



Pneumatic Cylinders

Ø160 to Ø320 mm P1F Series

According to ISO 15552

Catalogue PDE2667TCEN



ENGINEERING YOUR SUCCESS.



Important

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



Note

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



WARNING

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

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Contents

Tie-Rods Large Bores 160 to 320 mm

| | |
|----------------------------------|-------|
| Product Overview | 4 |
| Technical Data | 5-6 |
| Piston Rod Load Diagrams | 7 |
| Cushioning Characteristics | 8 |
| Dimensions | 9 |
| Order Code Key | 10 |
| Mountings Overview | 11 |
| Mountings Dimensions | 12-16 |
| Seal Kits | 17 |

Sensors

| | |
|---------------------------------------|----|
| Product Overview | 18 |
| Technical Data | 18 |
| Dimensions | 19 |
| Connection and Diagrams | 19 |
| Sensor Brackets | 19 |
| Ordering Data | 20 |
| Connectors and Cables..... | 20 |
| CPS Continuous Position Sensors | 21 |

Air Quality

| | |
|------------------------------|----|
| Specifying Air Quality | 22 |
|------------------------------|----|

Standard Cylinders ISO 15552

Global product range

The P1F Series meets the specifications of the ISO 15552 standard. This means full interchangeability to any cylinder anywhere around the globe.

The P1F will be available throughout the extensive worldwide Parker Hannifin organisation – for the benefit to you and your customers.



Features

- Tie-Rods design.
- Bore sizes 160 - 320 mm.
- Stroke up to 2300 mm.
- Corrosion resistant design.
- Stainless steel piston rod.
- Polyurethane seal technology.
- Stainless steel cushioning screws on same side.
- Adjustable pneumatic cushioning.
- Full range of mountings.
- Full range of drop-in' sensors.



Design Variants

Tie-Rods round profile - P1F-T, P1F-N

Tie-Rods design for heavy duty applications. Round tube is made in anodised aluminium; Tie-Rods in stainless steel as standard.

Bore sizes Ø32 to Ø125 mm, see catalogue PDE3570TC
Large bore sizes Ø160 to Ø320 mm.

Options

High temperature

All seals in the high temperature version of P1F are developed and validated for continuous operation up to +150°C. The combination of the seal geometry and the FKM (fluoro elastomers) material ensures reliable and long service life. High temperature cylinders have no magnetic piston and cannot be fitted with sensors (the magnetic field strength in high temperatures is too low to ensure correct reliable sensor function).

Technical Data

Cylinder forces

| Bore/ piston rod [mm] | Stroke | Surface area [cm ²] | Max theoretical force in N (under different pressure bar) | | | | | | | | | |
|-----------------------------|--------|---------------------------------------|---|-------|-------|-------|-------|--------------|-------|-------|-------|-------|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 160/40 | + | 201.1 | 2011 | 4021 | 6032 | 8042 | 10053 | 12064 | 14074 | 16085 | 18096 | 20106 |
| | - | 188.5 | 1885 | 3770 | 5655 | 7540 | 9425 | 11310 | 13195 | 15080 | 16965 | 18850 |
| 200/40 | + | 314.2 | 3142 | 6283 | 9425 | 12566 | 15708 | 18850 | 21991 | 25133 | 28274 | 31416 |
| | - | 301.6 | 3016 | 6032 | 9048 | 12064 | 15080 | 18096 | 21112 | 24127 | 27143 | 30159 |
| 250/50 | + | 490.9 | 4909 | 9818 | 14726 | 19635 | 24544 | 29453 | 34361 | 39270 | 44179 | 49088 |
| | - | 471.2 | 4712 | 9425 | 14137 | 18850 | 23562 | 28274 | 32987 | 37699 | 42412 | 47124 |
| 320/63 | + | 804.2 | 8042 | 16085 | 24127 | 32170 | 40212 | 48255 | 56297 | 64340 | 72382 | 80425 |
| | - | 773.1 | 7731 | 15462 | 23192 | 30923 | 38654 | 46385 | 54115 | 61846 | 69577 | 77308 |

+ = outward stroke
- = return stroke

Cylinder air consumption

| Bore/ piston rod [mm] | Stroke | Surface area [cm ²] | Air Consumption in l [Nl] / 10 mm (under different pressure bar) | | | | | | | | | |
|-----------------------------|--------|---------------------------------------|--|-------|-------|-------|-------|--------------|-------|-------|-------|-------|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 160/40 | + | 201.1 | 0.400 | 0.598 | 0.797 | 0.995 | 1.193 | 1.392 | 1.590 | 1.789 | 1.987 | 2.186 |
| | - | 188.5 | 0.375 | 0.561 | 0.747 | 0.933 | 1.119 | 1.305 | 1.491 | 1.677 | 1.863 | 2.049 |
| 200/40 | + | 314.2 | 0.624 | 0.934 | 1.245 | 1.555 | 1.865 | 2.175 | 2.485 | 2.795 | 3.105 | 3.415 |
| | - | 301.6 | 0.599 | 0.897 | 1.195 | 1.492 | 1.790 | 2.088 | 2.386 | 2.683 | 2.981 | 3.279 |
| 250/50 | + | 490.9 | 0.975 | 1.460 | 1.945 | 2.429 | 2.914 | 3.398 | 3.883 | 4.367 | 4.852 | 5.337 |
| | - | 471.2 | 0.936 | 1.402 | 1.867 | 2.332 | 2.797 | 3.262 | 3.728 | 4.193 | 4.658 | 5.123 |
| 320/63 | + | 804.2 | 1.598 | 2.392 | 3.186 | 3.980 | 4.774 | 5.568 | 6.362 | 7.156 | 7.950 | 8.744 |
| | - | 773.1 | 1.536 | 2.299 | 3.063 | 3.826 | 4.589 | 5.352 | 6.115 | 6.878 | 7.641 | 8.405 |

+ = outward stroke
- = return stroke

Weight

| Cyl.-bore [mm] | P1F-T | | P1F-N | | Moving parts | |
|-------------------|-------------------|--------------------|-------------------|--------------------|-------------------|--------------------|
| | Base 0 mm [kg] | per 100 mm [kg] | Base 0 mm [kg] | per 100 mm [kg] | Base 0 mm [kg] | per 100 mm [kg] |
| Ø160 | 11.90 | 1.816 | | | | |
| Ø200 | 14.83 | 1.986 | | | | |
| Ø250 | 29.00 | 3.700 | | | | |
| Ø320 | 55.00 | 5.860 | | | | |
| | | | | | | on request |

Tolerances [mm]

| Cyl.- bore [mm] | L ₂ [mm] | TG [mm] | stroke tolerance | |
|-----------------------|------------------------|------------|------------------|---------------|
| | | | <= 500 mm | > 500 mm |
| Ø160 | ± 1.1 | ± 1.1 | + 0.3 / + 2.0 | + 0.3 / + 3.0 |
| Ø200 | ± 1.6 | ± 1.1 | + 0.3 / + 2.0 | + 0.3 / + 3.0 |
| Ø250 | ± 1.6 | ± 1.5 | + 0.3 / + 2.0 | + 0.3 / + 3.0 |
| Ø320 | ± 2.2 | ± 1.5 | + 0.3 / + 2.0 | + 0.3 / + 3.0 |

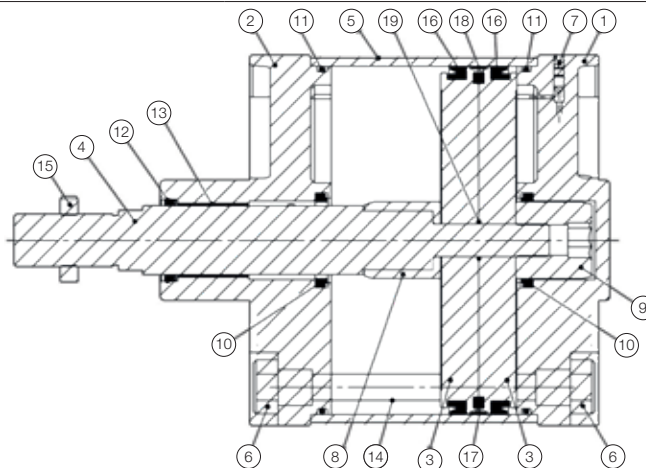
Technical Data

| | |
|------------------|--|
| Product type | Standard cylinder according to ISO 15552 |
| Bore size | 160 - 320 mm |
| Stroke length | 10 - 2300 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 (option M): -20°C to +80°C High temperature (option F): -20°C to +150°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. |



