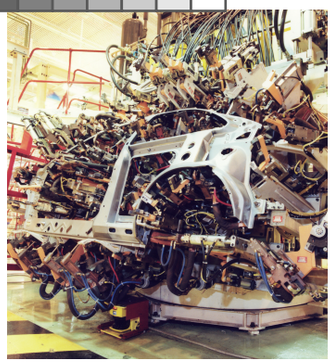
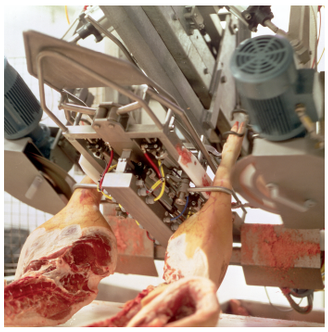




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process control
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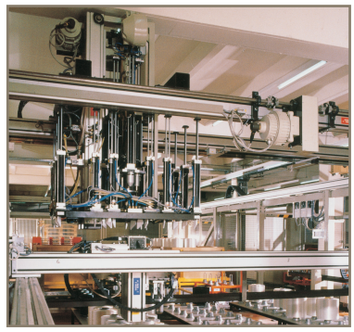




# Pneumatic Cylinders

## Series P1D-T Tie Rod Line - Ø32 to Ø320 mm
## According to ISO 15552

PDE2667TCUK April 2015



ENGINEERING YOUR SUCCESS.

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**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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## Design variants

The P1D-T range of tie rod cylinders is intended for use in a wide range of applications. Careful design and high quality manufacture throughout ensure long service life and optimum economy.
Mounting dimensions fully in accordance with ISO 15552 (ISO 6431 and CETOP RP52P) greatly simplifies installation and world-wide interchangeability.
For extreme conditions these cylinders for high and low temperatures have materials and sealing systems specially designed for their particular temperature ranges. Piston is made entirely from aluminium, to give optimum function at high or low temperature in combination with seals made from specially tested materials and special grease.





### 3 and 4 positions cylinders

This type of cylinder function consists of two cylinders installed back to back. Two cylinders with the same stroke give a 3 positions cylinder with a symmetrical centre position, whereas different strokes give a 4 positions cylinder where the two central positions can be calculated from the different stroke lengths.This type of unit is available as factory-fitted P1D tie-rod cylinders in bores Ø32 to 125 mm. Note that otherwise two cylinders can be flange mounted back-to-back with a special mounting.



### Tandem version

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



### Alternative piston rod materials

All P1D cylinders can be ordered with the following piston rod materials:

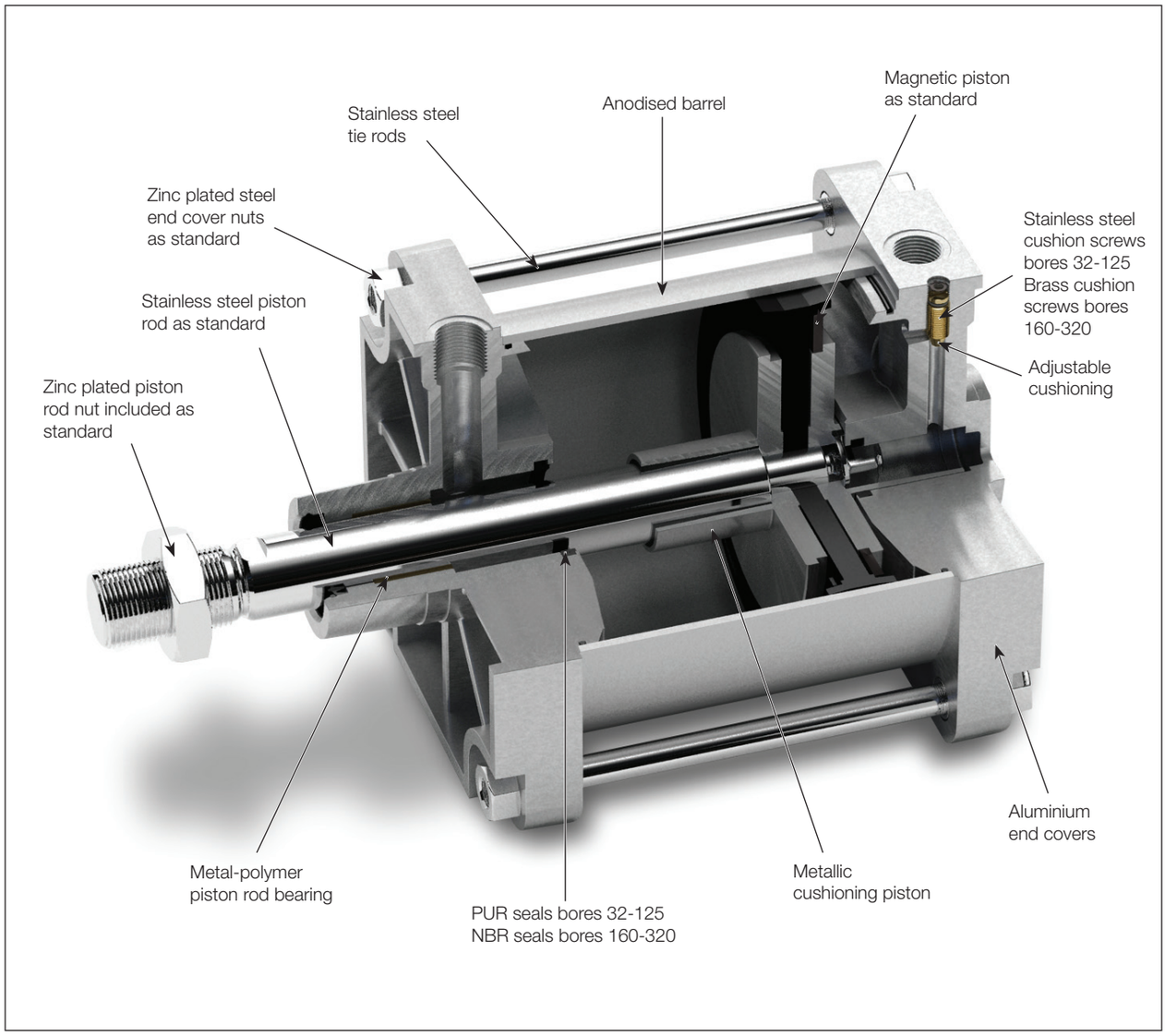
- Steel, hard chromed
- Stainless steel, roller polished (standard)
- Acid-proof steel, roller polished
- Stainless steel, hard chromed



### Through piston rod

All P1D cylinders are available with a through rod. Cylinders with a through piston rod can take higher side forces. Thanks to the double support of the piston rod. In addition, this design, with tie rods, makes it easier to install external position sensors.






## Standard cylinders P1D-T, ISO 15552 bores Ø32 - Ø320 mm

### Global product range

The P1D-T range of cylinders is intended for use in a wide range of applications.
Careful design and high quality manufacture throughout ensure long service life and optimum economy.
Mounting dimensions fully in accordance with ISO 15552 (ISO 6431 and CETOP RP52P) greatly simplifies installation and world-wide interchangeability.

### Features

- Bore sizes Ø32 - Ø320 mm
- Stroke lengths 5 - 2800mm. (32-125)
- Stroke lengths 10 - 2000mm. (160-320)
- Magnetic piston as standard
- Adjustable cushioning as standard
- Special versions on request
- ATEX version (160-320)

# P1D-T Pneumatic ISO Cylinders - Ø32 - Ø320 mm

## Cylinder forces, double acting variants

| Cyl. bore/ pist. rod mm | Stroke | Piston area cm² | Max theoretical force in N (bar) 1,0 | 2,0 | 3,0 | 4,0 | 5,0 | 6,0 | 7,0 | 8,0 | 9,0 | 10,0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **32/12** | + | 8,0 | 80 | 161 | 241 | 322 | 402 | **483** | 563 | 643 | 724 | 804 |
| | - | 6,9 | 69 | 138 | 207 | 276 | 346 | **415** | 484 | 553 | 622 | 691 |
| **40/16** | + | 12,6 | 126 | 251 | 377 | 503 | 628 | **754** | 880 | 1005 | 1131 | 1257 |
| | - | 10,6 | 106 | 212 | 318 | 424 | 530 | **636** | 742 | 848 | 954 | 1060 |
| **50/20** | + | 19,6 | 196 | 393 | 589 | 785 | 982 | **1178** | 1374 | 1571 | 1767 | 1963 |
| | - | 16,5 | 165 | 330 | 495 | 660 | 825 | **990** | 1155 | 1319 | 1484 | 1649 |
| **63/20** | + | 31,2 | 312 | 623 | 935 | 1247 | 1559 | **1870** | 2182 | 2494 | 2806 | 3117 |
| | - | 28,0 | 280 | 561 | 841 | 1121 | 1402 | **1682** | 1962 | 2242 | 2523 | 2803 |
| **80/25** | + | 50,3 | 503 | 1005 | 1508 | 2011 | 2513 | **3016** | 3519 | 4021 | 4524 | 5027 |
| | - | 45,4 | 454 | 907 | 1361 | 1814 | 2268 | **2721** | 3175 | 3629 | 4082 | 4536 |
| **100/25** | + | 78,5 | 785 | 1571 | 2356 | 3142 | 3927 | **4712** | 5498 | 6283 | 7069 | 7854 |
| | - | 73,6 | 736 | 1473 | 2209 | 2945 | 3682 | **4418** | 5154 | 5890 | 6627 | 7363 |
| **125/32** | + | 122,7 | 1227 | 2454 | 3682 | 4909 | 6136 | **7363** | 8590 | 9817 | 11045 | 12272 |
| | - | 114,7 | 1147 | 2294 | 3440 | 4587 | 5734 | **6881** | 8027 | 9174 | 10321 | 11468 |
| **160/40** | + | 201,0 | 2010 | 4019 | 6029 | 8038 | 10048 | **12058** | 14067 | 16077 | 18086 | 20096 |
| | - | 188,4 | 1884 | 3768 | 5652 | 7536 | 9420 | **11304** | 13188 | 15072 | 16956 | 18840 |
| **200/40** | + | 314,2 | 3142 | 6283 | 9425 | 12566 | 15708 | **18850** | 21991 | 25133 | 28274 | 31416 |
| | - | 294,5 | 2945 | 5891 | 8836 | 11781 | 14727 | **17672** | 20617 | 23562 | 26508 | 29453 |
| **250/50** | + | 490,9 | 4909 | 9818 | 14726 | 19635 | 24544 | **29453** | 34362 | 39270 | 44179 | 49088 |
| | - | 471,3 | 4713 | 9425 | 14138 | 18850 | 23563 | **28275** | 32988 | 37700 | 42413 | 47125 |
| **320/63** | + | 804,25 | 8043 | 16085 | 24128 | 32170 | 40213 | **48255** | 56298 | 64340 | 72383 | 80425 |
| | - | 773,1 | 7731 | 15462 | 23192 | 30923 | 38654 | **46385** | 54116 | 61846 | 69577 | 77308 |

+ = Outward stroke
- = Return stroke

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

## Main data: P1D-T

| Cylinder designation | Cylinder bore mm | Cylinder area cm² | Piston rod dia. mm | Piston rod area cm² | Piston rod thread | Cushioning length mm | Consumption[2] litre | Connection thread |
|---|---|---|---|---|---|---|---|---|
| P1D-T032••XXXX[1] | 32 | 8,0 | 12 | 1,1 | M10x1,25 | 17 | 0,105 | G1/8 |
| P1D-T040••XXXX[1] | 40 | 12,6 | 16 | 2,0 | M12x1,25 | 19 | 0,162 | G1/4 |
| P1D-T050••XXXX[1] | 50 | 19,6 | 20 | 3,1 | M16x1,5 | 20 | 0,253 | G1/4 |
| P1D-T063••XXXX[1] | 63 | 31,2 | 20 | 3,1 | M16x1,5 | 23 | 0,414 | G3/8 |
| P1D-T080••XXXX[1] | 80 | 50,3 | 25 | 4,9 | M20x1,5 | 23 | 0,669 | G3/8 |
| P1D-T100••XXXX[1] | 100 | 78,5 | 25 | 4,9 | M20x1,5 | 27 | 1,043 | G1/2 |
| P1D-T125••XXXX[1] | 125 | 122,7 | 32 | 8,0 | M27x2 | 30 | 1,662 | G1/2 |
| P1D-T160••XXXX[1] | 160 | 201,0 | 40 | 12,6 | M36x2 | 52 | 2,815 | G3/4 |
| P1D-T200••XXXX[1] | 200 | 314,2 | 40 | 19,6 | M36x2 | 52 | 4,398 | G3/4 |
| P1D-T250••XXXX[1] | 250 | 490,9 | 50 | 19,6 | M42x2 | 52 | 6,872 | G1 |
| P1D-T320••XXXX[1] | 320 | 804,3 | 63 | 31,2 | M48x2 | 50 | 11,259 | G1 |

### Total mass including moving parts

| Cylinder designation | Total mass (kg) at 0 mm stroke | Total mass (kg) Supplement per 10 mm stroke |
|---|---|---|
| P1D-T032••XXXX[1] | 0,55 | 0,023 |
| P1D-T040••XXXX[1] | 0,80 | 0,033 |
| P1D-T050••XXXX[1] | 1,20 | 0,048 |
| P1D-T063••XXXX[1] | 1,73 | 0,051 |
| P1D-T080••XXXX[1] | 2,45 | 0,075 |
| P1D-T100••XXXX[1] | 4,00 | 0,084 |
| P1D-T125••XXXX[1] | 6,87 | 0,138 |
| P1D-T160••XXXX[1] | 10,45 | 0,205 |
| P1D-T200••XXXX[1] | 17,80 | 0,220 |
| P1D-T250••XXXX[1] | 31,00 | 0,40 |
| P1D-T320••XXXX[1] | 60,00 | 0,60 |

### Mass moving parts only (for cushioning calculation)

| Cylinder designation | Mass moving parts (kg) at 0 mm stroke | Supplement per 10 mm stroke |
|---|---|---|
| P1D-T032••XXXX[1] | 0,13 | 0,009 |
| P1D-T040••XXXX[1] | 0,24 | 0,016 |
| P1D-T050••XXXX[1] | 0,42 | 0,025 |
| P1D-T063••XXXX[1] | 0,50 | 0,025 |
| P1D-T080••XXXX[1] | 0,90 | 0,039 |
| P1D-T100••XXXX[1] | 1,10 | 0,039 |
| P1D-T125••XXXX[1] | 2,34 | 0,063 |
| P1D-T160••XXXX[1] | x | x |
| P1D-T200••XXXX[1] | x | x |
| P1D-T250••XXXX[1] | x | x |
| P1D-T320••XXXX[1] | x | x |

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



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Pneumatic Division - Europe

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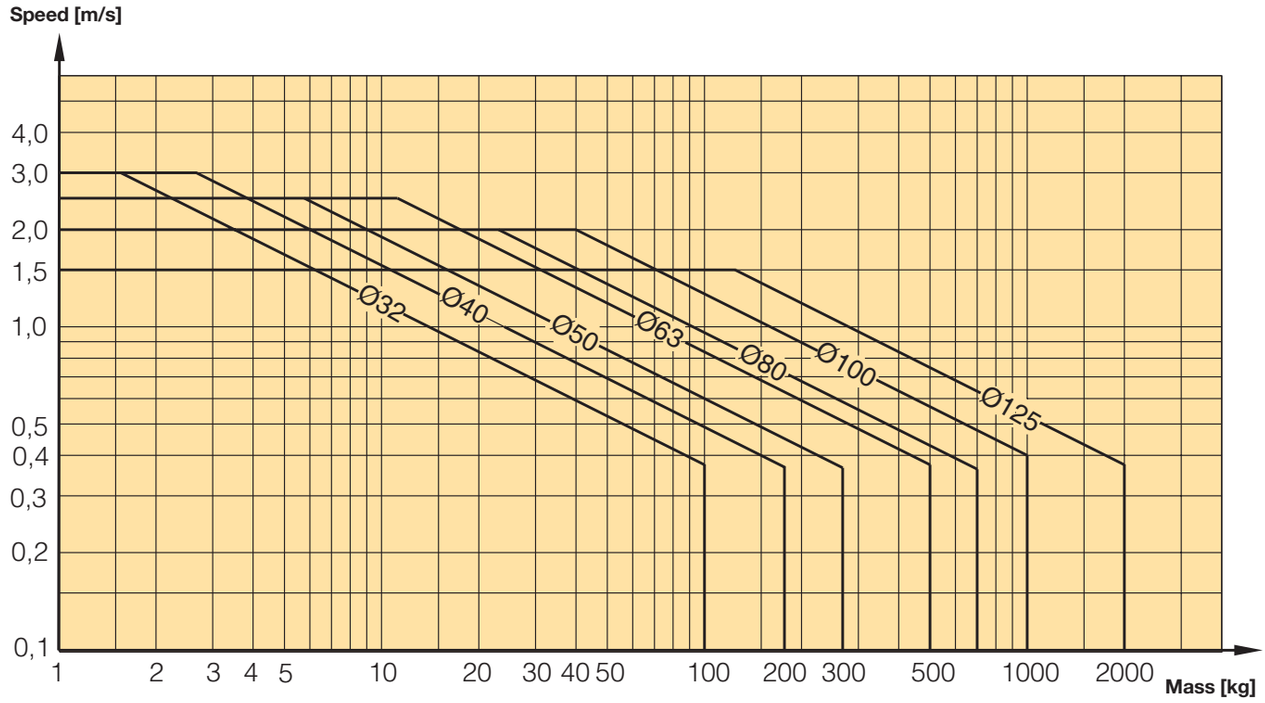
## Cushioning characteristics

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

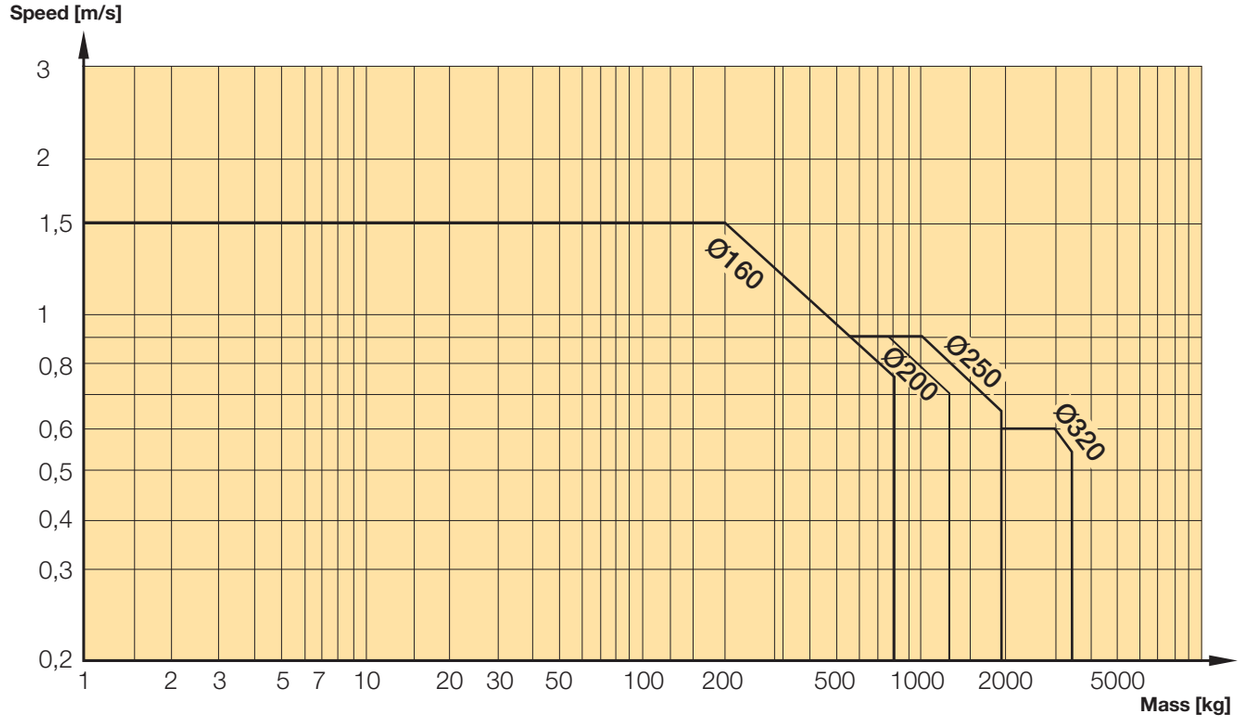
- Low load, i.e. low pressure drop across the piston
- Equilibrium speed
- Correctly adjusted cushioning screw
- 6 bar at cylinder port

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

### Ø32 - Ø125




### Ø160 - Ø320



## Guide for selecting suitable tubing

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

### The following is the basic principle:

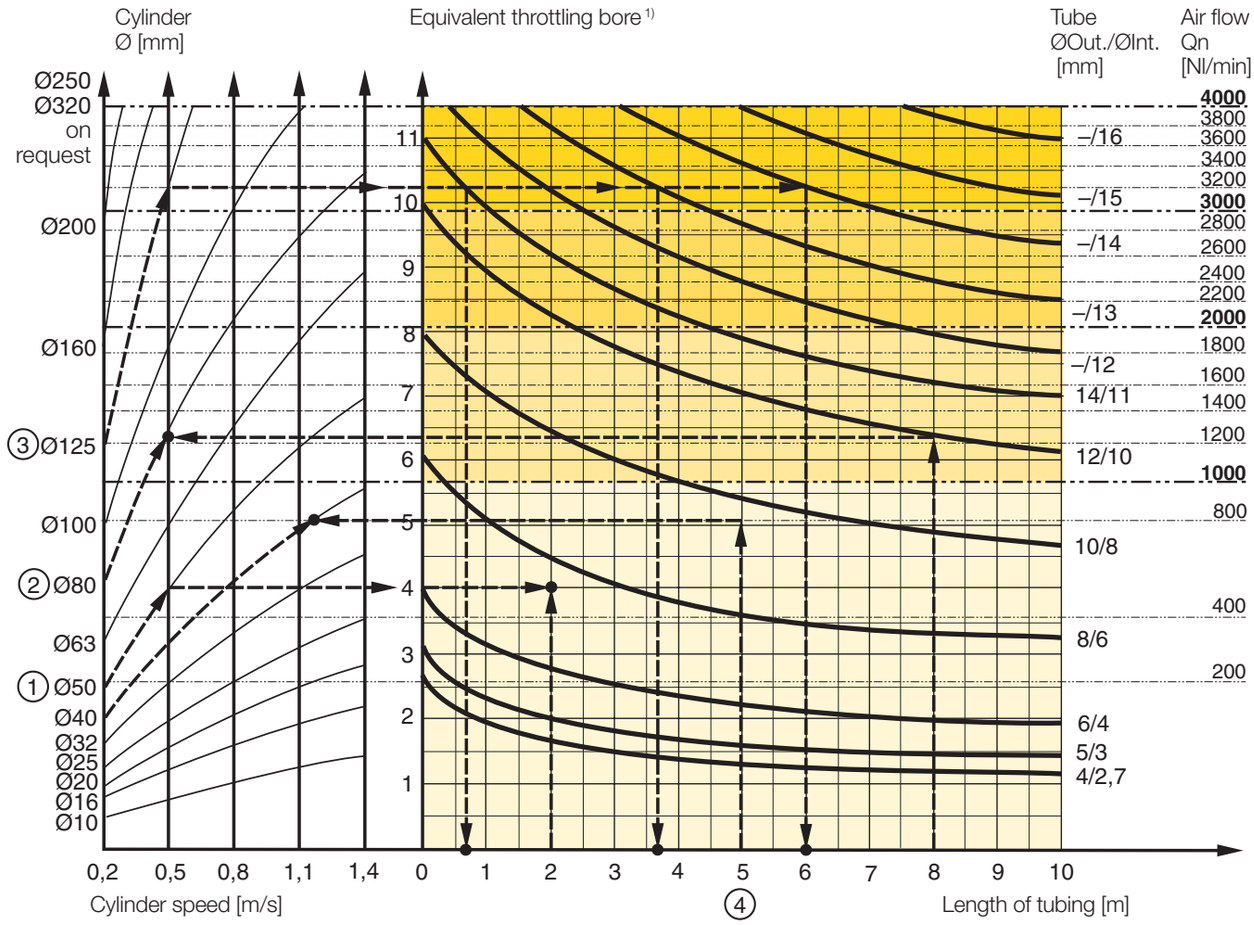
1. The primary line to the working valve could be over sized (this does not cause any extra air consumption and consequently does not create any extra costs in operation).
2. The tubes between the valve and the cylinder should, however, be optimized according to the principle that an insufficient bore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

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

### The following prerequisites apply:

The *cylinder load should be about 50%* of the theoretical force (= normal load). A lower load gives a higher velocity and vice versa. The tube size is selected as a function of the *cylinder bore*, the desired *cylinder velocity* and the *tube length* between the valve and the cylinder.

