



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



Pneumatic Cylinders

Series P1D - Ø32 to Ø125 mm
According to ISO 15552

Catalogue PDE2570TCUK June 2014



ENGINEERING YOUR SUCCESS.



Important

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



Note

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



WARNING

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The P1D standard cylinders, ISO 1552

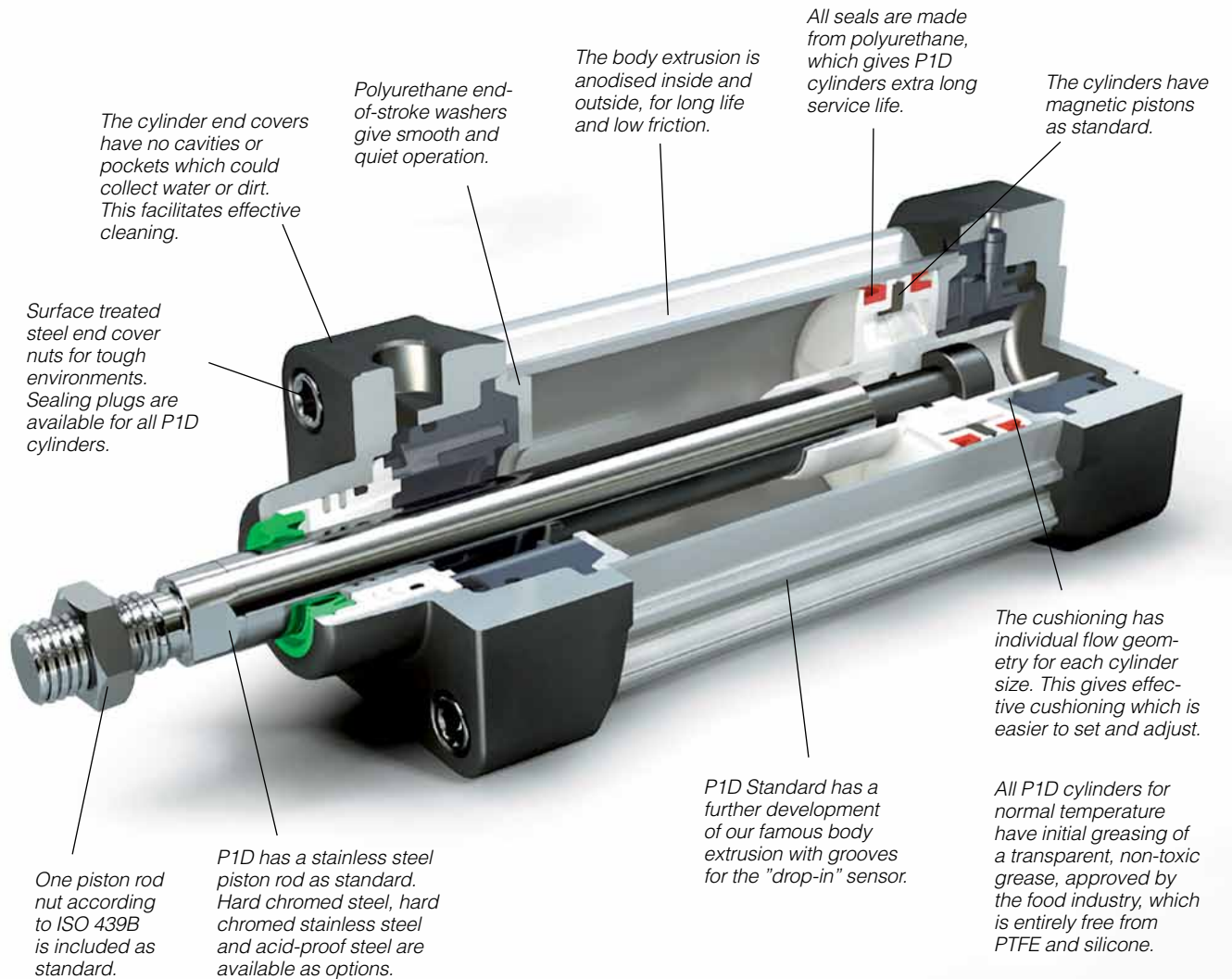
A complete cylinder range from the ground up, with major investment in research, material and technology, demands long experience and major resources. When we developed our P1D cylinder range, we started from scratch, but not really. Decades of research and learning about what our customers really need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

P1D is a cylinder design of the highest possible quality, every detail has been thought through, without

making any compromises. It has a large number of innovations which could only be achieved by using the best possible materials and methods. The result is a complete family of ISO/VDMA/AFNOR cylinders, of which we are very proud.

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

P1D Series Pneumatic Cylinders



P1D Standard

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

Installation dimensions according to international standards

Complies with the ISO 6431, ISO 15552, VDMA 24562 and AFNOR installation dimension standards. For customer reassurance world-wide.

High technology design

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

High quality

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

Even more functions and variants

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

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

P1D Series Pneumatic Cylinders

Complete accessory programme

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



Mechanically protected sensor technology

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



Optimised cushioning

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



Smooth, quiet operation and long service life

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



Design variants

- P1D Standard** – This series is the premier in ISO pneumatic cylinders. With various piston rod materials, seal options and supported by a full range of ISO mountings the P1D-S series is suitable for wide range of any applications.
- P1D Ultra Clean** – This series offers an ultra clean external design of cylinders that are suitable for applications that require a clean profile. With particular design features for the food and packaging industries this product can also be used for applications vehicles, in sawmills and bag-filling industries where a clean design is important.
- P1D Pro Clean** – This series of clean design cylinders offers two T slots within one face of the tube allowing the possibility to add sensors. The position of the T slots can be specified on any single face using the order code key. These cylinders have a clean design but are intended for applications where sensors are required.
- P1D Tie rod** – This series 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.
- P1D with valve built on** – P1D Standard can be ordered with a factory-fitted valve and piping. The valve series is the robust and compact Viking Xtreme series.
- P1D with piston rod locking** – P1D Standard is available in a version with piston rod locking, allowing the piston rod to be locked in any position and direction. The lock unit, of the air/spring actuated type, is integrated in the front end piece of the cylinder. The lock unit can be used for braking as well as locking. With no signal pressure, the full force of the lock is applied to the piston rod, and the lock is released at 4 bar signal pressure.
- P1D-X High and Low Temperature** – For extreme conditions. These cylinders for high and low temperatures have materials and sealing systems specially designed for their particular temperature ranges. End covers and pistons are made entirely from metal, to give optimum function at high or low temperature in combination with seals made from specially tested materials and special grease.





P1D Ultra Clean (non magnetic, without slots for sensors)

A clean external design of pneumatic cylinders is a request in more and more applications. It is always an advantage to be able to keep the cylinders clean. Within the food and packaging industries this is a clear demand. However, also in various applications on vehicles and within the sawmill and bag-filling industries a clean design is also important.

Food approved grease

The initial lubrication of the P1D-C cylinder range is made with our proven grease approved for use in the food industry. This edible grease is used for all our standard cylinders.

Smooth, quiet operation and long service life

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

Optimised cushioning

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

Dedicated plugs seal off end cover screw recesses

Normally 4 out of the 8 threads in the end cover screws are used for the installation. In order to seal off the threads not used, dedicated plugs are available. The collar of the head has a convex lip design and a rubber gasket is supplied with every plug. The plug is threaded into the end cover screw thread providing a high force and reliable sealing function. Assembled plugs seal against water intrusion as per IP67. These plugs are available as accessory in bags of 4.

Patented clean design centre trunnions

The design of traditional centre trunnions is typically not clean. Pockets, cavities and slots accumulate dirt, liquids etc. which disqualify this type of trunnion for use in the food industry.

The P1D-C range offers a unique solution for centre trunnion. This is an exceptionally clean design. The innovative design uses principles in line with EHEDG recommendations. All main dimensions comply with ISO 15552. The stainless steel pivots are countersunk into the body extrusion which seals off the pivots. The centre trunnion allows you to have an articulated cylinder installation in applications with high hygienic requirements.

The clean design centre trunnion represents an important opportunity for applications in the food and packaging industries. The centre trunnion is factory-fitted and is available for all P1D-C cylinders in bore sizes 32-80 mm and up to stroke length 700 mm. Longer stroke length on request.



P1D Pro Clean (magnetic, with 2 T slots)

The P1D is available in a Pro Clean version, based on the same high level technology. This future-proof cylinder is the perfect choice for the food, packaging and conveying applications.

Food approved grease

The initial lubrication of the P1D-C cylinder range is made with our proven grease approved for use in the food industry. This edible grease is used for all our standard cylinders.

Smooth, quiet operation and long service life

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

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Normally 4 out of the 8 threads in the end cover screws are used for the installation. In order to seal off the threads not used, dedicated plugs are available. The collar of the head has a convex lip design and a rubber gasket is supplied with every plug. The plug is threaded into the end cover screw thread providing a high force and reliable sealing function. Assembled plugs seal against water intrusion as per IP67. These plugs are available as accessory in bags of 4.

Mechanically protected sensor technology

The body extrusion has recessed only two sensor grooves on one side of the cylinder. The position of the T slots could be defined in the order code key. The sensors are of the "drop-in" type, and are quickly and easily installed in the T-groove from the side. Both the cable and the sensor are protected in the groove. Choose a sensor with 3 or 10 m cable, 8 mm connector or the M12 connector.

"Drop-in" sensor

The P1D Pro Clean uses "drop-in" P1D sensors. The body extrusion has 2 recessed sensor grooves on one side of the cylinder. The sensors are of the "drop-in" type, and are quickly and easily installed in the T-grooves. Both the cable and the sensor are protected in the groove.

**P1D Tie-Rod**

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

Installation dimensions to international standard

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

Smooth, quiet operation and long service life

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

Optimised cushioning

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

Complete accessory programme

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

"Drop-in" sensor

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

Design variants

3 and 4 position cylinders

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



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.



Alternative piston rod materials

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

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



Through piston rod

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



Low and high ambient temperature, P1D-X Series

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

- Low temperature: -40 °C to +40 °C
- High temperature: -10 °C to +150 °C

Low pressure hydraulics, P1D-X Series

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



Design variants

Dry piston rod, HPDE

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



Metal scraper ring, P1D-X Series

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



FPM scraper for high chemical resistance

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



P1D Series Pneumatic Cylinders

Cylinder forces, double acting variants

| Cyl. bore/ pist. rod mm | Stroke | Piston area cm ² | Max theoretical force in N (bar) | | | | | | | | | |
|----------------------------|--------|--------------------------------|----------------------------------|------|------|------|------|-------------|------|------|-------|-------|
| | | | 1,0 | 2,0 | 3,0 | 4,0 | 5,0 | 6,0 | 7,0 | 8,0 | 9,0 | 10,0 |
| 32/12 | + | 8,0 | 80 | 161 | 241 | 322 | 402 | 483 | 563 | 643 | 724 | 804 |
| | - | 6,9 | 69 | 138 | 207 | 276 | 346 | 415 | 484 | 553 | 622 | 691 |
| 40/16 | + | 12,6 | 126 | 251 | 377 | 503 | 628 | 754 | 880 | 1005 | 1131 | 1257 |
| | - | 10,6 | 106 | 212 | 318 | 424 | 530 | 636 | 742 | 848 | 954 | 1060 |
| 50/20 | + | 19,6 | 196 | 393 | 589 | 785 | 982 | 1178 | 1374 | 1571 | 1767 | 1963 |
| | - | 16,5 | 165 | 330 | 495 | 660 | 825 | 990 | 1155 | 1319 | 1484 | 1649 |
| 63/20 | + | 31,2 | 312 | 623 | 935 | 1247 | 1559 | 1870 | 2182 | 2494 | 2806 | 3117 |
| | - | 28,0 | 280 | 561 | 841 | 1121 | 1402 | 1682 | 1962 | 2242 | 2523 | 2803 |
| 80/25 | + | 50,3 | 503 | 1005 | 1508 | 2011 | 2513 | 3016 | 3519 | 4021 | 4524 | 5027 |
| | - | 45,4 | 454 | 907 | 1361 | 1814 | 2268 | 2721 | 3175 | 3629 | 4082 | 4536 |
| 100/25 | + | 78,5 | 785 | 1571 | 2356 | 3142 | 3927 | 4712 | 5498 | 6283 | 7069 | 7854 |
| | - | 73,6 | 736 | 1473 | 2209 | 2945 | 3682 | 4418 | 5154 | 5890 | 6627 | 7363 |
| 125/32 | + | 122,7 | 1227 | 2454 | 3682 | 4909 | 6136 | 7363 | 8590 | 9817 | 11045 | 12272 |
| | - | 114,7 | 1147 | 2294 | 3440 | 4587 | 5734 | 6881 | 8027 | 9174 | 10321 | 11468 |

+ = Outward stroke
- = Return stroke

Note!

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

Main data: P1D

| Cylinder designation | Cylinder | | Piston rod | | Cushioning length | Air consumption ²⁾ | Connection thread | |
|------------------------------|----------|-----------------|------------|-----------------|-------------------|-------------------------------|-------------------|------|
| | bore | area | dia. | area | | | | |
| | mm | cm ² | mm | cm ² | mm | litre | | |
| P1D-•032•-XXXX ¹⁾ | 32 | 8,0 | 12 | 1,1 | M10x1,25 | 17 | 0,105 | G1/8 |
| P1D-•040•-XXXX ¹⁾ | 40 | 12,6 | 16 | 2,0 | M12x1,25 | 19 | 0,162 | G1/4 |
| P1D-•050•-XXXX ¹⁾ | 50 | 19,6 | 20 | 3,1 | M16x1,5 | 20 | 0,253 | G1/4 |
| P1D-•063•-XXXX ¹⁾ | 63 | 31,2 | 20 | 3,1 | M16x1,5 | 23 | 0,414 | G3/8 |
| P1D-•080•-XXXX ¹⁾ | 80 | 50,3 | 25 | 4,9 | M20x1,5 | 23 | 0,669 | G3/8 |
| P1D-•100•-XXXX ¹⁾ | 100 | 78,5 | 25 | 4,9 | M20x1,5 | 27 | 1,043 | G1/2 |
| P1D-•125•-XXXX ¹⁾ | 125 | 122,7 | 32 | 8,0 | M27x2 | 30 | 1,662 | G1/2 |

Total mass including moving parts

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

Mass moving parts only (for cushioning calculation)

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


1) Stroke

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

P1D Series Pneumatic Cylinders

Standard stroke

Standard strokes for all P1D cylinders comply with ISO 4393. (* 40 is not an ISO standard stroke)
 Special strokes up to 2800 mm.