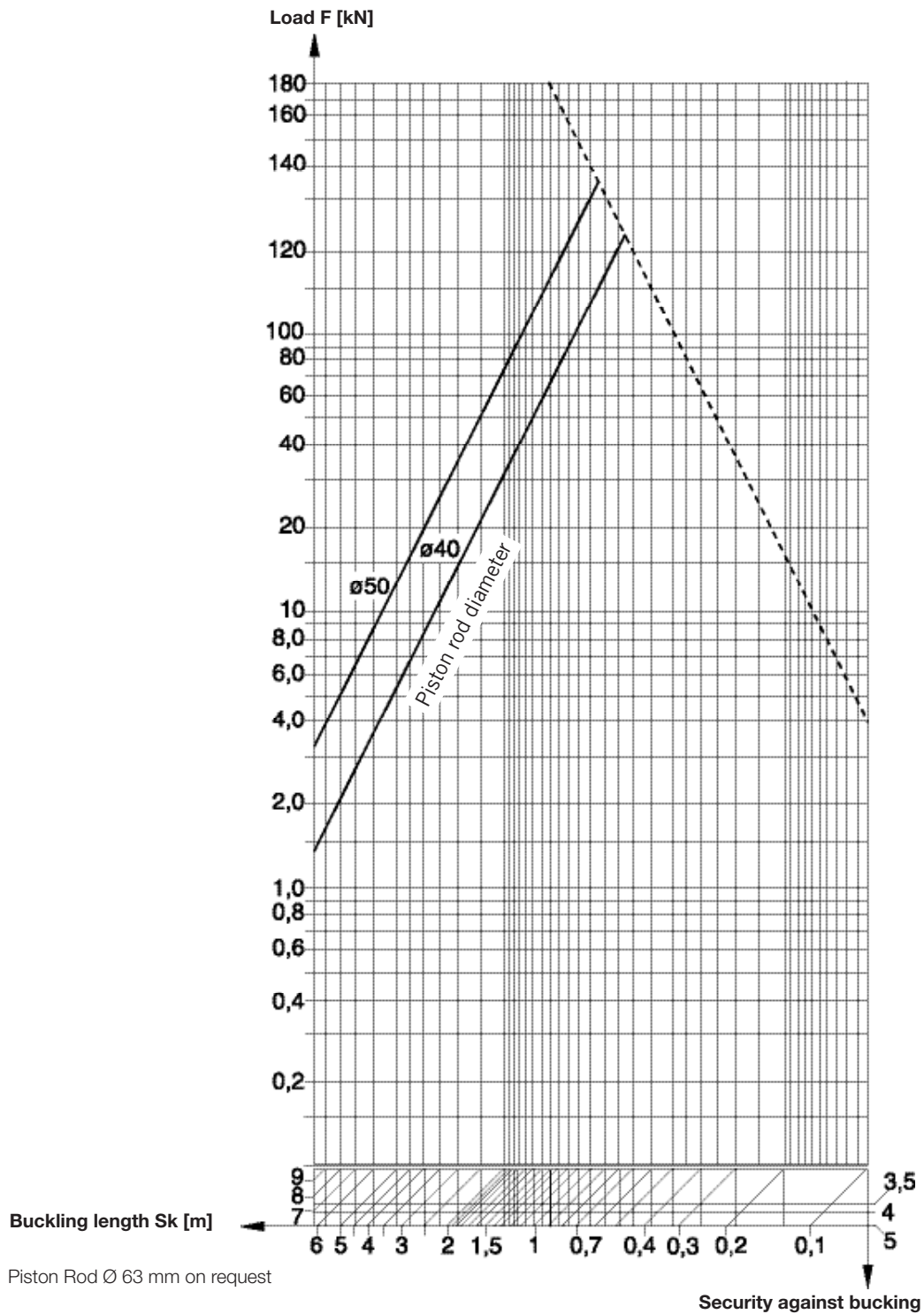
Material specification

| Pos | Part | Specification |
|------|--------------------------|--|
| 1, 2 | End covers | Die-cast painted aluminium |
| 3 | Piston | Die-cast aluminium (in 2 pieces) |
| 4 | Piston rod | Austenitic Stainless steel, DIN X8 CrNiS 18-9 |
| 5 | Cylinder barrel | Anodised aluminium |
| 6 | Tie rod nut | Zinc plated steel |
| 7 | Cushioning screws | Stainless steel DIN X8 CrNiS 18-9 |
| | O-ring cushioning screws | Nitrile rubber (NBR) |
| | | Fluoro elastomer (FKM) |
| 8 | Sleeves | Aluminium (integrated into the piston's half) |
| 9 | Piston nut | Zinc plated steel |
| 10 | Cushioning seal | Standard Polyurethane (PUR) Optional Fluoro elastomer (FKM) |
| 11 | O-ring end covers | Standard Nitrile rubber (NBR) Optional Fluoro elastomer (FKM) |
| 12 | Piston rod seal | Standard Polyurethane (PUR) Optional Fluoro elastomer (FKM) |
| 13 | Piston rod bearing | Self-lubricating sintered bronze |
| 14 | Tie rods | Austenitic Stainless steel, DIN X8 CrNiS 18-9 |
| 15 | Piston rod nut | Zinc plated steel |
| 16 | Piston seals | Standard Nitrile rubber (NBR) Optional Fluoro elastomer (FKM) |
| 17 | Magnet | Magnet rubber |
| 18 | Piston bearing | PTFE and carbographite |
| 19 | O-ring piston | Standard Nitrile rubber (NBR) Optional Fluoro elastomer (FKM) |

Piston rod load diagram

The piston rod diameter has to be determined to prevent the rod from buckling. Always take the maximum piston thrust force attainable at the specified operating pressure with the cylinder in question.

Loads resulting from longer strokes (as indicated in the diagram) on request. In case of special mounting conditions and transverse forces please consult. Recommended security factor against buckling: 3,5 to 5.



Buckling Possibilities of Piston Rods



Cushioning Characteristics

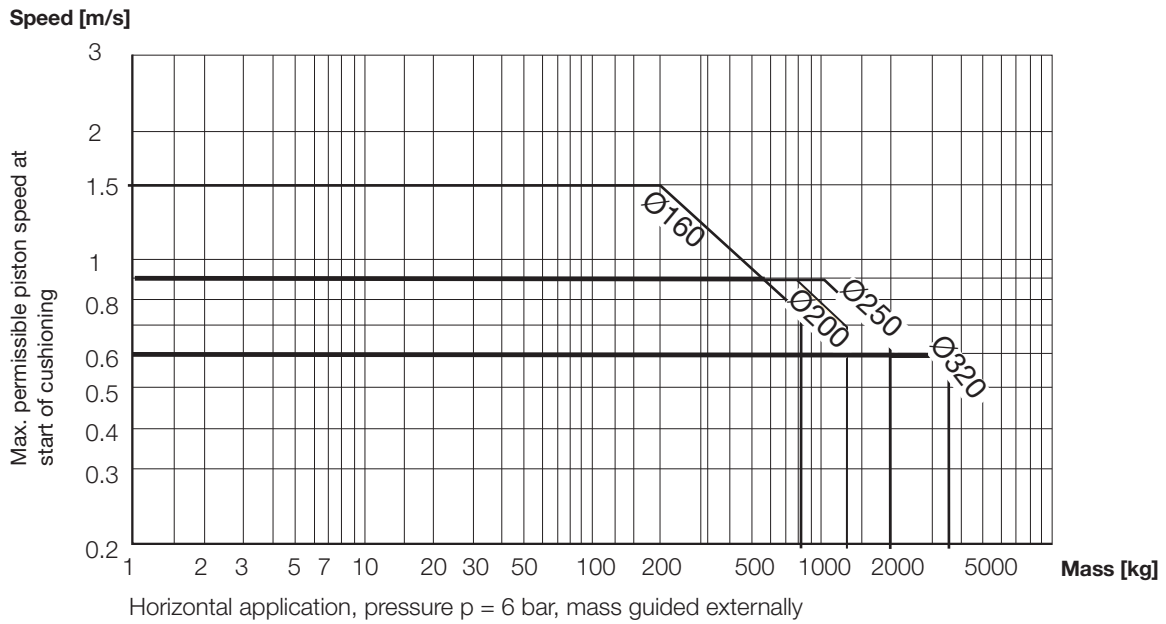
Air cushion is used to absorb kinetic energy due to load and speed at both end of stroke. This typically consists of a threaded needle screw that adjusts into an orifice in the cylinder end plate. By adjusting the screw further into the orifice you lessen the amount of air that can escape in a given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

Cushioning Diagram

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 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.