If you want to use the capacity of the valve to its maximum, and obtain maximum speed, the tubing should be chosen so that they at least correspond with the equivalent restriction diameter (see description below), so that the tubing does not restrict the total flow. This means that a short tubing must have at least the equivalent restriction diameter. If the tubing is longer, choose it from the table below. Straight fittings should be chosen for highest flow rates. (Elbow and banjo fittings cause restriction.)




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

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

### Example ①: Which tube diameter should be used?

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

### Example ②: What cylinder velocity will be obtained?

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

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

For a application a 125 mm bore cylinder will be used. Maximum velocity of piston rod is 0.5 m/s. The cylinder will be controlled by a valve with Qn 3200 Nl/min. What diameter of tube can be used and what is maximum lenght of tube.
We refer to the diagram. We start at the left side of the diagram cylinder Ø125. We follow the line until the intersection with the velocity line of 0.5 m/s. From here we draw a horizontal line in the diagram. This line shows us we need an equivalent throttling bore of approximately 10 mm. Following this line horizontally we cross a few intersections. These intersections shows us the minimum inner diameter (rightside diagram) in combination with the maximum length of tube (bottomside diagram).

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

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

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

### Valve series with respective flows in Nl/minute

| Valve series | Qn in Nl/Min |
|---|---|
| Interface PS1 | 120 |
| Moduflex Size 1 - Double 4/2 single solenoid | 165 |
| Adex A05 | 173 |
| Isys Micro - Single 5/3 APB | 228 |
| Moduflex Size 1 - Single or Double 3/2 | 235 |
| Isys Micro - Double 3/2 | 276 |
| Isys Micro - Single 5/2 | 282 |
| Moduflex Size 1 - Single 4/2 | 310 |
| ISOMAX DX02 | 378 |
| ISYS ISO HB | 390 |
| Moduflex Size 2 - Single or Double 3/2 | 440 |
| PVL-B stackable inline valve | 540 |
| Adex A12 | 560 |
| ISOMAX DX01 | 588 |
| Viking Xtrem P2LAX - G1/8" | 660 |
| Moduflex Size 2 - Single 4/2 | 800 |
| ISYS ISO HA | 918 |
| ISOMAX DX1 & DX Rail | 1032 |
| PVL-C stackable inline valve | 1100 |
| ISYS ISO H1 | 1248 |
| Viking Xtrem P2LBX - G1/4" | 1290 |
| ISOMAX DX2 & DX Rail | 2298 |
| Viking Xtrem P2LCX - G3/8" | 2460 |
| ISYS ISO H2 | 2520 |
| Viking Xtrem P2LDX - G1/2" | 2658 |
| ISOMAX DX3 & DX Rail | 3840 |
| ISYS ISO H3 | 5022 |



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# P1D-T Pneumatic ISO Cylinders - Ø32 - Ø320 mm

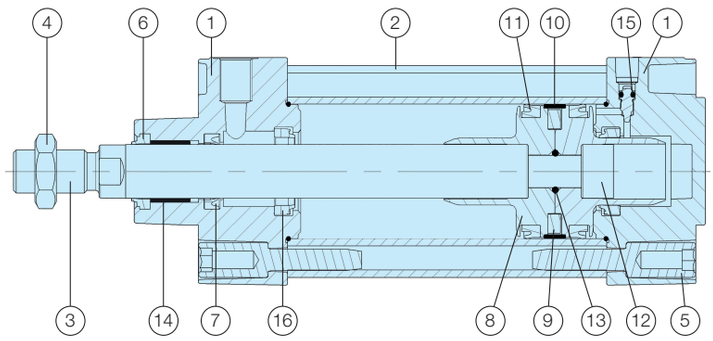
## General technical data

| | |
|---|---|
| Product type | Standard cylinder according to ISO 15552 |
| Bore size | 32 - 125 mm |
| Stroke length | 10-2800 mm |
| Versions | Double acting |
| Cushioning | Adjustable air cushioning |
| Position sensing | Proximity sensor in temperature range -25°C to +80°C |
| Installation | P1D cylinder and piston rod mountings |
| Mounting position | Any |

## 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 class 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 | 0,5 bar to 10 bar Hydraulic version : 2 bar to 10 bar |
| Ambient temperature | High temp version : -10°C to +150°C Hydraulic version : -20°C to +80°C Standard temp version : -20°C to +80°C<br>Low temp version : -40°C to +80°C Metal scraper version : -30°C to +80°C |
| Pre-lubricated | Further lubrication is normally not necessary. If additional lubrication is introduced it must be continued. |
| Oil used for hydraulic version | Hydraulic oil type HLP (DIN 51524, ISO 11158). Viscosity by 40°C: 32 mm²/s (cst). Example: Shell Tellus 32 or equal. |
| 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. |

## Material specification - Bores Ø32 to 125 mm




| Pos | Part | | Specification |
|---|---|---|---|
| 1 | End covers | | Anodised aluminium |
| 2 | Cylinder barrel | | Anodised aluminium |
| 3 | Piston rod | Standard | Stainless steel, DIN X 10 CrNiS 18 9 |
| | | Optional | Hard chromium plated Fe 490-2 FN |
| | | | Acid-proof steel |
| | | | Chrome plated stainless steel |
| 4 | Piston rod nut | Standard | Zinc plated steel |
| | | Optional | Stainless steel |
| | | Optional | Acid-proof steel |
| 5 | End cover screws | Standard | Zinc plated steel |
| | | Optional | Stainless steel |
| 6 | Scraper ring | High temperature | FPM (Viton) |
| | | Standard & low temperature, hydraulic | PUR (Polyurethane) |
| | | Metal scraper standard temperature | Stainless steel / Brass / NBR |
| 7 | Piston rod seal | High temperature | FPM (Viton) |
| | | Standard & low temperature | PUR (Polyurethane) |
| | | Hydraulic | NBR(Nitrile) |
| 8 | Piston | | Aluminium |
| 9 | Magnet | | Plastic coated magnetic material (Low temperature version only) |
| 10 | Piston bearing | | PTFE |
| 11 | Piston seals | High temperature | FPM (Viton) |
| | | Standard & low temperature | PUR (Polyurethane) |
| | | Hydraulic | NBR(Nitrile) |
| 12 | Piston bolt | | Zinc plated steel |
| 13 | O-rings | | Nitrile rubber |
| 14 | Piston rod bearing | | Multilayer PTFE/steel |
| 15 | Cushioning screws | | Stainless steel, DIN X 10 CrNiS 18 n9 |
| 16 | Cushioning seals | High temperature | FPM (Viton) |
| | | Standard & low temperature | PUR (Polyurethane) |
| | Note on materials | | RoHS compliant |

## General technical data

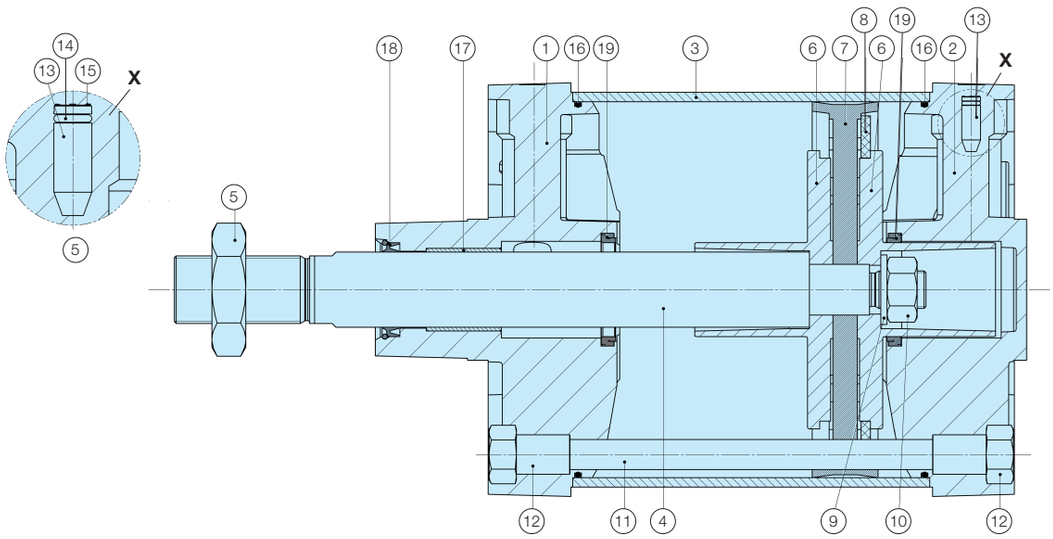
| | |
|---|---|
| Product type | Standard cylinder according to ISO 15552 |
| Bore size | 160 - 320 mm |
| Stroke length | 10-2000 mm |
| Versions | Double acting |
| Cushioning | Adjustable air cushioning |
| Position sensing | Proximity sensor in temperature range -25°C to +80°C |
| Installation | P1D cylinder and piston rod mountings |
| Mounting position | Any |

## 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 class 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 outdoor operation) and is in line with the air quality from most standard compressors with a standard filter.

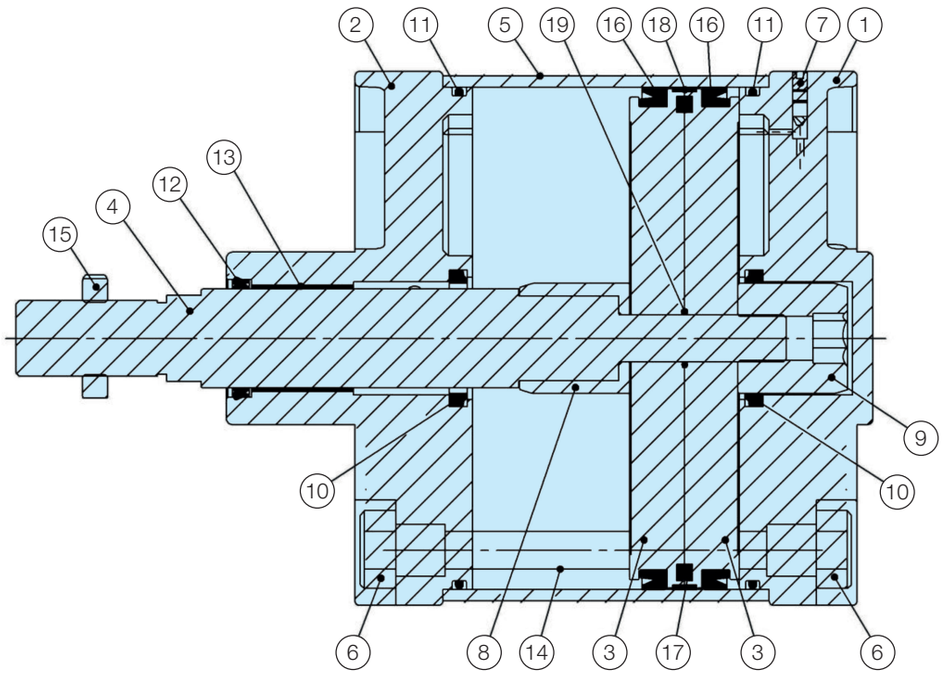
| | |
|---|---|
| Operating pressure | 1,0 bar to 10 bar |
| Ambient temperature<br>Standard version | -20°C to +80°C |
| High temp.version | -10°C to +150°C |
| Pre-lubricated | Further lubrication is normally not necessary. If additional lubrication is introduced it must be continued. |
| Corrosion resistance | High resistance to corrosion and chemicals. Materials and surface treatment have been selected for industrial applications where solvents and detergents are frequently used. |

## Material specification - Bores Ø160, Ø200 and Ø250 mm




| Pos | Part | | Specification |
|---|---|---|---|
| 1 | Front cover | | Aluminium |
| 2 | Rear cover | | Aluminium |
| 3 | Cylinder barrel | | Anodised aluminium |
| 4 | Piston rod | Standard | Stainless steel 1.4104 (X12CrMoS17) |
| | | Option | Chrome plated steel 1.5217 (20MnV6) |
| 5 | Piston rod nut | | Zinc plated steel |
| 6 | Cushioning piston | | Aluminium |
| 7 | Piston seal | Standard | NBR |
| | | Option | FKM |
| 8 | Magnet | | Magnet foil |
| 9 | Washer | | Zinc plated steel |
| 10 | Piston nut | | Zinc plated steel |
| 11 | Tie rod | | High alloyed steel 1.4104 (X12CrMoS17) |
| 12 | Tie rod nut | | Zinc plated steel |
| 13 | Cushioning screw | | Brass |
| 14 | Cushioning O ring | Standard | NBR |
| | | Option | FKM |
| 15 | Retaining clip | | Spring steel |
| 16 | O ring | Standard | NBR |
| | | Option | FKM |
| 17 | Rod bearing | | Metal-polymer material |
| 18 | Rod seal | Standard | NBR |
| | | Option | FKM |
| 19 | Cushion seal | Standard | NBR |
| | | Option | FKM |

## Material specification - Bore Ø320 mm




| Pos | Part | | Specification |
|---|---|---|---|
| 1 | Rear cover | | Aluminium |
| 2 | Front cover | | Aluminium |
| 3 | Piston | | Aluminium |
| 4 | Piston rod | Standard | Stainless steel 1.4021 (X20Cr13) |
| | | Option | Chrome plated steel 1.5217 (20MnV6) |
| 5 | Cylinder barrel | | Anodised aluminium |
| 6 | Tie rod nut | Standard | Zinc plated steel |
| | | Option | Stainless steel 1.4301 (X5CrNi18-10) |
| 7 | Cushioning screw | | Brass + Stainless steel |
| 8 | Cushioning tube | | Anodised aluminium |
| 9 | Cushioning female thread | | Anodised aluminium |
| 10 | Cushioning seal | Standard | PU |
| | | Option | FKM |
| 11 | O ring | Standard | NBR |
| | | Option | FKM |
| 12 | Rod seal | Standard | PU + HYTREL |
| | | Option | FKM + PTFE + Bronze |
| 13 | Rod bearing | | Metal + Polymer composite |
| 14 | Tie rod | Standard | Stainless steel, 1.4301 (X5CrNi18-10) |
| 15 | Piston rod nut | Standard | Zinc plated steel |
| | | Option | Stainless steel 1.4301 (X5CrNi18-10) |
| 16 | Piston seals | Standard | PU |
| | | Option | FKM |
| 17 | Magnet | | Plasto - Ferrite |
| 18 | Piston bearing | | PTFE + Bronze |
| 19 | Piston O-ring | Standard | NBR |
| | | Option | FKM |

## The simple and complete order code key

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

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

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

**Cylinder version**

| | |
|---|---|
| **T** | Tie rod |

**Stroke (mm)**
**e.g. 0100 = 100 mm**

Optional stroke lengths up to 2800 mm. Standard strokes see table.

**Cylinder bore mm**

| |
|---|
| **032** |
| **040** |
| **050** |
| **063** |
| **080** |
| **100** |
| **125** |
| **160** |
| **200** |
| **250** |
| **320** |

| End cover screws | | | | | | Function |
|---|---|---|---|---|---|---|
| Standard | | | Stainless steel[22] | | | |
| Std scraper | HDPE scraper[23] | FPM scraper[24] | Std scraper | HDPE scraper[23] | FPM scraper[24] | |
| **M** | **D** | **V** | **A** | **H** | **W** | Double-acting |
| **F** | **E** | **B** | **G** | **Y** | **Z** | Double-acting through rod |

**Note:** see the model codes for possible combination of options with bore sizes.

| Piston rod material | | | | Seals |
|---|---|---|---|---|
| Stainless steel | Chromium-plated steel | Acid-proof steel | Chrom.-pl. stainless steel | |
| **S** | **C** | **M** | **R** | Standard -20 °C to +80 °C. |

22) If stainless steel end cover screws are selected, the piston rod nuts are also supplied in stainless steel.
23) For dry rod operation.
24) FPM scraper should be chosen for higher chemical resistance on standard temperature versions only.

### Examples Standard, double acting cylinder

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

P1D-T032MS-0160
P1D-T100MS-0400



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## P1D cylinders with intermediate trunnion

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

For the P1D, the intermediate trunnion is available among the cylinder mountings in position 17. If G or 7 appears in position 17, the position of the intermediate trunnion should be specified as a three-digit measurement in positions 18-20. 000 indicates a loose intermediate trunnion. If D or 6 appears in position 17, the intermediate trunnion is always centred on the cylinder (no measurement specified in positions 18-20).

For the version with optional location of the intermediate trunnion or loose intermediate trunnion, no choices can be made for positions 18-20 since they are used for the XV dimension.

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

**Cylinder mountings**

| | | |
|---|---|---|
| 90° | 0° | 90° = shaft square to, 0° = shaft in line with ports[5)] |
| **D** | **6** | Trunnion MT4, mid position[6)] |
| **G** | **7** | Trunnion MT4, optional pos. (XV-meas. pos 18-20)[7)] |

**For XV position > 999mm consult your local sales support**

5) Shaft or pivots square to or in line with the cylinder ports.
6) Mid position means NNN for digits in position 18-20.
7) For XV-measure (from the piston rod thread according to ISO to the centre of the pivots) stated in mm in positions 18-20

**Example of centred trunnion**

P1D-T050MS-0250NDNNN P1D rod cylinder with intermediate trunnion installed in centre of cylinder.



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## Extended piston rod

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

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

**Cylinder bore mm**

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

**Piston rod extension**

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

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

The maximum extended piston rod length that can be specified by the order key is 339 mm. If a longer extended piston rod is needed please consult your local sales support.

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

**Example of an extended piston rod**

P1D-TK45MS-0200 P1D cylinder, bore 32 mm, with a 45 mm extended piston rod.

## Piston rod in alternative materials

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

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

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

| **Piston rod material** | | | | **Seals** |
|---|---|---|---|---|
| Stainless steel | Chromium-plated steel | Acid-proof steel | Chrom.-pl. stainless steel | |
| **S** | **C** | **M** | **R** | Standard -20 °C to +80 °C. |

**Example of piston rod material**

P1D-T032MS-0100 P1D cylinder, bore 32 mm, with stainless steel piston rod (standard)

## Through piston rod

All P1D cylinders can be ordered with a through piston rod. Order this design in position 9 in combination with the scraper ring system as below.

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

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

22) If stainless steel end cover screws are selected, the piston rod nuts are also supplied in stainless steel.

23) For dry rod operation.

26) FPM scraper should be chosen for higher chemical resistance on standard temperature versions only.

**Example of through piston rod**

P1D-T032FS-0100 P1D cylinder, bore 32 mm, with through piston rod.

## Operation with a dry piston rod

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

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

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

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

22) If stainless steel end cover screws are selected, the piston rod nut(s) are also supplied in stainless steel.

23) For dry rod operation.

26) FPM scraper should be chosen for higher chemical resistance on standard temperature versions only.

**Example of seal system for dry rod**

P1D-T040DS-0200 P1D cylinder with seal system for dry operation.

## 3 and 4 positions Tie Rod cylinders (Ø32 to 125 mm)

Factory-fitted 3 and 4 positions cylinders can be ordered.
Through going tie-rods fix the two cylinders into a compact unit.

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

| End cover screws | | | | | | Function |
|---|---|---|---|---|---|---|
| Standard | | | | Stainless steel 22) | | |
| Std scraper | Metal scraper25) | FPM scraper26) | Std scraper | Metal scraper25) | FPM scraper26) | |
| M | Q | V | A | S | W | Double acting |
| F | R | B | G | T | Z | Double acting through rod |
| **2** | **4** | **8** | **-** | **-** | **-** | **3 and 4 position cylinders** |
| C | J | L | - | - | - | Tandem |

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

### Equal strokes – 3 positions cylinders

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

### Unequal stroke – 4 positions cylinders

Specify letter T in position 5 (P1D-T) and number 2 in position 9 (if standard scraper ring)
Specify the shortest stroke in the ordinary positions 12, 13, 14, 15 and the longest stroke in positions 17, 18, 19, 20.

### Example of 3 and 4 positions cylinders

P1D-T0322S-0200 P1D Tie-Rod cylinder with 3 position with strokes 200 mm.

P1D-T0802S-0200N0250 P1D Tie-Rod cylinder with 4 position design with strokes 200 mm and 250 mm.

## Tandem Tie Rod cylinders (Ø32 to 125 mm)

The P1D-T are available in tandem design i.e. two cylinders in series, for almost double force. Order with the letter C in position 9 (if standard scraper ring).