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

Operation data

| | |
|---------------------|---------------|
| Working pressure | Max 10 bar |
| Working temperature | min max |
| Standard | -20 °C +80 °C |

Bores and strokes

| | |
|------------------|-----------------------------------|
| P1D | 32 - 125 mm |
| Standard strokes | 25 - 500 mm according to ISO 4393 |
| Max stroke | 2800 mm |

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

Working medium, air quality


Working medium Dry, filtered compressed air to ISO 8573-1 class 3.4.3.

Recommended air quality for cylinders

For best possible service life and trouble-free operation, ISO 8573-1 quality class 3.4.3 should be used. This means 5 µm filter (standard filter) dew point +3 °C for indoor operation (a lower dew point should be selected for outdoor operation) and oil concentration 1.0 mg oil/m³, which is what a standard compressor with a standard filter gives.

ISO 8573-1 quality classes

| Quality class | Pollution | | Water max. press. dew point (°C) | Oil max concentration (mg/m³) |
|---------------|--------------------|---------------------------|----------------------------------|-------------------------------|
| | particle size (µm) | max concentration (mg/m³) | | |
| 1 | 0,1 | 0,1 | -70 | 0,01 |
| 2 | 1 | 1 | -40 | 0,1 |
| 3 | 5 | 5 | -20 | 1,0 |
| 4 | 15 | 8 | +3 | 5,0 |
| 5 | 40 | 10 | +7 | 25 |
| 6 | - | - | +10 | - |



Important!

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

Material specification

Standard design

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

P1D Tie-Rod

| | |
|----------|----------------------------------|
| Tie-rods | Stainless steel, X 10 CrNiS 18 9 |
|----------|----------------------------------|

Design variants

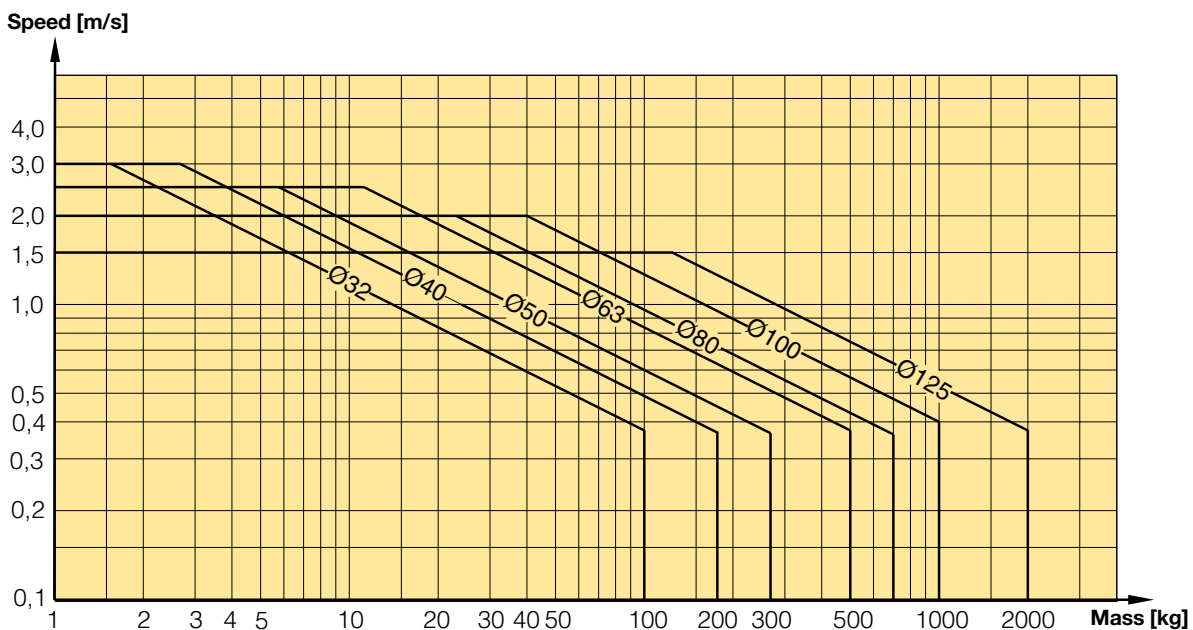
| | |
|---------------------------------|--|
| Cylinders for dry rod operation | |
| Seals/scraper ring | FPM/HDPE |
| Option | |
| Piston rod material | Hard-chromium plated steel, Fe 490-2 FN Acid-proof steel, X 5 CrNiMo 17 13 3 Hard-chromium plated stainless steel, X 10 CrNiS 18 9 |

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



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:

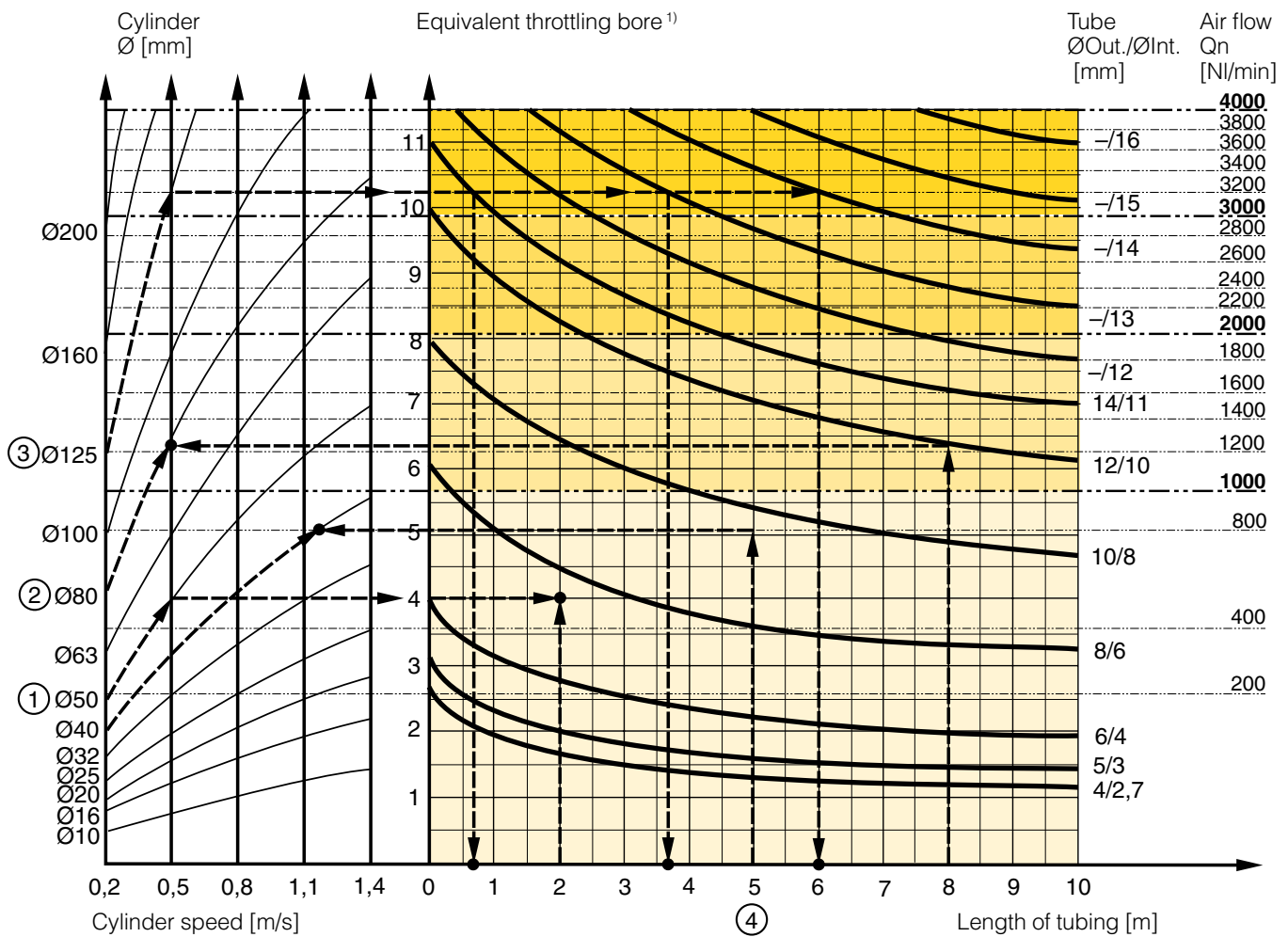
1. The primary line to the working valve could be over sized (this does not cause any extra air consumption and consequently does not create any extra costs in operation).
2. The tubes between the valve and the cylinder should, however, be optimized according to the principle that an insufficient bore 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.

P1D Series Pneumatic Cylinders

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 NI/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 length of tube?

For an application a 125 mm bore cylinder will be used. Maximum velocity of piston rod is 0.5 m/s. The cylinder will be controlled by a valve with Qn 3200 NI/min. What diameter of tube can be used and what is maximum length 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 NI/min. The distance between the cylinder and valve has been set to 5 m.

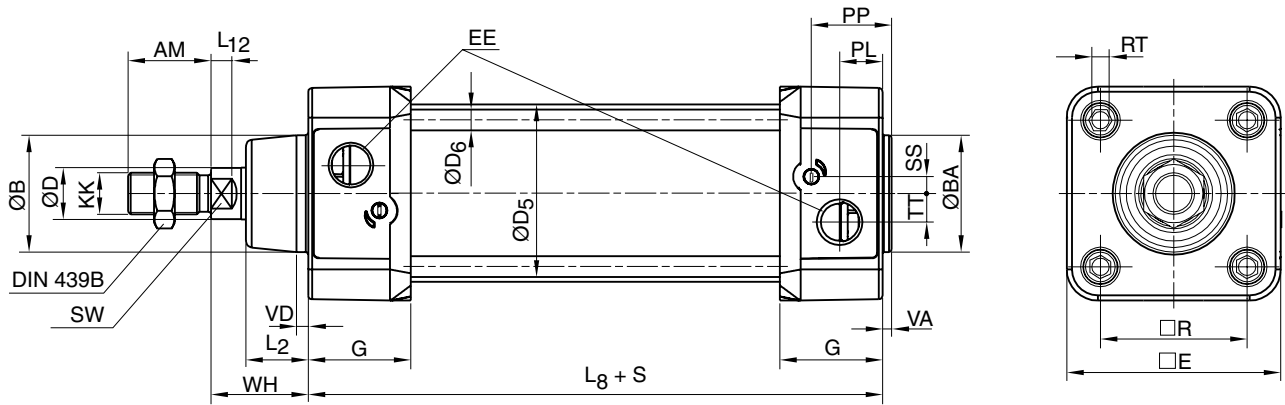
Tube dimension: What tube bore should be selected to obtain the maximum cylinder velocity? Start at pipe length 5 m, follow the line up to the intersection with 800 NI/min. Select the next largest tube diameter, in this case Ø10/8 mm.

Cylinder velocity: What maximum cylinder velocity will be obtained? Follow the line for 800 NI/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.

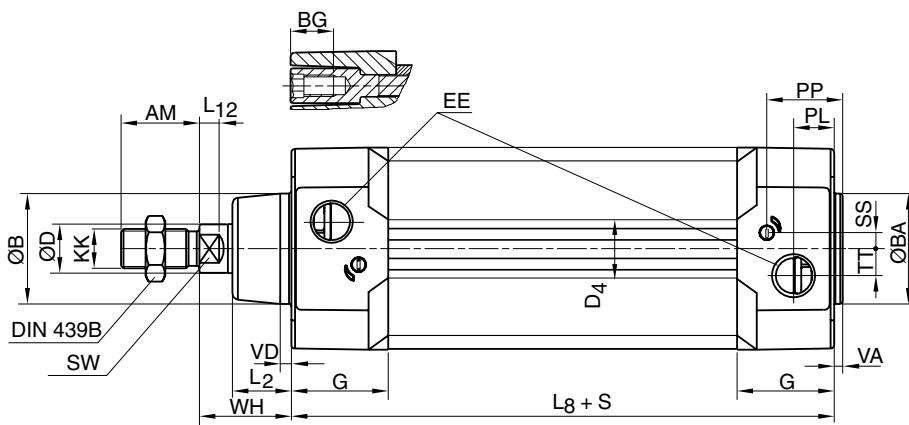
Valve series with respective flows in NI/minute

| Valve series | Qn in NI/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 |

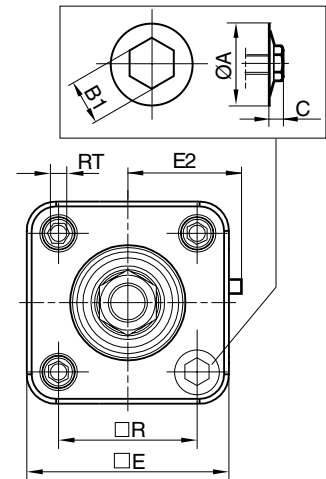
P1D Tie-Rod



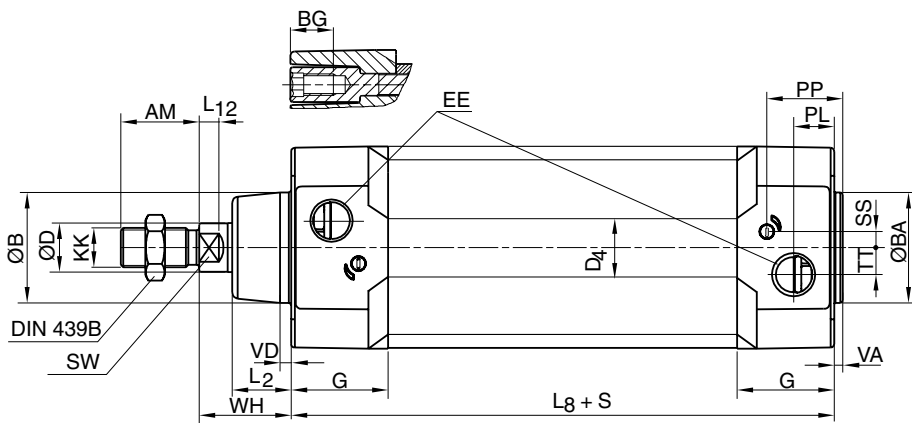
P1D Pro Clean (with 2 T slots for sensors)



