aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

Pneumatic Cylinders

Ø32 to Ø125 mm
According to ISO 15552

Catalogue PDE3570TCEN

ENGINEERING YOUR SUCCESS.

Technical Data

Cylinder forces

Bore/piston rod [mm]	Stroke	Surface area [cm²]	Max theoretical force in N in relation to applied pressure in bar									
			1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
32/12	+	8.0	80	161	241	322	402	**483**	563	643	724	804
	-	6.9	69	138	207	276	346	**415**	484	553	622	691
40/16	+	12.6	126	251	377	503	628	**754**	880	1005	1131	1257
	-	10.6	106	211	317	422	528	**633**	739	844	950	1056
50/20	+	19.6	196	393	589	785	982	**1178**	1374	1571	1767	1964
	-	16.5	165	330	495	660	825	**990**	1155	1319	1484	1649
63/20	+	31.2	312	623	935	1247	1559	**1870**	2182	2494	2806	3117
	-	28.0	280	561	841	1121	1402	**1682**	1962	2242	2523	2803
80/25	+	50.3	503	1005	1508	2011	2513	**3016**	3519	4021	4524	5027
	-	45.4	454	907	1361	1814	2268	**2721**	3175	3629	4082	4536
100/25	+	78.5	785	1571	2356	3142	3927	**4712**	5498	6283	7069	7854
	-	73.6	736	1473	2209	2945	3682	**4418**	5154	5891	6627	7363
125/32	+	122.7	1227	2454	3682	4909	6136	**7363**	8590	9818	11045	12272
	-	114.7	1147	2294	3440	4587	5734	**6881**	8027	9174	10321	11468

+ = outward stroke
- = return stroke

Cylinder air consumption

Bore/piston rod [mm]	Stroke	Surface area [cm²]	Air consumption in l/mm in relation to applied pressure in bar									
			1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
32/12 (G1/8)	+	8.0	0.016	0.024	0.032	0.040	0.048	**0.056**	0.064	0.072	0.079	0.087
	-	6.9	0.014	0.021	0.027	0.034	0.041	**0.048**	0.055	0.061	0.068	0.075
40/16 (G1/4)	+	12.6	0.025	0.037	0.050	0.062	0.075	**0.087**	0.099	0.112	0.124	0.137
	-	10.6	0.021	0.031	0.042	0.052	0.063	**0.073**	0.083	0.094	0.104	0.115
50/20 (G1/4)	+	19.6	0.039	0.058	0.078	0.097	0.117	**0.136**	0.155	0.175	0.194	0.213
	-	16.5	0.033	0.049	0.065	0.082	0.098	**0.114**	0.130	0.147	0.163	0.179
63/20 (G3/8)	+	31.2	0.062	0.093	0.123	0.154	0.185	**0.216**	0.247	0.277	0.308	0.339
	-	28.0	0.056	0.083	0.111	0.139	0.166	**0.194**	0.222	0.249	0.277	0.305
80/25 (G3/8)	+	50.3	0.100	0.150	0.199	0.249	0.298	**0.348**	0.398	0.447	0.497	0.546
	-	45.4	0.090	0.135	0.180	0.224	0.269	**0.314**	0.359	0.404	0.448	0.493
100/25 (G1/2)	+	78.5	0.156	0.234	0.311	0.389	0.466	**0.544**	0.621	0.699	0.776	0.854
	-	73.6	0.146	0.219	0.292	0.364	0.437	**0.510**	0.582	0.655	0.728	0.800
125/32 (G1/2)	+	122.7	0.244	0.365	0.486	0.607	0.728	**0.850**	0.971	1.092	1.213	1.334
	-	114.7	0.228	0.341	0.454	0.567	0.681	**0.794**	0.907	1.020	1.134	1.247

+ extending, - retracting

free air consumption for 1 cycle, 10 mm inward and 10 mm outward

Weight

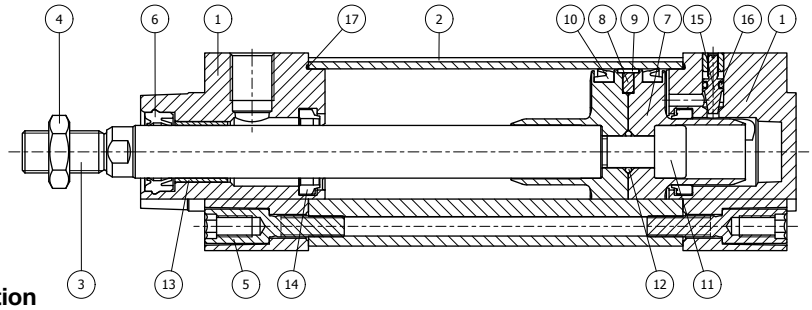
Cyl.-bore	P1F-S/A/L/H		P1F-T		Moving parts		Adder for rod lock	
[mm]	Base 0 mm [kg]	per 100 mm [kg]	Base 0 mm [kg]	per 100 mm [kg]	Base 0 mm [kg]	per 100 mm [kg]	P1F-H [kg]	P1F-L [kg]
Ø32	0.54	0.23	0.49	0.27	0.10	0.09	0.6	0.41
Ø40	0.74	0.32	0.73	0.31	0.19	0.16	0.8	0.44
Ø50	1.22	0.47	1.19	0.52	0.34	0.25	1.0	0.61
Ø63	1.69	0.49	1.68	0.54	0.40	0.24	1.2	1.25
Ø80	2.50	0.73	2.48	0.84	0.73	0.39	1.4	2.45
Ø100	3.65	0.80	3.66	0.88	1.02	0.38	1.6	3.72
Ø125	6.41	1.37	6.30	1.32	2.01	0.63	1.8	6.07