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

| End cover screws | | | | | | Function |
|---|---|---|---|---|---|---|
| Standard | | | | Stainless steel 22) | | |
| Std scraper | Metal scraper25) | FPM scraper26) | Std scraper | Metal scraper25) | FPM scraper26) | |
| M | Q | V | A | S | W | Double acting |
| F | R | B | G | T | Z | Double acting through rod |
| 2 | 4 | 8 | - | - | - | 3 and 4 position cylinders |
| **C** | **J** | **L** | **-** | **-** | **-** | **Tandem** |

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

# P1D-T Pneumatic ISO Cylinders - Ø32 - Ø125 mm

## Double acting with stainless steel piston rod

- Bore sizes Ø32 - Ø125mm
- Stroke lengths 5 - 2800mm
- Magnetic piston as standard
- Adjustable cushioning as standard
- Standard temperature range



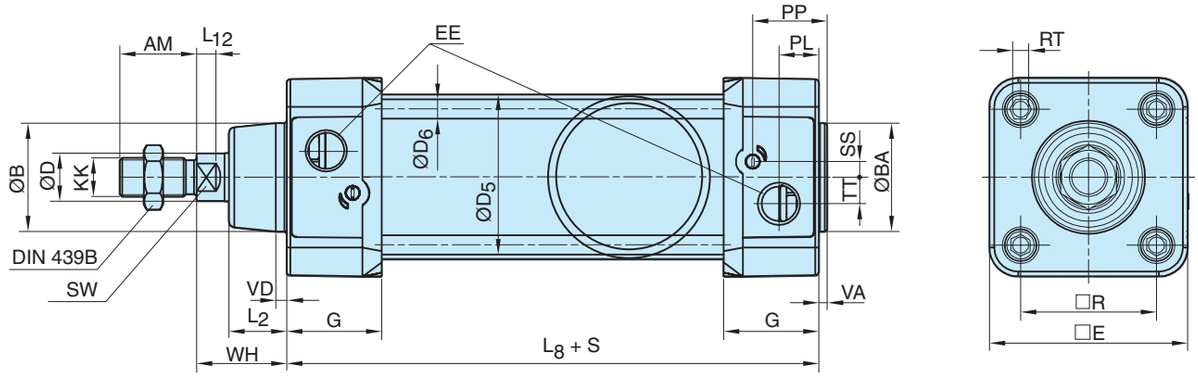
### P1D-T Standard temperature, magnetic piston

| Cyl. bore mm | Stroke mm | Order code |
|---|---|---|
| **32** Conn. G1/8 | 25 | **P1D-T032MS-0025** |
| | 40 | **P1D-T032MS-0040** |
| | 50 | **P1D-T032MS-0050** |
| | 80 | **P1D-T032MS-0080** |
| | 100 | **P1D-T032MS-0100** |
| | 125 | **P1D-T032MS-0125** |
| | 160 | **P1D-T032MS-0160** |
| | 200 | **P1D-T032MS-0200** |
| | 250 | **P1D-T032MS-0250** |
| | 320 | **P1D-T032MS-0320** |
| | 400 | **P1D-T032MS-0400** |
| | 500 | **P1D-T032MS-0500** |
| **40** Conn. G1/4 | 25 | **P1D-T040MS-0025** |
| | 40 | **P1D-T040MS-0040** |
| | 50 | **P1D-T040MS-0050** |
| | 80 | **P1D-T040MS-0080** |
| | 100 | **P1D-T040MS-0100** |
| | 125 | **P1D-T040MS-0125** |
| | 160 | **P1D-T040MS-0160** |
| | 200 | **P1D-T040MS-0200** |
| | 250 | **P1D-T040MS-0250** |
| | 320 | **P1D-T040MS-0320** |
| | 400 | **P1D-T040MS-0400** |
| | 500 | **P1D-T040MS-0500** |
| **50** Conn. G1/4 | 25 | **P1D-T050MS-0025** |
| | 40 | **P1D-T050MS-0040** |
| | 50 | **P1D-T050MS-0050** |
| | 80 | **P1D-T050MS-0080** |
| | 100 | **P1D-T050MS-0100** |
| | 125 | **P1D-T050MS-0125** |
| | 160 | **P1D-T050MS-0160** |
| | 200 | **P1D-T050MS-0200** |
| | 250 | **P1D-T050MS-0250** |
| | 320 | **P1D-T050MS-0320** |
| | 400 | **P1D-T050MS-0400** |
| | 500 | **P1D-T050MS-0500** |
| **63** Conn. G3/8 | 25 | **P1D-T063MS-0025** |
| | 40 | **P1D-T063MS-0040** |
| | 50 | **P1D-T063MS-0050** |
| | 80 | **P1D-T063MS-0080** |
| | 100 | **P1D-T063MS-0100** |
| | 125 | **P1D-T063MS-0125** |
| | 160 | **P1D-T063MS-0160** |
| | 200 | **P1D-T063MS-0200** |
| | 250 | **P1D-T063MS-0250** |
| | 320 | **P1D-T063MS-0320** |
| | 400 | **P1D-T063MS-0400** |
| | 500 | **P1D-T063MS-0500** |

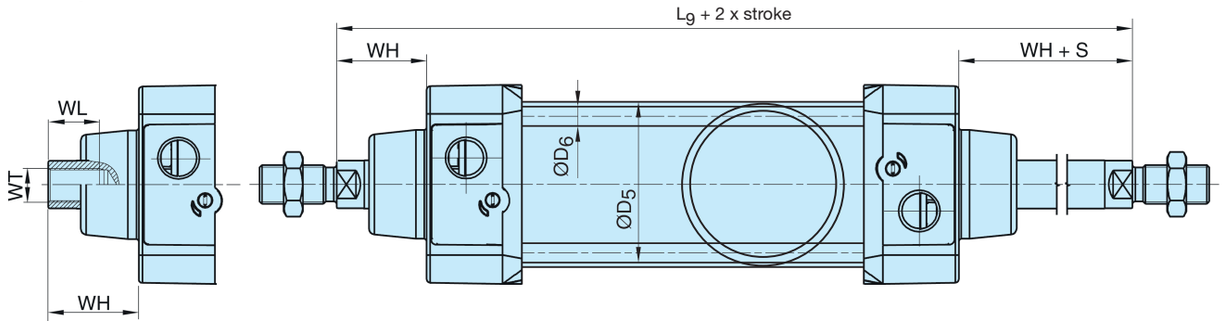
| Cyl. bore mm | Stroke mm | Order code |
|---|---|---|
| **80** Conn. G3/8 | 25 | **P1D-T080MS-0025** |
| | 40 | **P1D-T080MS-0040** |
| | 50 | **P1D-T080MS-0050** |
| | 80 | **P1D-T080MS-0080** |
| | 100 | **P1D-T080MS-0100** |
| | 125 | **P1D-T080MS-0125** |
| | 160 | **P1D-T080MS-0160** |
| | 200 | **P1D-T080MS-0200** |
| | 250 | **P1D-T080MS-0250** |
| | 320 | **P1D-T080MS-0320** |
| | 400 | **P1D-T080MS-0400** |
| | 500 | **P1D-T080MS-0500** |
| **100** Conn. G1/2 | 25 | **P1D-T100MS-0025** |
| | 40 | **P1D-T100MS-0040** |
| | 50 | **P1D-T100MS-0050** |
| | 80 | **P1D-T100MS-0080** |
| | 100 | **P1D-T100MS-0100** |
| | 125 | **P1D-T100MS-0125** |
| | 160 | **P1D-T100MS-0160** |
| | 200 | **P1D-T100MS-0200** |
| | 250 | **P1D-T100MS-0250** |
| | 320 | **P1D-T100MS-0320** |
| | 400 | **P1D-T100MS-0400** |
| | 500 | **P1D-T100MS-0500** |
| **125** Conn. G1/2 | 25 | **P1D-T125MS-0025** |
| | 40 | **P1D-T125MS-0040** |
| | 50 | **P1D-T125MS-0050** |
| | 80 | **P1D-T125MS-0080** |
| | 100 | **P1D-T125MS-0100** |
| | 125 | **P1D-T125MS-0125** |
| | 160 | **P1D-T125MS-0160** |
| | 200 | **P1D-T125MS-0200** |
| | 250 | **P1D-T125MS-0250** |
| | 320 | **P1D-T125MS-0320** |
| | 400 | **P1D-T125MS-0400** |
| | 500 | **P1D-T125MS-0500** |

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

## P1D-T Tie rod Standard temperature




**Internal piston rod thread**




## Dimensions

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

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

S=Stroke

## Tolerances

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

# P1D-T Pneumatic ISO Cylinders - Ø32 - Ø125 mm

## Double acting with stainless steel piston rod

- Bore sizes Ø32 - Ø125mm
- Stroke lengths 5 - 2800mm
- Magnetic piston as standard
- Adjustable cushioning as standard
- Low & High temperature versions
- Hydraulic & Metal scraper versions




### P1D-T High temperature, no magnetic piston *

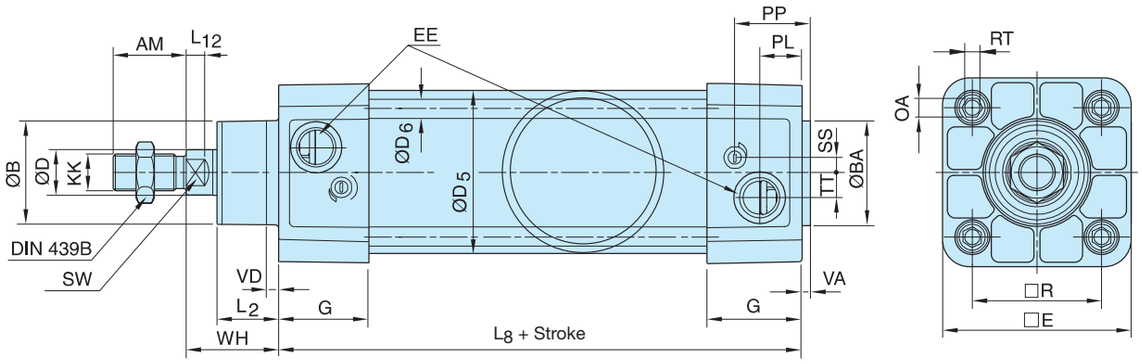
| Cyl. bore mm | Stroke mm | Order code |
|---|---|---|
| **32** Conn. G1/8 | 25 | **P1D-T032MF-0025** |
| | 40 | **P1D-T032MF-0040** |
| | 50 | **P1D-T032MF-0050** |
| | 80 | **P1D-T032MF-0080** |
| | 100 | **P1D-T032MF-0100** |
| | 125 | **P1D-T032MF-0125** |
| | 160 | **P1D-T032MF-0160** |
| | 200 | **P1D-T032MF-0200** |
| | 250 | **P1D-T032MF-0250** |
| | 320 | **P1D-T032MF-0320** |
| | 400 | **P1D-T032MF-0400** |
| | 500 | **P1D-T032MF-0500** |
| **40** Conn. G1/4 | 25 | **P1D-T040MF-0025** |
| | 40 | **P1D-T040MF-0040** |
| | 50 | **P1D-T040MF-0050** |
| | 80 | **P1D-T040MF-0080** |
| | 100 | **P1D-T040MF-0100** |
| | 125 | **P1D-T040MF-0125** |
| | 160 | **P1D-T040MF-0160** |
| | 200 | **P1D-T040MF-0200** |
| | 250 | **P1D-T040MF-0250** |
| | 320 | **P1D-T040MF-0320** |
| | 400 | **P1D-T040MF-0400** |
| | 500 | **P1D-T040MF-0500** |
| **50** Conn. G1/4 | 25 | **P1D-T050MF-0025** |
| | 40 | **P1D-T050MF-0040** |
| | 50 | **P1D-T050MF-0050** |
| | 80 | **P1D-T050MF-0080** |
| | 100 | **P1D-T050MF-0100** |
| | 125 | **P1D-T050MF-0125** |
| | 160 | **P1D-T050MF-0160** |
| | 200 | **P1D-T050MF-0200** |
| | 250 | **P1D-T050MF-0250** |
| | 320 | **P1D-T050MF-0320** |
| | 400 | **P1D-T050MF-0400** |
| | 500 | **P1D-T050MF-0500** |
| **63** Conn. G3/8 | 25 | **P1D-T063MF-0025** |
| | 40 | **P1D-T063MF-0040** |
| | 50 | **P1D-T063MF-0050** |
| | 80 | **P1D-T063MF-0080** |
| | 100 | **P1D-T063MF-0100** |
| | 125 | **P1D-T063MF-0125** |
| | 160 | **P1D-T063MF-0160** |
| | 200 | **P1D-T063MF-0200** |
| | 250 | **P1D-T063MF-0250** |
| | 320 | **P1D-T063MF-0320** |
| | 400 | **P1D-T063MF-0400** |
| | 500 | **P1D-T063MF-0500** |

| Cyl. bore mm | Stroke mm | Order code |
|---|---|---|
| **80** Conn. G3/8 | 25 | **P1D-T080MF-0025** |
| | 40 | **P1D-T080MF-0040** |
| | 50 | **P1D-T080MF-0050** |
| | 80 | **P1D-T080MF-0080** |
| | 100 | **P1D-T080MF-0100** |
| | 125 | **P1D-T080MF-0125** |
| | 160 | **P1D-T080MF-0160** |
| | 200 | **P1D-T080MF-0200** |
| | 250 | **P1D-T080MF-0250** |
| | 320 | **P1D-T080MF-0320** |
| | 400 | **P1D-T080MF-0400** |
| | 500 | **P1D-T080MF-0500** |
| **100** Conn. G1/2 | 25 | **P1D-T100MF-0025** |
| | 40 | **P1D-T100MF-0040** |
| | 50 | **P1D-T100MF-0050** |
| | 80 | **P1D-T100MF-0080** |
| | 100 | **P1D-T100MF-0100** |
| | 125 | **P1D-T100MF-0125** |
| | 160 | **P1D-T100MF-0160** |
| | 200 | **P1D-T100MF-0200** |
| | 250 | **P1D-T100MF-0250** |
| | 320 | **P1D-T100MF-0320** |
| | 400 | **P1D-T100MF-0400** |
| | 500 | **P1D-T100MF-0500** |
| **125** Conn. G1/2 | 25 | **P1D-T125MF-0025** |
| | 40 | **P1D-T125MF-0040** |
| | 50 | **P1D-T125MF-0050** |
| | 80 | **P1D-T125MF-0080** |
| | 100 | **P1D-T125MF-0100** |
| | 125 | **P1D-T125MF-0125** |
| | 160 | **P1D-T125MF-0160** |
| | 200 | **P1D-T125MF-0200** |
| | 250 | **P1D-T125MF-0250** |
| | 320 | **P1D-T125MF-0320** |
| | 400 | **P1D-T125MF-0400** |
| | 500 | **P1D-T125MF-0500** |

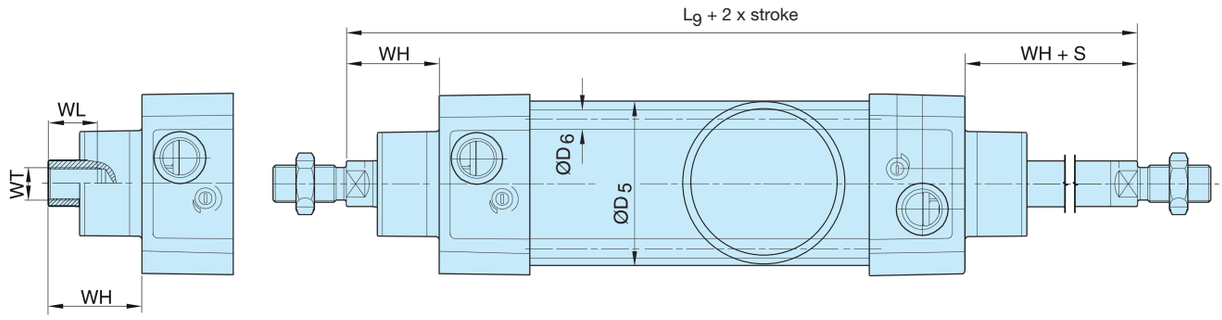
The cylinders are supplied complete with one zinc plated steel piston rod nut.

**Note:** * Change **MF** to **ML** for low temperature range magnetic piston,
**QC** for standard temp with metal scraper,
**MJ** for hydraulic version not magnetic

## P1D-T High, low temp, hydraulic and metal scraper options




**Internal piston rod thread**




### Dimensions

| Cylinder bore mm | AM mm | B mm | BA mm | BG mm | D mm | D4 mm | E mm | EE mm | G mm | KK | L2 mm | L8 mm | L9 mm | L12 mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 32 | 22 | 30 | 30 | 16 | 12 | 45,0 | 48,0 | G1/8 | 28,5 | M10x1,25 | 16,8 | 94 | 146 | 6,0 |
| 40 | 24 | 35 | 35 | 16 | 16 | 52,0 | 53,5 | G1/4 | 33,0 | M12x1,25 | 19,0 | 105 | 165 | 6,5 |
| 50 | 32 | 40 | 40 | 16 | 20 | 60,7 | 65,2 | G1/4 | 33,5 | M16x1,5 | 24,0 | 106 | 180 | 8,0 |
| 63 | 32 | 45 | 45 | 16 | 20 | 71,5 | 75,5 | G3/8 | 39,5 | M16x1,5 | 24,3 | 121 | 195 | 8,0 |
| 80 | 40 | 45 | 45 | 17 | 25 | 86,7 | 95,0 | G3/8 | 39,5 | M20x1,5 | 30,0 | 128 | 220 | 10,0 |
| 100 | 40 | 55 | 55 | 17 | 25 | 106,7 | 114,0 | G1/2 | 44,5 | M20x1,5 | 34,0 | 138 | 240 | 14,0 |
| 125 | 54 | 60 | 60 | 20 | 32 | 134,0 | 139,0 | G1/2 | 51,0 | M27x2 | 45,0 | 160 | 290 | 18,0 |

| Cylinder bore mm | OA mm | PL mm | PP mm | R mm | RT | SS mm | SW mm | TT mm | VA mm | VD mm | WH mm | WL | WT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 32 | 6,0 | 14,0 | 24,2 | 32,5 | M6 | 5,5 | 10 | 4,2 | 3,5 | 4,5 | 26 | 21 | M8x1 |
| 40 | 6,0 | 16,0 | 27,5 | 38,0 | M6 | 8,0 | 13 | 5,5 | 3,5 | 4,5 | 30 | 23 | M10x1,25 |
| 50 | 8,0 | 14,0 | 29,3 | 46,5 | M8 | 9,0 | 17 | 7,5 | 3,5 | 4,5 | 37 | 31 | M14x1,5 |
| 63 | 8,0 | 16,6 | 30,8 | 56,5 | M8 | 6,5 | 17 | 10,0 | 3,5 | 4,5 | 37 | 31 | M14x1,5 |
| 80 | 6,0 | 16,8 | 33,5 | 72,0 | M10 | 0 | 22 | 11,5 | 3,5 | 4,5 | 46 | 39 | M18x1,5 |
| 100 | 6,0 | 20,5 | 37,5 | 89,0 | M10 | 0 | 22 | 14,5 | 3,5 | 4,5 | 51 | 39 | M18x1,5 |
| 125 | 8,0 | 23,3 | 45,8 | 110,0 | M12 | 0 | 27 | 15,0 | 5,5 | 6,5 | 65 | 53 | M24x2 |

S=Stroke

### Tolerances

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

# P1D-T Pneumatic ISO Cylinders - Ø32 - Ø125 mm

### 3 and 4 positions cylinders

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



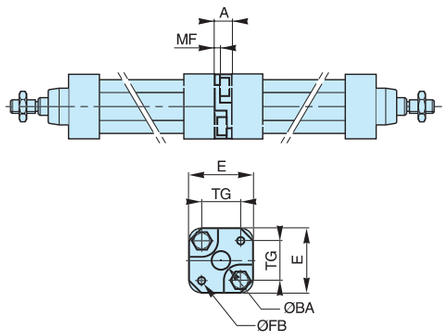
3 and 4 positions cylinders can be ordered in two ways.

### Factory-fitted

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

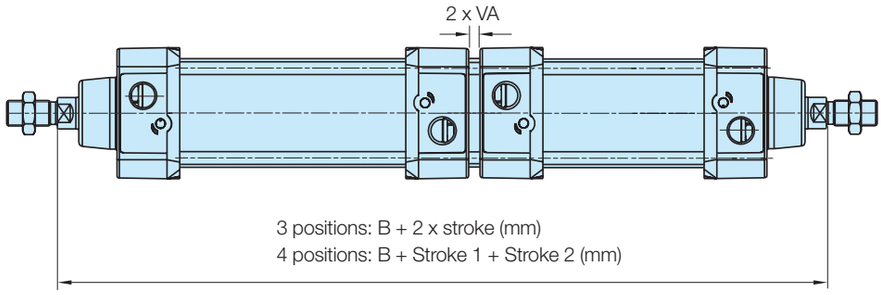
### Installation kit

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




| Cyl. bore mm | E mm | TG mm | ØFB mm | MF mm | A mm | ØBA mm | Weight Kg | **Order code** |
|---|---|---|---|---|---|---|---|---|
| 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** |

| Cylinder bore. mm | B mm | 2 x VA mm |
|---|---|---|
| 32 | 247 | 7 |
| 40 | 277 | 7 |
| 50 | 293 | 7 |
| 63 | 323 | 7 |
| 80 | 355 | 7 |
| 100 | 385 | 7 |
| 125 | 461 | 11 |

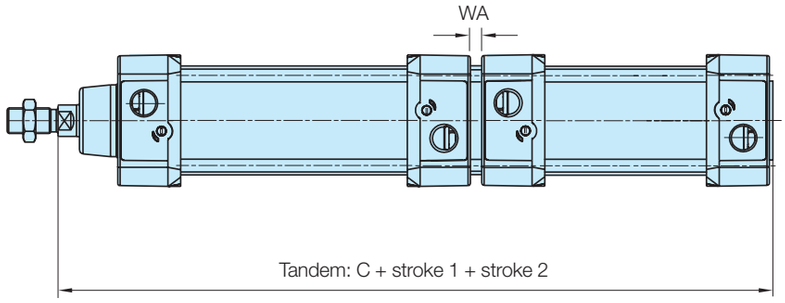



## Tandem version

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



| Cylinder bore. mm | C mm | WA mm |
|---|---|---|
| 32 | 221.5 | 7.5 |
| 40 | 247.5 | 7.5 |
| 50 | 256.5 | 7.5 |
| 63 | 286.5 | 7.5 |
| 80 | 309.5 | 7.5 |
| 100 | 334.5 | 7.5 |
| 125 | 396.5 | 11.5 |



## Order Key Code (Model code with 20 digits used only for the trunnion , female thread on the piston rod or to specify second cylinder stroke)

**15 digit order code**

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

**20 digit order code**

| 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|
| N | D | N | N | N |

### 4

| Cylinder type | |
|---|---|
| - | Standard with cushioning and magnetic piston |
| F | Standard with cushioning without magnet piston |

### 6-7-8

| Cylinder bore mm |
|---|
| 032 |
| 040 |
| 050 |
| 063 |
| 080 |
| 100 |
| 125 |

### 6 (Rod extension only)

| Cylinder bore mm | |
|---|---|
| K | 32 |
| L | 40 |
| M | 50 |
| N | 63 |
| P | 80 |
| Q | 100 |
| R | 125 |

### 7-8

**Piston rod extension**

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

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

### 9

| End cover screws | | | | Function |
|---|---|---|---|---|
| Standard | | Stainless steel | | |
| Std scraper | Metal scraper[3] | Std scraper | Metal scraper[3] | |
| **M** | **Q** | **A** | **S** | Double acting |
| **F** | **R** | **G** | **T** | Double acting through rod |
| **2** | **4** | **-** | **-** | 3 and 4 position cylinders |
| **C** | **J** | **-** | **-** | Tandem |

[3] -30°C for low temperature version, not available for high temp.