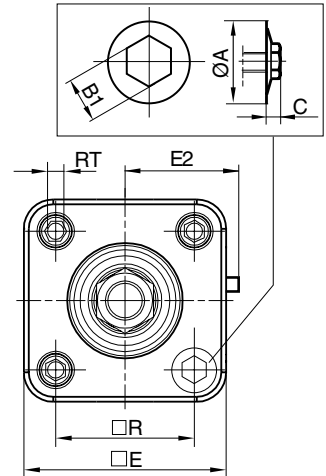
Sealing plug as accessory



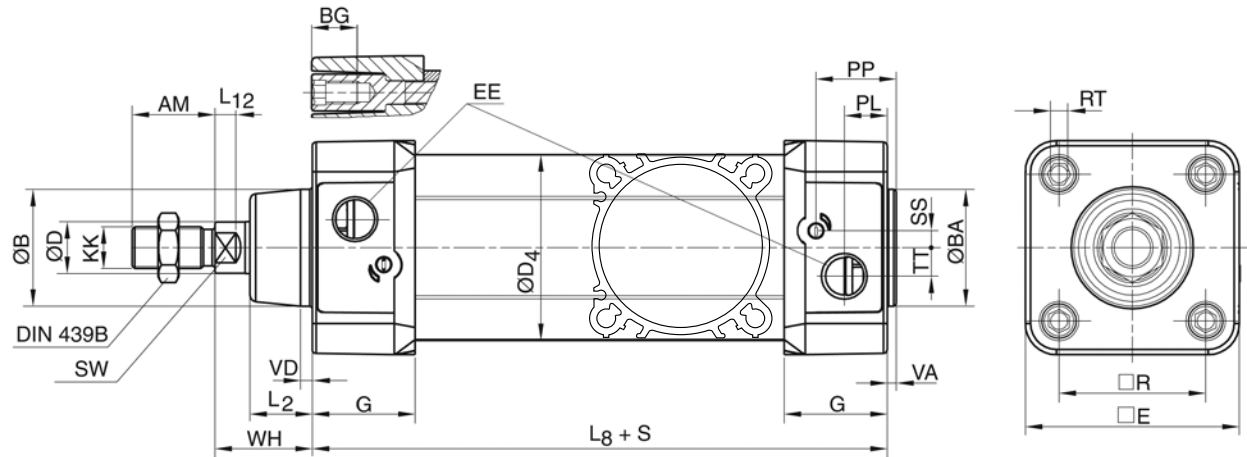
P1D Ultra Clean (without sensor function)



Sealing plug as accessory

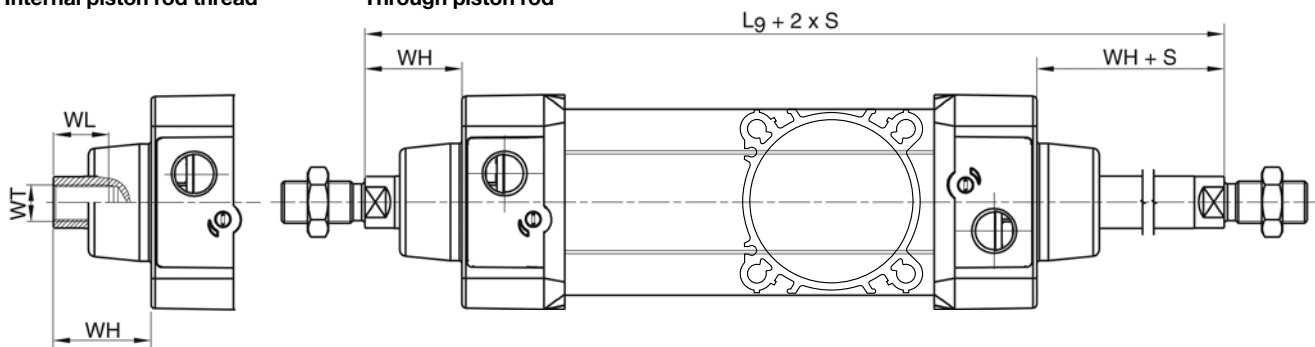


P1D Standard



Internal piston rod thread

Through piston rod



Dimensions (mm)

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

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

S=Stroke

Tolerances (mm)

| 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 |

3 and 4 position cylinders

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

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



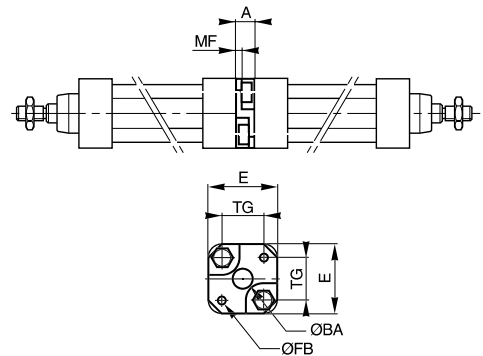
Factory-fitted P1D-T

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

Installation kit for all other P1D series

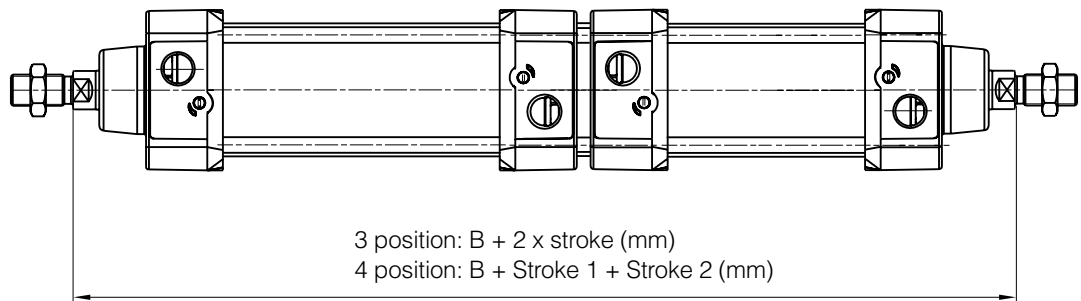
There is an installation kit for cylinder bores 32 – 100 mm which makes it possible to join any two P1D cylinders together at any time, to make a 3 or 4 position cylinders.

| Cyl. bore mm | E mm | TG mm | ØFB mm | MF mm | A mm | ØBA mm | Weight Kg | Order code | B, P1D with mounting kit in between mm |
|--------------|------|-------|--------|-------|------|--------|-----------|-----------------|--|
| 32 | 50 | 32,5 | 6,5 | 5 | 16 | 30 | 0,060 | P1E-6KB0 | 256 |
| 40 | 60 | 38,0 | 6,5 | 5 | 16 | 35 | 0,078 | P1E-6LB0 | 286 |
| 50 | 66 | 46,5 | 8,5 | 6 | 20 | 40 | 0,162 | P1E-6MB0 | 306 |
| 63 | 80 | 56,5 | 8,5 | 6 | 20 | 45 | 0,194 | P1E-6NB0 | 336 |
| 80 | 100 | 72,0 | 10,5 | 8 | 25 | 45 | 0,450 | P1E-6PB0 | 373 |
| 100 | 118 | 89,0 | 10,5 | 8 | 25 | 55 | 0,672 | P1E-6QB0 | 403 |



| Cylinder bore. mm | B, P1D-T mm |
|-------------------|-------------|
| 32 | 247 |
| 40 | 277 |
| 50 | 293 |
| 63 | 323 |
| 80 | 355 |
| 100 | 385 |
| 125 | 461 |

S=Stroke



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.

P1D Series Pneumatic Cylinders

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 | - | S | 0 | 3 | 2 | M | S | - | 0 | 1 | 0 | 0 |

| Cylinder version | |
|------------------|---|
| S | Standard |
| C | Ultra or Pro Clean (depends on digit 11) |
| T | Tie-Rod |
| V | Standard with valve built on (20 digits model code) |
| L | Standard with lock unit |
| H | Standard static lock unit |

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

| 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 |
| 2 | 6 | 8 | - | - | - | 3 and 4 positions (6) |
| C | K | L | - | - | - | Tandem (6) |

| Stroke (mm) | |
|--|----------|
| e.g. 0100 | = 100 mm |
| Optional stroke lengths up to 2800 mm. Standard strokes see table. | |

| 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. |

S and M not in combination with rod lock device

6) For P1D-T

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

23) For dry rod operation.

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

Example 1 Standard, double acting cylinder

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

P1D

P1D-S032MS-0160
P1D-S100MS-0400

Example 2 Tie-Rod, double acting cylinder

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

P1D

P1D-T040MC-0125

P1D Series Pneumatic Cylinders

P1D cylinders with centre trunnion

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

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

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

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

| Cylinder version | |
|------------------|---|
| S | Standard |
| C | Ultra Clean (N in position 11) |
| T | Tie-Rod |
| V | Standard with valve built on (20 digits model code) |
| L | Standard with lock unit |
| H | Standard static lock unit |

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

Except P1D-C Pro Clean version

For P1D-V please consult your local sales support

P1D-C Ultra Clean in bore sizes 32 to 80 mm and strokes up 700 m

Longer stroke length on request

Shaft square to 90° with ports only

5) Shaft or pivots square to or in line with the cylinder ports.

7) For P1D-S and P1D-T, XV-measure (from the piston rod thread according to ISO to the centre of the pivots) stated in mm in positions 18-20 (max 999, or 000 if loose centre trunnion specified except P1D-T).

Examples of centre trunnion

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

P1D Series Pneumatic Cylinders

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 - S K R 5 M S - 0 3 2 0 | | | | | | | | | | | | | | |

| Cylinder version | |
|------------------|---|
| S | Standard |
| C | Ultra or Pro Clean (depends on digit 11) |
| T | Tie-Rod |
| V | Standard with valve built on (20 digits model code) |
| L | Standard with lock unit |
| H | Standard static lock unit |

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

| Piston rod extension | | | |
|---|---------|--------------|---------|
| E.g. KR5 = Cylinder bore 32 mm with piston rod extension = 255 mm | | | |
| 01-99 | 1-99 | N0-N9 | 220-229 |
| A0-A9 | 100-109 | P0-P9 | 230-239 |
| B0-B9 | 110-119 | Q0-Q9 | 240-249 |
| C0-C9 | 120-129 | R0-R9 | 250-259 |
| D0-D9 | 130-139 | S0-S9 | 260-269 |
| E0-E9 | 140-149 | T0-T9 | 270-279 |
| F0-F9 | 150-159 | U0-U9 | 280-289 |
| G0-G9 | 160-169 | V0-V9 | 290-299 |
| H0-H9 | 170-179 | W0-W9 | 300-309 |
| J0-J9 | 180-189 | X0-X9 | 310-319 |
| K0-K9 | 190-199 | Y0-Y9 | 320-329 |
| L0-L9 | 200-209 | Z0-Z9 | 330-339 |
| M0-M9 | 210-219 | | |

The maximum extended piston rod length that can be specified by the order key is 339 mm. If a longer extended piston rod is needed please 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-SK45MS-0200 P1D Standard cylinder, bore 32 mm, with a 45 mm extended piston rod.
 P1D-TPD2MS-0500 P1D Tie-Rod cylinder, bore 80 mm, with 132 mm extended piston rod.

Piston rod in alternative materials

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

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

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

| Cylinder version | |
|------------------|---|
| S | Standard |
| C | Ultra or Pro Clean (depends on digit 11) |
| T | Tie-Rod |
| V | Standard with valve built on (20 digits model code) |
| L | Standard with lock unit |
| H | Standard static lock unit |

| 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. | | | |

S and M not in combination with rod lock device

Example of piston rod material

P1D-S032MS-0100 P1D Standard cylinder, bore 32 mm, with stainless steel piston rod (standard)
 P1D-T040MC-0160 P1D Tie-Rod cylinder, bore 40 mm, with hard chromed steel piston rod

P1D Series Pneumatic Cylinders

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 | - | S | 0 | 3 | 2 | F | S | - | 0 | 1 | 0 | 0 |

| Cylinder version | | End cover screws | | | | Function | | |
|------------------|---|------------------|------------------------------|--------------------------------|----------------------------|----------|----------|---------------------------|
| | | Standard | | Stainless steel ²²⁾ | | | | |
| S | Standard | Std scraper | Metal scraper ²⁵⁾ | HDPE scraper ²³⁾ | FPM scraper ²⁶⁾ | | | |
| C | Ultra or Pro Clean (depends on digit 11) | | | | | | | |
| T | Tie-Rod | | | | | | | |
| V | Standard with valve built on (20 digits model code) | | | | | | | |
| L | Standard with lock unit | | | | | | | |
| H | Standard static lock unit | | | | | | | |
| M | Q | D | V | A | S | H | W | Double-acting |
| F | R | E | B | G | T | Y | Z | Double-acting through rod |

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

23) For dry rod operation. Not for P1D-L and H versions.

25) The metal scraper ring requires a hard-chromium plated piston rod. Option only for P1D-T and P1D-X versions.

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

Example of through piston rod

P1D-S032FS-0100 P1D Standard cylinder, bore 32 mm, with through piston rod
 P1D-T050FS-0125 P1D Tie-Rod cylinder, bore 50 mm, with through piston rod

3 and 4 positions Tie Rod cylinders

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

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

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

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

23) For dry rod operation.

25) The metal scraper ring requires a hard-chromium plated piston rod

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

Equal stroke – 3 position cylinders

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

Example of 3 and 4 position cylinders

P1D-T0322S-0200 P1D Tie-Rod cylinder with 3 position

Unequal stroke – 4 position 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.

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

P1D Series Pneumatic Cylinders

Tandem Tie Rod cylinders

The P1D-T is available in tandem design i.e. two cylinders in series, for almost double force. Order with the letter C in position 9 (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 scraper ²⁵⁾ | HDPE scraper ²⁶⁾ | FPM scraper ²³⁾ | Std scraper | Metal scraper ²⁵⁾ | HDPE scraper ²⁶⁾ | FPM scraper ²³⁾ | |
| M | Q | D | V | A | S | H | W | Double-acting |
| F | R | E | B | G | T | Y | Z | Double-acting through rod |
| 2 | 4 | 6 | 8 | - | - | - | - | 3 and 4 position cylinders |
| C | J | K | L | - | - | - | - | Tandem |

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

23) For dry rod operation.

25) The metal scraper ring requires a hard-chromium plated piston rod.

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

Operation with a dry piston rod

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

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

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

| Cylinder version | |
|------------------|---|
| S | Standard |
| C | Ultra or Pro Clean (depends on digit 11) |
| T | Tie-Rod |
| V | Standard with valve built on (20 digits model code) |

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

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

23) For dry rod operation.

25) The metal scraper ring requires a hard-chromium plated piston rod.