Technical Data

Product type	Standard cylinder according to ISO 15552
Bore size	32 - 125 mm
Stroke length	5 - 2000 mm
Versions	Double acting
Cushioning	Adjustable air cushioning
Position sensing	Proximity sensor
Installation	ISO cylinder and piston rod mountings

Operating and environmental data

Operating medium	For best possible service life and trouble-free operation dry filtered compressed air to ISO 8573-1:2010 quality 3.4.3 should be used. This specifies a dew point of + 3°C 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 in line with the air quality from most standard compressors with a standard filter.			
Operating pressure	1 to 10 bar			
Ambient temperature	Standard temperature version: High temperature version: Low temperature version:	-20°C to +80°C -10°C to +150°C -40°C to + 80°C	Metal scraper wiper seal: With FKM wiper seal:	-30°C to +80°C -10°C to +80°C
Pre-lubricated	Further lubrication is normally not necessary. If additional lubrication is introduced it must be continued. Hydraulic oil type HLP (DIN 51524. ISO 11158). Viscosity by 40°C: 32 mm2/s (cst). Example: Shell Tellus 32 or equal.			
Corrosion resistance	Material and surface treatment selected for typical industrial applications with resistance to corrosion and chemicals.			



Material specification

Pos	Part		Specification
1	End covers		Aluminium
2	Cylinder barrel		Anodised aluminium (profile or round tube)
3	Piston rod	Standard	Austenitic stainless steel, DIN X8 CrNiS 18 - 9
		Optional	Chromium plated steel DIN C45E
			Chromium plated stainless steel DIN X2 CrNiMoN 17- 12 - 2
4	Piston rod nut	Standard	Zinc plated steel
		Optional	Stainless steel
5	End cover screws	Standard	Zinc plated steel
6	Piston rod seal	Standard	Polyurethane (TPU-PUR)
		Optional	Fluoro elastomer (FKM) / Metallic scraper (Brass)
7	Piston	Standard	Poloxymethylene (POM)
		Optional	Aluminium
8	Magnet		Plastic coated magnetic material
9	Piston bearing	Standard	Poloxymethylene (POM)
		Optional	Polytetrafluoroethylene (PTFE)
10	Piston seals	Standard	Polyurethane (TPU-PUR)
		Optional	Fluoro elastomer (FKM)
11	Piston bolt		Zinc plated steel
12	O-ring piston bolt	Standard	Nitrile rubber (NBR)
		Optional	Fluoro elastomer (FKM)
13	Piston rod bearing		Multilayer Steel / PTFE
14	Cushioning seals	Standard	Polyurethane (TPU-PUR)
		Optional	Fluoro elastomer (FKM)
15	Cushioning screw		Stainless steel DIN X8 CrNiS 18-9
16	O-ring cushioning screw	Standard	Nitrile rubber (NBR)
		Optional	Fluoro elastomer (FKM)
17	O-ring end cover	Standard	Nitrile rubber (NBR)
		Optional	Fluoro elastomer (FKM)
	Tie-Rods		Austenitic stainless steel, DIN X8 CrNiS 18-9
	Tie-Rods nut		Zinc plated steel