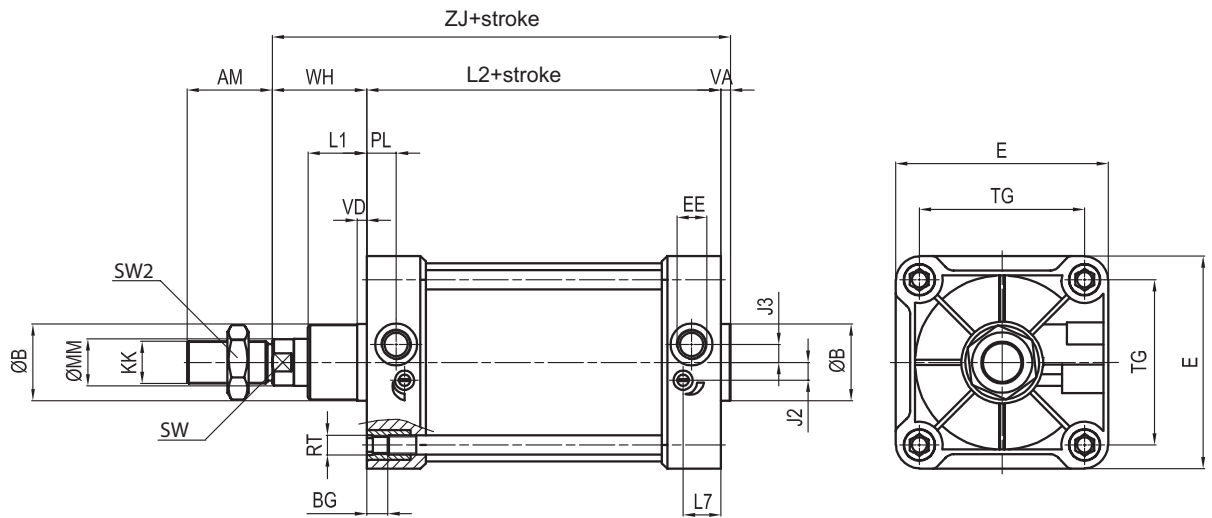
The mass is the sum of internal and external friction, plus any gravitational forces.



Dimensions

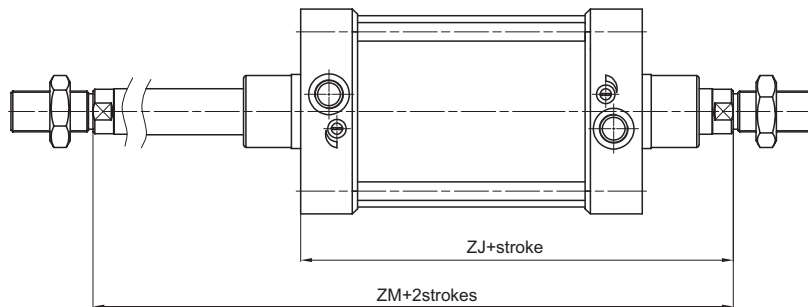
Tie-Rods with round profile design

P1F-T



Tie-Rods with through piston rod

P1F-N

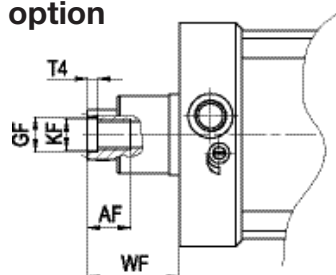


Dimensions [mm]

| Cyl.- bore | AM | ØB _{d11} | BG | E | EE | J ₂ | J ₃ | KK | L ₁ | L ₂ | H | L ₇ | MM _{Ø17} | PL | RT | SW | SW2 | TG | VA | VD | WH | ZJ | ZJ* | ZM* |
|------------|----|-------------------|----|-----|------|----------------|----------------|-------|----------------|----------------|----|----------------|-------------------|----|-----|----|-----|-----|----|----|-----|-----|-----|-----|
| Ø160 | 72 | 65 | 24 | 180 | 3/4" | 15 | 15 | M36x2 | 50 | 180 | 14 | 32 | 40 | 25 | M16 | 36 | 55 | 140 | 6 | 8 | 80 | 266 | 260 | 340 |
| Ø200 | 72 | 75 | 24 | 220 | 3/4" | 15 | 15 | M36x2 | 65 | 180 | 14 | 34 | 40 | 25 | M16 | 36 | 55 | 175 | 6 | 25 | 95 | 281 | 275 | 370 |
| Ø250 | 84 | 90 | 25 | 270 | 1" | 25 | 25 | M42x2 | 75 | 200 | 20 | 40 | 50 | 30 | M20 | 46 | 65 | 220 | 8 | 25 | 105 | 313 | 305 | 410 |
| Ø320 | 96 | 110 | 30 | 350 | 1" | 35 | 35 | M48x2 | 90 | 220 | 17 | 45 | 63 | 30 | M24 | 55 | 75 | 270 | 10 | 25 | 120 | 350 | 340 | 460 |

*for through piston rod version

Female thread option



Dimensions [mm]

| Cyl.- bore | AF | KF | T4 | WF | GF |
|------------|----|-----|----|-----|----|
| Ø160 | 36 | M20 | 10 | 80 | 22 |
| Ø200 | 36 | M20 | 10 | 95 | 22 |
| Ø250 | 40 | M24 | 12 | 105 | 26 |
| Ø320 | 50 | M30 | 15 | 120 | 32 |

Mountings

Flange MF1 / MF2 ①



P1C-4SMB

P1C-4TMB

P1C-4VMB

P1C-4WMB

Foot brackets MS1 ②



P1C-4SMF

P1C-4TMF

P1C-4VMF

P1C-4WMF

Pivot bracket with rigid bearing AB7 ③



P1C-4SMDB

P1C-4TMDB

P1C-4VMDB

P1C-4WMDC

Swivel eye bracket MP6 ④



P1C-4SMSB

P1C-4TMSB

P1C-4VMSB

P1C-4WMSB

Clevis bracket MP2 ⑤



P1C-4SMTB

P1C-4TMTB

P1C-4VMTB

P1C-4WMTB

Clevis bracket MP4 ⑥



P1C-4SMEB

P1C-4TMEB

P1C-4VMEB

P1C-4WMEB

Swivel rod eye AP6 ⑫



P1C-4SRS

P1C-4SRS

P1C-4VRS

P1C-4WRS

Clevis AP2 ⑬



P1C-4SRC

P1C-4SRC

P1C-4VRC

P1C-4WRC

Flexo coupling PM5 ⑭



P1C-4SRF

P1C-4SRF

P1C-4VRF

P1C-4WRF

Pivot brackets AT4



Ø160

PD24425

Ø200

PD24425

Ø250

PD25763

Ø320

KL9130

Intermediate trunnion MT4 ⑫



refer to page 15

refer to page 15

refer to page 15

refer to page 15

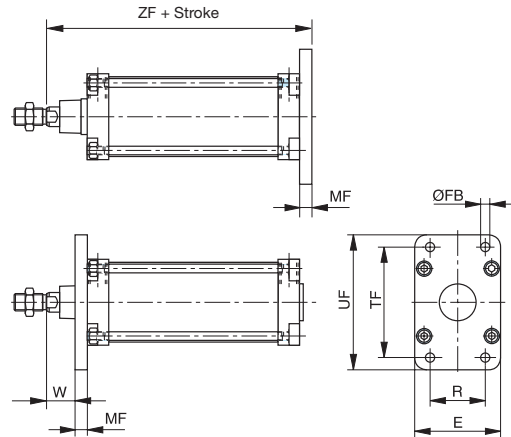
Flange MF1/MF2 ①



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

Materials:

Flange: Surface-treated steel
Mounting screws acc. to DIN 6912:
Zinc-plated steel 8.8
Supplied complete with mounting screws for attachment to the cylinder.



| Cyl.-bore [mm] | ZF* [mm] | MF [mm] | W* [mm] | UF [mm] | E [mm] | TF [mm] | R [mm] | ØFB [mm] | Weight [kg] | Order code |
|----------------|----------|---------|---------|---------|--------|---------|--------|----------|-------------|-----------------|
| Ø160 | 280 | 20 | 60 | 260 | 180 | 230 | 115 | 18 | 6.69 | P1C-4SMB |
| Ø200 | 300 | 25 | 70 | 300 | 220 | 270 | 135 | 22 | 11.55 | P1C-4TMB |
| Ø250 | 330 | 25 | 80 | 400 | 285 | 330 | 165 | 26 | 20.15 | P1C-4VMB |
| Ø320 | 370 | 30 | 90 | 470 | 350 | 400 | 200 | 33 | 34.55 | P1C-4WMB |

*Does not apply to cylinder with piston rod extension.

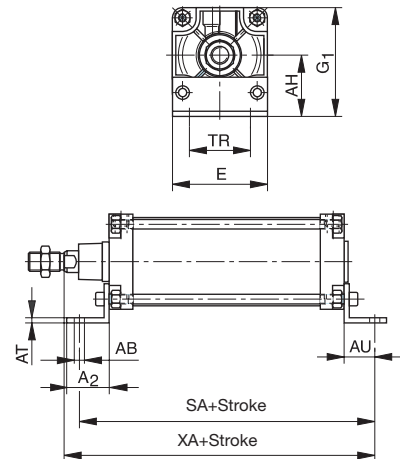
Foot brackets MS1 ②



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

Materials:

Flange: Surface-treated steel
Mounting screws acc. to DIN 6912:
Zinc-plated steel 8.8:
Intended for fixed mounting of the cylinder.
Foot brackets can be fitted to the front or rear end cover of the cylinder.
Supplied complete with mounting screws for attachment to the cylinder.



| Cyl.-bore [mm] | E [mm] | TR [mm] | AH [mm] | G1 [mm] | AT [mm] | A2 [mm] | ØAB [mm] | SA [mm] | XA* [mm] | AU [mm] | Weight [mm] | Order code |
|----------------|--------|---------|---------|---------|---------|---------|----------|---------|----------|---------|-------------|-----------------|
| Ø160 | 180 | 115 | 115 | 208 | 10 | 75 | 18,5 | 300 | 320 | 60 | 2.24 | P1C-4SMF |
| Ø200 | 220 | 135 | 135 | 245 | 12 | 100 | 24 | 320 | 345 | 70 | 3.72 | P1C-4TMF |
| Ø250 | 270 | 165 | 165 | 300 | 14 | 100 | 26 | 350 | 382 | 75 | 6.60 | P1C-4VMF |
| Ø320 | 340 | 200 | 200 | 370 | 23 | 120 | 33 | 390 | 425 | 85 | 17.00 | P1C-4WMF |

*Does not apply to cylinder with piston rod extension.

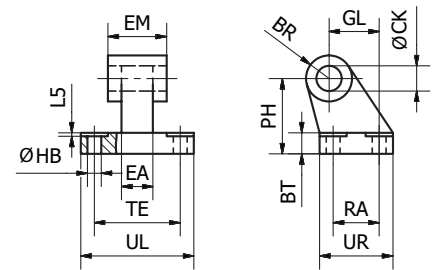
Pivot bracket with rigid bearing AB7 ③



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

Materials:

Bores 160 to 250 mm
 Pivot bracket: Aluminium
 Bush: Steel and PTFE
 Bore 320 mm
 Pivot bracket: Surface-treated steel



| Cyl.-bore [mm] | ØCK _{H7} [mm] | ØHB [mm] | L5 [mm] | TE [mm] | UL [mm] | GL [mm] | RA [mm] | EA [mm] | EM [mm] | UR [mm] | PH [mm] | BT [mm] | BR [mm] | Weight [mm] | Order code |
|-------------------|---------------------------|-------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|----------------|------------------|
| Ø160 | 30 | 14 | 4 | 118 | 156 | 97 | 88 | 36 | 90 | 126 | 115 | 25 | 31.5 | 2.58 | P1C-4SMDB |
| Ø200 | 30 | 18 | 4 | 122 | 162 | 105 | 90 | 40 | 90 | 130 | 135 | 30 | 31.5 | 3.30 | P1C-4TMDB |
| Ø250 | 40 | 22 | 4.5 | 150 | 200 | 128 | 110 | 45 | 110 | 160 | 165 | 35 | 40 | 5.70 | P1C-4VMDB |
| Ø320 | 45 | 26 | - | 170 | 234 | 150 | 122 | 55 | 120 | 186 | 200 | 40 | 45 | 21.90 | P1C-4WMDC |

Swivel eye bracket MP6 ④

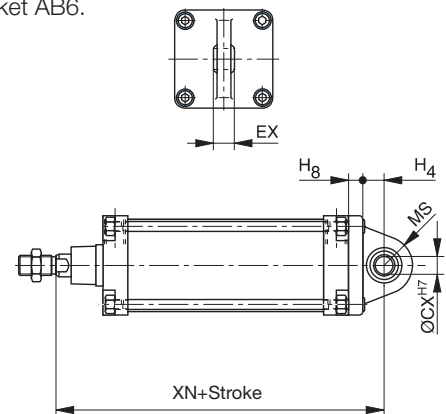


Intended for use together with clevis bracket AB6.

Materials:

Bores 160 to 250 mm
 Bracket: Aluminium
 Swivel bearing acc. to DIN 648K:
 Hardened steel

Bore 320 mm
 Pivot bracket: Surface-treated steel
 Supplied complete with mounting
 screws for attachment to cylinder.



| Cyl.-bore [mm] | EX [mm] | XN* [mm] | H8 [mm] | H4 [mm] | MS [mm] | ØCX _{H7} [mm] | Weight [kg] | Order code Not anodised |
|-------------------|------------|-------------|------------|------------|------------|---------------------------|----------------|----------------------------|
| Ø160 | 43 | 315 | 20 | 35 | 44 | 35 | 4.36 | P1C-4SMSB |
| Ø200 | 43 | 335 | 25 | 35 | 47 | 35 | 3.72 | P1C-4TMSB |
| Ø250 | 49 | 377 | 25 | 45 | 52 | 40 | 5.85 | P1C-4VMSB |
| Ø320 | 60 | 420 | 30 | 50 | 63 | 45 | 30.30 | P1C-4WMSB |

*Does not apply to cylinder with piston rod extension.

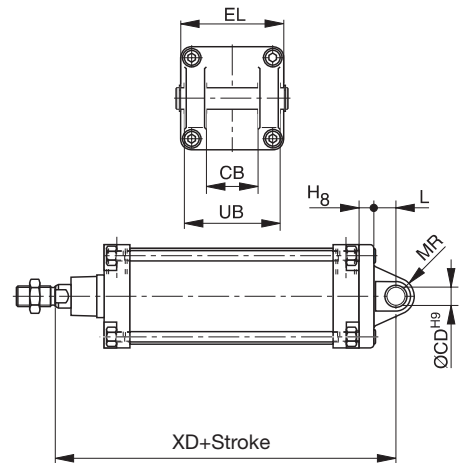
Clevis bracket MP2 ⑤



Intended for flexible mounting of the cylinder. Clevis bracket MP4 can be combined with pivot bracket and swivel rod eye.