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

Example of seal system for dry rod

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

P1D Series Pneumatic Cylinders

P1D Standard

The order numbers on this page refer to P1D Standard without sensors. The cylinders can be ordered with sensors, fittings, piston rod and cylinder mountings, speed controls etc. for efficient logistics. Please consult your local sales.

CE  II 2GD c T4 120 °C



P1D Standard

Double-acting

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

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

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

P1D Series Pneumatic Cylinders

P1D Ultra Clean without sensor function

This version is a permanently sealed P1D Ultra Clean with no facility for installing sensors. The cylinder has a very clean design and is intended for applications where no sensors are used.

The P1D without the sensor function can of course be combined with other equipment and functions.



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

Cylinder version

| | |
|---|-------------|
| C | Ultra Clean |
|---|-------------|

P1D Ultra Clean without sensor function is defined by the letter C in position 5, N in position 11 and the 15-digit order code.

Double acting

| Cyl. bore mm | Stroke mm | Order code |
|-------------------------|-----------------|-----------------|
| 32 Conn. G1/8 | 25 | P1D-C032MSN0025 |
| | 40 | P1D-C032MSN0040 |
| | 50 | P1D-C032MSN0050 |
| | 80 | P1D-C032MSN0080 |
| | 100 | P1D-C032MSN0100 |
| | 125 | P1D-C032MSN0125 |
| | 160 | P1D-C032MSN0160 |
| | 200 | P1D-C032MSN0200 |
| | 250 | P1D-C032MSN0250 |
| | 320 | P1D-C032MSN0320 |
| 400 | P1D-C032MSN0400 | |
| 500 | P1D-C032MSN0500 | |
| 40 Conn. G1/4 | 25 | P1D-C040MSN0025 |
| | 40 | P1D-C040MSN0040 |
| | 50 | P1D-C040MSN0050 |
| | 80 | P1D-C040MSN0080 |
| | 100 | P1D-C040MSN0100 |
| | 125 | P1D-C040MSN0125 |
| | 160 | P1D-C040MSN0160 |
| | 200 | P1D-C040MSN0200 |
| | 250 | P1D-C040MSN0250 |
| | 320 | P1D-C040MSN0320 |
| 400 | P1D-C040MSN0400 | |
| 500 | P1D-C040MSN0500 | |
| 50 Conn. G1/4 | 25 | P1D-C050MSN0025 |
| | 40 | P1D-C050MSN0040 |
| | 50 | P1D-C050MSN0050 |
| | 80 | P1D-C050MSN0080 |
| | 100 | P1D-C050MSN0100 |
| | 125 | P1D-C050MSN0125 |
| | 160 | P1D-C050MSN0160 |
| | 200 | P1D-C050MSN0200 |
| | 250 | P1D-C050MSN0250 |
| | 320 | P1D-C050MSN0320 |
| 400 | P1D-C050MSN0400 | |
| 500 | P1D-C050MSN0500 | |

| Cyl. bore mm | Stroke mm | Order code |
|--------------------------|-----------------|-----------------|
| 63 Conn. G3/8 | 25 | P1D-C063MSN0025 |
| | 40 | P1D-C063MSN0040 |
| | 50 | P1D-C063MSN0050 |
| | 80 | P1D-C063MSN0080 |
| | 100 | P1D-C063MSN0100 |
| | 125 | P1D-C063MSN0125 |
| | 160 | P1D-C063MSN0160 |
| | 200 | P1D-C063MSN0200 |
| | 250 | P1D-C063MSN0250 |
| | 320 | P1D-C063MSN0320 |
| 400 | P1D-C063MSN0400 | |
| 500 | P1D-C063MSN0500 | |
| 80 Conn. G3/8 | 25 | P1D-C080MSN0025 |
| | 40 | P1D-C080MSN0040 |
| | 50 | P1D-C080MSN0050 |
| | 80 | P1D-C080MSN0080 |
| | 100 | P1D-C080MSN0100 |
| | 125 | P1D-C080MSN0125 |
| | 160 | P1D-C080MSN0160 |
| | 200 | P1D-C080MSN0200 |
| | 250 | P1D-C080MSN0250 |
| | 320 | P1D-C080MSN0320 |
| 400 | P1D-C080MSN0400 | |
| 500 | P1D-C080MSN0500 | |
| 100 Conn. G1/2 | 25 | P1D-C100MSN0025 |
| | 40 | P1D-C100MSN0040 |
| | 50 | P1D-C100MSN0050 |
| | 80 | P1D-C100MSN0080 |
| | 100 | P1D-C100MSN0100 |
| | 125 | P1D-C100MSN0125 |
| | 160 | P1D-C100MSN0160 |
| | 200 | P1D-C100MSN0200 |
| | 250 | P1D-C100MSN0250 |
| | 320 | P1D-C100MSN0320 |
| 400 | P1D-C100MSN0400 | |
| 500 | P1D-C100MSN0500 | |

| Cyl. bore mm | Stroke mm | Order code |
|--------------------------|-----------------|-----------------|
| 125 Conn. G1/2 | 25 | P1D-C125MSN0025 |
| | 40 | P1D-C125MSN0040 |
| | 50 | P1D-C125MSN0050 |
| | 80 | P1D-C125MSN0080 |
| | 100 | P1D-C125MSN0100 |
| | 125 | P1D-C125MSN0125 |
| | 160 | P1D-C125MSN0160 |
| | 200 | P1D-C125MSN0200 |
| | 250 | P1D-C125MSN0250 |
| | 320 | P1D-C125MSN0320 |
| 400 | P1D-C125MSN0400 | |
| 500 | P1D-C125MSN0500 | |

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

P1D Series Pneumatic Cylinders

P1D Pro Clean with sensor function

This version is a P1D Pro Clean design with 2 T slots on one face of the tube giving then the possibility to add sensors. The cylinder has a clean design and is intended for applications where sensors still need to be used.

The P1D with the sensor function can of course be combined with other equipment and functions.

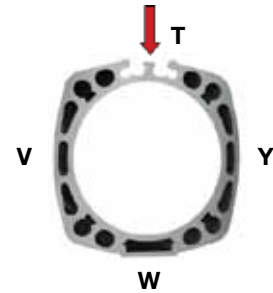


| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| P | 1 | D | - | C | 0 | 4 | 0 | M | S | T* | 0 | 2 | 5 | 0 |

| Cylinder version | |
|------------------|-----------|
| C | Pro Clean |

P1D Pro Clean with sensor function is defined by the letter C in position 5, and in position 11 by the position of the 2 T slots. T on the top, - Y on the right, W on the bottom, V on the left side and the 15-digit order code. Note: cylinder is showed piston rod in the front and air ports on the top.

T slots in the tube can be turn by 90°



Double acting, 2 T slots on the top

| Cyl. bore mm | Stroke mm | Order code |
|-------------------------|------------------------|------------------------|
| 32 Conn. G1/8 | 25 | P1D-C032MST0025 |
| | 40 | P1D-C032MST0040 |
| | 50 | P1D-C032MST0050 |
| | 80 | P1D-C032MST0080 |
| | 100 | P1D-C032MST0100 |
| | 125 | P1D-C032MST0125 |
| | 160 | P1D-C032MST0160 |
| | 200 | P1D-C032MST0200 |
| | 250 | P1D-C032MST0250 |
| | 320 | P1D-C032MST0320 |
| 400 | P1D-C032MST0400 | |
| 500 | P1D-C032MST0500 | |
| 40 Conn. G1/4 | 25 | P1D-C040MST0025 |
| | 40 | P1D-C040MST0040 |
| | 50 | P1D-C040MST0050 |
| | 80 | P1D-C040MST0080 |
| | 100 | P1D-C040MST0100 |
| | 125 | P1D-C040MST0125 |
| | 160 | P1D-C040MST0160 |
| | 200 | P1D-C040MST0200 |
| | 250 | P1D-C040MST0250 |
| | 320 | P1D-C040MST0320 |
| 400 | P1D-C040MST0400 | |
| 500 | P1D-C040MST0500 | |
| 50 Conn. G1/4 | 25 | P1D-C050MST0025 |
| | 40 | P1D-C050MST0040 |
| | 50 | P1D-C050MST0050 |
| | 80 | P1D-C050MST0080 |
| | 100 | P1D-C050MST0100 |
| | 125 | P1D-C050MST0125 |
| | 160 | P1D-C050MST0160 |
| | 200 | P1D-C050MST0200 |
| | 250 | P1D-C050MST0250 |
| | 320 | P1D-C050MST0320 |
| 400 | P1D-C050MST0400 | |
| 500 | P1D-C050MST0500 | |

| Cyl. bore mm | Stroke mm | Order code |
|--------------------------|------------------------|------------------------|
| 63 Conn. G3/8 | 25 | P1D-C063MST0025 |
| | 40 | P1D-C063MST0040 |
| | 50 | P1D-C063MST0050 |
| | 80 | P1D-C063MST0080 |
| | 100 | P1D-C063MST0100 |
| | 125 | P1D-C063MST0125 |
| | 160 | P1D-C063MST0160 |
| | 200 | P1D-C063MST0200 |
| | 250 | P1D-C063MST0250 |
| | 320 | P1D-C063MST0320 |
| 400 | P1D-C063MST0400 | |
| 500 | P1D-C063MST0500 | |
| 80 Conn. G3/8 | 25 | P1D-C080MST0025 |
| | 40 | P1D-C080MST0040 |
| | 50 | P1D-C080MST0050 |
| | 80 | P1D-C080MST0080 |
| | 100 | P1D-C080MST0100 |
| | 125 | P1D-C080MST0125 |
| | 160 | P1D-C080MST0160 |
| | 200 | P1D-C080MST0200 |
| | 250 | P1D-C080MST0250 |
| | 320 | P1D-C080MST0320 |
| 400 | P1D-C080MST0400 | |
| 500 | P1D-C080MST0500 | |
| 100 Conn. G1/2 | 25 | P1D-C100MST0025 |
| | 40 | P1D-C100MST0040 |
| | 50 | P1D-C100MST0050 |
| | 80 | P1D-C100MST0080 |
| | 100 | P1D-C100MST0100 |
| | 125 | P1D-C100MST0125 |
| | 160 | P1D-C100MST0160 |
| | 200 | P1D-C100MST0200 |
| | 250 | P1D-C100MST0250 |
| | 320 | P1D-C100MST0320 |
| 400 | P1D-C100MST0400 | |
| 500 | P1D-C100MST0500 | |

| Cyl. bore mm | Stroke mm | Order code |
|--------------------------|------------------------|------------------------|
| 125 Conn. G1/2 | 25 | P1D-C125MST0025 |
| | 40 | P1D-C125MST0040 |
| | 50 | P1D-C125MST0050 |
| | 80 | P1D-C125MST0080 |
| | 100 | P1D-C125MST0100 |
| | 125 | P1D-C125MST0125 |
| | 160 | P1D-C125MST0160 |
| | 200 | P1D-C125MST0200 |
| | 250 | P1D-C125MST0250 |
| | 320 | P1D-C125MST0320 |
| 400 | P1D-C125MST0400 | |
| 500 | P1D-C125MST0500 | |

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



P1D with valve built on

P1D Standard can be ordered with a factory-fitted valve and tubing. The valve series is the robust and compact Viking Xtreme series, with product code P2LAX (for cylinder bores 32-63), P2LBX (for cylinder bores 80-100) and P2LDX (for cylinder bore 125). This valve series was specially designed for harsh environments and a long service life. The valve is securely fitted to a fixing plate bolted onto the cylinder barrel. The unit is delivered complete with valve, Prestolok push-in connection in nickel plated brass, and hosing. The valve has built-in silencers (Siflow for speed regulation), and electrically-operated versions have solenoid valves (P2E with spring-loaded manual override) and a cable head with LED and spark dispersion. The supply voltage is 24V for AC as well as DC versions. This UC (Universal Current) is possible because of a built-in rectifier in the cable head, allowing the use of direct current and alternating current for actuation. Of course, the entire range of P1D accessories can also be used for the P1D with built-in valve, and cylinders can be ordered with factory-fitted accessories and sensors.

Fast response

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

No maintenance and easy to service

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

Wide range of applications

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

Range of solenoid valve voltages

The solenoid valves are available in different voltage.

Technical data

| | |
|-------------------------------|------------------------------|
| Working pressure | max 10 bar |
| Working media | dry filtered compressed air. |
| Working temperature: | -15 °C to +60 °C |
| Flow, P2LAX, acc. to ISO 6358 | Qn = 720 NI/min |
| Flow, P2LBX, acc. to ISO 6358 | Qn = 1290 NI/min |
| Flow, P2LDX, acc. to ISO 6358 | Qn = 2650 NI/min |

Material specification

| | |
|-------------------------|---------------------|
| Valves ¹⁾ | |
| Housing and ends | Anodised aluminium |
| Solenoid valves | |
| Housing | Polyamide |
| Magnet coil | Epoxy coated |
| Fixing plate | Anodised aluminium |
| Fixing screws for plate | Stainless steel |
| Fixing screws for valve | Zinc-coated steel |
| Angle connections | Nickel-coated brass |
| Plastic tubes | PUR |

Accessories

| Name | Order code |
|---|-------------------|
| Siflow silencer for P2LAX valve, G1/8 | 9301050901 |
| Sintered plastic silencer for P2LAX valve, G1/8 | P6M-PAB1 |
| Siflow silencer for P2LBX valve, G1/4 | 9301050902 |
| Sintered plastic silencer for P2LBX valve, G1/4 | P6M-PAB2 |
| Siflow silencer for P2LDX valve, G1/2 | 9301050904 |
| Sintered plastic silencer for P2LDX valve, G1/2 | P6M-PAB4 |
| Fixing plate for Ø32 - Ø63, valve P2LAX, -BX | 9121742111 |
| Fixing plate for Ø80, Ø100, valve P2LAX, -BX, -DX | 9121742112 |
| Fixing plate for Ø125, valve P2LAX, -BX, -DX | 9121742113 |

Part numbers are here above given as spare parts or to add a valve on a P1D-S Standard by yourself.

1) see also catalogue for P2L series Viking valves

With valve built on

A 20-character order number is used to order the P1D Standard with factory fitted valve. Position 5 indicates the cylinder version, with the actuation type in position 11 and the valve type in position 20. Note that cylinder diameters 32-63 use valve P2LAX (1/8"), diameters 80-100 use P2LBX (1/4"),

and diameter 125 uses P2LDX (1/2"). This version of the cylinder can of course be combined with factory-fitted cylinder accessories, piston rod accessories and sensors. Fixing plates for different valve sizes may be ordered separately.