Guide for selecting suitable tubing

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

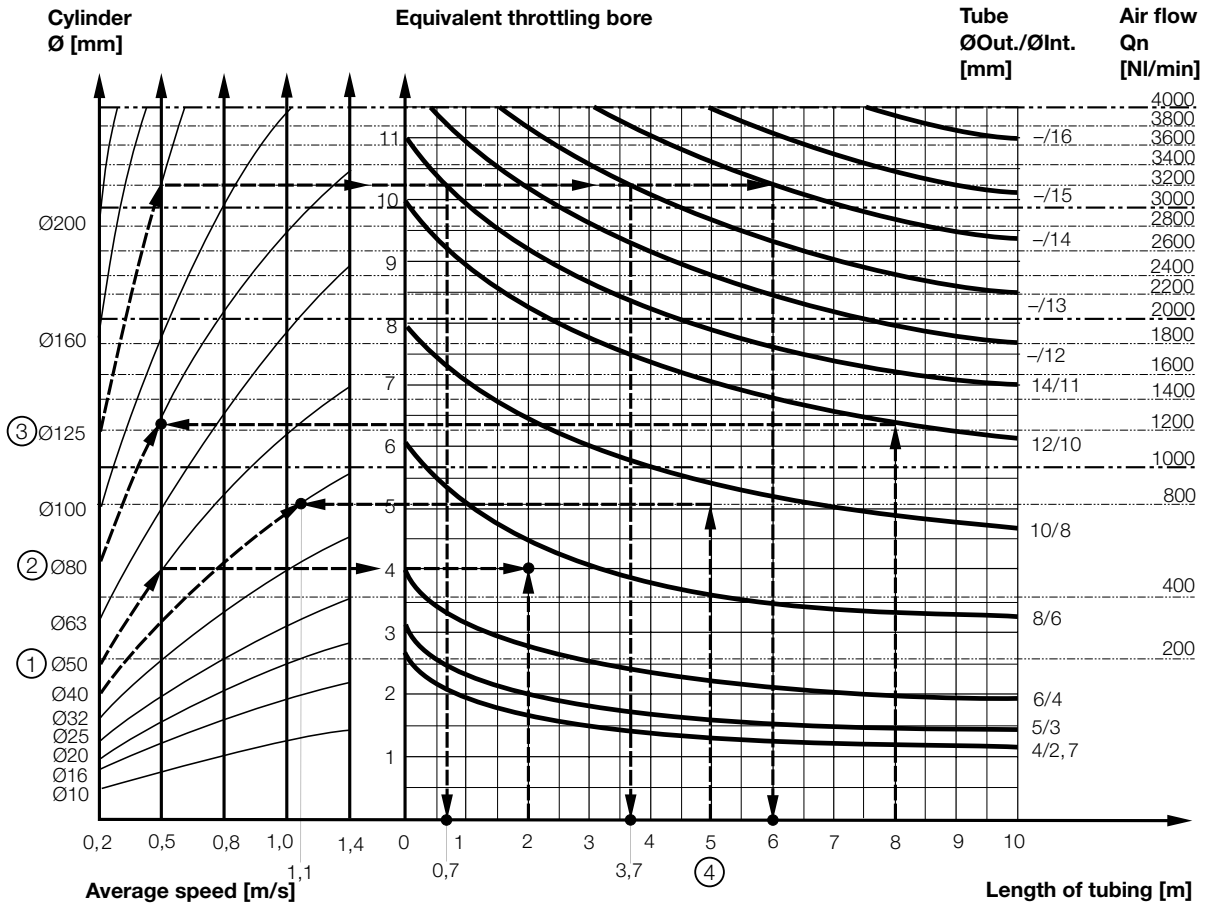
The following is the basic principle:

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

The following prerequisites apply

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

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



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

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

Cylinder with Rod Lock

Function on pressure loss

The piston rod lock can be used in all material handling systems where controlled fastening or positioning is required. Additional measures are required for use in safety-related applications (refer to EC Machinery Directive).
The piston rod cylinder with brakes is suitable for use in safety-related sections of control systems. The piston rod lock is also suitable for use as a pressure-loss brake for cylinders with suspended loads, for example. Piston rod can be held in position for long periods even with alternating loads, fluctuating operating pressure or leaks in the system. The signal air to the lock unit can be connected directly to the air system or to the supply air for the valve controlling the cylinder in question. For controlled on/off operation of the lock unit, a separate valve, with large exhaust flow capacity, is used.

Clean and compact design

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

Material specification, piston rod locking

	Dynamic Rod Lock Unit	Static Rod Lock Unit
Housing	Anodised aluminium	Anodised aluminium
Carriage	-	Anodised aluminium
Lock collars	Hardened steel	Brass
Springs	Stainless steel	Stainless steel
Bore sizes 32-40 mm	UHMWPE plastic	-
Bore sizes 50-125 mm	Polyurethane PUR	-
O Rings	Nitrile rubber NBR	-
Scraper ring	Polyurethane PUR	Polyurethane PUR
Air filter	Brass / Sintered bronze	-

Note!
If a rod guidance module is to be fitted to the brake and the cylinder, as the piston rod extension (WH dimension) is not in accordance with the ISO standard, the piston rod must be extended to provide the same WH dimension as for the cylinder itself.
Cylinder piston rod material must be made in steel or stainless steel chromium plated.