### 10

| Piston rod material | | | | Seals |
|---|---|---|---|---|
| Stainless steel | Chromium-plated steel [1] | Acid-proof steel | Chromium plated stainless steel [1] | |
| **S** | **C** | **M** | **R** | Standard temperature -20°C to +80°C. [2] |
| **F** | **G** | **N** | **D** | High temperature -10°C to +150°C. No magnetic function. |
| **L** | **K** | **P** | **E** | Low temperature -40°C to +80°C. |
| **-** | **J** | **-** | **Z** | Low pressure hydraulic -20°C to +80°C. |

[1] In combination with metal scraper
[2] Piston made of acetal. for high, low temp & Hydraulic version piston made of aluminium

### 12-13-14-15

**Stroke (mm) e.g. 0100 = 100 mm**

Optional stroke lengths up to 2800 mm.
Standard strokes see table below

### 17-18-19-20

**Intermediate trunnion**

| 90° | 0° | Pivots Vs Air Ports |
|---|---|---|
| **D** | **6** | Centre trunnion MT4, mid position NNN digits 18-19-20 |
| **G** | **7** | Trunnion MT4, optional pos. (XV-meas. digits 18-19-20) |

**N** and stroke of the second cylinder if diffrent otherwise use 15 digits model code

### 19

**Piston rod thread**

| | |
|---|---|
| **6** | Internal piston rod thread |

## Standard strokes

Standard strokes for all P1D-T cylinders comply with ISO 4393.
Non standard strokes up to 2800 mm.

| Order no XXXX = Stroke | Cylinder bore (mm) | ● = Standard stroke (mm) / ▭ = Stroke to special order: 25 | 50 | 80 | 100 | 125 | 160 | 200 | 250 | 320 | 400 | 500 | 600 | 700 | 800 | 2800 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **P1D-T** | | | | | | | | | | | | | | | | |
| **P1D-T032**-XXXX** | **32** | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | ▭ | |
| **P1D-T040**-XXXX** | **40** | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | ▭ | |
| **P1D-T050**-XXXX** | **50** | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | ▭ | |
| **P1D-T063**-XXXX** | **63** | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | ▭ | |
| **P1D-T080**-XXXX** | **80** | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | ▭ | |
| **P1D-T100**-XXXX** | **100** | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | ▭ | |
| **P1D-T125**-XXXX** | **125** | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | ▭ | |

# P1D-T Pneumatic ISO Cylinders - Ø160 - Ø320 mm

## Double acting with stainless steel piston rod

- Bore sizes Ø160 - Ø320mm
- Stroke lengths 10 - 2000mm
- Magnetic piston as standard
- Adjustable cushioning as standard
- High temperature version
- ATEX version (add-EXNN to the order code)



### P1D-T Standard temperature, magnetic piston

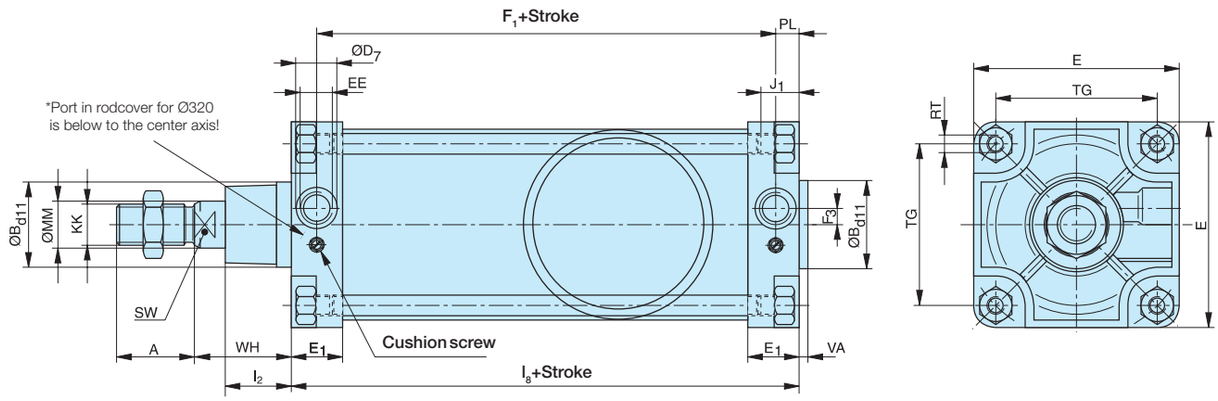
| Cyl. bore mm | Stroke mm | Order code |
|---|---|---|
| **160** Conn. G3/4 | 50 | **P1D-T160MS-0050** |
| | 80 | **P1D-T160MS-0080** |
| | 100 | **P1D-T160MS-0100** |
| | 125 | **P1D-T160MS-0125** |
| | 160 | **P1D-T160MS-0160** |
| | 200 | **P1D-T160MS-0200** |
| | 250 | **P1D-T160MS-0250** |
| | 320 | **P1D-T160MS-0320** |
| | 400 | **P1D-T160MS-0400** |
| | 500 | **P1D-T160MS-0500** |
| | 800 | **P1D-T160MS-0800** |
| | 1000 | **P1D-T160MS-1000** |
| **200** Conn. G3/4 | 50 | **P1D-T200MS-0050** |
| | 80 | **P1D-T200MS-0080** |
| | 100 | **P1D-T200MS-0100** |
| | 125 | **P1D-T200MS-0125** |
| | 160 | **P1D-T200MS-0160** |
| | 200 | **P1D-T200MS-0200** |
| | 250 | **P1D-T200MS-0250** |
| | 320 | **P1D-T200MS-0320** |
| | 400 | **P1D-T200MS-0400** |
| | 500 | **P1D-T200MS-0500** |
| | 800 | **P1D-T200MS-0800** |
| | 1000 | **P1D-T200MS-1000** |

| Cyl. bore mm | Stroke mm | Order code |
|---|---|---|
| **250** Conn. G1 | 50 | **P1D-T250MS-0050** |
| | 80 | **P1D-T250MS-0080** |
| | 100 | **P1D-T250MS-0100** |
| | 125 | **P1D-T250MS-0125** |
| | 160 | **P1D-T250MS-0160** |
| | 200 | **P1D-T250MS-0200** |
| | 250 | **P1D-T250MS-0250** |
| | 320 | **P1D-T250MS-0320** |
| | 400 | **P1D-T250MS-0400** |
| | 500 | **P1D-T250MS-0500** |
| | 800 | **P1D-T250MS-0800** |
| | 1000 | **P1D-T250MS-1000** |
| **320** Conn. G1 | 50 | **P1D-T320MS-0050** |
| | 80 | **P1D-T320MS-0080** |
| | 100 | **P1D-T320MS-0100** |
| | 125 | **P1D-T320MS-0125** |
| | 160 | **P1D-T320MS-0160** |
| | 200 | **P1D-T320MS-0200** |
| | 250 | **P1D-T320MS-0250** |
| | 320 | **P1D-T320MS-0320** |
| | 400 | **P1D-T320MS-0400** |
| | 500 | **P1D-T320MS-0500** |
| | 800 | **P1D-T320MS-0800** |
| | 1000 | **P1D-T320MS-1000** |

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

**Note:** * Change MS to MF for high temperature range no magnetic piston,
QC for standard temp with metal scraper

## P1D-T Tie rod




**Note *:** for bore size 320mm, front air port is on the bottom of the axis of the cylinder and the cushioning screw on the top

### Dimensions (mm)

| Cyl. Ø | A | $ØB_{d11}$ | $ØD_7$ | E | $E_1$ | $F_1$ + Stroke | $F_3$ | $J_1$ max. | $I_2$ | $I_8$ + Stroke | EE | KK | MM | PL | RT | SW | TG | VA | WH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 160 | 72 | 65 | 33 | 180 | 45 | 130 | 11 | 23 | 50 | 180 | G3/4 | M36x2 | 40 | 25 | M16 | 36 | 140 | 6 | 80 |
| 200 | 72 | 75 | 33 | 220 | 45 | 130 | 15 | 23 | 60 | 180 | G3/4 | M36x2 | 40 | 25 | M16 | 36 | 175 | 6 | 95 |
| 250 | 84 | 90 | 40 | 280 | 64 | 136 | 21 | 27 | 70 | 200 | G1 | M42x2 | 50 | 32 | M20 | 46 | 280 | 10 | 105 |
| 320 | 96 | 110 | - | 340 | 56 | 164 | –20*/20 | 28 | 89,5 | 220 | G1 | M48x2 | 63 | 28 | M24 | 55 | 340 | 10 | 120 |

### Tolerances

| Cylinder bore mm | $L_8$ mm | TG mm | Stroke tolerance up to stroke 500 mm | Stroke tolerance for stroke over 500 mm |
|---|---|---|---|---|
| 160 | ±1,1 | ±1,1 | +0,3/+2,0 | +0,3/+3,0 |
| 200 | ±1,6 | ±1,1 | +0,3/+2,0 | +0,3/+3,0 |
| 250 | ±1,6 | ±1,5 | +0,3/+2,0 | +0,3/+3,0 |
| 320 | ±2,2 | ±1,5 | +0,3/+2,0 | +0,3/+3,0 |

## Order Key Code (Model code with 20 digits used only for the trunnion option or for the ATEX version)

**15 digit order code**

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

**20 digit order code**

| 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|
| N | D | N | N | N |

**4**

| Cylinder type | |
|---|---|
| - | Standard with cushioning and magnetic piston |
| F | Standard with cushioning without magnet piston |

**6-7-8**

| Cylinder bore mm |
|---|
| 160 |
| 200 |
| 250 |
| 320 |

**9**

| Function | |
|---|---|
| M | Standard scraper |
| Q | Metallic scraper |
| V | FPM scraper |
| F | Thru rod, standard scraper |
| R | Thru rod, metallic scraper |
| B | Thru rod, FPM scraper |

**10**

| Piston rod Material | | Seals |
|---|---|---|
| Stainless steel | Chromium plated steel | |
| S | C | Standard temperature version -20°C to +80°C. |
| F | G | High temperature version -10°C to +150°C. No magnetic function, keep - symbol in digit 4 |

**12-13-14-15**

| Stroke (mm) e.g. 0100 = 100 mm |
|---|
| Optional stroke lengths up to 2000 mm. Standard strokes see table below. |

**17-18-19-20**

| Intermediate trunnion | | |
|---|---|---|
| 90° | 0° | Pivots Vs Air Ports |
| D | 6 | Centre trunnion MT4, mid position (NNN digits 18-19-20) |
| G | 7 | Trunnion MT4, optional pos. (XV-meas. digits 18-19-20) |

**16-17-18-19-20**

| ATEX version e.g. P1D-T160MS-0500-EXNN | |
|---|---|
| -EXNN | According to ATEX |

CE Ex II 2GD c T4 120 °C

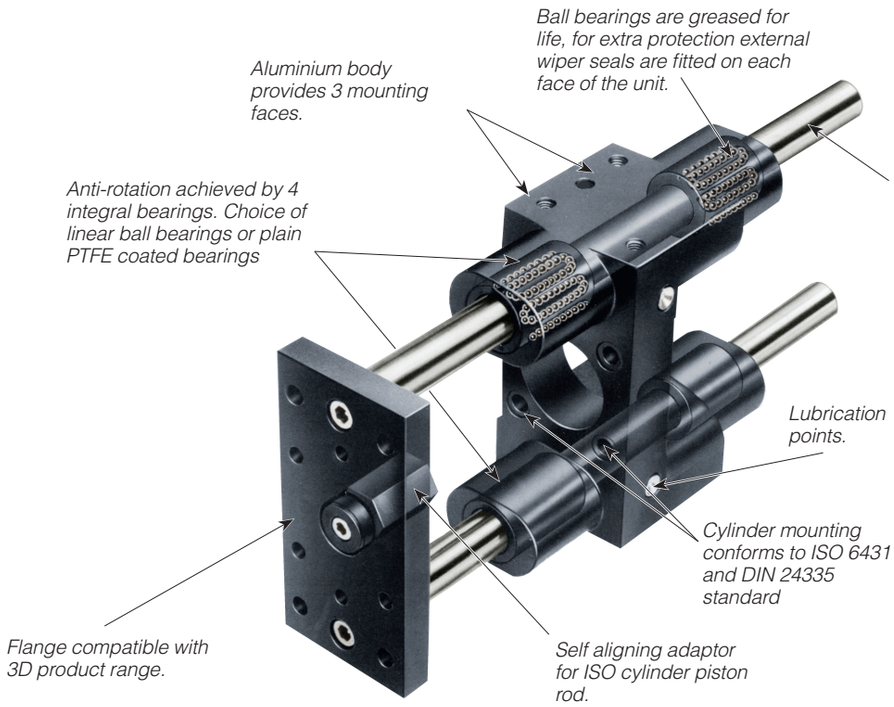
## Standard strokes

Standard strokes for all P1D-T cylinders comply with ISO 4393.
Non standard strokes up to 2000 mm.

| Order no XXXX = Stroke | Cylinder bore (mm) | ● = Standard stroke (mm) / = Stroke to special order 50 | 80 | 100 | 125 | 160 | 200 | 250 | 320 | 400 | 500 | 800 | 1000 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P1D-T | | | | | | | | | | | | | | |
| P1D-T160MS-XXXX | 160 | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | // | // | |
| P1D-T200MS-XXXX | 200 | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | // | // | |
| P1D-T250MS-XXXX | 250 | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | // | // | |
| P1D-T320MS-XXXX | 320 | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | // | // | |



PDE2667TCUK_P1D-T_Cylinders_Catalogue_V8.indd 26 30/04/2015 12:29:06




*Installation on P1D cylinders should have a pisron rod WH dimensions as shown in the chart below*

| Cyl. dim mm | Piston rod extension WH mm |
|---|---|
| 32 | 26 |
| 40 | 30 |
| 50 | 37 |
| 63 | 37 |
| 80 | 46 |
| 100 | 51 |

## P1D with rod guidance modules

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

## Technical data

| | |
|---|---|
| Load | See diagram on next page |
| Working temperature | –20 °C to +80 °C |

### Material specifications

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

## Order code key for rod guidance modules

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

| | Cylinder version |
|---|---|
| **E** | ISO cylinders |

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

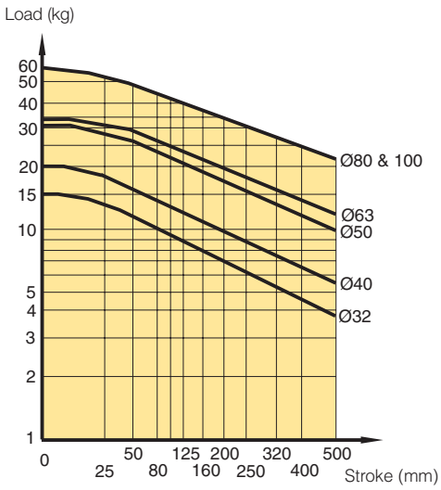
| | Guide module type |
|---|---|
| **H** | H style, ball bearings |
| **J** | H style, plain bearings |
| **K** | U style, plain bearings |

| Stroke length (mm) |
|---|
| Same as for the cylinder<br>e.g. **0100** = 100 mm. |

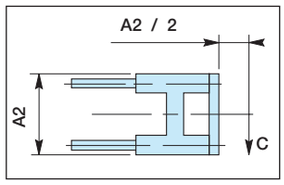
# Technical information 'H style'

## Rod guide with ball bearings

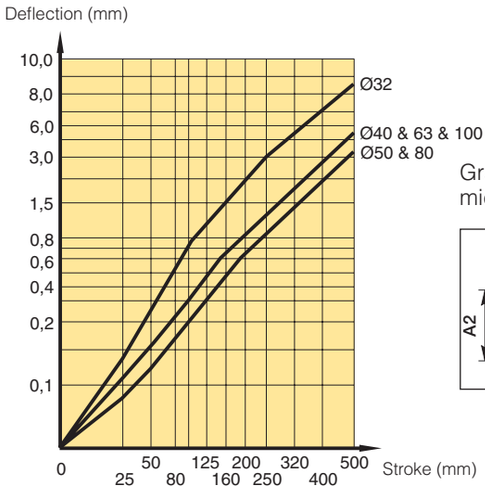
### Maximum load carried



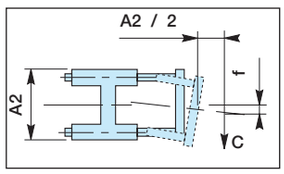

Graphs established at mid point of stroke



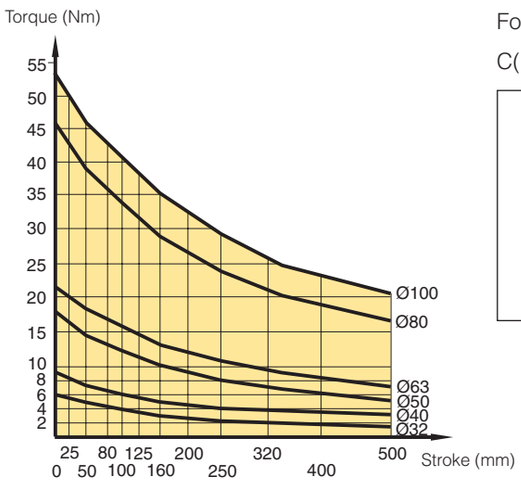

### Maximum deflection/max load




Graphs established at mid point of stroke

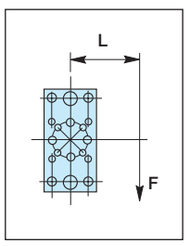



### Maximum permissible torque (Nm)



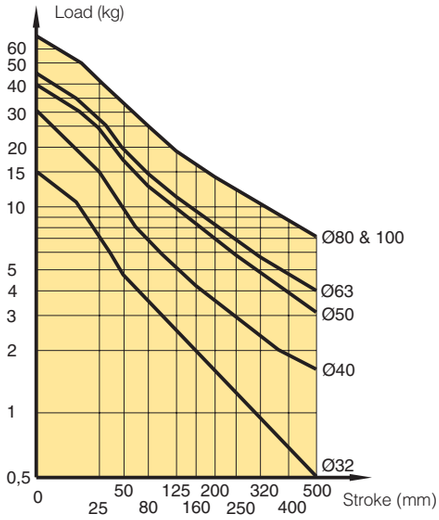

Formula:

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

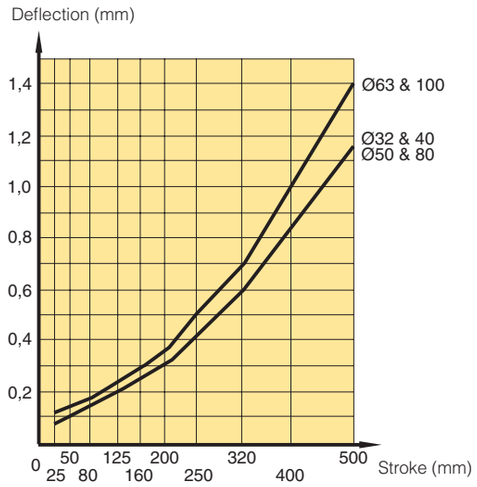



## Rod guide with plain bearings

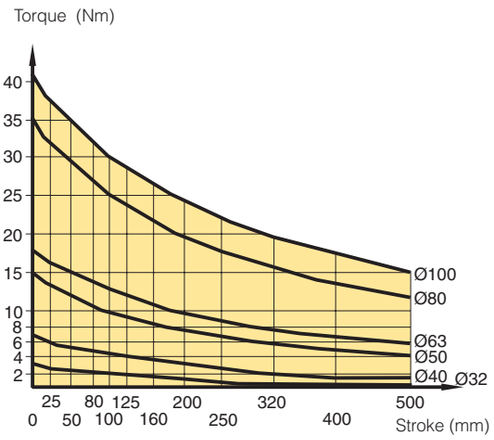
### Maximum load carried



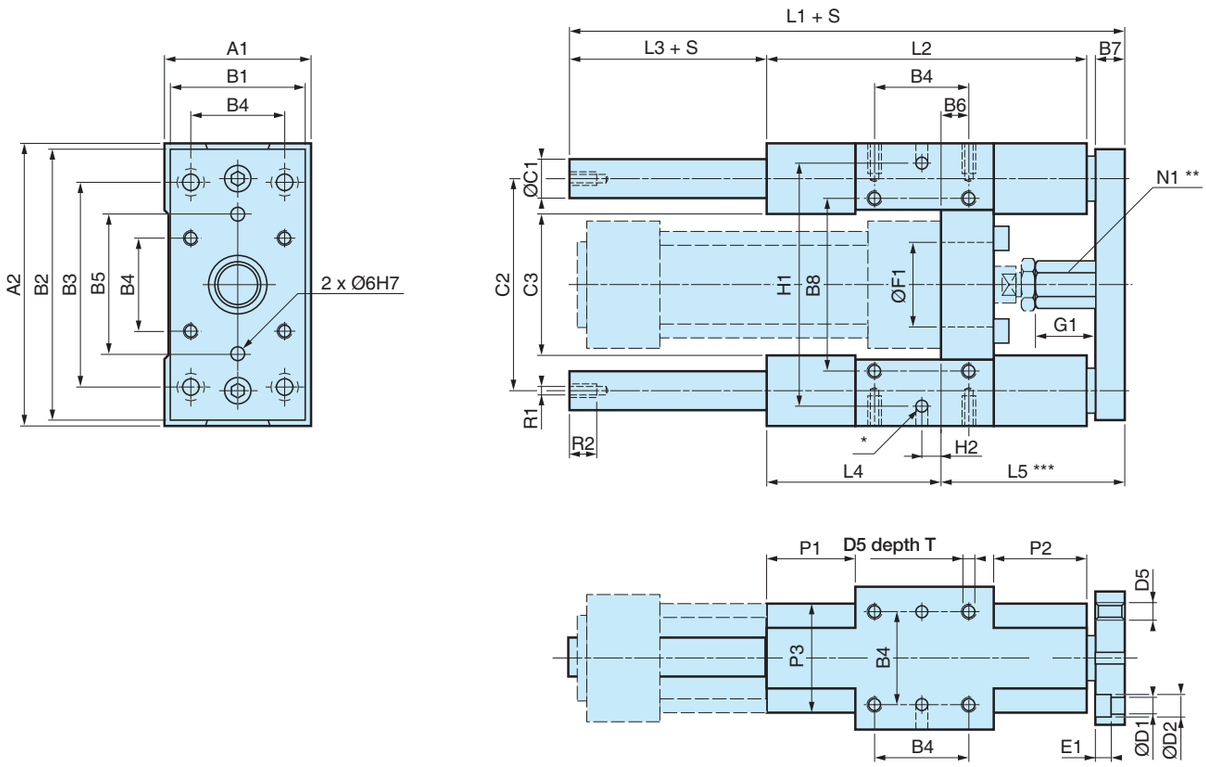

### Maximum deflection/max load




### Maximum permissible torque (Nm)



## H style guidance modules




## Dimensions (mm)

| Cyl. bore mm | $A_1$ mm | $A_2$ mm | $B_1$ mm | $B_2$ mm | $B_3$ mm | $B_4$ mm | $B_5$ mm | $B_6$ mm | $B_7$ mm | $B_8$ mm | $ØC_1$ mm | $C_2$ mm | $C_3$ mm | $ØD_1$ mm | $ØD_2$ mm | $D_5$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 32 | 50 | 97 | 45 | 90 | 78 | 32,5 | 50 | 4,2 | 12 | 61 | 12 | 73,5 | 50 | 6,6 | 11 | M6 |
| 40 | 58 | 115 | 54 | 110 | 84 | 38,0 | 54 | 11,0 | 12 | 69 | 16 | 86,5 | 58 | 6,6 | 11 | M6 |
| 50 | 70 | 137 | 63 | 130 | 100 | 46,5 | 72 | 18,8 | 15 | 85 | 20 | 103,5 | 70 | 8,4 | 15 | M8 |
| 63 | 85 | 152 | 80 | 145 | 105 | 56,5 | 82 | 15,0 | 15 | 100 | 20 | 118,5 | 83 | 8,4 | 15 | M8 |
| 80 | 105 | 189 | 100 | 180 | 130 | 72,0 | 106 | 21,0 | 20 | 130 | 25 | 147,0 | 102 | 10,5 | 18 | M10 |
| 100 | 130 | 213 | 120 | 200 | 150 | 89,0 | 131 | 24,5 | 20 | 150 | 25 | 171,5 | 125 | 10,5 | 18 | M10 |