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

| Cylinder version | |
|------------------|------------------------------------|
| V | Standard with factory fitted valve |

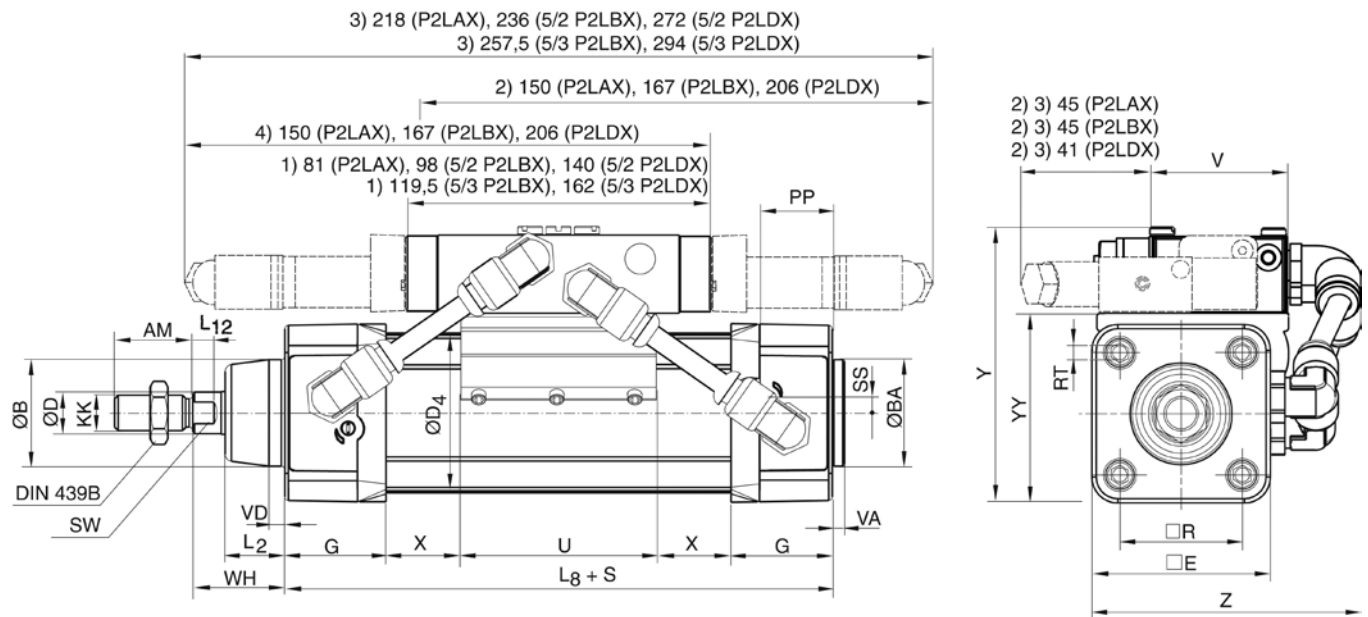
| Factory fitted valve type | |
|---------------------------|-----------------------|
| 0 | Air actuated |
| 1 | Electrically actuated |

Delivered without solenoid(s) on the valve
For selecting coil(s) and plug(s) see pages 61 - 62

| Valve function | |
|---------------------------------------|--|
| Electrically actuated internal supply | |
| F | Elec-Elec, 5/2 |
| H | Elec-Spring, 5/2 |
| K | Spring-Elec*, 5/2 |
| M | Elec-Elec, 5/3, closed centre position |
| Q | Elec-Elec, 5/3, vented centre |
| S | Elec-Elec, 5/3, pressurised centre |

* Piston rod in extended position with unactuated valve

P1D with built on valve



Dimensions (mm)

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

| Cylinder bore mm | PP mm | R mm | RT | SS mm | SW mm | VA mm | VD mm | WH mm | U mm | V mm | X mm |
|------------------|-------|-------|-----|-------|-------|-------|-------|-------|------|------|----------|
| 32 | 21,8 | 32,5 | M6 | 4,0 | 10 | 3,5 | 4,5 | 26 | 55 | 40 | -9+S/2 |
| 40 | 21,9 | 38,0 | M6 | 8,0 | 13 | 3,5 | 4,5 | 30 | 55 | 40 | -8+S/2 |
| 50 | 23,0 | 46,5 | M8 | 4,0 | 17 | 3,5 | 5,0 | 37 | 55 | 40 | -8+S/2 |
| 63 | 27,4 | 56,5 | M8 | 6,5 | 17 | 3,5 | 5,0 | 37 | 55 | 40 | -6,5+S/2 |
| 80 | 30,5 | 72,0 | M10 | 0 | 22 | 3,5 | 4,0 | 46 | 55 | 40 | -2,5+S/2 |
| 100 | 35,8 | 89,0 | M10 | 0 | 22 | 3,5 | 4,0 | 51 | 55 | 40 | -2,5+S/2 |
| 125 | 40,5 | 110,0 | M12 | 0 | 27 | 5,5 | 6,0 | 65 | 55 | 48 | 2+S/2 |

| Cylinder bore mm | Y mm | YY mm | Z mm | ZZ mm |
|------------------|------|-------|------|-------|
| 32 | 80 | 56 | 80 | 90 |
| 40 | 88 | 64 | 87 | 96 |
| 50 | 102 | 78 | 96 | 105 |
| 63 | 109 | 85 | 107 | 116 |
| 80 | 127 | 102 | 132 | 125 |
| 100 | 142 | 117 | 148 | 140 |
| 125 | 180 | 146 | 183 | 159 |

S=Stroke

- 1) Air actuated 5/2 and 5/3
- 2) Electrically actuated 5/2 with spring return
- 3) Electrically actuated 5/2 and 5/3 (2 solenoid valves)
- 4) Electrically actuated 5/2 with spring return(reverse function)

- P2LAX Ø32 - Ø63 mm
- P2LBX Ø80 - Ø100 mm
- P2LDX Ø125 mm



P1D-L



P1D cylinder with piston rod locking

The P1D cylinder is available in a version with piston rod locking, allowing the piston rod to be locked in any position. The lock unit, of the air/spring actuated type, is integrated in the front end piece of the cylinder. With no signal pressure, the full force of the lock is applied to the piston rod, and the lock is released at 4 bar signal pressure. Lock units are available in bores 32-125 mm. Of course, the entire range of P1D accessories can also be used for the locking cylinder. However, the lock unit increases the overall length of the cylinder. Not certified for used in safety systems.

Clean and compact design

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

Locking and braking

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

Function on pressure loss

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

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

Technical data

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

1) Signal pressure to inlet port of lock unit.

Static lock forces

Lock forces at 0 bar signal pressure to lock unit

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

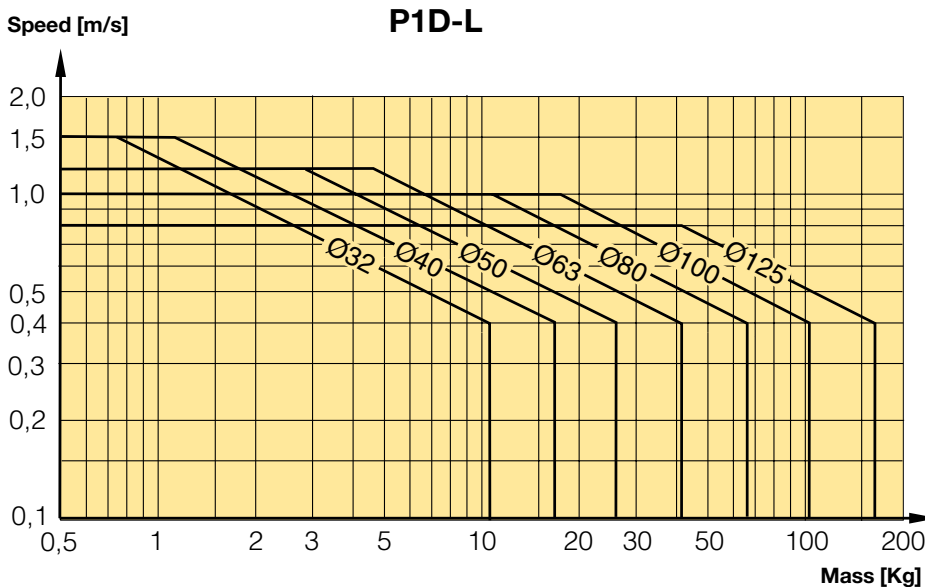
Material specification, piston rod locking

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

Other data as for relevant base cylinder.

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

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



Use as a brake

The table shows the maximum values for speed and braking mass if the cylinder is used as a brake. The cylinder should not be exposed to additional compressive forces as this significantly reduces the external mass that can be braked. We recommend system solutions as shown in the pneumatic circuits (Fastening in position) or similar, in which the cylinder does not act as a motor during braking. Heat is generated if the brake is used frequently, and this must be taken into account to ensure that the maximum temperature is not exceeded.

Piston rod locking

To order a cylinder with piston rod locking, position 5 should contain L. Note that the P1D with piston rod locking requires a chrome plated piston rod or chrome plated stainless steel piston rod because of the high surface pressure.

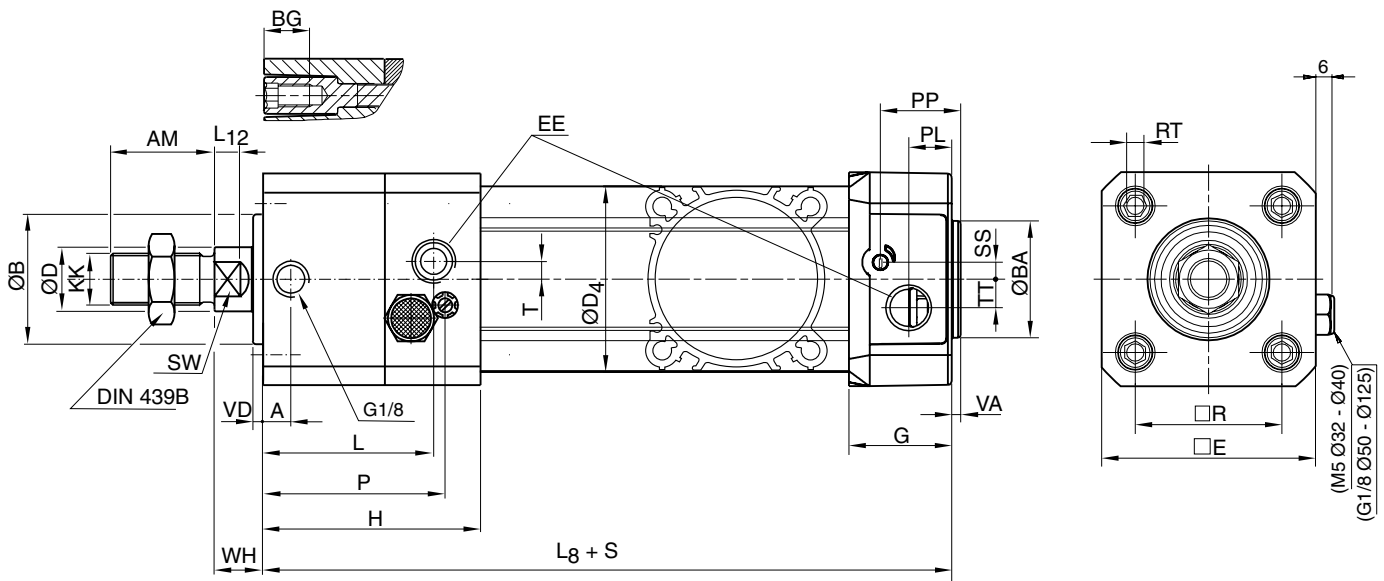
| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| P | 1 | D | - | L | 0 | 8 | 0 | M | C | - | 0 | 2 | 0 | 0 |

Cylinder version

L With pneumatic override

| Material Piston rod | Seals |
|--------------------------|----------------------------|
| Hard chrome plated steel | |
| C | Standard -20 °C to +80 °C. |

P1D-L



Dimensions (mm)

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

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

S=Stroke

* WH is shorter than the ISO WH dimension without rod lock unit

Tolerances (mm)

| Cylinder bore mm | B | BA | L ₈ | L ₉ | R | Stroke tolerance up to stroke 500 mm | Stroke tolerance for stroke over 500 mm |
|---------------------|-----|-----|----------------|----------------|------|---|--|
| mm | mm | mm | mm | mm | 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-H



P1D cylinder with static piston rod locking

The P1D cylinder is available in a version with piston rod locking, allowing the piston rod to be locked in any position. The lock unit, of the air/spring actuated type. With no signal pressure, the full force of the lock is applied to the piston rod, and the lock is released at 3 bar signal pressure. Lock units are available for P1D Standard, in bores 32-125 mm. Of course, the entire range of P1D accessories can also be used for the locking cylinder, which can be ordered with factory fitted accessories, sensors. However, the lock unit increases the overall length of the cylinder. Not certified for used in safety systems.

Function on pressure loss

The piston rod lock can be used in all material handling systems where controlled fastening or positioning is required. The signal air to the lock unit can be connected directly to the air system or to the supply air for the valve controlling the cylinder in question. For controlled on/off operation of the lock unit, a separate valve, with large exhaust flow capacity, is used.

Piston rod locking

To order a cylinder with piston rod locking, position should contain H (P1D Standard with lock unit). Note that the P1D with piston rod locking requires a chrome plated piston

rod because of the high surface pressure. For factory-fitted central trunnion.

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

| | |
|-------------------------|------------------|
| Cylinder version | |
| H | Static lock unit |

| | |
|--------------------------|----------------------------|
| Material | Seals |
| Piston rod | |
| Hard chrome plated steel | |
| C | Standard -20 °C to +80 °C. |

Technical data

| | |
|--------------------------------|------------------------------|
| Working pressure | max 10 bar |
| Working media | dry filtered compressed air. |
| Working temperature: | -20 °C to +80 °C |
| Release pressure ¹⁾ | min 3 bar ± 10% |

1) Signal pressure to inlet port of lock unit.

Static lock forces

Lock forces at 0 bar signal pressure lock unit

| Cylinder dia. mm | Lock force N |
|---------------------|-----------------|
| 32 | 600 |
| 40 | 1000 |
| 50 | 1400 |
| 63 | 2000 |
| 80 | 5000 |
| 100 | 5000 |
| 125 | 7000 |

Material specification, piston rod locking

| | |
|-------------|--------------------------|
| Housing | Black anodised aluminium |
| Carriage | Red anodised aluminium |
| Lock collar | Brass |
| Springs | Stainless steel |

Other data as for relevant base cylinder.