Materials:

- Bores 160 to 250 mm
- Clevis bracket: Aluminium
- Pin: Surface hardened steel
- Locking pin: Spring steel
- Circlips according to DIN 471: Spring steel
- Mounting screws acc. to DIN 912: Zinc-plated steel 8.8
- Bore 320 mm
- Pivot bracket: Surface-treated steel
- Supplied complete with mounting screws for attachment to the cylinder.



| Cyl.-bore [mm] | EL [mm] | XD* [mm] | ØCD ^{H8} [mm] | CB ^{H14} [mm] | UB [mm] | H8 [mm] | L [mm] | MR [mm] | Weight [kg] | Order code |
|----------------|---------|----------|------------------------|------------------------|---------|---------|--------|---------|-------------|------------------|
| Ø160 | 180 | 315 | 30 | 90 | 170 | 20 | 35 | 25 | 2.20 | P1C-4SMTB |
| Ø200 | 220 | 335 | 30 | 90 | 170 | 25 | 35 | 25 | 3.47 | P1C-4TMTB |
| Ø250 | 270 | 377 | 40 | 110 | 200 | 25 | 45 | 40 | 5.80 | P1C-4VMTB |
| Ø320 | 340 | 420 | 45 | 120 | 220 | 30 | 50 | 54 | 31.00 | P1C-4WMTB |

*Does not apply to cylinder with piston rod extension.

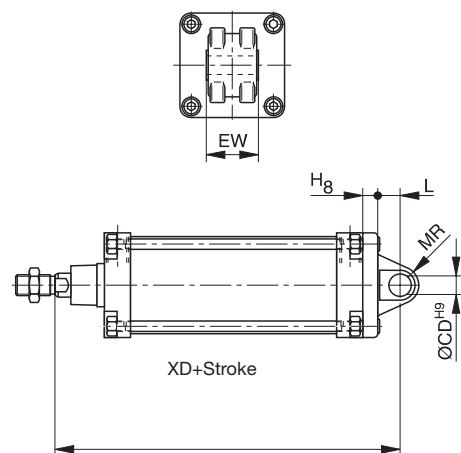
Clevis bracket MP4 ⑥



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

Materials:

- Bores 160 to 250 mm
- Clevis bracket: Aluminium
- Bush: PTFE
- Mounting screws acc. to DIN 912: Zinc-plated steel 8.8
- Bore 320 mm
- Pivot bracket: Surface-treated steel
- Supplied complete with mounting screws for attachment to the cylinder.



| Cyl.-bore [mm] | EW [mm] | XD* [mm] | H8 [mm] | L [mm] | MR [mm] | ØCD [mm] | Weight [kg] | Order code |
|----------------|---------|----------|---------|--------|---------|----------|-------------|------------------|
| Ø160 | 90 | 315 | 20 | 35 | 30 | 30 | 2.31 | P1C-4SMEB |
| Ø200 | 90 | 335 | 25 | 35 | 31 | 30 | 2.50 | P1C-4TMEB |
| Ø250 | 110 | 375 | 25 | 45 | 41 | 40 | 6.20 | P1C-4VMEB |
| Ø320 | 120 | 420 | 30 | 50 | 46 | 45 | 33.00 | P1C-4WMEB |

*Does not apply to cylinder with piston rod extension.

Intermediate Trunnion - MT4

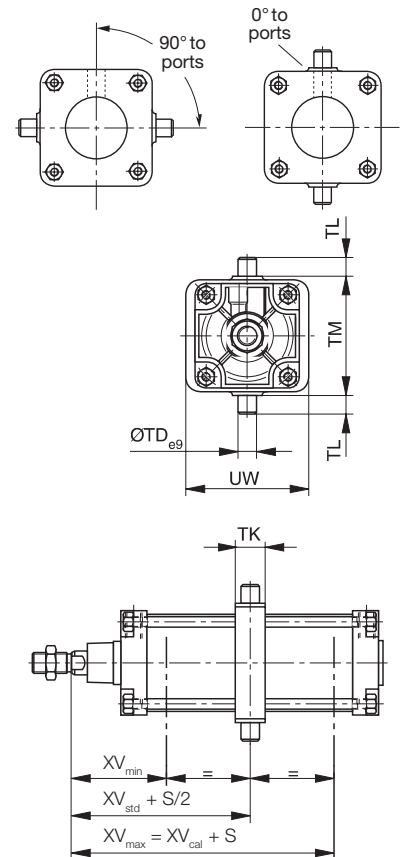


Available for P1F Tie-Rods versions the MT4 centre trunnion when combined with AT4 pivot brackets is intended for articulated mounting of the cylinder.

Material: Zinc plated steel

Refer to the model code page 10 for ordering cylinder with trunnion.

Important note: The trunnion is fixed at factory following XV dimension and cannot be added later on the cylinder.



| Cyl.-bore [mm] | TK _{h14} [mm] | TL _{h14} [mm] | TM [mm] | ØTD _{e9} [mm] | UW [mm] | XV _{min} [mm] | XV _{std} [mm] | XV _{cal} [mm] | Weight [kg] |
|-------------------|---------------------------|---------------------------|------------|---------------------------|------------|---------------------------|---------------------------|---------------------------|----------------|
| Ø160 | 40 | 32 | 200 | 32 | 190 | 150 | 170 | 190 | 6.10 |
| Ø200 | 40 | 32 | 250 | 32 | 240 | 165 | 185 | 205 | 8.10 |
| Ø250 | 50 | 40 | 320 | 40 | 296 | 185 | 205 | 225 | 14.80 |
| Ø320 | 65 | 50 | 400 | 50 | | 207 | 230 | 253 | 16.00 |

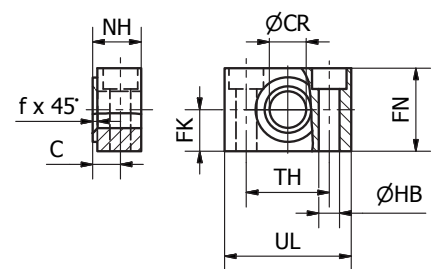
Important:
 If the cylinder is ordered with a piston rod protusion (WH dimension), please add this extra length to XV_{min}, XV_{std} and XV_{cal}

Pivot Brackets for MT Trunnion - AT4



Intended for use together with trunnion MT4.

Materials:
 Pivot bracket: Surface-treated aluminium
 Bush: Bronze
 Supplied in pairs



According to ISO 15552

| Cyl.-bore [mm] | UL [mm] | NH [mm] | TH [mm] | C [mm] | CR [mm] | HB [mm] | FN [mm] | FK [mm] | fx45° [mm] | Weight [kg] | Order code |
|-------------------|------------|------------|------------|-----------|------------|------------|------------|------------|---------------|----------------|----------------|
| Ø160 | 92 | 35 | 60 | 17,5 | 32 | 18 | 60 | 30 | 1.0 | 0,35 | PD24425 |
| Ø200 | 92 | 35 | 60 | 17,5 | 32 | 18 | 60 | 30 | 1.6 | 0,35 | PD24425 |
| Ø250 | 140 | 40 | 90 | 20 | 40 | 22 | 70 | 35 | 1.6 | 0,50 | PD25763 |
| Ø320 | 150 | 60 | 100 | 30 | 50 | 26 | 80 | 40 | 1.6 | 6,70 | KL9130 |

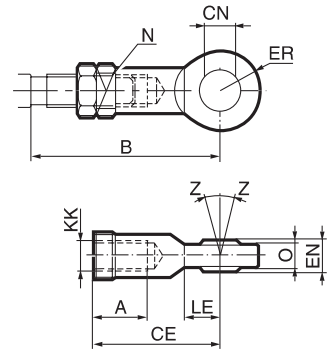
PDE2667TCEN
Pneumatic Cylinders ISO 15552