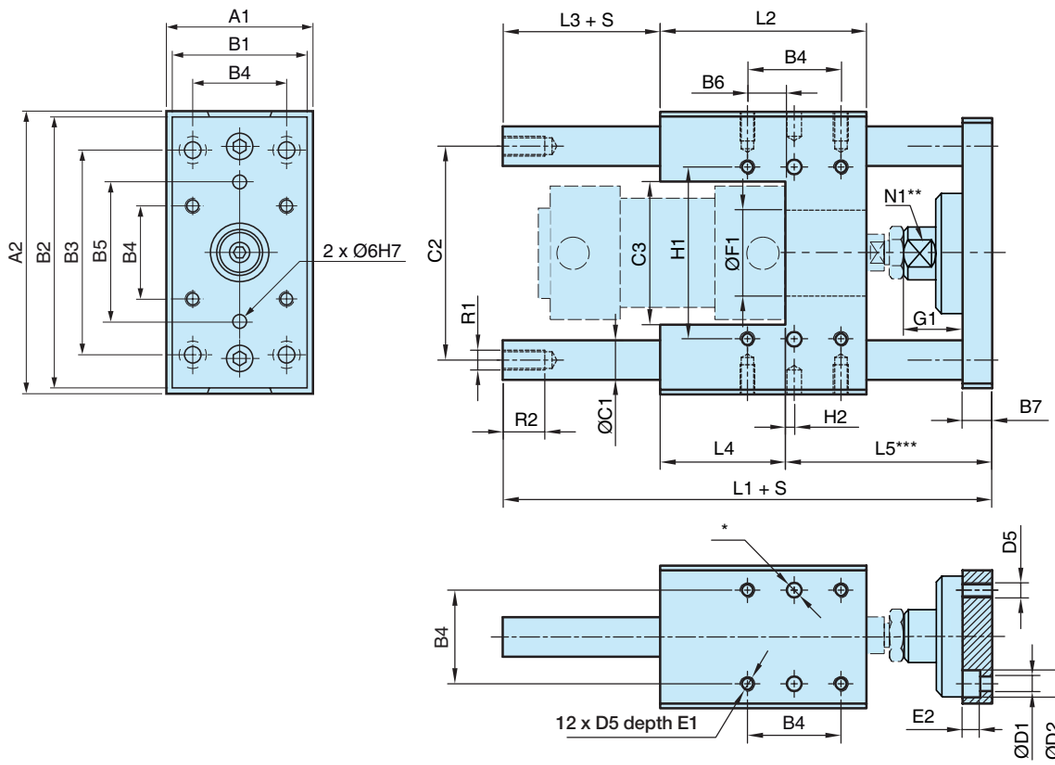
| Cyl. bore mm | $E_1$ mm | Ø $F_1^{+0,1/0}$ mm | $G_1$ mm | $L_1$ mm | $L_2$ mm | $L_3$ mm | $L_4$ mm | $L_5$ mm | $N_1$ mm | $P_1^{\pm1}$ mm | $P_2^{\pm1}$ mm | $P_3$ mm | $R_1$ mm | $R_2$ mm | W mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 32 | 7 | 30 | 17 | 150 | 120 | 15 | 71 | 64 | 17 | 36 | 31 | 40 | M6 | 11 | 5 |
| 40 | 7 | 35 | 24 | 170 | 130 | 25 | 71 | 74 | 17 | 36 | 36 | 44 | M6 | 11 | 6 |
| 50 | 9 | 40 | 27 | 197 | 150 | 24 | 79 | 89 | 24 | 42 | 44 | 50 | M8 | 16 | 8 |
| 63 | 9 | 45 | 27 | 222 | 180 | 24 | 109 | 89 | 24 | 58 | 44 | 60 | M8 | 16 | 8 |
| 80 | 11 | 45 | 32 | 247 | 200 | 24 | 113 | 110 | 30 | 50 | 52 | 70 | M10 | 16 | 10 |
| 100 | 11 | 55 | 32 | 267 | 220 | 24 | 128 | 115 | 30 | 49 | 51 | 70 | M10 | 16 | 10 |

| Cyl. bore mm | $H_1^{\pm0,05}$ mm | $H_2$ mm | T mm | Weight at 0 mm stroke kg | Supplement weight per 10 mm stroke kg |
|---|---|---|---|---|---|
| 32 | 81 | 11,7 | 12 | 0,970 | 0,018 |
| 40 | 99 | 8,0 | 12 | 1,550 | 0,032 |
| 50 | 119 | 4,2 | 16 | 2,560 | 0,050 |
| 63 | 132 | 13,0 | 16 | 3,570 | 0,050 |
| 80 | 166 | 15,0 | 20 | 6,530 | 0,078 |
| 100 | 190 | 20,5 | 20 | 8,760 | 0,078 |

S = Stroke length

* 6 hole Ø6 $^{H7}$, depth $10^{+1/0}$
** Hexagon profile
*** Min adjustment=0, max.=W

## U style guidance modules




## Dimensions (mm)

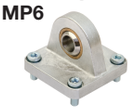
| Cyl. bore. mm | $A_1$ mm | $A_2$ mm | $B_1$ mm | $B_2$ mm | $B_3$ mm | $B_4$ mm | $B_5$ mm | $B_6$ mm | $B_7$ mm | $C_1$ mm | $C_2$ mm | $C_3$ mm | $D_1$ mm | $D_2$ mm | $D_5$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 32 | 50 | 97 | 45 | 90 | 78 | 32,5 | 50 | 18,0 | 12 | 12 | 74 | 50 | 6,6 | 11 | M6 |
| 40 | 58 | 115 | 54 | 110 | 84 | 38,0 | 54 | 15,5 | 12 | 16 | 87 | 58 | 6,6 | 11 | M6 |
| 50 | 70 | 137 | 63 | 130 | 100 | 46,5 | 72 | 19,5 | 15 | 20 | 104 | 70 | 9,0 | 15 | M8 |
| 63 | 85 | 152 | 80 | 145 | 105 | 56,5 | 82 | 29,5 | 15 | 20 | 119 | 85 | 9,0 | 15 | M8 |
| 80 | 105 | 189 | 100 | 180 | 130 | 72,0 | 106 | 39,0 | 20 | 25 | 148 | 105 | 11,0 | 18 | M10 |
| 100 | 130 | 213 | 120 | 200 | 150 | 89,0 | 131 | 53,5 | 20 | 25 | 172 | 130 | 11,0 | 18 | M10 |

| Cyl. bore. mm | $E_1$ mm | $E_2$ mm | Ø $F_1^{+0,1/0}$ mm | $G_1$ | $L_1$ mm | $L_2$ mm | $L_3$ mm | $L_4$ mm | $L_5$ mm | $N_1$ mm | $R_1$ mm | $R_2$ | $H_1^{\pm0,05}$ mm | $H_2$ mm | W*** mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 32 | 10 | 6,5 | 30 | 30 | 133 | 72 | 14 | 44 | 75 | 13 | M6 | 11 | 61 | 1,75 | 5 |
| 40 | 10 | 6,5 | 35 | 36 | 149 | 84 | 12 | 51 | 86 | 15 | M8 | 12 | 69 | 3,50 | 5 |
| 50 | 13 | 9,0 | 40 | 42 | 175 | 100 | 12 | 60 | 103 | 22 | M8 | 12 | 85 | 3,75 | 5 |
| 63 | 13 | 9,0 | 45 | 42 | 190 | 115 | 12 | 75 | 103 | 22 | M8 | 12 | 100 | 1,25 | 5 |
| 80 | 16 | 11,0 | 45 | 49 | 238 | 162 | 0 | 112 | 126 | 27 | M10 | 16 | 130 | 3,00 | 6 |
| 100 | 16 | 11,0 | 55 | 49 | 249 | 167 | 6 | 112 | 131 | 27 | M10 | 16 | 150 | 8,50 | 6 |

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

S = Stroke length

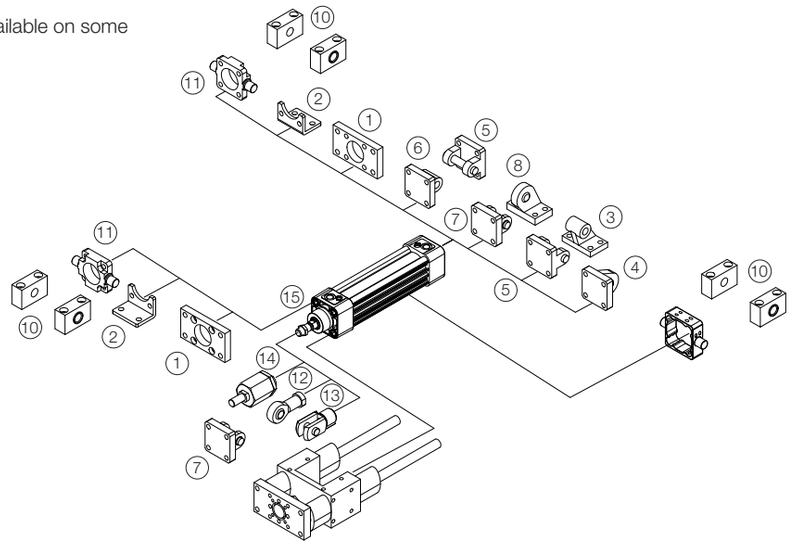
* 6 hole Ø6 $^{H7}$, depth $10^{+1/0}$
** Width of jaw
*** Min adjustment=0, max.=W

| | Flange MF1/MF2 [1] | Foot brackets MS1 [2] | Pivot bracket with rigid bearing AB7 [3] | Swivel eye bracket MP6 [4] | Clevis bracket MP2 [5] |
|---|---|---|---|---|---|
| |  |  |  |  |  |
| Ø 32 | P1C-4KMB | P1C-4KMF | P1C-4KMDB | PD23843 | P1C-4KMTB |
| Ø 40 | P1C-4LMB | P1C-4LMF | P1C-4LMDB | PD23844 | P1C-4LMTB |
| Ø 50 | P1C-4MMB | P1C-4MMF | P1C-4MMDB | PD23845 | P1C-4MMTB |
| Ø 63 | P1C-4NMB | P1C-4NMF | P1C-4NMDB | PD23846 | P1C-4NMTB |
| Ø 80 | P1C-4PMB | P1C-4PMF | P1C-4PMDB | PD23847 | P1C-4PMTB |
| Ø 100 | P1C-4QMB | P1C-4QMF | P1C-4QMDB | PD23848 | P1C-4QMTB |
| Ø 125 | P1C-4RMB | P1C-4RMF | P1C-4RMDB | PD23849 | P1C-4RMTB |
| Ø 160 | PD23410 | PD70512 | P1C-4SMDB | PD23850 | P1C-4SMTB |
| Ø 200 | PD24924 | PD24792 | P1C-4TMDB | PD25766 | P1C-4TMTB |
| Ø 250 | PD25761 | PD25758 | P1C-4UMDC | PD25760 | P1C-4UMTB |
| Ø 320 | KL9140 | KL9139 | P1C-4VMDC | KL9136 | P1C-4VMTB |

| | Clevis bracket MP4 [6] | Clevis bracket AB6 [7] | Pivot bracket with swivel bearing CS7 [8] | 3 and 4 positions flange JP1 | Pivot brackets AT4 for MT* trunnion [10] |
|---|---|---|---|---|---|
| |  |  |  |  |  |
| Ø 32 | PD23412 | P1C-4KMCB | KC5130 | P1E-6KB0 | PD23381 |
| Ø 40 | PD23413 | P1C-4LMCB | KC5131 | P1E-6LB0 | PD23382 |
| Ø 50 | PD23414 | P1C-4MMCB | KC5132 | P1E-6MB0 | PD23382 |
| Ø 63 | PD23415 | P1C-4NMCB | KC5133 | P1E-6NB0 | PD23383 |
| Ø 80 | PD23416 | P1C-4PMCB | KC5134 | P1E-6PB0 | PD23383 |
| Ø 100 | PD23417 | P1C-4QMCB | KC5135 | P1E-6QB0 | PD23384 |
| Ø 125 | PD23418 | P1C-4RMCB | KC5136 | | PD23384 |
| Ø 160 | PD22628 | | | | PD24425 |
| Ø 200 | PD24999 | | | | PD24425 |
| Ø 250 | PD25759 | | | | PD25763 |
| Ø 320 | KL9135 | | | | KL9130 |

| | Flange trunnion MT5/MT6 [11] | Swivel rod eye AP6 [12] | Clevis AP2 [13] | Flexo coupling PM5 [14] | Zinc-plated nut MR9 [15] |
|---|---|---|---|---|---|
| |  |  |  |  |  |
| Ø 32 | P1D-4KMYF | P1C-4KRS | P1C-4KRC | P1C-4KRF | P14-4KRPZ |
| Ø 40 | P1D-4LMYF | P1C-4LRS | P1C-4LRC | P1C-4LRF | P14-4LRPZ |
| Ø 50 | P1D-4MMYF | P1C-4MRS | P1C-4MRC | P1C-4MRF | P14-4MRPZ |
| Ø 63 | P1D-4NMYF | P1C-4MRS | P1C-4MRC | P1C-4MRF | P14-4MRPZ |
| Ø 80 | P1D-4PMYF | P1C-4PRS | P1C-4PRC | P1C-4PRF | P14-4PRPZ |
| Ø 100 | P1D-4QMYF | P1C-4PRS | P1C-4PRC | P1C-4PRF | P14-4PRPZ |
| Ø 125 | | P1C-4RRS | P1C-4RRC | P1C-4RRF | P14-4RRPZ |
| Ø 160 | | KY6863 | KY6867 | KY1139 | |
| Ø 200 | | KY6863 | KY6867 | KY1139 | |
| Ø 250 | | KY6864 | KY6868 | KY1140 | |
| Ø 320 | | KL9132 | KL9131 | KL9133 | |

**Note:** Black anodization available on some mountings.



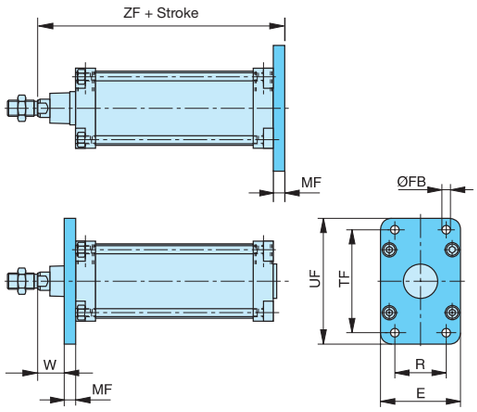
## Flange MF1/MF2 ①



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 cylinder.




| Bore mm | ZF mm | MF mm | W mm | UF mm | E mm | TF mm | R mm | ØFB mm | Weight kg | Order code |
|---|---|---|---|---|---|---|---|---|---|---|
| 32 | 130,0 | 10,0 | 16,0 | 80,0 | 45,0 | 64,0 | 32,0 | 7,0 | 0,23 | **P1C-4KMB** |
| 40 | 145,0 | 10,0 | 20,0 | 80,0 | 52,0 | 72,0 | 36,0 | 9,0 | 0,28 | **P1C-4LMB** |
| 50 | 155,0 | 12,0 | 25,0 | 80,0 | 65,0 | 90,0 | 45,0 | 9,0 | 0,53 | **P1C-4MMB** |
| 63 | 170,0 | 12,0 | 25,0 | 80,0 | 75,0 | 100,0 | 50,0 | 9,0 | 0,71 | **P1C-4NMB** |
| 80 | 190,0 | 16,0 | 30,0 | 80,0 | 95,0 | 126,0 | 63,0 | 12,0 | 1,59 | **P1C-4PMB** |
| 100 | 205,0 | 16,0 | 35,0 | 80,0 | 115,0 | 150,0 | 75,0 | 14,0 | 2,19 | **P1C-4QMB** |
| 125 | 245,0 | 20,0 | 45,0 | 80,0 | 140,0 | 180,0 | 90,0 | 16,0 | 3,78 | **P1C-4RMB** |
| 160 | 180,0 | 20,0 | 60,0 | 80,0 | 180,0 | 230,0 | 115,0 | 18,0 | 7,20 | **PD23410** |
| 200 | 300,0 | 25,0 | 70,0 | 80,0 | 220,0 | 270,0 | 135,0 | 22,0 | 12,20 | **PD24924** |
| 250 | 330,0 | 25,0 | 80,0 | 80,0 | 280,0 | 330,0 | 165,0 | 26,0 | 19,20 | **PD25761** |
| 320 | 370,0 | 30,0 | 90,0 | 80,0 | 340,0 | 400,0 | 200,0 | 33,0 | 38,00 | **KL9140** |

Dimensions for cylinders without piston rod protusion or with rod lock unit

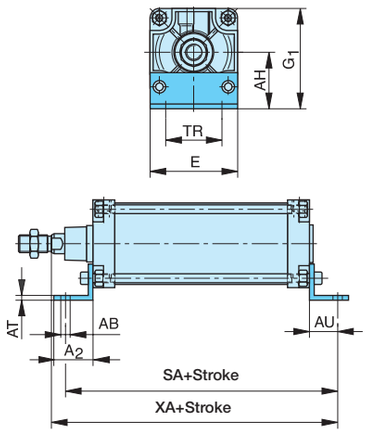
## Foot brackets MS1 ②



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

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

Supplied complete with mounting screws for attachment to cylinder.




| Bore mm | E mm | TR mm | AH mm | G1 mm | AT mm | A2 mm | ØAB mm | SA mm | XA mm | AU mm | Weight kg | Order code |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 32 | 45,0 | 32,0 | 32,0 | 56,0 | 4,5 | 34,0 | 7,0 | 142,0 | 144,0 | 24,0 | 0,06 | **P1C-4KMF** |
| 40 | 52,0 | 36,0 | 36,0 | 62,8 | 4,5 | 36,0 | 9,0 | 161,0 | 163,0 | 28,0 | 0,08 | **P1C-4LMF** |
| 50 | 65,0 | 45,0 | 45,0 | 77,6 | 5,5 | 45,0 | 9,0 | 170,0 | 175,0 | 32,0 | 0,16 | **P1C-4MMF** |
| 63 | 75,0 | 50,0 | 50,0 | 87,8 | 5,5 | 45,0 | 9,0 | 185,0 | 190,0 | 32,0 | 0,25 | **P1C-4NMF** |
| 80 | 95,0 | 63,0 | 63,0 | 110,5 | 6,5 | 55,0 | 12,0 | 210,0 | 215,0 | 41,0 | 0,50 | **P1C-4PMF** |
| 100 | 115,0 | 75,0 | 71,0 | 128,0 | 6,5 | 56,0 | 14,0 | 220,0 | 230,0 | 41,0 | 0,85 | **P1C-4QMF** |
| 125 | 140,0 | 90,0 | 90,0 | 159,5 | 8,0 | 67,0 | 16,0 | 250,0 | 270,0 | 45,0 | 1,48 | **P1C-4RMF** |
| 160 | 180,0 | 115,0 | 115,0 | 205,0 | 8,0 | 80,0 | 18,0 | 300,0 | 320,0 | 60,0 | 3,80 | **PD70512** |
| 200 | 220,0 | 135,0 | 135,0 | 245,0 | 9,0 | 100,0 | 22,0 | 320,0 | 345,0 | 70,0 | 5,00 | **PD24792** |
| 250 | 280,0 | 165,0 | 165,0 | 305,0 | 10,0 | 110,0 | 26,0 | 350,0 | 380,0 | 75,0 | 9,70 | **PD25758** |
| 320 | 340,0 | 200,0 | 200,0 | 370,0 | 23,0 | 125,0 | 33,0 | 390,0 | 470,0 | 85,0 | 17,00 | **KL9139** |

Weight per item
Dimensions for cylinders without piston rod protusion or with rod lock unit



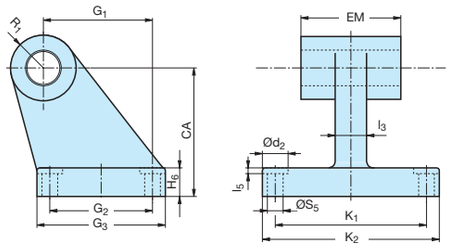
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**Pivot bracket with rigid bearing AB7** ③



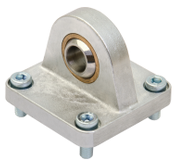
Intended for flexible mounting of cylinder. The pivot bracket can be combined with clevis bracket MP2.