Technical data

Working pressure:	Max 10 bar	Max 10 bar
Working media:	Dry filtered compressed air	Dry filtered compressed air
Working temperature:	-20 to +80°C	-20 to +80°C
Release pressure [1]:	Min 4 bar +/- 10%	> 4 bar

[1] Signal pressure to inlet port of lock unit

Static lock forces

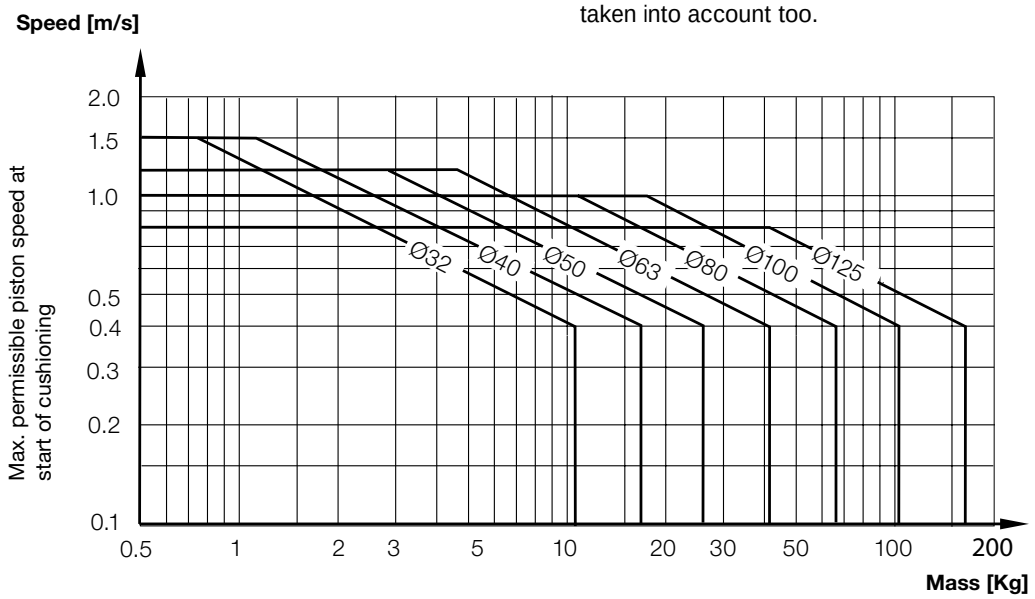
Cylinder bore [mm]	Lock force [N] dyn. rod lock	Lock force [N] static rod lock
Ø32	550	600
Ø40	860	1000
Ø50	1345	1500
Ø63	2140	2200
Ø80	3450	3000
Ø100	5390	5000
Ø125	8425	7500

Locking and breaking

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

Use as a break

The table shows the maximum values for speed and braking mass if the cylinder is used as a brake. The cylinder should not be exposed to additional compressive forces as this significantly reduces the external mass that can be braked. The cylinder does not act as a motor during braking. Heat is generated if the brake is used frequently, and this must be taken into account too.



Cushioning Characteristics

Air cushion is used to absorb kinetic energy due to load and speed at both end of stroke.
This typically consists of a threaded needle screw that adjusts into an orifice in the cylinder end plate.
By adjusting the screw further into the orifice you lessen the amount of air that can escape in a given time.
Slowing the exhaust of air creates back pressure which slows the piston as it enters into the end cushioning seal.

The graph is valid for an horizontal movement and the pressure of 6 bar.

The mass is the sum of internal and external friction, plus any gravitational forces.
Work out your expected moving mass and read off the maximum permissible speed at start of cushioning.
Alternatively, take your desired speed and expected mass and find the cylinder bore size required.
Please note that piston speed at start of cushioning is typically approx. 50 % higher than the average speed and that it is this higher speed which determines the choice of cylinder.

Separate Rod Locking Device

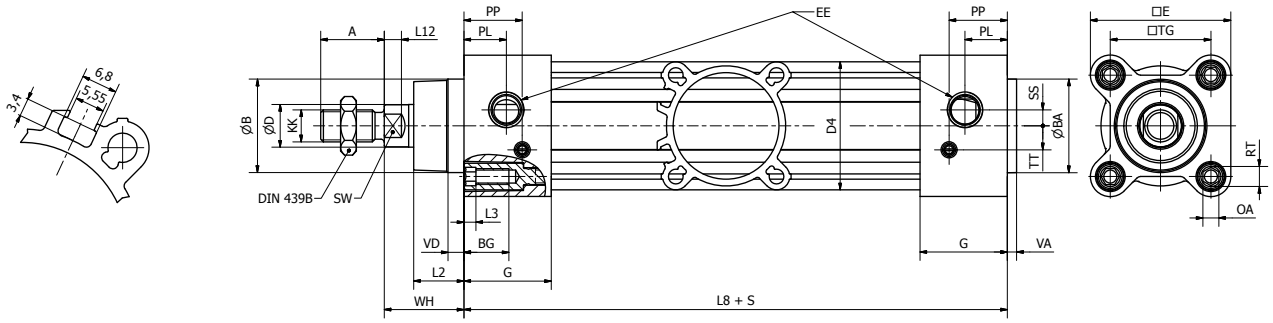
Separate Rod Locking to be mounted on a standard P1F.
The cylinder needs to have extended piston rod.
Note! Chromium plated piston rod must be used.