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

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

Manual release



All Cartridge Rod Locking are supplied with a plug. By screwing this plug down, it will give a manual release without using any release pressure.

Separate Rod Locking



Separate Rod Locking to be mounted on a standard P1D. The cylinder need to have extended piston rod according to the table besides.
Note! Chrome plated piston rod must be used.

| Cyl. bore Ø mm | Rod Ø mm | Rod extension mm | Weight kg | Order code |
|-------------------|-------------|---------------------|--------------|--------------|
| 32 | 12 | 48 | 0,18 | BT032 |
| 40 | 16 | 55 | 0,25 | BT040 |
| 50 | 20 | 70 | 0,53 | BT050 |
| 63 | 20 | 70 | 0,70 | BT063 |
| 80 | 25 | 90 | 1,87 | BT080 |
| 100 | 25 | 92 | 2,60 | BT100 |
| 125 | 32 | 122 | 4,60 | BT125 |

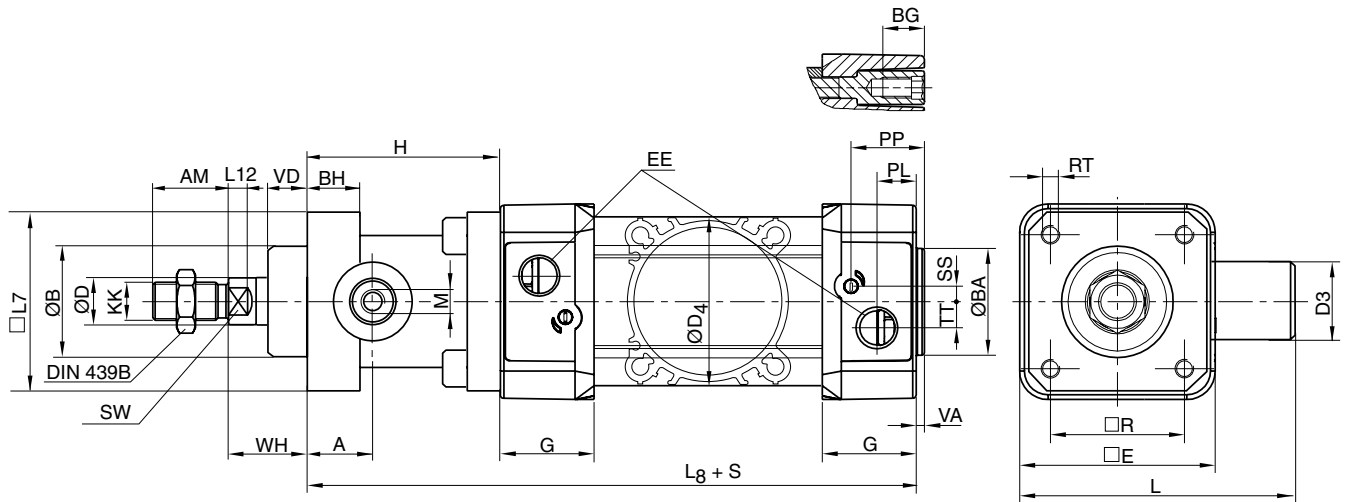
Spare cartridge



Spare parts for the complete Separate Rod Locking.

| Cyl. bore Ø mm | Rod Ø mm | Weight kg | Order code |
|-------------------|-------------|--------------|-------------------|
| 32 | 12 | 0,05 | BTC032 |
| 40 | 16 | 0,09 | BTC040 |
| 50 | 20 | 0,17 | BTC050 |
| 63 | 20 | 0,17 | BTC063 |
| 80 | 25 | 0,70 | BTC080/100 |
| 100 | 25 | 0,70 | BTC080/100 |
| 125 | 32 | 1,60 | BTC125 |

P1D-H



Dimensions (mm)

| Cylinder bore mm | A | AM | B | BA | BG | BH | D | D3 | D4 | E | EE | G | H | KK |
|---------------------|------|----|----|----|----|----|----|----|-------|-------|------|------|-------|----------|
| 32 | 16,5 | 22 | 30 | 30 | 16 | 13 | 12 | 20 | 45,0 | 50,0 | G1/8 | 28,5 | 48,0 | M10x1,25 |
| 40 | 19,0 | 24 | 35 | 35 | 16 | 13 | 16 | 24 | 52,0 | 57,4 | G1/4 | 33,0 | 55,0 | M12x1,25 |
| 50 | 24,5 | 32 | 40 | 40 | 16 | 16 | 20 | 30 | 60,7 | 69,4 | G1/4 | 33,5 | 70,0 | M16x1,5 |
| 63 | 20,5 | 32 | 45 | 45 | 16 | 16 | 20 | 38 | 71,5 | 82,4 | G3/8 | 39,5 | 70,0 | M16x1,5 |
| 80 | 29,0 | 40 | 45 | 45 | 17 | 20 | 25 | 48 | 86,7 | 99,4 | G3/8 | 39,5 | 90,0 | M20x1,5 |
| 100 | 27,0 | 40 | 55 | 55 | 17 | 20 | 25 | 48 | 106,7 | 116,0 | G1/2 | 44,5 | 92,0 | M20x1,5 |
| 125 | 35,5 | 54 | 60 | 60 | 20 | 30 | 32 | 65 | 134,0 | 139,0 | G1/2 | 51,0 | 122,0 | M27x2 |

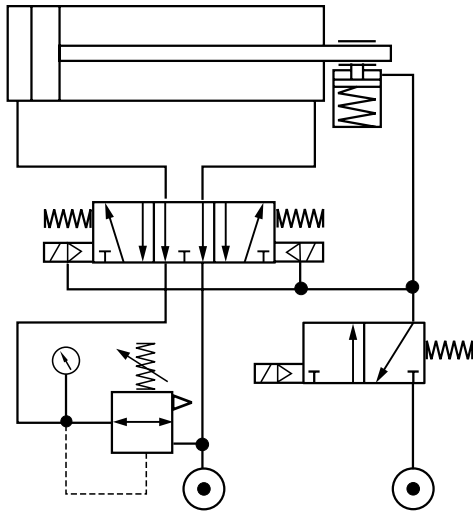
| Cylinder bore mm | L | L7 | L8 | L12 | M | PL | PP | R | RT | SS | SW | TT | VA | VD | WH |
|---------------------|-----|-----|-----|------|------|------|------|-------|-----|-----|----|------|-----|----|----|
| 32 | 70 | 45 | 142 | 6,0 | M5 | 13,0 | 21,8 | 32,5 | M6 | 4,0 | 10 | 4,5 | 3,5 | 10 | 26 |
| 40 | 86 | 50 | 160 | 6,5 | G1/8 | 14,0 | 21,9 | 38,0 | M6 | 8,0 | 13 | 5,5 | 3,5 | 10 | 30 |
| 50 | 105 | 60 | 176 | 8,0 | G1/8 | 14,0 | 23,0 | 46,5 | M8 | 4,0 | 17 | 7,5 | 3,5 | 12 | 37 |
| 63 | 122 | 70 | 191 | 8,0 | G1/8 | 16,4 | 27,4 | 56,5 | M8 | 6,5 | 17 | 11,0 | 3,5 | 12 | 37 |
| 80 | 162 | 90 | 218 | 10,0 | G1/8 | 16,0 | 30,5 | 72,0 | M10 | 0 | 22 | 15,0 | 3,5 | 20 | 46 |
| 100 | 170 | 105 | 230 | 14,0 | G1/8 | 18,0 | 35,8 | 89,0 | M10 | 0 | 22 | 20,0 | 3,5 | 23 | 51 |
| 125 | 205 | 140 | 282 | 18,0 | G1/8 | 28,0 | 40,5 | 110,0 | M12 | 0 | 27 | 17,5 | 5,5 | 45 | 65 |

S=Stroke

Tolerances (mm)

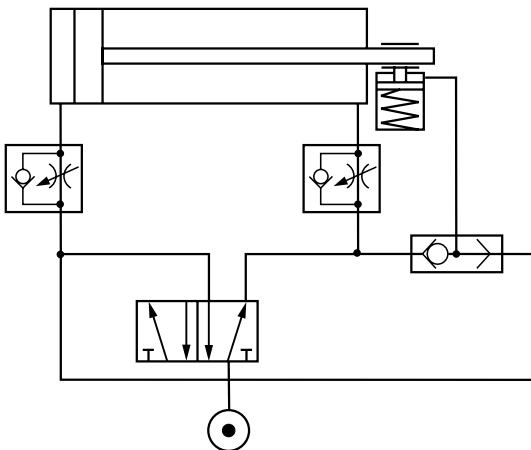
| Cylinder bore mm | B | BA | L ₈ | L ₉ | R | Stroke tolerance up to stroke 500 mm | Stroke tolerance for stroke over 500 mm |
|---------------------|-----|-----|----------------|----------------|------|---|--|
| 32 | d11 | d11 | ±0,4 | ±2 | ±0,5 | +0,3/+2,0 | +0,3/+3,0 |
| 40 | d11 | d11 | ±0,7 | ±2 | ±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 |

Fastening in position



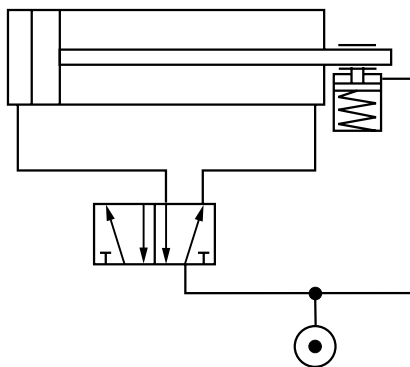
This is the optimum solution for straightforward fastening in any position, while preserving the maximum expected service life of the lock. The cylinder is supplied with compressed air via a 5/3 valve with vented centre. The valve is supplied with full pressure in port 3, port 2 is connected to the minus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

Function on hose rupture

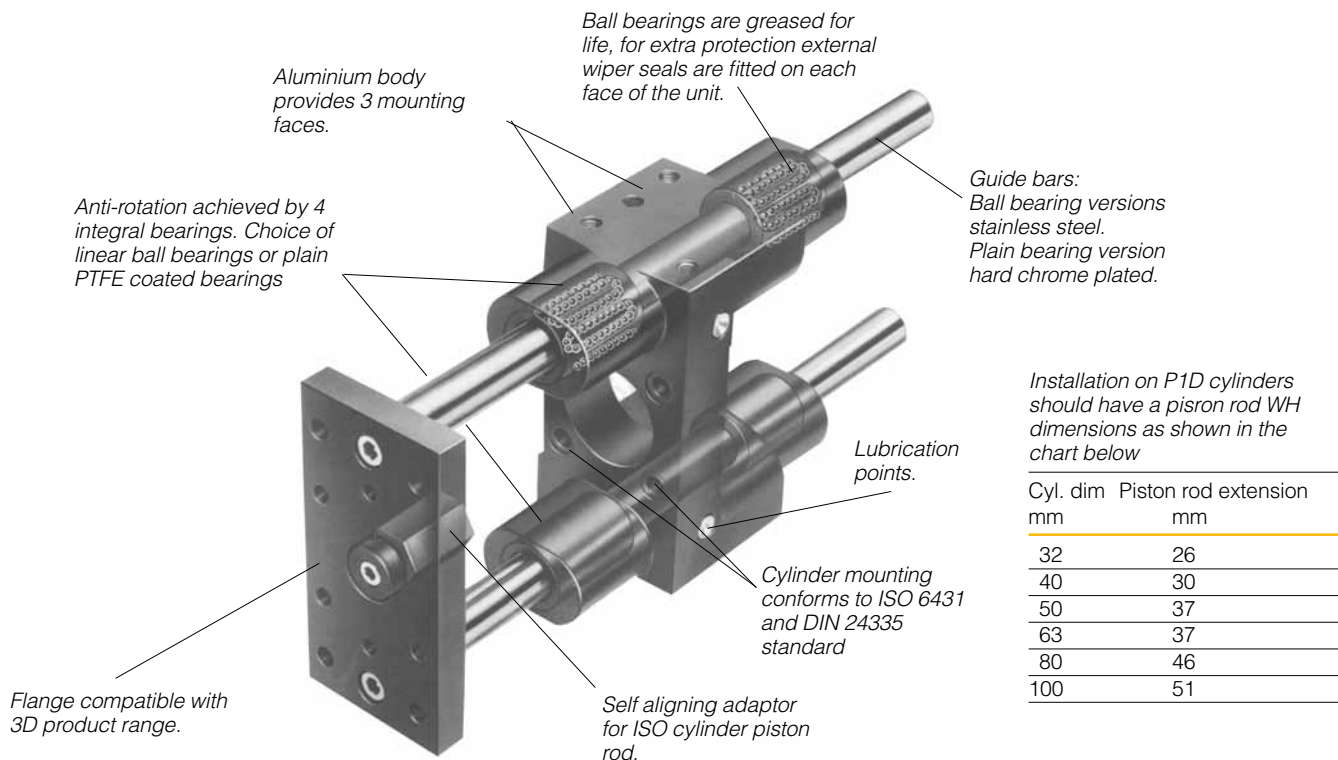


This arrangement helps to secure the piston rod if there is a pressure loss due to hose rupture. The cylinder is supplied by a 5/2 valve and the cylinder speed is controlled using flow control valves with by-pass fitted near the cylinder. A TEE piece is fitted in the pipe between the working valve and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

Function on pressure loss



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



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

| Cyl. dim mm | Piston rod extension 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 chrome plated for plain bearing
 Front plate Anodised aluminium
 Guide bars, U style Stainless steel
 Front plate Zinc-plated steel
 Bearings Plain bearings
 Linear ball bearings

Order code key for rod guidance modules

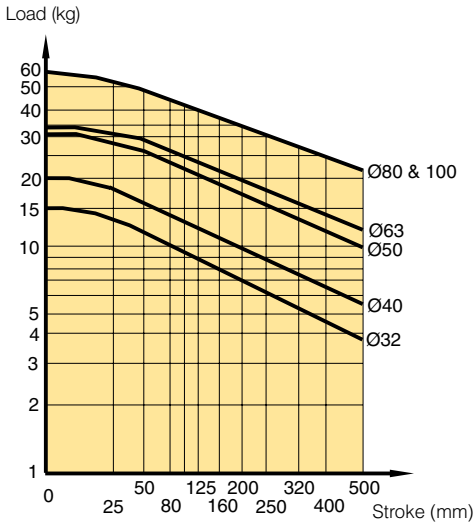
P1E - 4KRH - 0100

| Cylinder version | Bore size mm | Guide module type | Stroke length (mm) |
|------------------------|--------------|----------------------------------|---|
| E ISO cylinders | K 32 | H H style, ball bearings | Same as for the cylinder e.g. 0100 = 100 mm. |
| | L 40 | J H style, plain bearings | |
| | M 50 | K U style, plain bearings | |
| | N 63 | | |
| | P 80 | | |
| | Q 100 | | |