Swivel rod eye AP6 ⑫



Swivel rod eye for articulated mounting of the cylinder

Materials: Swivel rod eye: Zinc-plated steel
 Swivel bearing according to DIN 648K:
 Hardened steel



According to DIN ISO 8139

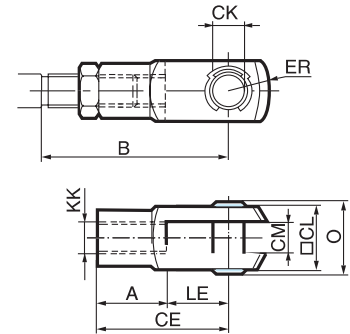
| Cyl.-bore [mm] | A [mm] | B _{min} [mm] | CE [mm] | ØCN _{H9} [mm] | EN _{H12} [mm] | ER [mm] | KK [mm] | LE _{min} [mm] | N [mm] | O [mm] | Weight [kg] | Order code |
|-------------------|-----------|--------------------------|------------|---------------------------|---------------------------|------------|------------|---------------------------|-----------|-----------|----------------|-----------------|
| Ø160 | 56 | 141 | 125 | 35 | 43 | 40,5 | M36x2 | 41 | 50 | 28 | 1.6 | P1C-4SRS |
| Ø200 | 56 | 141 | 125 | 35 | 43 | 40,5 | M36x2 | 41 | 50 | 28 | 1.6 | P1C-4SRS |
| Ø250 | 60 | 164 | 142 | 40 | 49 | 45,5 | M42x2 | 46 | 55 | 33 | 2.4 | P1C-4VRS |
| Ø320 | 65 | 191 | 160 | 50 | 60 | 58,5 | M48x2 | 59 | 65 | 45 | 5.0 | P1C-4WRS |

Clevis AP2 ⑬



Clevis for articulated mounting of the cylinder.

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



According to DIN ISO 8140

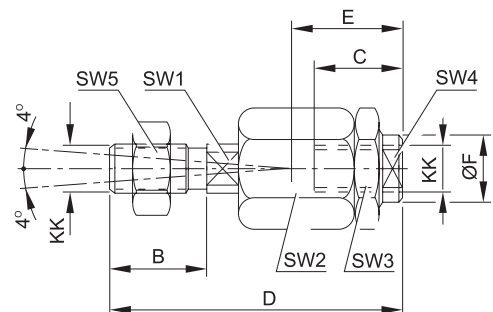
| Cyl.-bore [mm] | A [mm] | B _{min} [mm] | CE [mm] | CK _{H11/e9} [mm] | CL [mm] | CM [mm] | ER [mm] | KK [mm] | LE [mm] | O [mm] | Weight [kg] | Order code |
|-------------------|-----------|--------------------------|------------|------------------------------|------------|------------|------------|------------|------------|-----------|----------------|-----------------|
| Ø160 | 72 | 144 | 144 | 35 | 70 | 35 | - | M36x2 | 72 | - | 2.93 | P1C-4SRC |
| Ø200 | 72 | 144 | 144 | 35 | 70 | 35 | - | M36x2 | 72 | - | 2.93 | P1C-4SRC |
| Ø250 | 84 | 168 | 168 | 40 | 85 | 40 | - | M42x2 | 84 | - | 5.64 | P1C-4VRC |
| Ø320 | 96 | 192 | 192 | 50 | 96 | 50 | - | M48x2 | 96 | - | 7.86 | P1C-4WRC |

Flexo coupling PM5 ⑭



Flexo coupling for articulated mounting of piston rod.
 Flexo fitting is intended to take up axial angle errors within a range of ±4°.

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




| Cyl.-bore [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] | Order code |
|-------------------|------------|-----------|-----------|-----------|-----------|------------|-------------|-------------|-------------|-------------|-------------|----------------|-----------------|
| Ø160 | M36x2 | 72 | 50 | 241 | 110 | 56 | 36 | 75 | 75 | 50 | 55 | 5.1 | P1C-4SRF |
| Ø200 | M36x2 | 72 | 50 | 241 | 110 | 56 | 36 | 75 | 75 | 50 | 55 | 5.1 | P1C-4SRF |
| Ø250 | M42x2 | 82 | 88 | 271 | 120 | 64 | 36 | 85 | 85 | 60 | 65 | 9.2 | P1C-4VRF |
| Ø320 | M48x2 | 82 | 88 | 271 | 120 | 64 | 42 | 85 | 85 | 60 | 75 | 9.4 | P1C-4WRF |

Seal Kits

Complete seal kits consisting of:

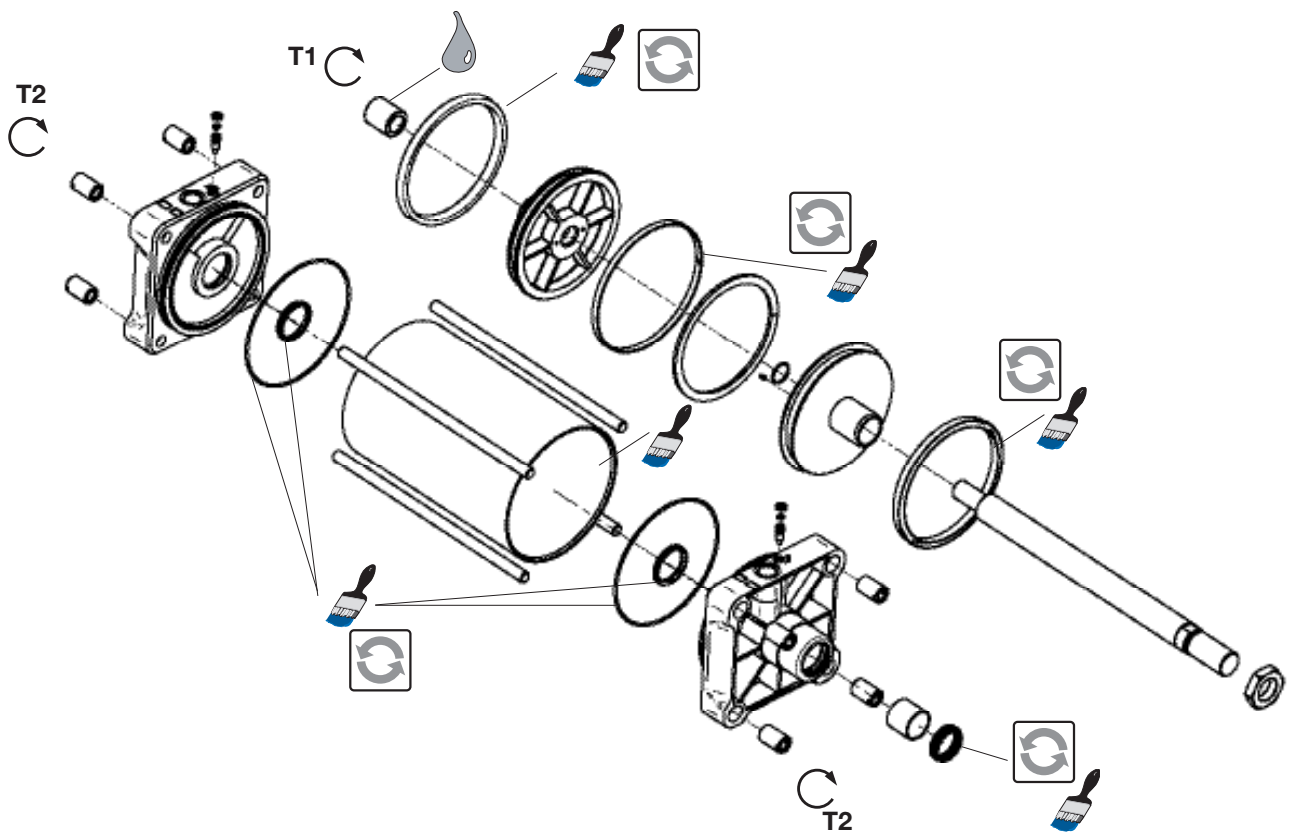
- 2 piston seals.
- 2 cushioning seals.
- 1 wiper seal.
- 1 piston rod seal, 2 for bores 250, 320 mm.
- 2 O-Rings.