Material:
Pivot bracket: Aluminium
Bearing: Sintered oil-bronze bushing




| Bore mm | R1 mm | ØCX H7 mm | G1 mm | CA mm | H6 mm | G2 mm | G3 mm | EM mm | l3 mm | Ød2 mm | l5 mm | ØS5 mm | K1 mm | K2 mm | Weight kg | Order code Not anodised | Order code Black anodised |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 32 | 10,0 | 10,0 | 21,0 | 32,0 | 8,0 | 18,0 | 31,0 | 25,5 | 10,0 | - | - | 6,6 | 38,0 | 51,0 | 0,06 | **P1C-4KMDB** | **P1C-4KMD** |
| 40 | 11,0 | 12,0 | 24,0 | 36,0 | 10,0 | 22,0 | 35,0 | 27,0 | 15,0 | - | - | 6,6 | 41,0 | 54,0 | 0,08 | **P1C-4LMDB** | **P1C-4LMD** |
| 50 | 13,0 | 12,0 | 33,0 | 45,0 | 12,0 | 30,0 | 45,0 | 31,0 | 16,0 | - | - | 9,0 | 50,0 | 65,0 | 0,15 | **P1C-4MMDB** | **P1C-4MMD** |
| 63 | 15,0 | 16,0 | 37,0 | 50,0 | 12,0 | 35,0 | 50,0 | 39,0 | 16,0 | - | - | 9,0 | 52,0 | 67,0 | 0,20 | **P1C-4NMDB** | **P1C-4NMD** |
| 80 | 15,0 | 16,0 | 47,0 | 63,0 | 14,0 | 40,0 | 60,0 | 49,0 | 20,0 | - | - | 11,0 | 66,0 | 86,0 | 0,33 | **P1C-4PMDB** | **P1C-4PMD** |
| 100 | 19,0 | 20,0 | 55,0 | 71,0 | 15,0 | 50,0 | 70,0 | 59,0 | 20,0 | - | - | 11,0 | 76,0 | 96,0 | 0,49 | **P1C-4QMDB** | **P1C-4QMD** |
| 125 | 22,5 | 25,0 | 70,0 | 90,0 | 20,0 | 60,0 | 90,0 | 69,0 | 30,0 | - | - | 14,0 | 94,0 | 124,0 | 1,02 | **P1C-4RMDB** | **P1C-4RMD** |
| 160 | 31,5 | 30,0 | 97,0 | 115,0 | 25,0 | 88,0 | 126,0 | 90,0 | 36,0 | 20,0 | 4,0 | 14,0 | 118,0 | 156,0 | 6,50 | **P1C-4SMDB** | **-** |
| 200 | 31,5 | 30,0 | 105,0 | 135,0 | 30,0 | 90,0 | 130,0 | 90,0 | 40,0 | 26,0 | 4,0 | 18,0 | 122,0 | 162,0 | 8,00 | **P1C-4TMDB** | **-** |
| 250 | 40,0 | 40,0 | 128,0 | 165,0 | 35,0 | 110,0 | 160,0 | 110,0 | 45,0 | 33,0 | 4,5 | 22,0 | 150,0 | 200,0 | 13,50 | **P1C-4UMDB** | **-** |
| 320 | 45,0 | 45,0 | 150,0 | 200,0 | 40,0 | 122,0 | 186,0 | 120,0 | 55,0 | - | - | 26,0 | 170,0 | 234,0 | 21,90 | **P1C-4VMDC** | **-** |

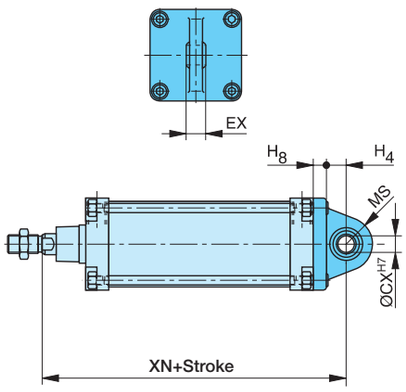
**Swivel eye bracket MP6** ④



Intended for use together with clevis bracket GA

Material:
Bracket: Aluminium
Swivel bearing acc. to DIN 648K: Hardened steel

Supplied complete with mounting screws for attachment to cylinder.




| Bore mm | EX mm | XN mm | H8 mm | H4 mm | MS mm | ØCX H7 mm | Weight kg | Order code Not anodised | Order code Black anodised |
|---|---|---|---|---|---|---|---|---|---|
| 32 | 14,0 | 142,0 | 10,0 | 12,0 | 16,0 | 10,0 | 0,10 | **PD23843** | **P1C-4KMSA** |
| 40 | 16,0 | 160,0 | 10,0 | 15,0 | 21,0 | 12,0 | 0,11 | **PD23844** | **P1C-4LMSA** |
| 50 | 16,0 | 170,0 | 11,0 | 16,0 | 23,0 | 12,0 | 0,20 | **PD23845** | **P1C-4MMSA** |
| 63 | 21,0 | 190,0 | 11,0 | 21,0 | 27,0 | 16,0 | 0,27 | **PD23846** | **P1C-4NMSA** |
| 80 | 21,0 | 210,0 | 15,0 | 21,0 | 29,0 | 16,0 | 0,52 | **PD23847** | **P1C-4PMSA** |
| 100 | 25,0 | 230,0 | 16,0 | 25,0 | 34,0 | 20,0 | 0,72 | **PD23848** | **P1C-4QMSA** |
| 125 | 31,0 | 275,0 | 20,0 | 30,0 | 40,0 | 25,0 | 1,53 | **PD23849** | **P1C-4RMSA** |
| 160 | 37,0 | 315,0 | 20,0 | 35,0 | 48,0 | 30,0 | 2,60 | **PD23850** | **-** |
| 200 | 43,0 | 335,0 | 24,0 | 36,0 | 47,0 | 30,0 | 11,30 | **PD25766** | **-** |
| 250 | 49,0 | 375,0 | 28,0 | 42,0 | 53,0 | 40,0 | 19,00 | **PD25760** | **-** |
| 320 | 60,0 | 420,0 | 30,0 | 50,0 | 63,0 | 45,0 | 30,30 | **KL9136** | **-** |

Dimensions for cylinders without piston rod protusion or with rod lock unit

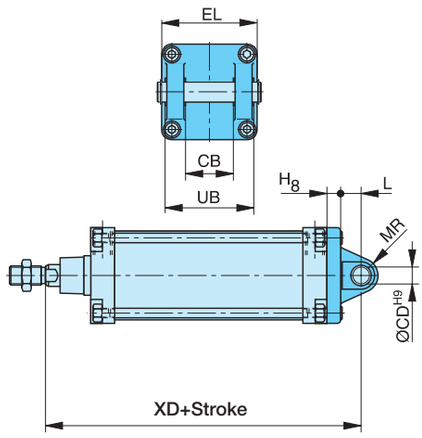
## Clevis bracket MP2 (5)



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

Material:
Clevis bracket: Aluminium
Pin: Surface hardened steel
Circlips according to DIN 471: Spring steel
Mounting screws acc. to DIN 912: Zinc-plated steel 8.8

Supplied complete with mounting screws for attachment to cylinder.




| Bore mm | EL mm | XD mm | ØCD H9 mm | CB H14 mm | UB mm | H8 mm | L mm | MR mm | Weight kg | Order code Not anodised | Order code Black anodised |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 32 | 53,0 | 142,0 | 10,0 | 26,0 | 45,0 | 10,0 | 12,0 | 11,0 | 0,08 | **P1C-4KMTB** | **P1C-4KMT** |
| 40 | 60,0 | 160,0 | 12,0 | 28,0 | 52,0 | 10,0 | 15,0 | 13,0 | 0,11 | **P1C-4LMTB** | **P1C-4LMT** |
| 50 | 68,0 | 170,0 | 12,0 | 32,0 | 60,0 | 11,0 | 16,0 | 18,0 | 0,14 | **P1C-4MMTB** | **P1C-4MMT** |
| 63 | 78,0 | 190,0 | 16,0 | 40,0 | 70,0 | 11,0 | 21,0 | 18,0 | 0,29 | **P1C-4NMTB** | **P1C-4NMT** |
| 80 | 98,0 | 210,0 | 16,0 | 50,0 | 90,0 | 15,0 | 21,0 | 22,0 | 0,36 | **P1C-4PMTB** | **P1C-4PMT** |
| 100 | 118,0 | 230,0 | 20,0 | 60,0 | 110,0 | 16,0 | 25,0 | 22,0 | 0,64 | **P1C-4QMTB** | **P1C-4QMT** |
| 125 | 139,0 | 275,0 | 25,0 | 70,0 | 130,0 | 20,0 | 30,0 | 30,0 | 1,17 | **P1C-4RMTB** | **P1C-4RMT** |
| 160 | 172,0 | 315,0 | 30,0 | 90,0 | 170,0 | 20,0 | 35,0 | 30,0 | 2,60 | **P1C-4SMTB** | **-** |
| 200 | 172,0 | 335,0 | 30,0 | 90,0 | 170,0 | 25,0 | 35,0 | 31,0 | 4,10 | **P1C-4TMTB** | **-** |
| 250 | 280,0 | 375,0 | 40,0 | 110,0 | 200,0 | 25,0 | 45,0 | 41,0 | 7,10 | **P1C-4UMTB** | **-** |
| 320 | 340,0 | 420,0 | 45,0 | 120,0 | 220,0 | 30,0 | 50,0 | 54,0 | 31,0 | **P1C-4VMTB** | **-** |

Dimensions for cylinders without piston rod protusion or with rod lock unit

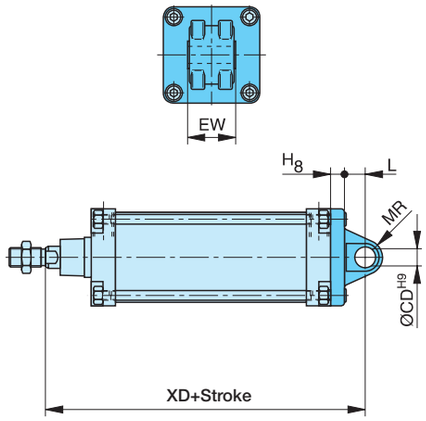
## Clevis bracket MP4 (6)



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

Material:
Clevis bracket: Aluminium
Mounting screws acc. to DIN 912: Zinc-plated steel 8.8

Supplied complete with mounting screws for attachment to cylinder.




| Bore mm | EW mm | XD mm | H8 mm | L mm | MR mm | ØCD mm | Weight kg | Order code Not anodised | Order code Black anodised |
|---|---|---|---|---|---|---|---|---|---|
| 32 | 26,0 | 142,0 | 10,0 | 12,0 | 11,0 | 10,0 | 0,09 | **PD23412** | **P1C-4KME** |
| 40 | 28,0 | 160,0 | 10,0 | 15,0 | 13,0 | 12,0 | 0,13 | **PD23413** | **P1C-4LME** |
| 50 | 32,0 | 170,0 | 11,0 | 16,0 | 18,0 | 12,0 | 0,17 | **PD23414** | **P1C-4MME** |
| 63 | 40,0 | 190,0 | 11,0 | 21,0 | 18,0 | 16,0 | 0,36 | **PD23415** | **P1C-4NME** |
| 80 | 50,0 | 210,0 | 15,0 | 21,0 | 22,0 | 16,0 | 0,58 | **PD23416** | **P1C-4PME** |
| 100 | 60,0 | 230,0 | 16,0 | 25,0 | 22,0 | 20,0 | 0,89 | **PD23417** | **P1C-4QME** |
| 125 | 70,0 | 275,0 | 20,0 | 30,0 | 30,0 | 25,0 | 1,75 | **PD23418** | **P1C-4RME** |
| 160 | 90,0 | 315,0 | 20,0 | 35,0 | 30,0 | 30,0 | 2,70 | **PD22628** | **-** |
| 200 | 90,0 | 335,0 | 25,0 | 35,0 | 31,0 | 30,0 | 4,20 | **PD24999** | **-** |
| 250 | 110,0 | 375,0 | 25,0 | 45,0 | 41,0 | 40,0 | 15,70 | **PD25759** | **-** |
| 320 | 120,0 | 420,0 | 30,0 | 50,0 | 46,0 | 45,0 | 33,00 | **KL9135** | **-** |

Dimensions for cylinders without piston rod protusion or with rod lock unit

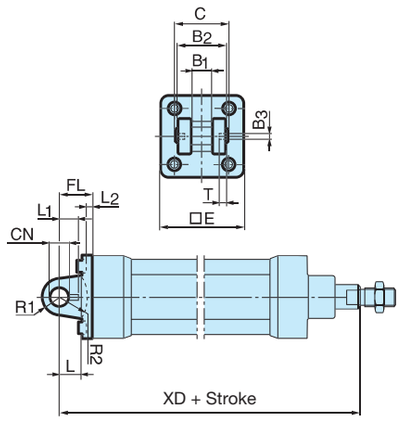
**Clevis bracket AB6** ⑦



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.

Material:
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

Supplied complete with mounting screws for attachment to cylinder.




| Bore mm | C mm | B2 mm | B1 mm | B3 mm | T mm | E mm | ØCN mm | L1 mm | FL mm | L2 mm | R1 mm | R2 mm | L mm | Weight kg | Order code Not anodised | Order code Black anodised |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 32 | 41 | 34 | 14 | 3,3 | 3 | 45 | 10 | 11,5 | 22 | 5,5 | 11 | 17 | 12 | 0,09 | **P1C-4KMCB** | **P1C-4KMCA** |
| 40 | 48 | 40 | 16 | 4,3 | 4 | 55 | 12 | 12,0 | 25 | 5,5 | 13 | 20 | 15 | 0,13 | **P1C-4LMCB** | **P1C-4LMCA** |
| 50 | 54 | 45 | 21 | 4,3 | 4 | 65 | 16 | 14,0 | 27 | 6,5 | 18 | 22 | 17 | 0,17 | **P1C-4MMCB** | **P1C-4MMCA** |
| 63 | 60 | 51 | 21 | 4,3 | 4 | 75 | 16 | 14,0 | 32 | 6,5 | 18 | 25 | 20 | 0,36 | **P1C-4NMCB** | **P1C-4NMCA** |
| 80 | 75 | 65 | 25 | 4,3 | 4 | 95 | 20 | 16,0 | 36 | 10,0 | 22 | 30 | 20 | 0,58 | **P1C-4PMCB** | **P1C-4PMCA** |
| 100 | 85 | 75 | 25 | 4,3 | 4 | 115 | 20 | 16,0 | 41 | 10,0 | 22 | 32 | 25 | 0,89 | **P1C-4QMCB** | **P1C-4QMCA** |
| 125 | 110 | 97 | 37 | 6,3 | 6 | 140 | 30 | 24,0 | 50 | 10,0 | 30 | 42 | 30 | 1,75 | **P1C-4RMCB** | **P1C-4RMCA** |

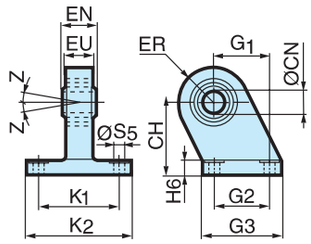
Dimensions for cylinders without piston rod protusion or with rod lock unit

**Pivot bracket with swivel bearing CS7** ⑧



Intended for use together with clevis bracket GA.

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

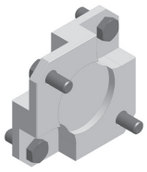



| Bore mm | EN mm | EU mm | Z mm | ØS5 mm | K1 mm | K2 mm | ER mm | G1 mm | ØCN mm | CH mm | H6 mm | G2 mm | G3 mm | Weight kg | Order code | Order code Black steel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 32 | 14 | 10,5 | 4° | 6,6 | 38 | 51 | 16 | 21 | 10 | 32 | 10 | 18 | 31 | 0,18 | **KC5130** | **P1C-4KMA** |
| 40 | 16 | 12,0 | 4° | 6,6 | 41 | 54 | 18 | 24 | 12 | 36 | 10 | 22 | 35 | 0,25 | **KC5131** | **P1C-4LMA** |
| 50 | 21 | 15,0 | 4° | 9,0 | 50 | 65 | 21 | 33 | 16 | 45 | 12 | 30 | 45 | 0,47 | **KC5132** | **P1C-4MMA** |
| 63 | 21 | 15,0 | 4° | 9,0 | 52 | 67 | 23 | 37 | 16 | 50 | 12 | 35 | 50 | 0,57 | **KC5133** | **P1C-4NMA** |
| 80 | 25 | 18,0 | 4° | 11,0 | 66 | 86 | 28 | 47 | 20 | 63 | 14 | 40 | 60 | 1,05 | **KC5134** | **P1C-4PMA** |
| 100 | 25 | 18,0 | 4° | 11,0 | 76 | 96 | 30 | 55 | 20 | 71 | 15 | 50 | 70 | 1,42 | **KC5135** | **P1C-4QMA** |
| 125 | 37 | 25,0 | 4° | 14,0 | 94 | 124 | 40 | 70 | 30 | 90 | 20 | 60 | 90 | 3,10 | **KC5136** | **P1C-4RMA** |



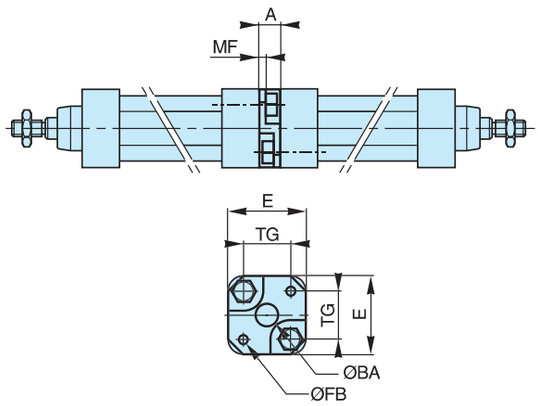
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**3 and 4 positions flange JP1**



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

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




| Bore mm | E mm | TG mm | ØFB mm | MF mm | A mm | ØBA mm | Weight kg | Order code |
|---|---|---|---|---|---|---|---|---|
| 32 | 50 | 32,5 | 6,5 | 5 | 16 | 30 | 0,09 | **P1E-6KB0** |
| 40 | 60 | 38,0 | 6,5 | 5 | 16 | 35 | 0,13 | **P1E-6LB0** |
| 50 | 66 | 46,5 | 8,5 | 6 | 20 | 40 | 0,17 | **P1E-6MB0** |
| 63 | 80 | 56,5 | 8,5 | 6 | 20 | 45 | 0,37 | **P1E-6NB0** |
| 80 | 100 | 72,0 | 10,5 | 8 | 25 | 45 | 0,46 | **P1E-6PB0** |
| 100 | 118 | 89,0 | 10,5 | 8 | 25 | 55 | 0,83 | **P1E-6QB0** |

**Pivot brackets AT4 for (10) MT* mounting trunnion**

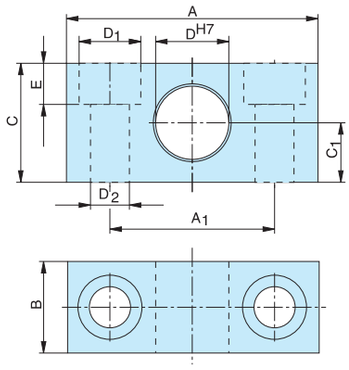


Intended for use together with intermediate trunnion MT4 or MT5 / MT6.

Material:
Pivot bracket:
Ø32-125 mm – Aluminium
Ø160-250 mm – Anodised aluminium
Ø 320 mm – steel

Bearing acc. to DIN 1850 C

Supplied in pairs.

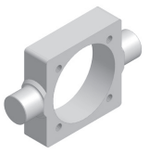



| Bore mm | A mm | A1 mm | B mm | C mm | C1 mm | ØD H7 mm | ØD1 mm | ØD2 mm | E mm | Weight kg | Order code Not anodised |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 32 | 55 | 36 | 20 | 26 | 13 | 12 | 13,5 | 8,4 | 9,0 | 0,06 | **PD23381** |
| 40 | 55 | 36 | 20 | 26 | 13 | 16 | 13,5 | 8,4 | 9,0 | 0,06 | **PD23382** |
| 50 | 55 | 36 | 20 | 26 | 13 | 16 | 13,5 | 8,4 | 9,0 | 0,06 | **PD23382** |
| 63 | 65 | 42 | 25 | 30 | 15 | 20 | 16,5 | 10,5 | 11,0 | 0,10 | **PD23383** |
| 80 | 65 | 42 | 25 | 30 | 15 | 20 | 16,5 | 10,5 | 11,0 | 0,10 | **PD23383** |
| 100 | 75 | 50 | 28 | 40 | 20 | 25 | 19,0 | 13,0 | 13,0 | 0,18 | **PD23384** |
| 125 | 75 | 50 | 28 | 40 | 20 | 25 | 19,0 | 13,0 | 13,0 | 0,18 | **PD23384** |
| 160 | 92 | 60 | 35 | 60 | 30 | 32 | 26,0 | 18,0 | 17,0 | 0,35 | **PD24425** |
| 200 | 92 | 60 | 35 | 60 | 30 | 32 | 26,0 | 18,0 | 17,0 | 0,35 | **PD24425** |
| 250 | 140 | 90 | 40 | 70 | 35 | 40 | 33,0 | 22,0 | 21,5 | 0,50 | **PD25763** |
| 320 | 150 | 100 | 60 | 80 | 40 | 50 | 40,0 | 26,0 | 25,5 | 6,70 | **KL9130** |



PDE2667TCUK_P1D-T_Cylinders_Catalogue_V8.indd 36 30/04/2015 12:29:12

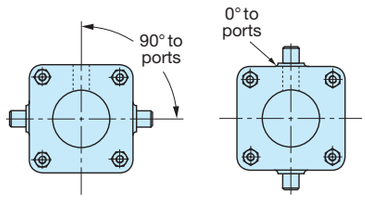
**Intermediate trunnion MT4**

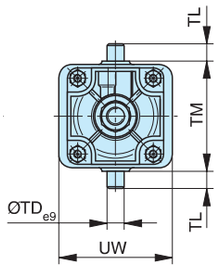


The trunnion is MT4 for P1D-T factory-fitted in the centre of the cylinder or at an optional location specified by the XV-measure - Combined with pivot brackets AT4.

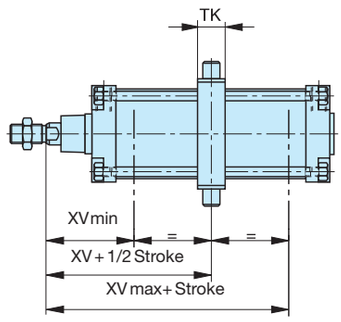
Material:
Trunnion: Zinc plated steel
Trunnion centred
The central trunnion for the P1D-T is ordered with letter D in position 17 (no dimension specified in positions18-20).
e.g. P1D-T160MS-0500NDNNN
Trunnion with optional location

The trunnion for the P1D-T is ordered with letter G in position 17 and desired XV-measure (3-digit measure in mm) in positions 18-20. e.g. P1D-T160MS-0500NG300



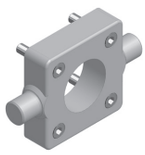




| Bore mm | TK mm | TL h14 mm | TM h14 mm | ØTD e9 mm | XV min mm | XV mm | XV max mm | Weight kg |
|---|---|---|---|---|---|---|---|---|
| 32 | 15 | 12 | 50 | 12 | 62,0 | 73,0 | 84,0 | 0,13 |
| 40 | 20 | 16 | 63 | 16 | 73,0 | 82,5 | 92,0 | 0,31 |
| 50 | 20 | 16 | 75 | 16 | 80,5 | 90,0 | 99,5 | 0,37 |
| 63 | 25 | 20 | 90 | 20 | 89,0 | 97,5 | 106,0 | 0,69 |
| 80 | 25 | 20 | 110 | 20 | 98,0 | 110,0 | 122,0 | 0,89 |
| 100 | 30 | 25 | 132 | 25 | 110,5 | 120,0 | 129,5 | 1,58 |
| 125 | 32 | 25 | 180 | 25 | 132,0 | 145,0 | 158,0 | 2,60 |
| 160 | 45 | 32 | 200 | 32 | 150,0 | 170,0 | 190,0 | 6,10 |
| 200 | 50 | 32 | 250 | 32 | 165,0 | 185,0 | 205,0 | 8,10 |
| 250 | 55 | 40 | 320 | 40 | 195,0 | 205,0 | 210,0 | 14,8 |
| 320 | 65 | 50 | 400 | 50 | 210,0 | 230,0 | 250,0 | 16,0 |




**Important:** If the cylinder is ordered with a piston rod protusion (WH dimension), please add this extra length to XVmin, XV and XVmax.

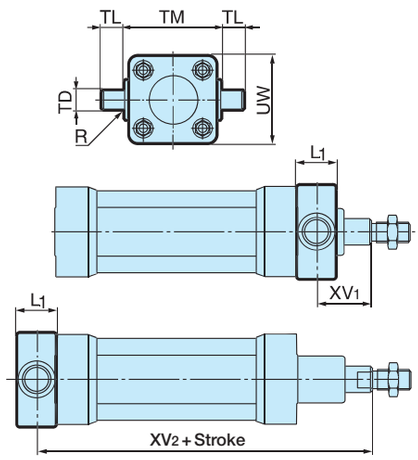
**Flange trunnion** (11) **MT5/MT6**



Intended for articulated mounting of cylinder. This trunnion can be flange mounted on the front or rear end cover of all P1D cylinders.
Individual trunnions have order code as shown to the right.