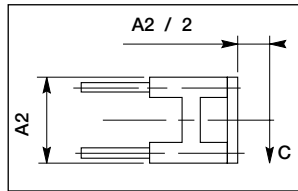
Technical information 'H style'

Rod guide with ball bearings

Maximum load carried

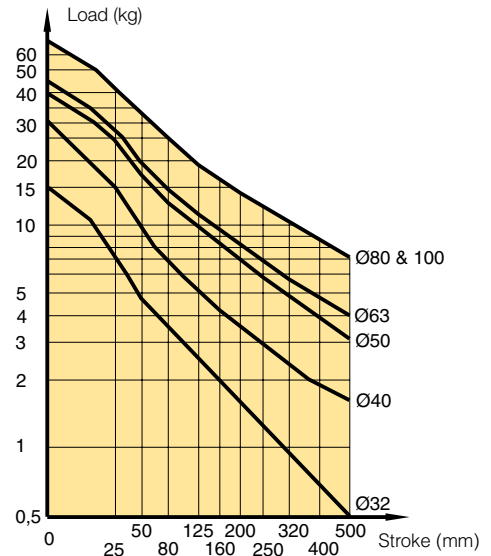


Graphs established at mid point of stroke

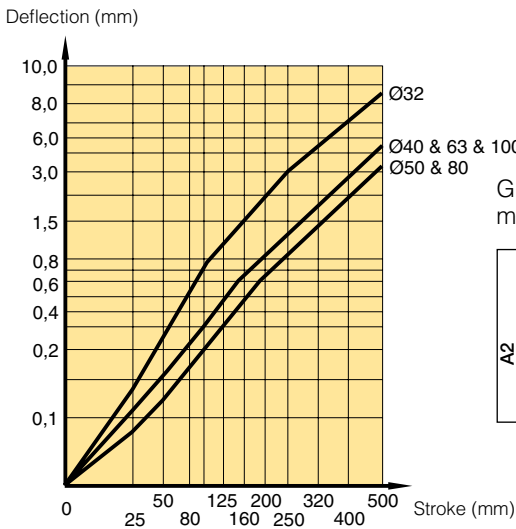


Rod guide with plain bearings

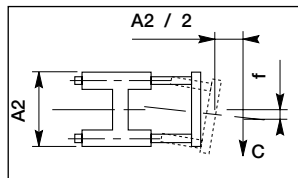
Maximum load carried



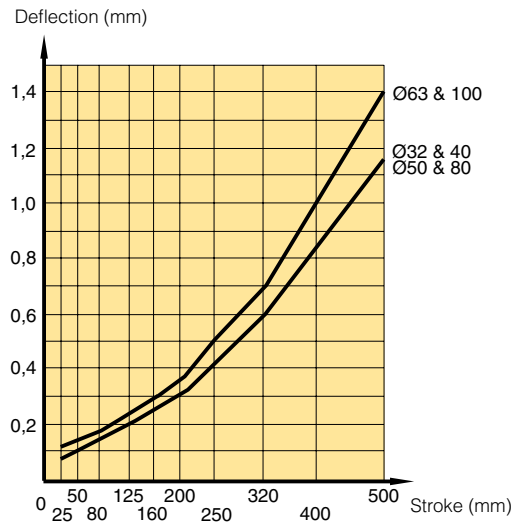
Maximum deflection/max load



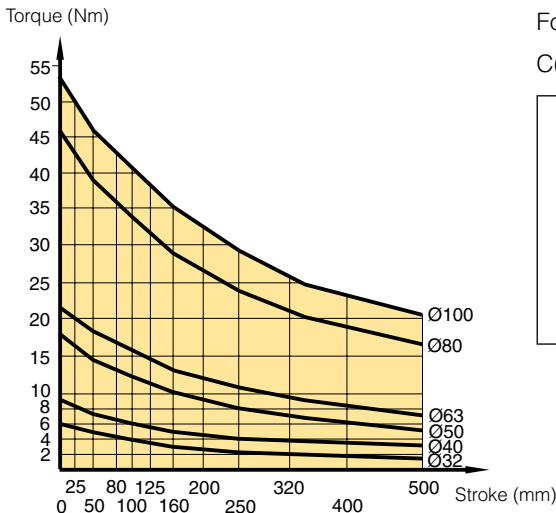
Graphs established at mid point of stroke



Maximum deflection/max load

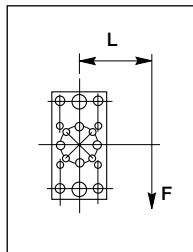


Maximum permissible torque (Nm)

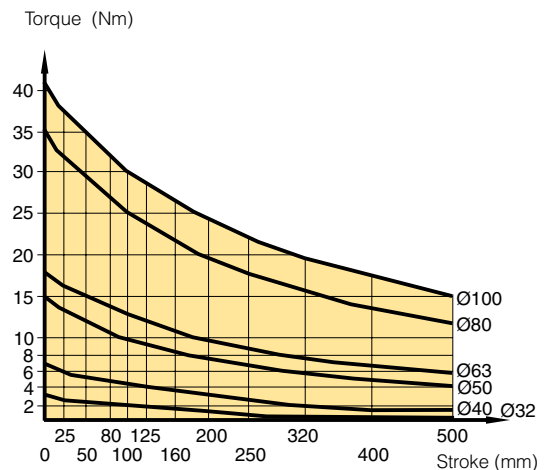


Formula:

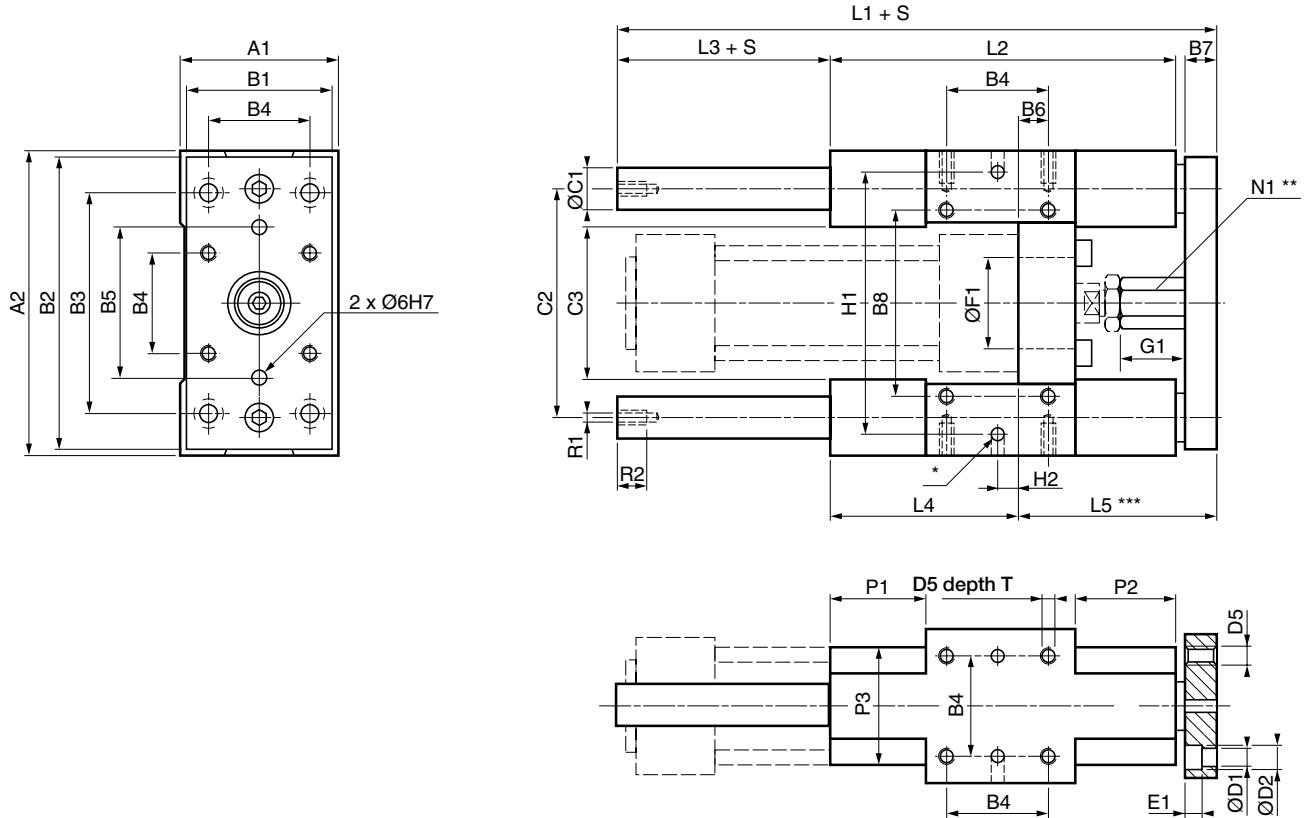
$$C(Nm) = F(N) \times L(m)$$



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 | ØF 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 ^{±1} mm | P ₂ ^{±1} 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 ^{±0,05} 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

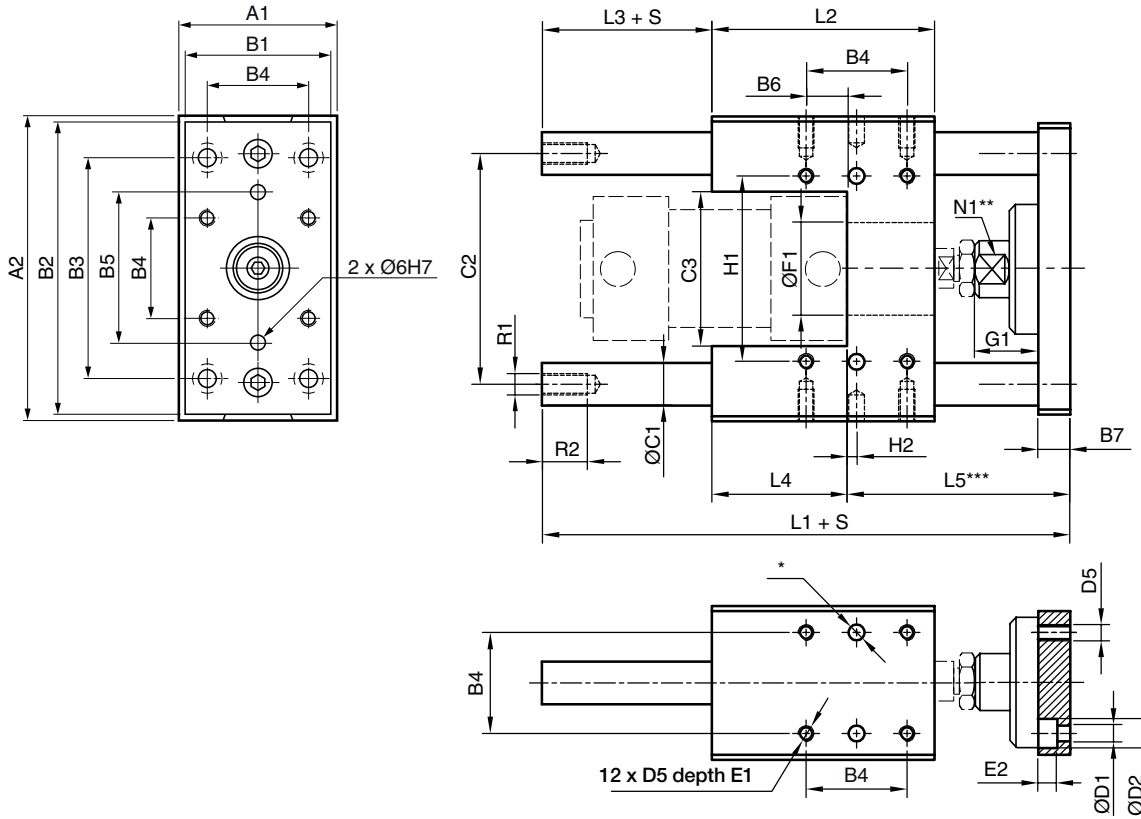
* 6 hole Ø6^{H7}, depth 10^{+1/0}

** 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 ^{±0,05} 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 ⁴ bracket MP6



Clevis bracket MP2 ⁵



| | | | | | |
|-------|-----------------|-----------------|-----------------|------------------|-----------------|
| Ø 32 | P1C-4KMB | P1C-4KMF | P1C-4KMD | P1C-4KMSA | P1C-4KMT |
| Ø 40 | P1C-4LMB | P1C-4LMF | P1C-4LMD | P1C-4LMSA | P1C-4LMT |
| Ø 50 | P1C-4MMB | P1C-4MMF | P1C-4MMD | P1C-4MMSA | P1C-4MMT |
| Ø 63 | P1C-4NMB | P1C-4NMF | P1C-4NMD | P1C-4NMSA | P1C-4NMT |
| Ø 80 | P1C-4PMB | P1C-4PMF | P1C-4PMD | P1C-4PMSA | P1C-4PMT |
| Ø 100 | P1C-4QMB | P1C-4QMF | P1C-4QMD | P1C-4QMSA | P1C-4QMT |
| Ø 125 | P1C-4RMB | P1C-4RMF | P1C-4RMD | P1C-4RMSA | P1C-4RMT |

Clevis bracket MP4 ⁶



Clevis bracket AB6 ⁷



Pivot bracket with swivel bearing CS7 ⁸



3 and 4 positions flange JP1



Pivot brackets AT4 ¹⁰ for MT* trunnion



| | | | | | |
|-------|-----------------|------------------|-----------------|-----------------|-------------------|
| Ø 32 | P1C-4KME | P1C-4KMCA | P1C-4KMA | P1E-6KB0 | 9301054261 |
| Ø 40 | P1C-4LME | P1C-4LMCA | P1C-4LMA | P1E-6LB0 | 9301054262 |
| Ø 50 | P1C-4MME | P1C-4MMCA | P1C-4MMA | P1E-6MB0 | 9301054262 |
| Ø 63 | P1C-4NME | P1C-4NMCA | P1C-4NMA | P1E-6NB0 | 9301054264 |
| Ø 80 | P1C-4PME | P1C-4PMCA | P1C-4PMA | P1E-6PB0 | 9301054264 |
| Ø 100 | P1C-4QME | P1C-4QMCA | P1C-4QMA | P1E-6QB0 | 9301054266 |
| Ø 125 | P1C-4RME | P1C-4RMCA | P1C-4RMA | P1E-6QB0 | 9301054266 |