Greases

| | | | |
|--|----------------------|------|-------------------|
|  | Standard temperature | 30 g | 9127394541 |
| | High temperature | 30 g | 9127394521 |

| Cyl.-bore [mm] | Standard temperature ¹⁾ | High temperature ¹⁾ |
|----------------|------------------------------------|--------------------------------|
| Ø160 | P1F-6160RN | P1F-6160RF |
| Ø200 | P1F-6200RN | P1F-6200RF |
| Ø250 | P1F-6250RN | P1F-6250RF |
| Ø320 | P1F-6320RN | P1F-6320RF |

¹⁾ for through piston rod, add K at the end, ie P1F-6160RNK



| Cyl.-bore [mm] | AF [mm] | Piston T1 [Nm] |  | T2 [Nm] |
|----------------|---------|----------------|---|---------|
| Ø160 | 27 | 110-130 | <u>25</u> 3,7 | 65-80 |
| Ø200 | 27 | 110-130 | <u>25</u> 3,7 | 65-80 |
| Ø250 | 27 | 110-130 | <u>32</u> 5,5 | 65-80 |
| Ø320 | 27 | 110-130 | <u>32</u> 5,5 | 65-80 |



= Included in seal kit



Lubricated with grease



= Socket head across flats



Locking fluid
 Loctite 243 locking fluid must be used



= Tightening torque

Drop-in sensors

The P8S sensors can easily be installed from the side in the sensor groove, at any position along the piston stroke. The sensors are completely recessed and thus mechanically protected. Choose between electronic or reed sensors and several cable lengths and 8 mm and M12 connectors.



Electronic sensors

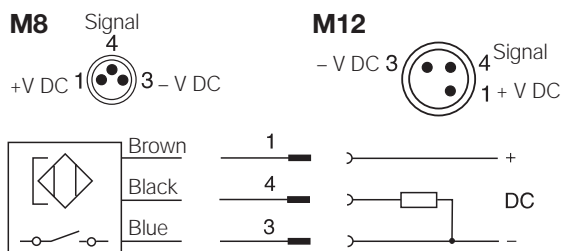
The electronic sensors are "Solid State", i.e. they have no moving parts at all. They are provided with short-circuit protection and transient protection as standard. The built-in electronics make the sensors suitable for applications with high on and off switching frequency, and where very long service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

Reed sensors

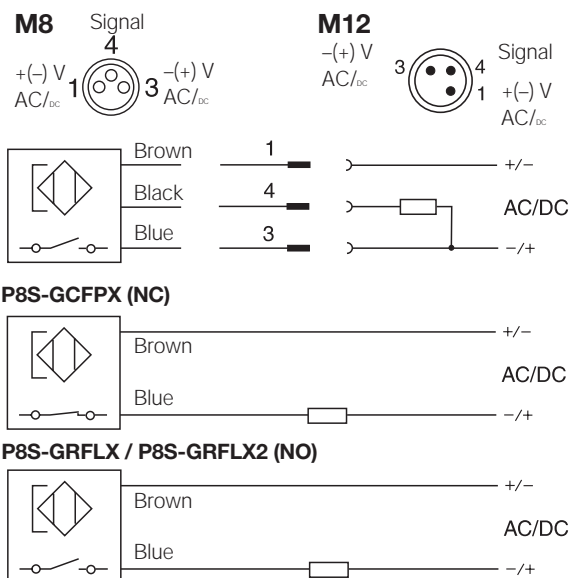
The sensors are based on proven reed switches, which offer reliable function in many applications. Simple installation, a protected position on the cylinder and clear LED indication.

| | Electronic | Reed |
|---|---|---|
| Cylinder type: | Profile with T-slot | |
| Cylinder type with adaptor: | Profile with S-slot (dovetail) Tie rods Round cylinders | |
| Installation: | Drop-in. Fixed by 1.5 mm stainless steel allen key or flathead screwdriver. | |
| Housing length: | 34.7 mm 31.5 mm (ATEX) | |
| Output Type / Function: | PNP, Normally Open (NO) NPN, Normally Closed (NC) | Normally Open (NO) Normally Closed (NC) |
| Switching (on/off) switching frequency: | ≤1000 Hz | ± 400 Hz |
| Degree of Protection (IP): | IP67 | |
| Power consumption: | ≤ 10 mA | - |
| Input Supply Voltage Range: | 10 to 30 V DC 18 to 30 V DC (ATEX) | 10 to 30 10 to 120 10 to 230 V AC/DC (2-wire) 10 to 30 V AC/DC (3-wire) |
| Voltage Drop: | ≤ 2,2 V | ≤ 3,5 V (2-wire NO) ≤ 0,1 V (3-wire) ≤ 0,1 V (2-wire NC) |
| Continuous output current: | ≤ 100 mA ≤ 70 mA (ATEX) | ≤ 100 mA (2-wire NO) ≤ 500 mA (3-wire) ≤ 500 mA (2-wire NC) |
| Switching capacity: | - | ≤ 10 W |
| Hazardous area category: | 3G / 3D (ATEX) | - |
| Protection Class: | III | II (2-wire) III (3-wire) |
| Response Sensitivity: | 2.65.. 2.95 mT | 2.1.. 3.4 mT |
| Overrun Distance: | 3 mm | 9 mm |
| Hysteresis: | ≤ 0.5 mT | ≤ 0.2 mT |
| Repeatability: | ≤ 0.1 mT | |
| Reverse Polarity Protection: | Yes | |
| Short-circuit Protection: | Yes | - |
| Power-up Pulse Protection: | Yes | - |
| Ambiant Operating Temperature Range: | -25 to +75 °C (PUR cable) -20 to +70°C (PVC cable) -20 to +45°C (ATEX) | |
| Shock and Vibration resistance: | 30 g 11 ms / 10 ... 55 Hz, 1 mm | |
| EMC: | According to EN 60947-5-2 | |
| Industry Standard: | CE C UL US RoHs Ex | CE C UL US RoHs |
| UL Certification: | On request | |
| Housing Material: | Plastic polyamid PA12 (ATEX) PA66 | Plastic polyamid PA12 (2-wire 240V) PA66 |
| Cable Specification: | PUR (Polyurethane) PVC (Polyvinyl Chloride) | |
| Conductor Cross-Section: | 0.14 mm ² (3 wire) | 0.14 mm ² (3-wire) 0.12 mm ² (2-wire) |
| Colour of LED: | Yellow | |
| Connection Style: | M8 snap-in M8R (knurled nuts) M12 (knurled nuts) None (Flying lead) | |

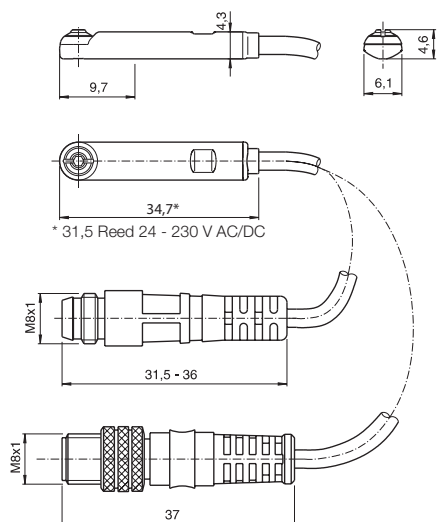
Electronic sensors



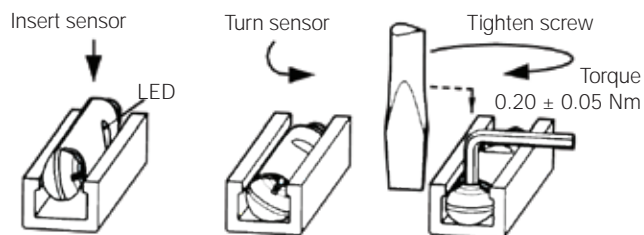
Reed sensors



Dimensions [mm]