Cyl.-bore [mm]	Rod [mm]	Rod extension [mm]	Weight [kg]	Order Code
Ø32	12	48	0.60	**KC8227**
Ø40	16	55	0.80	**KC8228**
Ø50	20	70	1.00	**KC8229**
Ø63	20	70	1.20	**KC8230**
Ø80	25	90	1.40	**KC8231**
Ø100	25	92	1.60	**KC8232**
Ø125	32	122	1.80	**KC8233**

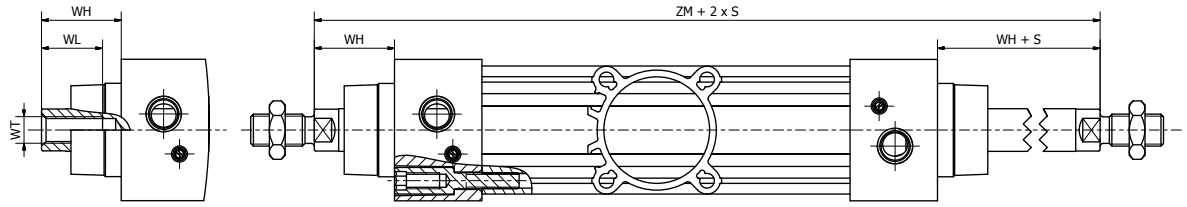
Dimensions

Smooth profile design

P1F-S / P1F-A

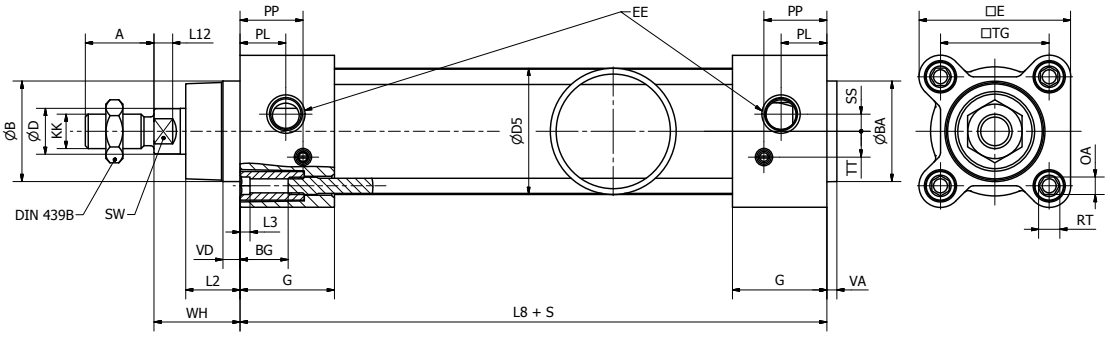


P1F-K

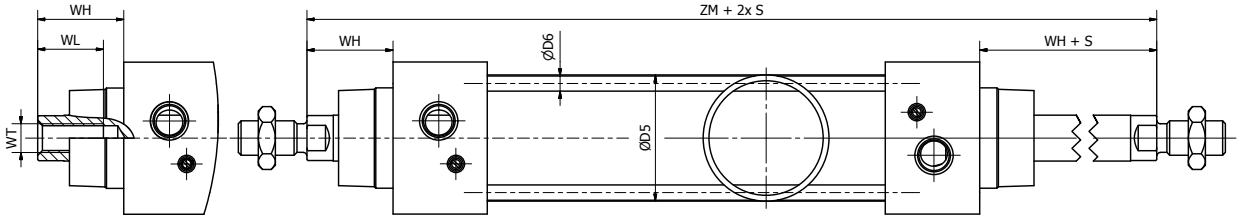


Tie-Rods with round profile design

P1F-T



P1F-N



Dimensions

Dimensions [mm]

Cyl.-bore [mm]	A	ØB d11	ØBA d11	BG	ØD	D4	ØD5	ØD6	E	EE	G	KK	L2	L3	L8
Ø32	22	30	30	17	12	42.5	35	5.3	47	G1/8	28.4	M10x1.25	16.8	4.5	94
Ø40	24	35	35	17	16	48	43	5.3	53	G1/4	33	M12x1.25	19	4.5	105
Ø50	32	40	40	18	20	59.5	54	7.1	64.5	G1/4	33.4	M16x1.5	27.6	4.5	106
Ø63	32	45	45	18	20	69.5	67	7.1	75	G3/8	39.4	M16x1.5	24.3	4.5	121
Ø80	40	45	45	19.5	25	86	85	8.9	94	G3/8	39.4	M20x1.5	30.1	5.5	128
Ø100	40	55	55	19.5	25	103	105	8.9	111	G1/2	44.3	M20x1.5	34	5.5	138
Ø125	54	60	60	20	32	130	130	10.8	136	G1/2	50.8	M27x2	45	0	160