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

Delivered complete with mounting screws for attachment to the cylinder




| Bore mm | TM h14 mm | TL h14 mm | ØTD e9 mm | R mm | UW mm | L1 mm | $XV_1$ mm | $XV_2$ mm | Weight kg | **Order code** |
|---|---|---|---|---|---|---|---|---|---|---|
| 32 | 50 | 12 | 12 | 1,0 | 46 | 14 | 19,5 | 127,0 | 0,17 | **P1D-4KMYF** |
| 40 | 63 | 16 | 16 | 1,6 | 59 | 19 | 21,0 | 144,0 | 0,43 | **P1D-4LMYF** |
| 50 | 75 | 16 | 16 | 1,6 | 69 | 19 | 28,0 | 152,5 | 0,55 | **P1D-4MMYF** |
| 63 | 90 | 20 | 20 | 1,6 | 84 | 24 | 25,5 | 170,0 | 1,10 | **P1D-4NMYF** |
| 80 | 110 | 20 | 20 | 1,6 | 102 | 24 | 34,5 | 186,0 | 1,66 | **P1D-4PMYF** |
| 100 | 132 | 25 | 25 | 2,0 | 125 | 29 | 37,0 | 203,5 | 3,00 | **P1D-4QMYF** |

Dimensions for cylinders without piston rod protusion or with rod lock unit

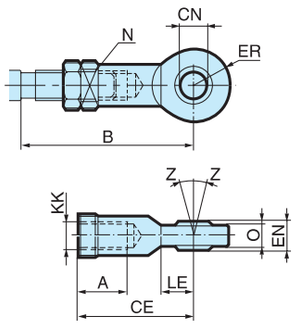
**Swivel rod eye AP6** (12)



Swivel rod eye for articulated mounting of cylinder. Swivel rod eye can be combined with clevis bracket GA. Maintenance-free.

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

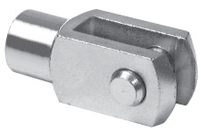
Swivel rod eye: Stainless steel
Swivel bearing according to DIN 648K: Hardened steel




According to ISO 8139

| Bore mm | A mm | B min mm | B max mm | CE mm | ØCN H9 mm | EN h12 mm | ER mm | KK mm | LE min mm | N mm | O mm | Z mm | Weight kg | Order code | Order code Stainless steel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 32 | 20 | 48,0 | 55 | 43 | 10 | 14 | 14 | M10x1,25 | 15 | 17 | 10,5 | 12° | 0,08 | **P1C-4KRS** | **P1S-4JRT** |
| 40 | 22 | 56,0 | 62 | 50 | 12 | 16 | 16 | M12x1,25 | 17 | 19 | 12,0 | 12° | 0,12 | **P1C-4LRS** | **P1S-4LRT** |
| 50 | 28 | 72,0 | 80 | 64 | 16 | 21 | 21 | M16x1,5 | 22 | 22 | 15,0 | 15° | 0,25 | **P1C-4MRS** | **P1S-4MRT** |
| 63 | 28 | 72,0 | 80 | 64 | 16 | 21 | 21 | M16x1,5 | 22 | 22 | 15,0 | 15° | 0,25 | **P1C-4MRS** | **P1S-4MRT** |
| 80 | 33 | 87,0 | 97 | 77 | 20 | 25 | 25 | M20x1,5 | 26 | 32 | 18,0 | 15° | 0,46 | **P1C-4PRS** | **P1S-4PRT** |
| 100 | 33 | 87,0 | 97 | 77 | 20 | 25 | 25 | M20x1,5 | 26 | 32 | 18,0 | 15° | 0,46 | **P1C-4PRS** | **P1S-4PRT** |
| 125 | 51 | 123,5 | 137 | 110 | 30 | 37 | 35 | M27x2 | 36 | 41 | 25,0 | 15° | 1,28 | **P1C-4RRS** | **P1S-4RRT** |
| 160 | 56 | | | 125 | 35 | 43 | 40 | M36x2 | 41 | 50 | 28,0 | | 1,60 | **KY6863** | **-** |
| 200 | 56 | | | 125 | 35 | 43 | 40 | M36x2 | 41 | 50 | 28,0 | | 1,60 | **KY6863** | **-** |
| 250 | 60 | | | 142 | 40 | 49 | 45 | M42x2 | 46 | 55 | 33,0 | | 3,50 | **KY6864** | **-** |
| 320 | 65 | | | 160 | 50 | 60 | 58 | M48x2 | 59 | 65 | 45,0 | | 5,20 | **KY9132** | **-** |

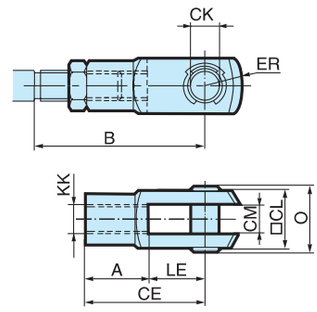
**Clevis AP2** (13)



Clevis for articulated mounting of cylinder.

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

Clevis, clip: Stainless steel
Pin: Stainless steel




According to ISO 8140

| Bore mm | A mm | B min mm | B max mm | CE mm | CK h11/e9 mm | CL mm | CM mm | ER mm | KK mm | LE mm | O mm | Weight kg | Order code | Order code Stainless steel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 32 | 20 | 45,0 | 52 | 40 | 10 | 20 | 10 | 16 | M10x1,25 | 20 | 28,0 | 0,09 | **P1C-4KRC** | **P1S-4JRD** |
| 40 | 24 | 54,0 | 60 | 48 | 12 | 24 | 12 | 19 | M12x1,25 | 24 | 32,0 | 0,15 | **P1C-4LRC** | **P1S-4LRD** |
| 50 | 32 | 72,0 | 80 | 64 | 16 | 32 | 16 | 25 | M16x1,5 | 32 | 41,5 | 0,35 | **P1C-4MRC** | **P1S-4MRD** |
| 63 | 32 | 72,0 | 80 | 64 | 16 | 32 | 16 | 25 | M16x1,5 | 32 | 41,5 | 0,35 | **P1C-4MRC** | **P1S-4MRD** |
| 80 | 40 | 90,0 | 100 | 80 | 20 | 40 | 20 | 32 | M20x1,5 | 40 | 50,0 | 0,75 | **P1C-4PRC** | **P1S-4PRD** |
| 100 | 40 | 90,0 | 100 | 80 | 20 | 40 | 20 | 32 | M20x1,5 | 40 | 50,0 | 0,75 | **P1C-4PRC** | **P1S-4PRD** |
| 125 | 56 | 123,5 | 137 | 110 | 30 | 55 | 30 | 45 | M27x2 | 54 | 72,0 | 2,10 | **P1C-4RRC** | **P1S-4RRD** |
| 160 | 72 | | | 144 | 35 | 70 | 36 | | M36x2 | 72 | | 2,90 | **KY6867** | **-** |
| 200 | 72 | | | 144 | 35 | 70 | 36 | | M36x2 | 72 | | 2,90 | **KY6867** | **-** |
| 250 | 84 | | | 168 | 40 | 85 | 40 | | M42x2 | 84 | | 6,00 | **KY6868** | **-** |
| 320 | 96 | | | 192 | 50 | 90 | 50 | | M48x2 | 96 | | 7,90 | **KY9131** | **-** |

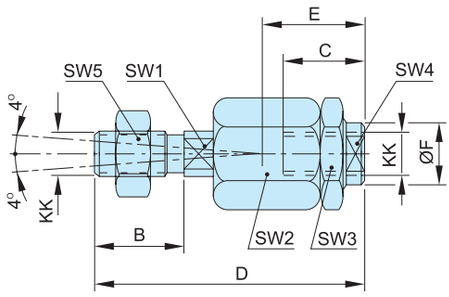
**Flexo coupling PM5** (14)



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

Material
Flexo coupling, nut: Zinc-plated steel

Supplied complete with galvanized adjustment nut.



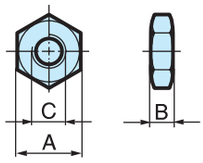

| Bore mm | KK mm | B mm | C mm | D mm | E mm | ØF mm | SW1 mm | SW2 mm | SW3 mm | SW4 mm | SW5 mm | Weight kg | Order code |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 32 | M10x1,25 | 20 | 23 | 73 | 31 | 21,0 | 12 | 30 | 30 | 19 | 17 | 0,21 | **P1C-4KRF** |
| 40 | M12x1,25 | 24 | 23 | 77 | 31 | 21,0 | 12 | 30 | 30 | 19 | 19 | 0,22 | **P1C-4LRF** |
| 50 | M16x1,5 | 32 | 32 | 108 | 45 | 33,5 | 19 | 41 | 41 | 30 | 24 | 0,67 | **P1C-4MRF** |
| 63 | M16x1,5 | 32 | 32 | 108 | 45 | 33,5 | 19 | 41 | 41 | 30 | 24 | 0,67 | **P1C-4MRF** |
| 80 | M20x1,5 | 40 | 42 | 122 | 56 | 33,5 | 19 | 41 | 41 | 30 | 30 | 0,72 | **P1C-4PRF** |
| 100 | M20x1,5 | 40 | 42 | 122 | 56 | 33,5 | 19 | 41 | 41 | 30 | 30 | 0,72 | **P1C-4PRF** |
| 125 | M27x2 | 54 | 48 | 147 | 51 | 39,0 | 24 | 55 | 55 | 32 | 41 | 1,80 | **P1C-4RRF** |
| 160 | M36x2 | 72 | 50 | 241 | 110 | 56,0 | 36 | 75 | 75 | 50 | 55 | 5,10 | **KY1139** |
| 200 | M36x2 | 72 | 50 | 241 | 110 | 56,0 | 36 | 75 | 75 | 50 | 55 | 5,10 | **KY1139** |
| 250 | M42x2 | 82 | 88 | 271 | 120 | - | 36 | 80 | 80 | 60 | 65 | 7,90 | **KY1140** |
| 320 | M48x2 | 82 | 88 | 271 | 120 | - | 42 | 80 | 80 | 60 | 75 | 7,90 | **KY9133** |

**Nut MR9** (15)



Intended for fixed mounting of accessories to the piston rod.
Material: Zinc-plated steel

All P1D cylinders are delivred with a zinc-plated steel piston rod nut, except P1D Ultra Clean, which is delivered with a stainless steel piston rod nut instead.




**Stainless steel nut MR9**



Intended for fixed mounting of accessories to the piston rod.

Material: Stainless steel A2

All P1D cylinders are delivred with a zinc-plated steel piston rod nut, exceptP1D-C delivered with a stainless steel piston rod nut instead.

**Acid-proof nut MR9**



Intended for fixed mounting of accessories to the piston rod.

Material: Acid-proof steel A4

Cylinders with acid-proof piston rod are supplied with nut of acid-proof steel

According to DIN 439 B

| Bore mm | A mm | B mm | C mm | Nut Weight kg | Nut Order code | Stainless steel nut Order code | Acid-proof nut Order code |
|---|---|---|---|---|---|---|---|
| 32 | 17 | 5,0 | M10x1,25 | 0,007 | **P14-4KRPZ** | **P14-4KRPS** | **P14-4KRPX** |
| 40 | 19 | 6,0 | M12x1,25 | 0,010 | **P14-4LRPZ** | **P14-4LRPS** | **P14-4LRPX** |
| 50 | 24 | 8,0 | M16x1,5 | 0,021 | **P14-4MRPZ** | **P14-4MRPS** | **P14-4MRPX** |
| 63 | 24 | 8,0 | M16x1,5 | 0,021 | **P14-4MRPZ** | **P14-4MRPS** | **P14-4MRPX** |
| 80 | 30 | 10,0 | M20x1,5 | 0,040 | **P14-4PRPZ** | **P14-4PRPS** | **P14-4PRPX** |
| 100 | 30 | 10,0 | M20x1,5 | 0,040 | **P14-4PRPZ** | **P14-4PRPS** | **P14-4PRPX** |
| 125 | 41 | 13,5 | M27x2 | 0,100 | **P14-4RRPZ** | **P14-4RRPS** | **P14-4RRPX** |

* Supplied as pack of 10 off
** Weight per item

| Type | Description | Cyl. bore Ø mm | Weight kg | Order code |
|---|---|---|---|---|
| **Stainless steel screw set for MP2, MP4, MS1 and AB6**  | Set of stainless steel screws for fitting clevis brackets MP2, MP4 and GA onto the cylinder. The screws have an internal hexagonal head and are used in special environments, e.g. the food industry, or where there are extra demands for protection against corrosion.<br><br>Material:<br>According to DIN 912, Stainless steel, A2<br><br>4 pcs per pack. | 32 | 0,02 | **9301054321** |
| | | 40 | 0,02 | **9301054321** |
| | | 50 | 0,05 | **9301054322** |
| | | 63 | 0,05 | **9301054322** |
| | | 80 | 0,09 | **9301054323** |
| | | 100 | 0,09 | **9301054323** |
| | | 125 | 0,15 | **9301054324** |
| **Stainless steel screw set for MF1/MF2**  | Set of stainless steel screws for fitting flanges MF1/MF2 onto the cylinder. The screws have an internal hexagonal head and are used in special environments, e.g. the food industry, or where there are extra demands for protection against corrosion.<br><br>Material:<br>According to DIN 6912, Stainless steel, A2<br><br>4 pcs per pack | 32 | 0,02 | **9301054331** |
| | | 40 | 0,02 | **9301054331** |
| | | 50 | 0,04 | **9301054332** |
| | | 63 | 0,04 | **9301054332** |
| | | 80 | 0,07 | **9301054333** |
| | | 100 | 0,07 | **9301054333** |
| | | 125 | 0,12 | **9301054334** |

## Stainless steel pin AA6 set for AB6 mounting

**Materials**
Pin: stainless steel
Locking pin: stainless steel
Circlips according to DIN 471: stainless steel

| Cyl. Bore Ø mm | Weight kg | Order code |
|---|---|---|
| 32 | 0.05 | **9301054311** |
| 40 | 0.06 | **9301054312** |
| 50 | 0.07 | **9301054313** |
| 63 | 0.07 | **9301054314** |
| 80 | 0.17 | **9301054315** |
| 100 | 0.31 | **9301054316** |
| 125 | 0.54 | **9301054317** |

## Stainless steel pin AA4 set for MP2 mounting

**Materials**
Pin: stainless steel
Locking pin: stainless steel
Circlips according to DIN 471: stainless steel

| Cyl. Bore Ø mm | Weight kg | Order code |
|---|---|---|
| 32 | 0.07 | **on request** |
| 40 | 0.08 | **on request** |
| 50 | 0.09 | **on request** |
| 63 | 0.09 | **on request** |
| 80 | 0.19 | **on request** |
| 100 | 0.33 | **on request** |
| 125 | 0.56 | **on request** |

## Drop-in sensors

Choose between electronic or reed sensors and several cable lengths and 8 mm and M12 connectors.
The same standard sensors are used for all P1D versions.



## 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.

### Technical data

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

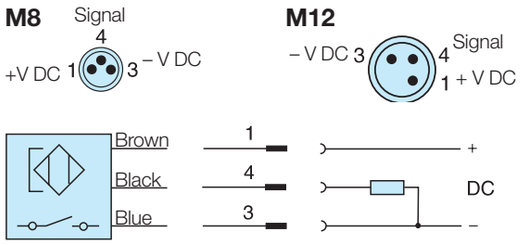
## Reed sensors

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

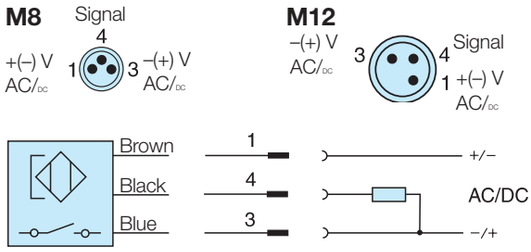
### Technical data

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

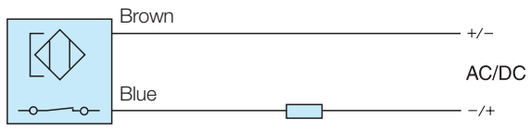
## Electronic sensors



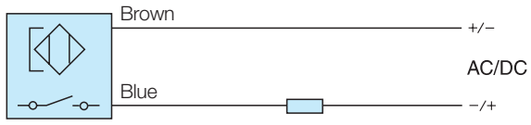

## Reed sensors




**P8S-GCFPX**

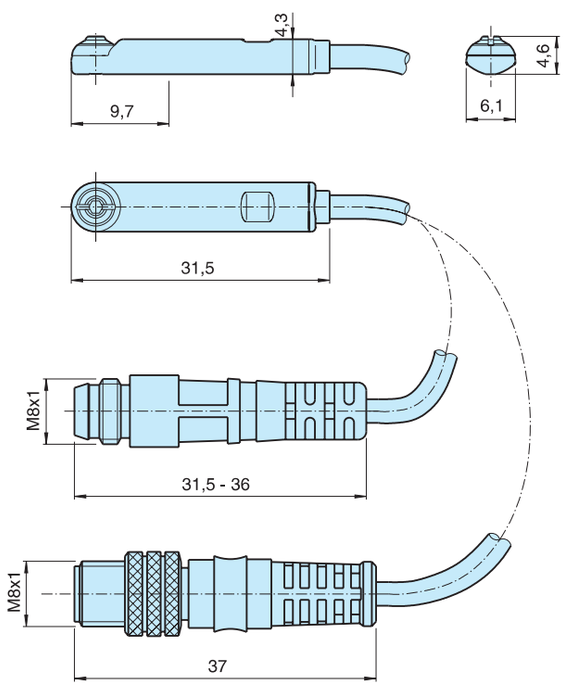



**P8S-GRFLX / P8S-GRFLX2**

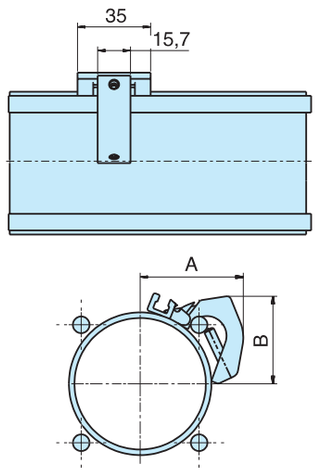



## Dimensions

**Sensors**




## Sensor mounting - P1D-T 32 - 125mm

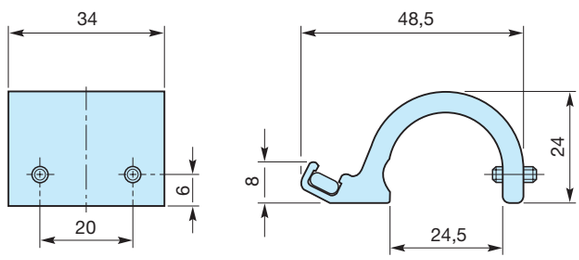



| Cyl. bore mm | A mm | B mm |
|---|---|---|
| 32 | 35 | 26 |
| 40 | 39 | 30 |
| 50 | 44 | 30 |
| 63 | 50 | 42 |
| 80 | 54 | 52 |
| 100 | 62 | 60 |
| 125 | 74 | 69 |

**Order code**

**P8S-TMA0X**

## Sensor mounting - P1D-T 160 - 320mm




**Order code**

**PD48956**



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## Ordering data

| Output/function | Cable/connector | Weight kg | Order code |
|---|---|---|---|
| **Electronic sensors , 10-30 V DC** | | | |
| PNP type, normally open | 0,27 m PUR-cable and 8 mm snap-in male connector | 0,007 | **P8S-GPSHX** |
| PNP type, normally open | 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 | 5m PVC-cable without connector [2)] | 0,050 | **P8S-GCFPX** |
| **Reed sensors, 10-120 V AC/DC** | | | |
| Normally open | 3 m PVC-cable without connector | 0,030 | **P8S-GRFLX** |
| **Reed sensorer, 24-230 V AC/DC** | | | |
| Normally open | 3 m PVC-cable without connector | 0,030 | **P8S-GRFLX2** |

2) Without LED

**Adapter for tie-rod design**

| Description | Weight kg | Order code |
|---|---|---|
| Double jointed adapter for cylinder P1D-T cylinder bore Ø32 to Ø125 mm | 0,07 | **P8S-TMA0X** |
| Double jointed adapter for cylinder P1D-T cylinder bore Ø160 to Ø320 mm | 0,07 | **PD48956** |



## Connecting cables with one connector

The cables have an integral snap-in female connector.



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

## Male connectors for connecting cables

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



### Technical data

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

| Connector | Weight kg | Order code |
|---|---|---|
| M8 screw connector | 0,017 | **P8CS0803J** |
| M12 screw connector | 0,022 | **P8CS1204J** |

## Pneumatic cylinder sensor for P1D-T

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

### Function:

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

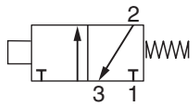
If more than one sensor is used with a cylinder there must be a distance of at least 20 mm between sensors to prevent them influencing each other.