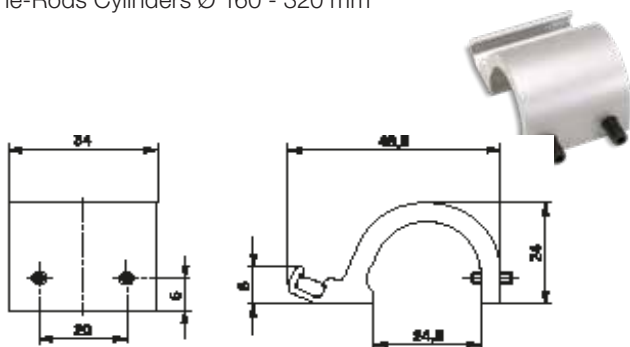


Sensor Installation



Brackets for sensors for Tie-Rods version

P8S-TMA08
 (anodised aluminium, zinc plated screws)
 Tie-Rods Cylinders Ø 160 - 320 mm



PDE2667TCEN

Pneumatic Cylinders ISO 15552

Sensors

| Output/function | Cable/connector | Weight [kg] | Order code |
|---------------------------------------|--|-------------|------------|
| Electronic sensors, 10-30 V DC | | | |
| PNP type, normally open | 0.27 m PUR cable and 8 mm snap-in male connector | 0.007 | P8S-GPSHX |
| PNP type, normally open | 0.27 m PUR cable and M12 screw male connector | 0.015 | P8S-GPMHX |
| PNP type, normally open | 3 m PVC cable without connector | 0.030 | P8S-GPFLX |
| PNP type, normally open | 10 m PVC cable without connector | 0.110 | P8S-GPFTX |
| Reed sensors, 10-30 V AC/DC | | | |
| Normally open | 0.27 m PUR cable and 8 mm snap-in male connector | 0.007 | P8S-GSSHX |
| Normally open | 0.27 m PUR cable and M12 screw male connector | 0.015 | P8S-GSMHX |
| Normally open | 3 m PVC cable without connector | 0.030 | P8S-GSFLX |
| Normally open | 10 m PVC cable without connector | 0.110 | P8S-GSFTX |
| Normally closed | 5 m PVC cable without connector without LED | 0.050 | P8S-GCFPX |
| Reed sensors, 10-120 V AC/DC | | | |
| Normally open | 3 m PVC cable without connector | 0.030 | P8S-GRFLX |
| Reed sensors, 24-230 V AC/DC | | | |
| Normally open | 3 m PVC cable without connector | 0.030 | P8S-GRFLX2 |

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 connectors and meet protection class IP 65.



Technical data

| | |
|--------------------------------|--|
| Operating voltage: | max. 32V AC/DC |
| Operating current per contact: | max. 4 A |
| Connection cross section: | 0.25... 0.5 mm ² (conductor diameter min 0.1) |
| Protection class: | IP65 And IP 67 when plugged and screwed down (EN 60529) |
| Temperature range: | - 25... +85°C |

| Connector | Weight [kg] | Order Code |
|---------------------|-------------|------------------|
| M8 screw connector | 0.018 | P8CS0803J |
| M12 screw connector | 0.022 | P8CS1204J |

Connecting cables

| Description | Weight [g] | For Product Series | Order Code |
|---|------------|-----------------------------|-------------------|
| Cable flex PVC 3 meter with 8mm snap-in connector / flying leads | 70 | P8S Sensors with M8 | 9126344341 |
| Cable flex PVC 10 meter with 8mm snap-in connector / flying leads | 210 | P8S Sensors with M8 | 9126344342 |
| Cable PUR 3 meter with 8mm snap-in connector / flying leads | 70 | P8S Sensors with M8 | 9126344345 |
| Cable flex PUR 10 meter with 8mm snap-in connector / flying leads | 210 | P8S Sensors with M8 | 9126344346 |
| Cable PVC 2.5 meter with M8 screw connector / flying leads | 60 | P8S Sensors with knurled M8 | KC3102 |
| Cable PVC 5 meter with M8 screw connector / flying leads | 120 | P8S Sensors with knurled M8 | KC3104 |

Continuous Position Sensing

Analogue signal or IO-Link communication for linear cylinders many applications require more than just end of stroke sensing of an actuator, but traditional methods of continuous sensing are expensive and difficult to implement. Parker's CPS series of the P8S sensor family enables quick, easy, precise, and contactless position sensing of a piston. This can be installed on a standard linear actuator and offers an outstanding price to performance ratio.

Product Features:

- Continuous position sensing
- IO-Link communication with M12 connector
- No modification to the actuator
- Analogue 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:

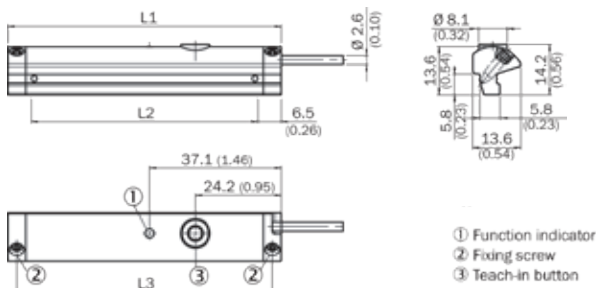
- 1 ms sampling rate
- 0.03% full scale resolution
- 0.06% full scale repeatability
- 0.3 mm Linearity error

How it installs:

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

- Pivot the sensor into the slot
- Teach the CPS unit the desired measuring range
- Tighten set screws

Dimensions in mm (inch)

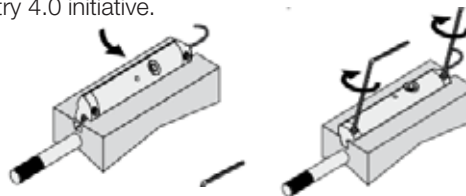


How it connects:

Analogue 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 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.



| Order Code | | | | |
|------------|------|-----|------------------|------------------|
| L1 | L2 * | L3 | Analogue | IO-Link |
| 45 | 32 | 40 | P8SAGACHA | P8SAGHMHA |
| 77 | 64 | 72 | P8SAGACHB | P8SAGHMHB |
| 141 | 128 | 136 | P8SAGACHD | P8SAGHMHD |
| 205 | 192 | 200 | P8SAGACHF | P8SAGMHMF |
| 269 | 256 | 264 | P8SAGACHH | P8SAGMHMH |

*L2 equal to the measuring range

Ordering Data

Drop in T-slot, Turn, Screw, it's done

| Output | Measuring length | Configuration Option | Order Code | Weight [g] | For product series |
|----------|------------------|-----------------------------------|------------------|------------|----------------------|
| Analogue | 32 mm | Teach Button | P8SAGACHA | 16 | With T-slot groove * |
| | 64 mm | | P8SAGACHB | 26 | |
| | 128 mm | | P8SAGACHD | 46 | |
| | 192 mm | | P8SAGACHF | 66 | |
| | 256 mm | | P8SAGACHH | 86 | |
| IO-Link | 32 mm | Teach Button or IO-Link parameter | P8SAGHMHA | 20 | With T-slot groove * |
| | 64 mm | | P8SAGHMHB | 30 | |
| | 128 mm | | P8SAGHMHD | 50 | |
| | 192 mm | | P8SAGMHMF | 70 | |
| | 256 mm | | P8SAGMHMH | 90 | |

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

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

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 metre 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 | | | | Water | | Oil |
|-------------------------|--|----------------|--------------|--|--------------------------------|----------------------------|---------------------------------------|
| | Maximum number of particles per m ³ | | | Mass Concentration mg/m ³ | Vapour Pressure Dewpoint | Liquid g/m ³ | Total Oil (aerosol liquid and vapour) |
| | 0,1 - 0,5 micron | 0,5 - 1 micron | 1 - 5 micron | | | | mg/m ³ |
| 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 metre 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 metre of compressed air, not more than 0.01mg of oil is allowed. This is a total level for liquid oil, oil aerosol and oil vapour.

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.**

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