Cyl.-bore [mm]	L12	OA	PL	PP	RT	SS	SW	TG	TT	VA	VD	WH	WL	WT	ZM
Ø32	6	6	14	20	M6	5	10	32.5	6.5	3.6	6	26	21	M8x1	146
Ø40	6.5	6	16	22	M6	6	13	38	9	3.5	6	30	23	M10x1.25	165
Ø50	8	8	15.5	21.5	M8	6	17	46.5	9	3.6	6	37	31	M14x1.5	180
Ø63	8	8	18	28	M8	10	17	56.5	11	3.5	6	37	31	M14x1.5	195
Ø80	10	10	20	30	M10	11.5	22	72	14	3.5	6	46	39	M18x1.5	220
Ø100	10	10	18	33	M10	11.5	22	89	14	3.5	6	51	39	M18x1.5	240
Ø125	13	8	20	40	M12	0	27	110	22	5.5	9	65	53	M24x2	290

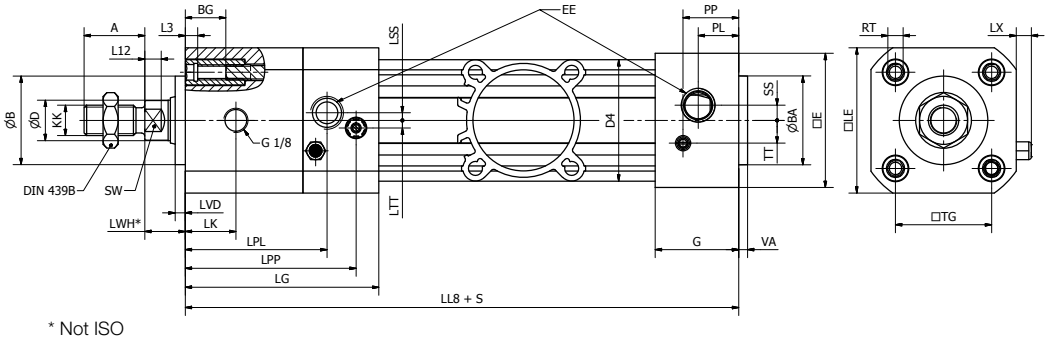
Tolerances [mm]

Cyl.-bore [mm]	A	L8	TG	ZM	stroke tolerance		
					s ≤ 350 mm	350 mm < s ≤ 600 mm	s > 600 mm
Ø32	0 / - 0.5	± 0.3	± 0.4	-0.4 /+ 2.2	+ 1.7	+ 1.9	+ 2.3
Ø40	0 / - 0.5	± 0.3	± 0.4	-0.4 /+ 2.2	+ 1.7	+ 1.9	+ 2.3
Ø50	0 / - 0.5	± 0.4	± 0.4	-0.4 /+ 2.2	+ 1.8	+ 2	+ 2.4
Ø63	0 / - 0.5	- 0.5 / + 0.3	± 0.4	-0.4 /+ 2.2	+ 1.9	+ 2.1	+ 2.5
Ø80	0 / - 0.5	± 0.4	± 0.4	-0.4 /+ 2.2	+ 1.9	+ 2.1	+ 2.5
Ø100	0 / - 0.5	± 0.5	± 0.4	-0 /+ 2.5	+ 2.0	+ 2.2	+ 2.6
Ø125	0 / - 1.0	± 0.5	± 0.4	-0 /+ 2.6	+ 2.1	+ 2.3	+ 2.7

