherwise provided in these Terms.

14. Cancellations and Changes. Buyer may not cancel or modify, including but not limited to movement of delivery dates for the Products, any order for any reason except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage and any additional expense. Seller, at any time, may change features, specifications, designs and availability of Products.

15. Limitation on Assignment. Buyer may not assign its rights or obligations without the prior written consent of Seller.

16. Force Majeure. Seller is not liable for delay or failure to perform any of its obligations by reason of events or circumstances beyond its reasonable control. Such circumstances include without limitation: accidents, labor disputes or stoppages, government acts or orders, acts of nature, pandemics, epidemics, other widespread illness, or public health emergency, delays or failures in delivery from carriers or suppliers, shortages of materials, war (whether declared or not) or the serious threat of same, riots, rebellions, acts of terrorism, fire or any reason whether similar to the foregoing or otherwise. Seller will resume performance as soon as practicable after the event of force majeure has been removed. All delivery dates affected by force majeure shall be tolled for the duration of such force majeure and rescheduled for mutually agreed dates as soon as practicable after the force majeure condition ceases to exist. Force majeure shall not include financial distress, insolvency, bankruptcy, or other similar conditions affecting one of the parties, affiliates and/or sub-contractors.

Offer of Sale

17. Waiver and Severability. Failure to enforce any provision of these Terms will not invalidate that provision; nor will any such failure prejudice either party's right to enforce that provision in the future. Invalidation of any provision of these Terms shall not invalidate any other provision herein and, the remaining provisions will remain in full force and effect.

18. Termination. Seller may terminate any agreement governed by or arising from these Terms for any reason and at any time by giving Buyer thirty (30) days prior written notice. Seller may immediately terminate, in writing, if Buyer: (a) breaches any provision of these Terms, (b) becomes or is deemed insolvent, (c) appoints or has appointed a trustee, receiver or custodian for all or any part of Buyer's property, (d) files a petition for relief in bankruptcy on its own behalf, or one is filed against Buyer by a third party, (e) makes an assignment for the benefit of creditors; or (f) dissolves its business or liquidates all or a majority of its assets.

19. Ownership of Software. Seller retains ownership of all Software supplied to Buyer hereunder. In no event shall Buyer obtain any greater right in and to the Software than a right in the nature of a license limited to the use thereof and subject to compliance with any other terms provided with the Software.

20. Indemnity for Infringement of Intellectual Property Rights. Seller is not liable for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights ("Intellectual Property Rights") except as provided in this Section. Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on a third party claim that one or more of the Products sold hereunder infringes the Intellectual Property Rights of a third party in the country of delivery of the Products by Seller to Buyer. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of any such claim, and Seller having sole control over the defense of the claim including all negotiations for settlement or compromise. If one or more Products sold hereunder is subject to such a claim, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Products, replace or modify the Products so as to render them non-infringing, or offer to accept return of the Products and refund the purchase price less a reasonable allowance for depreciation. Seller has no obligation or liability for any claim of infringement: (i) arising from information provided by Buyer; or (ii) directed to any Products provided hereunder for which the designs are specified in whole or part by Buyer; or (iii) resulting from the modification, combination or use in a system of any Products provided hereunder. The foregoing provisions of this Section constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for claims of infringement of Intellectual Property Rights.

21. Governing Law. These Terms and the sale and delivery of all Products are deemed to have taken place in, and shall be governed and construed in accordance with, the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of

Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to the sale and delivery of the Products.

22. Entire Agreement. These Terms, along with the terms set forth in the main body of any Quote, forms the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of sale and purchase. In the event of a conflict between any term set forth in the main body of a Quote and these Terms, the terms set forth in the main body of the Quote shall prevail. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter shall have no effect. These Terms may not be modified unless in writing and signed by an authorized representative of Seller.

23. Compliance with Laws. Buyer agrees to comply with all applicable laws, regulations, and industry and professional standards, including those of the United States of America, and the country or countries in which Buyer may operate, including without limitation the U.S. Foreign Corrupt Practices Act ("FCPA"), the U.S. Anti-Kickback Act ("Anti-Kickback Act"), U.S. and E.U. export control and sanctions laws ("Export Laws"), the U.S. Food Drug and Cosmetic Act ("FDCA"), and the rules and regulations promulgated by the U.S. Food and Drug Administration ("FDA"), each as currently amended. Buyer agrees to indemnify, defend, and hold harmless Seller from the consequences of any violation of such laws, regulations and standards by Buyer, its employees or agents. Buyer acknowledges that it is familiar with all applicable provisions of the FCPA, the Anti-Kickback Act, Export Laws, the FDCA and the FDA and certifies that Buyer will adhere to the requirements thereof and not take any action that would make Seller violate such requirements. Buyer represents and agrees that Buyer will not make any payment or give anything of value, directly or indirectly, to any governmental official, foreign political party or official thereof, candidate for foreign political office, or commercial entity or person, for any improper purpose, including the purpose of influencing such person to purchase Products or otherwise benefit the business of Seller. Buyer further represents and agrees that it will not receive, use, service, transfer or ship any Products from Seller in a manner or for a purpose that violates Export Laws or would cause Seller to be in violation of Export Laws. Buyer agrees to promptly and reliably provide Seller all requested information or documents, including end-user statements and other written assurances, concerning Buyer's ongoing compliance with Export Laws.



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