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

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

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



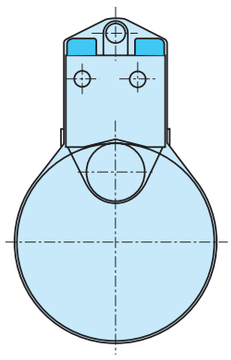



| Description | Weight kg | Order code |
|---|---|---|
| Pneumatic sensor | 0,02 | **P8S-A34X** |
| Fixing for P1D-T cylinder bore Ø32 to Ø125 mm | 0,01 | **P8S-AMA1** |

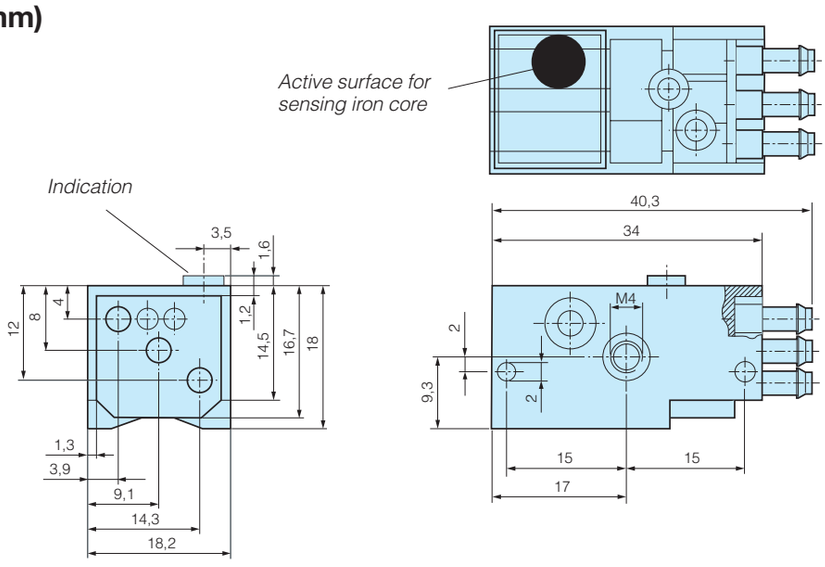
### Technical data:

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

## Cylinder fixing - P1D-T 32 - 125mm



## Dimensions (mm)



## P1D Seal kits

Complete seal kits consisting of:
Piston seals
Cushioning seals
Piston rod bearing
Combined piston rod seal and scraper ring
O-rings



| Cyl.bore | P1D-T cylinder version | | | |
|---|---|---|---|---|
| mm | Standard | Standard temperature with FPM scraper ring | Standard temperature Dry piston rod with HDPE scraper ring | Through rod Standard temperature |
| 32 | **P1D-6KRN** | **P1D-6KRV** | **P1D-6KRD** | **P1D-6KRNF** |
| 40 | **P1D-6LRN** | **P1D-6LRV** | **P1D-6LRD** | **P1D-6LRNF** |
| 50 | **P1D-6MRN** | **P1D-6MRV** | **P1D-6MRD** | **P1D-6MRNF** |
| 63 | **P1D-6NRN** | **P1D-6NRV** | **P1D-6NRD** | **P1D-6NRNF** |
| 80 | **P1D-6PRN** | **P1D-6PRV** | **P1D-6PRD** | **P1D-6PRNF** |
| 100 | **P1D-6QRN** | **P1D-6QRV** | **P1D-6QRD** | **P1D-6QRNF** |
| 125 | **P1D-6RRN** | **P1D-6RRV** | **P1D-6RRD** | **P1D-6RRNF** |

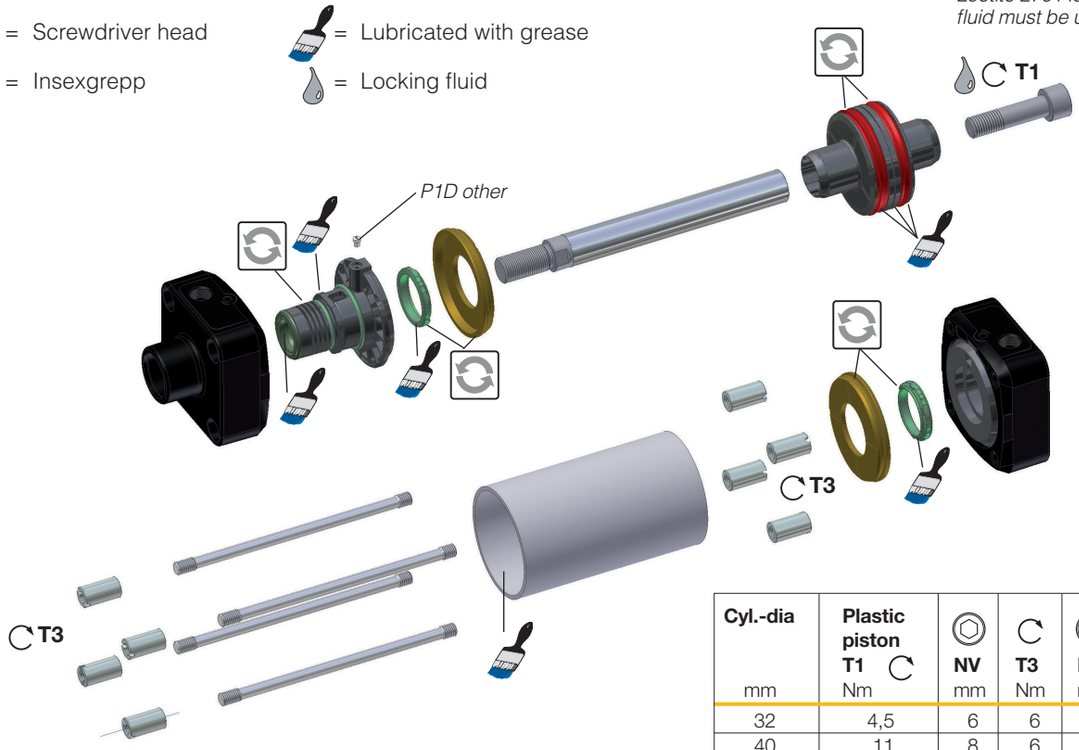



| | | |
|---|---|---|
| Standard temperature | 30g | **9127394541** |

## Seal kit for bores Ø32 - Ø125 mm

= Included in seal kit
= Screwdriver head
= Insexgrepp
= Tightening torque
= Lubricated with grease
= Locking fluid

*Loctite 270 or Loctite 2701 locking fluid must be used*




| Cyl.-dia mm | Plastic piston T1 Nm | NV mm | T3 Nm | NV mm | NV mm |
|---|---|---|---|---|---|
| 32 | 4,5 | 6 | 6 | 6 | |
| 40 | 11 | 8 | 6 | 6 | |
| 50 | 20 | 10 | 11 | 8 | |
| 63 | 20 | 10 | 11 | 8 | |
| 80 | 40 | 14 | 20 | | 3x16 |
| 100 | 120 | 14 | 20 | | 3x16 |
| 125 | 120 | 14 | 40 | | 4x18 |

## Seal kits

Complete seal kits consisting of:
Piston seals
Cushioning seals
Piston rod seal
O-rings
Scraper ring

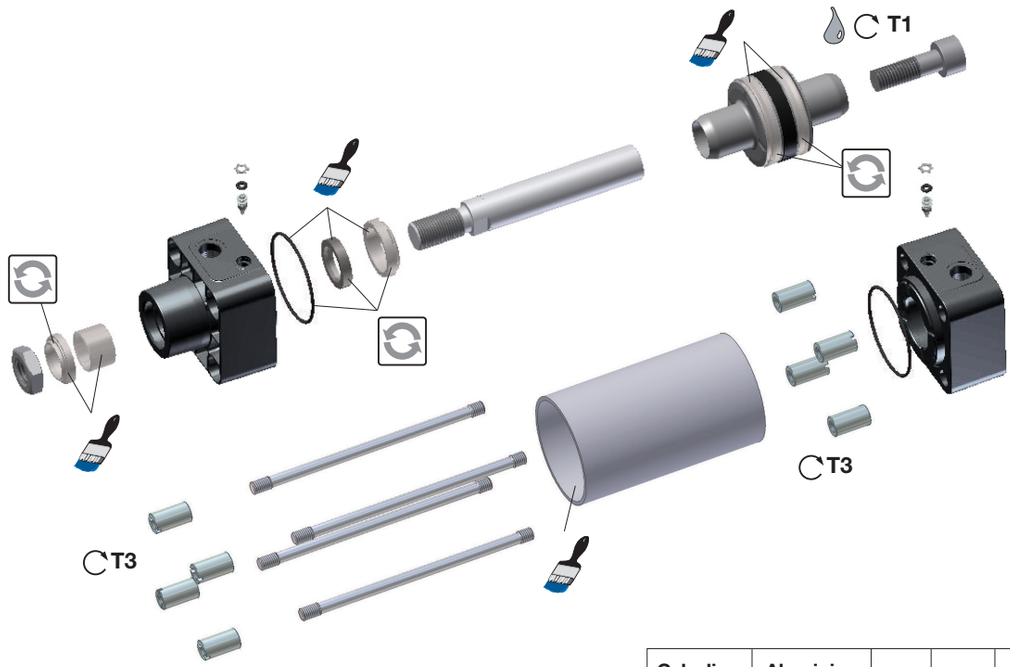


| Cyl.bore | P1D cylinder version | | | |
|---|---|---|---|---|
| mm | High temp. | Low temp. | Metal scraper | Hydraulic version |
| 32 | **P1D-6KRFX** | **P1D-6KRLX** | **P1D-6KRQX** | **P1D-6KRHX** |
| 40 | **P1D-6LRF** | **P1D-6LRL** | **P1D-6LRQX** | **P1D-6LRH** |
| 50 | **P1D-6MRFX** | **P1D-6MRLX** | **P1D-6MRQX** | **P1D-6MRHX** |
| 63 | **P1D-6NRF** | **P1D-6NRL** | **P1D-6NRQX** | **P1D-6NRH** |
| 80 | **P1D-6PRF** | **P1D-6PRL** | **P1D-6PRQX** | **P1D-6PRH** |
| 100 | **P1D-6QRF** | **P1D-6QRL** | **P1D-6QRQX** | **P1D-6QRH** |
| 125 | **P1D-6RRF** | **P1D-6RRL** | **P1D-6RRQX** | **P1D-6RRH** |




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

## Seal kit for bores Ø32 - Ø125 mm




= Included in seal kit
= Socket head
= Tightening torque

Lubricated with grease
Locking fluid

*Loctite 270 or Loctite 2701 locking fluid must be used*

| Cyl.-dia | Aluminium piston T1 | AF | T3 | NV | NV |
|---|---|---|---|---|---|
| mm | Nm | mm | Nm | mm | mm |
| 32 | 15 | 6 | 6 | 6 | |
| 40 | 30 | 8 | 6 | 6 | |
| 50 | 40 | 10 | 11 | 8 | |
| 63 | 40 | 10 | 11 | 8 | |
| 80 | 120 | 14 | 20 | | 3x16 |
| 100 | 120 | 14 | 20 | | 3x16 |
| 125 | 120 | 14 | 40 | | 4x18 |

## Seal Kits

Complete seal kits consisting of:
Piston complete
Cushioning seals
Piston rod bearing
Scraper ring
Piston rod seal
O-rings

Material specification, see page 11



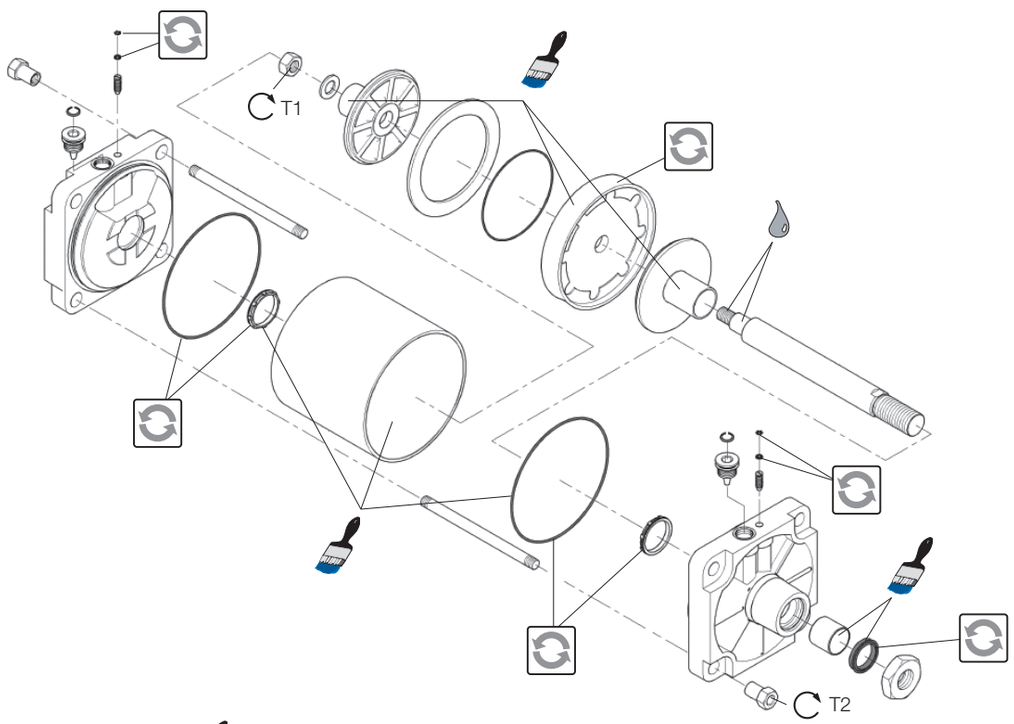
| Cyl.bore mm | Standard | High Temp. |
|---|---|---|
| 160 | **PD23013** | **PD26995** |
| 200 | **PD25006** | **PD27427** |
| 250 | **PD25872** | **PD27976** |




| | | |
|---|---|---|
| Standard | 4g tube | **KL8220** |
| High temperature | 4g tube | **KL8220** |

| Cyl.bore mm | Through rod Standard temperature |
|---|---|
| 160 | **P1D-6SRNF** |
| 200 | **P1D-6TRNF** |
| 250 | **P1D-6URNF** |

## Seal kit for bores Ø160 - Ø250 mm




= Included in seal kit
= Lubricated with grease
= Socket head
= Locking fluid
= Tightening torque
= Nut A/F

*Loctite LT638 locking fluid must be used*

| Cyl.-dia mm | Plastic piston T1 Nm | NV mm | T2 Nm | NV mm |
|---|---|---|---|---|
| 160 | 100 | 30 | 85 | 27 |
| 200 | 100 | 30 | 95 | 27 |
| 250 | 120 | 36 | 140 | 41 |

## Seal Kits

Complete seal kits consisting of:
Piston complete
Cushioning seals
Piston rod bearing
Scraper ring
Piston rod seal
O-rings

Material specification, see page 12



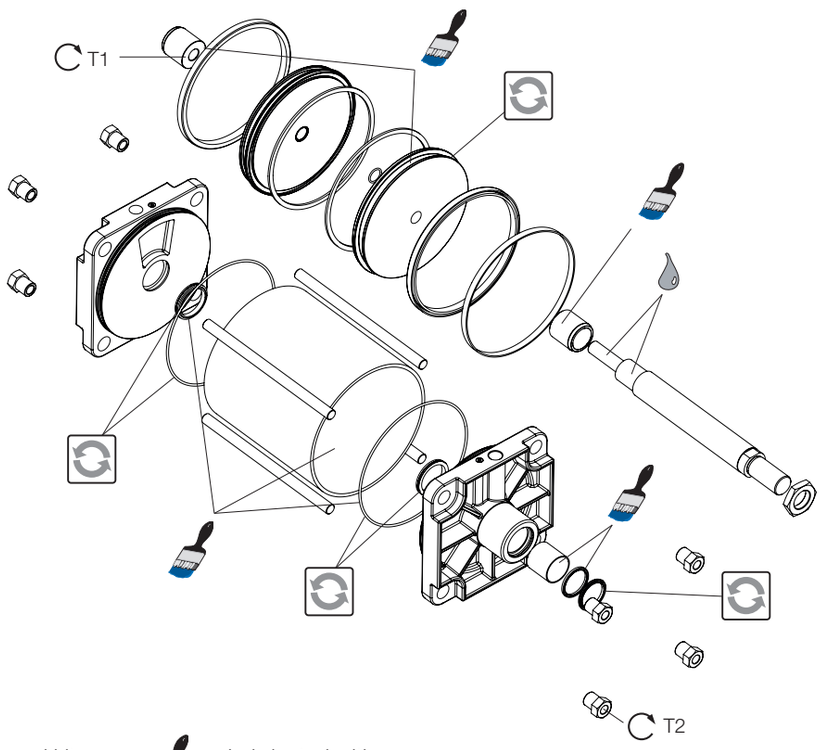
| Cyl.bore mm | Standard | High Temp. |
|---|---|---|
| 320 | **KL7339** | **KL7340** |

| Cyl.bore mm | Through rod Standard temperature |
|---|---|
| 320 | **P1D-6VRNF** |




| | | |
|---|---|---|
| Standard | 4g tube | **KL8220** |
| High temperature | 4g tube | **KL8220** |

## Seal kit for bore Ø320 mm




= Included in seal kit
= Lubricated with grease
= Socket head
= Locking fluid
= Tightening torque
= Nut A/F

*Loctite LT638 locking fluid must be used*

| Cyl.-dia | Piston T1 | NV | T2 | NV |
|---|---|---|---|---|
| mm | Nm | mm | Nm | mm |
| 320 | 250 | 30 | 200 | 41 |

## Order code key, spare parts

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P | 1 | D | - | 8 | 0 | 3 | 2 | D | G | - | 0 | 1 | 0 | 0 |

| | |
|---|---|
| 8 | Spare parts |

| Cylinder dia. mm |
|---|
| 032 |
| 040 |
| 050 |
| 063 |
| 080 |
| 100 |
| 125 |
| 160 |
| 200 |
| 250 |
| 320 |

| Piston rod* | |
|---|---|
| D | Standard external thread |
| G | Standard internal thread |
| H | Through rod ext. threads |
| J | Through rod int. threads |
| **Cylinder barrel** | |
| B | Cylindrical (for tie rod) |
| **Tie rod** | |
| T | Tie rod (order 4 for a cylinder) |

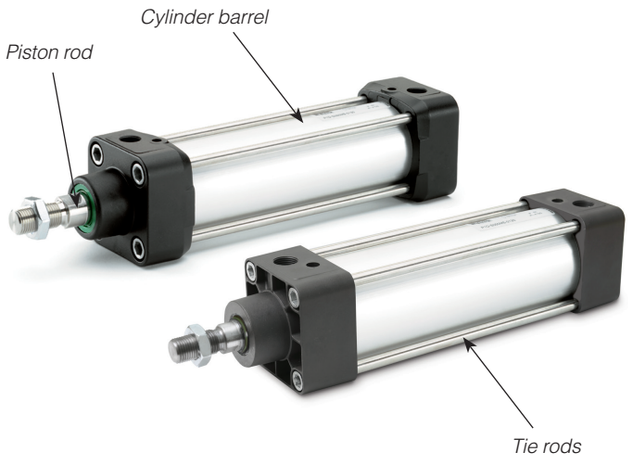
| Piston rod | |
|---|---|
| G | Stainless steel |
| H | Hard-chromium plated |
| J | Acid-resistant steel |
| K | Chromium plated stainless |
| **Cylinder barrel** | |
| A | Aluminium |

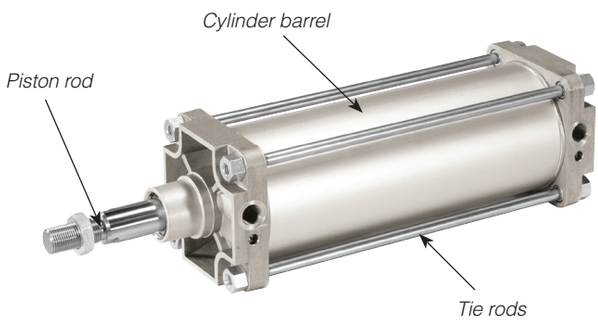
* 2 piston rod pieces delivered in one set if through rod option selected

**Stroke** (mm) e.g.**
**0100 = 100 mm**

Any stroke up to max. 2800 mm.

** When ordering piston rods for cylinders with an extended piston rod, add together the stroke and the extension in the order key.
For example, a cylinder with stroke 100 mm and a piston rod extension of 25 mm is ordered with 0125 in the order number.



# 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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# Introduction to the ATEX directive

## Explosive atmospheres

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

a) **flammable substances** – gases, vapours, mists or dusts
b) with **air**
c) under specific **atmospheric conditions**
d) in which, after ignition has occurred, combustion spreads to the entire flammable mixture

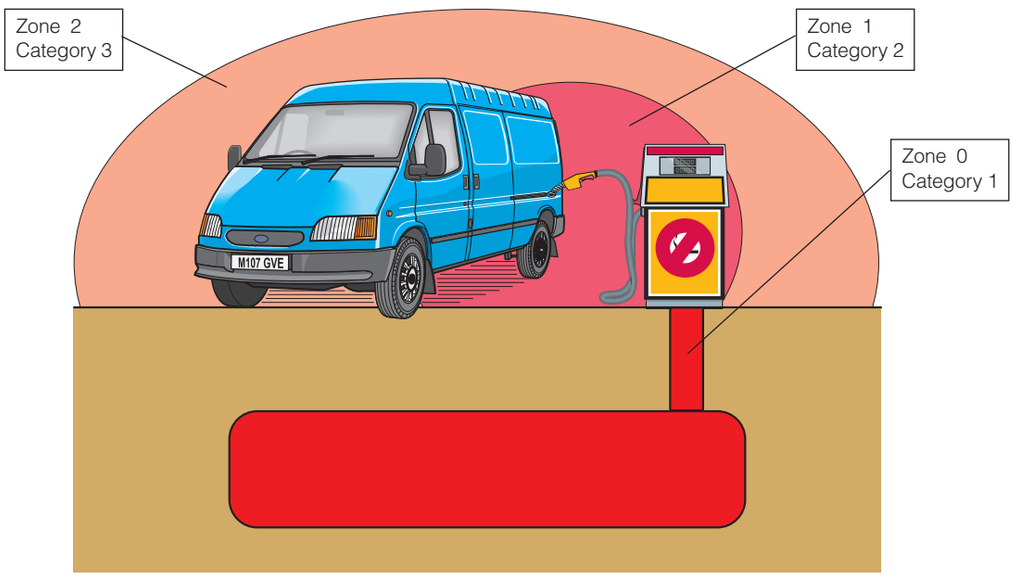
(NB: with regard to dust, it may be that not all dust is combusted after ignition has occurred)

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

**Harmonised European ATEX standard**

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

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




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

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

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

**Levels of protection for the various equipment categories**

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

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

**Definition of groups** (EN 1127-1)

**Group I** Equipment intended for use in underground parts of mines as well as those parts of surface installations of such mines likely to be endangered by flammable vapours and/or flammable dusts.

**Group II** Equipment intended for use in other places exposed to explosive atmospheres.

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

G = gas and D = dust

**Temperature classes**

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

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

**Declaration of conformity**

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

**Operation, installation and maintenance**

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

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



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# Safety instructions for the P1D-T cylinder with accessories

## Supplementary safety instructions for installation of ATEX certified cylinders.

The safety instructions in this document are valid for the ATEX certified P1D-T cylinders, bore 160 - 320mm, as per below with reference to the order code key in the product catalogue.

P1D-T***MS-****-EXNN

All strokes in the range 50 - 1000mm

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

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

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

### Real life applications

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

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

### Checklist

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

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

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

### Installation requirements in Ex-areas

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

### Inspecting cylinders during operation

The P1D-T cylinder must be kept clean on the outside, and a layer of dust/dirt thicker than 1 mm must never be allowed to form.
Inspect and verify that the cylinder, with attachments, compressed air fittings, hoses, tubes, etc. meet the standards of ”safe” installation.

### Spare parts

Only spare parts, kits etc. supplied by Parker Hannifin may be used for repair and maintenance of the P1D-T cylinders.

## Marking of ATEX certified P1D-T cylinders

The ATEX certified P1D-T cylinders, bore 160 - 320mm, as per below with reference to the order code key in the product catalogue have an ATEX certification marking as shown further below.

P1D-T***MS-****-EXNN

All strokes in the range 50 - 1000mm

CE Ex II 2GD c T4 120 °C

CE — Communauté Européenne = EU
CE on the product shows that Parker Hannifin products meet one or more EU directives

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

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

**2GD** — Stands for equipment category 2G means the equipment can be used in zones 1 and 2 where there is a risk involving gases, vapours or mists of combustible liquids and 2D in zones 21 and 22 where there is a risk involving dusts. 2GD Means the equipment can be used in zones 1, 2, 21 and 22.

**c** — Safe design (prEN 13463-5)

**T4** — If equipment is in temperature class T4, the maximum surface temperature must not exceed 135 °C. (To guarantee this, the product has been tested to ensure that the maximum is 130 °C. This provides a safety margin of 5 °K.)

**120 °C** — Maximum permitted surface temperature on P1D-S cylinder in atmospheres containing potentially explosive dusts.



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

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

### Instructions for use

### Safety instructions

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

### Applications

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

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

  **P8S-TMC02** Suitable for P1S diameter 32 - 63 mm

  **P8S-TMC03** Suitable for P1S diameter 80 - 125 mm

The following data applies to these attachments:

- Ambient temperature Ta = 0 °C to 45 °C
- Low energy absorption to EN 50 021

- The sensor may also be installed on tie-rod cylinders or profile cylinders by means of this attachment:

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

### Installation

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

### Technical data for sensor

Operating voltage Ub = 18 to 30 V DC
Max. load current $I_a \leq 70mA$
Ambient temperature: -20 °C to 45 °C

### Commissioning

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

### Maintenance

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

## P8S-GPFLX/EX cylinder sensor

**CE Ex II3G EEx nA II T4X**
**II3D 135 °C IP67**

CE Communautué Européenne = EU
CE on the product shows that Parker Hannifin products meet one or more EU directives

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

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

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

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

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

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

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

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

**IP67** Satisfies protection class IP67

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

### Components

Parker Hannifin guarantees that our cylinder mountings, tube fittings, tubes, etc. are not ignition sources and are therefore not subject to the provisions of the ATEX directive.

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

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

Examples of components:

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



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