Dimensions

Dynamic rod lock with smooth profile design

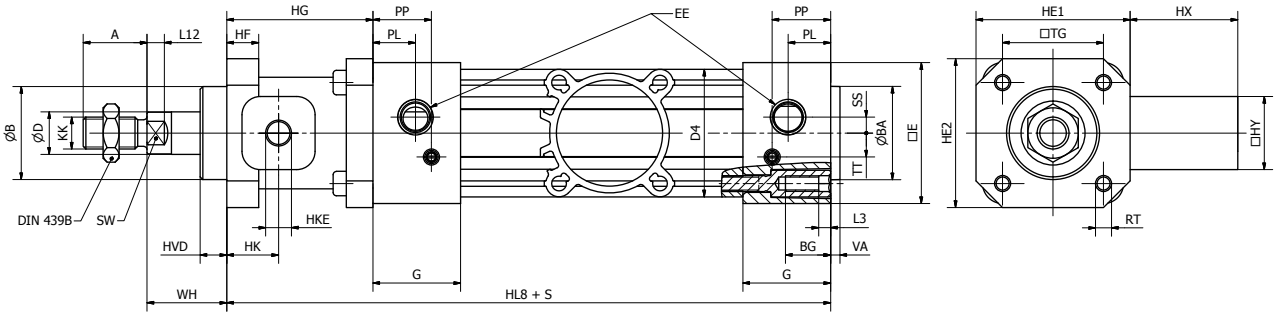
P1F-L



* Not ISO

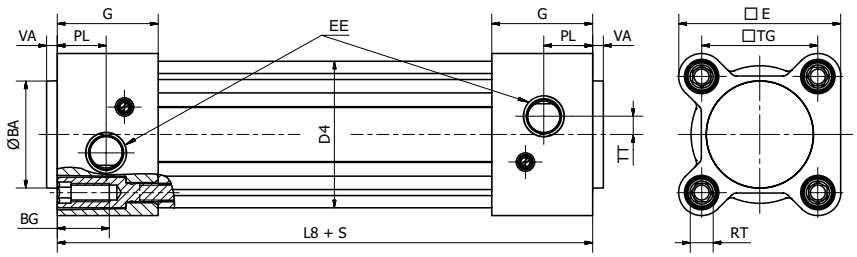
Static rod lock with smooth profile design

P1F-H



Air reservoir with smooth profile design

P1F-P



Important
Pressure Equipment Directive. According (PED) to the directive 2014/68/EU, for uncertified pressure vessels:
Max Working pressure x Volume maximized to 50 Bar x litre, i.e. max 10 bar and 5 liter volume.
In accordance we therefore maximised the volume to max 5 litre cylinder.

Dimensions

Dimensions [mm]

Cyl.-bore [mm]	A	ØB d11	ØBA d11	BG	ØD	D4	ØD5	ØD6	E	EE	G	KK	L2	L3	L8
Ø32	22	30	30	17	12	42.5	35	5.3	47	G1/8	28.4	M10x1.25	16.8	4.5	94
Ø40	24	35	35	17	16	48	43	5.3	53	G1/4	33	M12x1.25	19	4.5	105
Ø50	32	40	40	18	20	59.5	54	7.1	64.5	G1/4	33.4	M16x1.5	27.6	4.5	106
Ø63	32	45	45	18	20	69.5	67	7.1	75	G3/8	39.4	M16x1.5	24.3	4.5	121
Ø80	40	45	45	19.5	25	86	85	8.9	94	G3/8	39.4	M20x1.5	30.1	5.5	128
Ø100	40	55	55	19.5	25	103	105	8.9	111	G1/2	44.3	M20x1.5	34	5.5	138
Ø125	54	60	60	20	32	130	130	10.8	136	G1/2	50.8	M27x2	45	0	160

Cyl.-bore [mm]	L12	OA	PL	PP	RT	SS	SW	TG	TT	VA	VD	WH	WL	WT	ZM
Ø32	6	6	14	20	M6	5	10	32.5	6.5	3.6	6	26	21	M8x1	146
Ø40	6.5	6	16	22	M6	6	13	38	9	3.5	6	30	23	M10x1.25	165
Ø50	8	8	15.5	21.5	M8	6	17	46.5	9	3.6	6	37	31	M14x1.5	180
Ø63	8	8	18	28	M8	10	17	56.5	11	3.5	6	37	31	M14x1.5	195
Ø80	10	10	20	30	M10	11.5	22	72	14	3.5	6	46	39	M18x1.5	220
Ø100	10	10	18	33	M10	11.5	22	89	14	3.5	6	51	39	M18x1.5	240
Ø125	13	8	20	40	M12	0	27	110	22	5.5	9	65	53	M24x2	290

Cyl.-bore [mm]	LE	LG	LK	LL8	LPL	LPP	LSS	LTT	LVD	LWH	LX
Ø32	50	71	18.5	137	53	63	3	4.5	4	15	6
Ø40	57.4	76.5	20	149	56	67.5	3	3	4	16	6
Ø50	70	80	21	153	65	71	8	5.5	4	17	7
Ø63	82.4	96	30	178	76.5	87	8.5	3	4	17	7
Ø80	100	110	35	199	89	101	9	6	4	20	7
Ø100	116	132	54	226	112	122	12	6	4	20	7
Ø125	139	144.5	65.5	254	124.5	134.5	14	6	6	27	7

Cyl.-bore [mm]	HE1	HE2	HF	HG	HK	HKE	HL8	HVD	HX	HY
Ø32	50	48	12	48	16	G1/8	142	10	40	25
Ø40	58	56	12	55	19.5	G1/8	160	10	40.5	27.5
Ø50	70	68	16	70	21	G1/8	176	12	48.5	32.5
Ø63	85	82	15	70	21	G1/8	191	12	49	41
Ø80	105	100	16	90	28	G1/8	218	20	65.5	49
Ø100	130	120	18	92	27	G1/8	230	23	59.5	53
Ø125	150	140	27	122	37	G1/8	282	32	69.5	65

Tolerances [mm]

Cyl.-bore	A	L8	TG	ZM	stroke tolerance		
[mm]					s ≤ 350 mm	350 mm < s ≤ 600 mm	s > 600 mm
Ø32	0/-0.5	± 0.3	±0.4	-0.4/+2.2	+ 1.7	+ 1.9	+ 2.3
Ø40	0/-0.5	± 0.3	±0.4	-0.4/+2.2	+ 1.7	+ 1.9	+ 2.3
Ø50	0/-0.5	- 0.3 / + 0.5	±0.4	-0.4/+2.2	+ 1.8	+ 2	+ 2.4
Ø63	0/-0.5	- 0.6 / + 0.2	±0.4	-0.4/+2.2	+ 1.9	+ 2.1	+ 2.5
Ø80	0/-0.5	± 0.4	±0.4	-0.4/+2.2	+ 1.9	+ 2.1	+ 2.5
Ø100	0/-0.5	± 0.5	±0.4	-0/+2.5	+ 2.0	+ 2.2	+ 2.6
Ø125	0/-1.0	± 0.5	±0.4	-0/+2.6	+ 2.1	+ 2.3	+ 2.7

P1F-P

Cyl.-bore	Air volume	Air volume per stroke
[mm]	[cm³]	[cm³/100 mm]
Ø32	40	80
Ø40	68	126
Ø50	91	196
Ø63	137	312
Ø80	289	503
Ø100	417	785
Ø125	809	1227

Order code

Order Instructions	P	1	F	-	S	0	3	2	M	S	-	0	1	6	0	-	0	0	0	0	

Product family	
P1F	Rod type cylinder ISO15552

Air port design	
-	BSPP

Profile/cylinder design	
S	Smooth
A [1)]	ATEX smooth
K	Smooth with through rod
L [2)]	Smooth with dynamic rod lock
H [2)]	Smooth with static rod lock
T	Tie-Rods
N	Tie-Rods with through rod
P	Air reservoir

Cylinder bore size	
032	32 mm
040	40 mm
050	50 mm
063	63 mm
080	80 mm
100	100 mm
125	125 mm

[1)] ATEX version is specified for standard temperature range -20°C to +60°C without options
[2)] use the rod lock cylinder in standard temperature range -20°C to +80°C only in combination with chrome plated piston rod material
[3)] High and low temp option only with aluminium piston
[4)] Only in combination with chrome plated piston rod material

Rod extension or trunnion mounting	
0000	without
P . . .	Piston rod extension in mm
G000	Trunnion mount
7000	Trunnion mount +90° vs. air ports

Cylinder Stroke	
….	Stroke length in mm (max. 2000)

Piston style	
-	Standard with magnet
F	Standard w/o magnet
X	Aluminium with magnet
A	Aluminium w/o magnet

Piston Rod material male thread	
S	Stainless steel
C	Chrome plated carbon steel
R	Chrome plated stainless steel***
A	without (air reservoir)
Piston Rod material female thread	
E	Stainless steel
F	Chrome plated carbon steel
G	Chrome plated stainless steel***

Temperature range	
Standard temp. -20 to +80°C	
M	Polyurethane (PUR)
V	FKM wiper seal -10° to +80°C
High Temp. -10 to +150°C	
F [3)]	Fluoro elastomere (FKM)
Low Temp. -40 to +80°C	
L [3)]	Polyurethane (TPU-PUR)
Q [3) 4)]	Metallic scraper -30° to +80°C

*** on request

Standard strokes for all P1F cylinders compliant to ISO 4393
(with the exception of stroke 40 mm)
Special strokes up to 2000 mm.

Order code **Cylinder bore** (mm) **● = Standard stroke (mm)** **= Stroke to special order**

	0025	0040	0050	0080	0100	0125	0160	0200	0250	0320	0400	0500	0600	0700	0800	2000	
P1F-S032MS -	●	●	●	●	●	●	●	●	●	●	●	●				//	**-0000**
P1F-S040MS -	●	●	●	●	●	●	●	●	●	●	●	●				//	**-0000**
P1F-S050MS -	●	●	●	●	●	●	●	●	●	●	●	●				//	**-0000**
P1F-S063MS -	●	●	●	●	●	●	●	●	●	●	●	●				//	**-0000**
P1F-S080MS -	●	●	●	●	●	●	●	●	●	●	●	●				//	**-0000**
P1F-S100MS -	●	●	●	●	●	●	●	●	●	●	●	●				//	**-0000**
P1F-S125MS -	●	●	●	●	●	●	●	●	●	●	●	●				//	**-0000**