Flange trunnion ¹¹ MT5/MT6



Centre trunnion MT4 ¹²



Swivel rod eye AP6 ¹³



Clevis AP2 ¹⁴



Flexo coupling PM5 ¹⁵

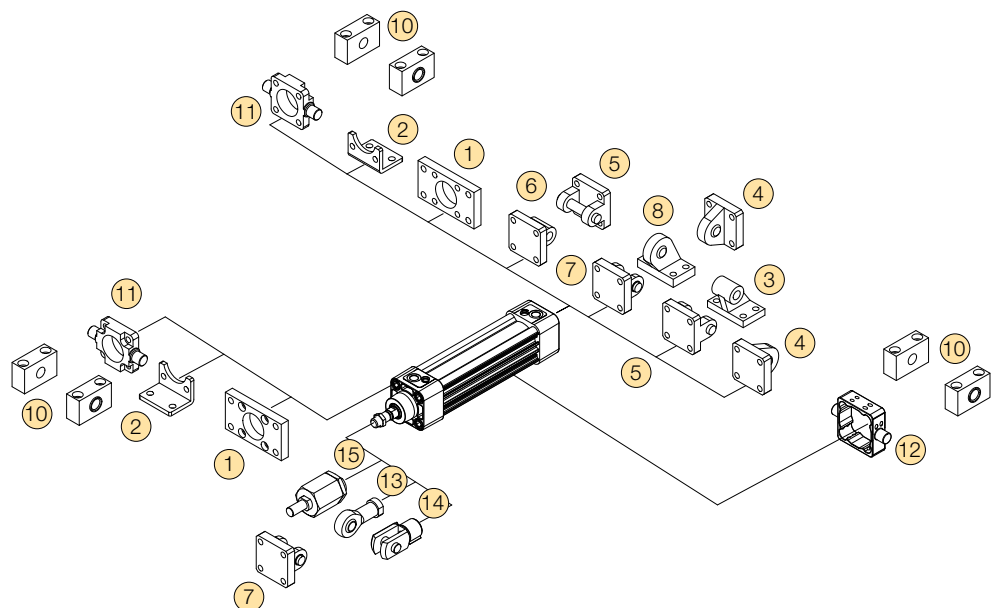



| | | | | | |
|-------|------------------|-----------------------|-----------------|-----------------|-----------------|
| Ø 32 | P1D-4KMYF | Factory fitted | P1C-4KRS | P1C-4KRC | P1C-4KRF |
| Ø 40 | P1D-4LMYF | Factory fitted | P1C-4LRS | P1C-4LRC | P1C-4LRF |
| Ø 50 | P1D-4MMYF | Factory fitted | P1C-4MRS | P1C-4MRC | P1C-4MRF |
| Ø 63 | P1D-4NMYF | Factory fitted | P1C-4MRS | P1C-4MRC | P1C-4MRF |
| Ø 80 | P1D-4PMYF | Factory fitted | P1C-4PRS | P1C-4PRC | P1C-4PRF |
| Ø 100 | P1D-4QMYF | Factory fitted | P1C-4PRS | P1C-4PRC | P1C-4PRF |
| Ø 125 | P1D-4RRYF | Factory fitted | P1C-4RRS | P1C-4RRC | P1C-4RRF |

Zinc-plated steel nut MR9 (pack of 10)



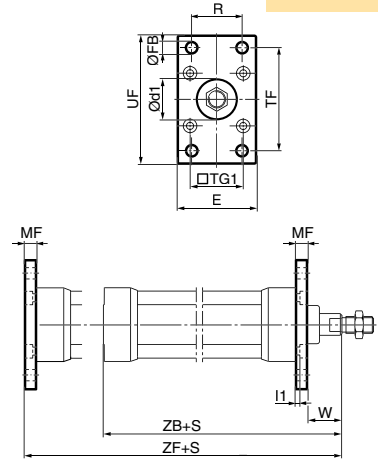
| | |
|-------|------------------|
| Ø 32 | P14-4KRPZ |
| Ø 40 | P14-4LRPZ |
| Ø 50 | P14-4MRPZ |
| Ø 63 | P14-4MRPZ |
| Ø 80 | P14-4PRPZ |
| Ø 100 | P14-4PRPZ |
| Ø 125 | P14-4RRPZ |




| Type | Description | For mounting screws in stainless steel see page 51 | Cyl. bore Ø mm | Weight kg | Order code |
|---|--|--|-------------------|--------------|---|
| Flange MF1/MF2  | Intended for fixed mounting of cylinder. Flange can be fitted to front or rear end cover of cylinder. Materials Flange: Surface-treated steel Mounting screws acc. to DIN 6912: Zinc-plated steel 8.8 Supplied complete with mounting screws for attachment to cylinder. | | 32 | 0,23 | P1C-4KMB P1C-4LMB P1C-4MMB P1C-4NMB P1C-4PMB P1C-4QMB P1C-4RMB |
| | | | 40 | 0,28 | |
| | | | 50 | 0,53 | |
| | | | 63 | 0,71 | |
| | | | 80 | 1,59 | |
| | | | 100 | 2,19 | |
| 125 | 3,78 | | | | |

| Cyl. bore mm | d1 mm | FB mm | TG1 mm | E mm | R JS14 mm | MF JS14 mm | TF JS14 mm | UF mm | I1 mm | W* mm | ZF* mm | ZB* mm |
|--------------|-------|-------|--------|------|-----------|------------|------------|-------|-------|-------|--------|--------|
| 32 | 30 | 7 | 32,5 | 45 | 32 | 10 | 64 | 80 | 5,0 | 16 | 130 | 123,5 |
| 40 | 35 | 9 | 38,0 | 52 | 36 | 10 | 72 | 90 | 5,0 | 20 | 145 | 138,5 |
| 50 | 40 | 9 | 46,5 | 65 | 45 | 12 | 90 | 110 | 6,5 | 25 | 155 | 146,5 |
| 63 | 45 | 9 | 56,5 | 75 | 50 | 12 | 100 | 120 | 6,5 | 25 | 170 | 161,5 |
| 80 | 45 | 12 | 72,0 | 95 | 63 | 16 | 126 | 150 | 8,0 | 30 | 190 | 177,5 |
| 100 | 55 | 14 | 89,0 | 115 | 75 | 16 | 150 | 170 | 8,0 | 35 | 205 | 192,5 |
| 125 | 60 | 16 | 110,0 | 140 | 90 | 20 | 180 | 205 | 10,5 | 45 | 245 | 230,5 |

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

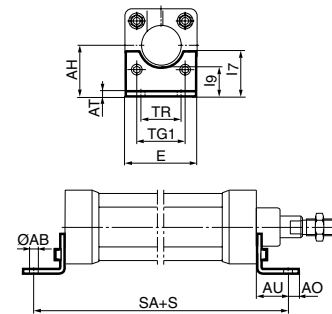



| Type | Description | Materials | Cyl. bore mm | Weight kg | Order code |
|---|--|-----------|-----------------|--------------|---|
| Foot brackets MS1  | Intended for fixed mounting of cylinder. Foot bracket can be fitted to front and rear end covers of cylinder. Foot bracket: Surface-treated steel Mounting screws acc. to DIN 912: Zinc-plated steel 8.8 Supplied in pairs with mounting screws for attachment to cylinder. | | 32 | 0,06** | P1C-4KMF P1C-4LMF P1C-4MMF P1C-4NMF P1C-4PMF P1C-4QMF P1C-4RMF |
| | | | 40 | 0,08** | |
| | | | 50 | 0,16** | |
| | | | 63 | 0,25** | |
| | | | 80 | 0,50** | |
| | | | 100 | 0,85** | |
| 125 | 1,48** | | | | |

** Weight per item

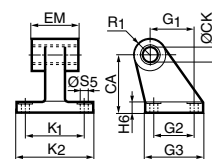
| Cyl. bore mm | AB mm | TG1 mm | E mm | TR JS14 mm | AO mm | AU mm | AH JS15 mm | I7 mm | AT mm | I9 JS14 mm | SA* mm |
|--------------|-------|--------|------|------------|-------|-------|------------|-------|-------|------------|--------|
| 32 | 7 | 32,5 | 45 | 32 | 10 | 24 | 32 | 30 | 4,5 | 17,0 | 142 |
| 40 | 9 | 38,0 | 52 | 36 | 8 | 28 | 36 | 30 | 4,5 | 18,5 | 161 |
| 50 | 9 | 46,5 | 65 | 45 | 13 | 32 | 45 | 36 | 5,5 | 25,0 | 170 |
| 63 | 9 | 56,5 | 75 | 50 | 13 | 32 | 50 | 35 | 5,5 | 27,5 | 185 |
| 80 | 12 | 72,0 | 95 | 63 | 14 | 41 | 63 | 49 | 6,5 | 40,5 | 210 |
| 100 | 14 | 89,0 | 115 | 75 | 15 | 41 | 71 | 54 | 6,5 | 43,5 | 220 |
| 125 | 16 | 110,0 | 140 | 90 | 22 | 45 | 90 | 71 | 8,0 | 60,0 | 250 |


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



| Type | Description | Materials | Cyl. bore mm | Weight kg | Order code |
|---|---|-----------|-----------------|--------------|---|
| Pivot bracket with rigid bearing AB7  | Intended for flexible mounting of cylinder. The pivot bracket can be combined with clevis bracket MP2. Pivot bracket: Surface-treated aluminium, black Bearing: Sintered oil-bronze bushing | | 32 | 0,06 | P1C-4KMD P1C-4LMD P1C-4MMD P1C-4NMD P1C-4PMD P1C-4QMD P1C-4RMD |
| | | | 40 | 0,08 | |
| | | | 50 | 0,15 | |
| | | | 63 | 0,20 | |
| | | | 80 | 0,33 | |
| | | | 100 | 0,49 | |
| 125 | 1,02 | | | | |

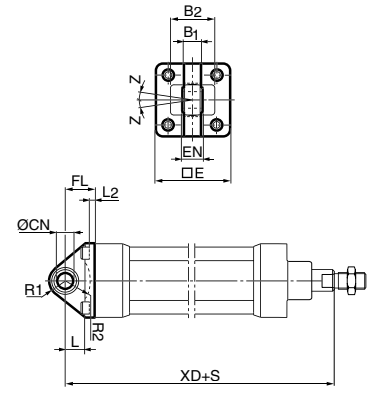
| Cyl. bore mm | CK mm | S5 H9 mm | K1 H13 mm | K2 JS14 mm | G1 JS14 mm | G2 JS14 mm | EM mm | G3 mm | CA JS15 mm | H6 mm | R1 mm |
|--------------|-------|----------|-----------|------------|------------|------------|-------|-------|------------|-------|-------|
| 32 | 10 | 6,6 | 38 | 51 | 21 | 18 |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




| Type | Description | For mounting screws in stainless steel see page 51 | Cyl. bore Ø mm | Weight kg | Order code |
|---|--|--|----------------|-----------|--|
|  Swivel eye bracket MP6 | Intended for use together with clevis bracket GA | | 32 | 0,08 | P1C-4KMSA P1C-4LMSA P1C-4MMSA P1C-4NMSA P1C-4PMSA P1C-4QMSA P1C-4RMSA |
| | Material | | 40 | 0,11 | |
| | Bracket: Surface-treated aluminium, black | | 50 | 0,20 | |
| | Swivel bearing acc. to DIN 648K: Hardened steel | | 63 | 0,27 | |
| | | | 80 | 0,52 | |
| | Supplied complete with mounting screws for attachment to cylinder. | | 100 | 0,72 | |
| | | 125 | 1,53 | | |

| Cyl. bore mm | E mm | B1 mm | B2 mm | EN mm | R1 mm | R2 mm | FL mm | I2 mm | L mm | CN H7 mm | XD* mm | Z ° |
|--------------|------|-------|-------|-------|-------|-------|-------|-------|------|----------|--------|-----|
| 32 | 45 | 10,5 | - | 14 | 16 | - | 22 | 5,5 | 12 | 10 | 142 | 4° |
| 40 | 52 | 12,0 | - | 16 | 18 | - | 25 | 5,5 | 15 | 12 | 160 | 4° |
| 50 | 65 | 15,0 | 51 | 21 | 21 | 19 | 27 | 6,5 | 15 | 16 | 170 | 4° |
| 63 | 75 | 15,0 | - | 21 | 23 | - | 32 | 6,5 | 20 | 16 | 190 | 4° |
| 80 | 95 | 18,0 | - | 25 | 29 | - | 36 | 10,0 | 20 | 20 | 210 | 4° |
| 100 | 115 | 18,0 | - | 25 | 31 | - | 41 | 10,0 | 25 | 20 | 230 | 4° |
| 125 | 140 | 25,0 | - | 37 | 40 | - | 50 | 10,0 | 30 | 30 | 275 | 4° |

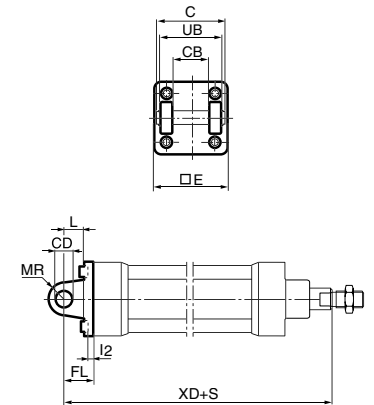
S = Stroke length * Does not apply to cylinders with lock unit




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

| Cyl. bore mm | C mm | E mm | UB mm | CB mm | FL mm | L mm | I2 mm | CD H9 mm | MR mm | XD* mm |
|--------------|------|------|-------|-------|-------|------|-------|----------|-------|--------|
| 32 | 53 | 45 | 45 | 26 | 22 | 13 | 5,5 | 10 | 10 | 142 |
| 40 | 60 | 52 | 52 | 28 | 25 | 16 | 5,5 | 12 | 12 | 160 |
| 50 | 68 | 65 | 60 | 32 | 27 | 16 | 6,5 | 12 | 12 | 170 |
| 63 | 78 | 75 | 70 | 40 | 32 | 21 | 6,5 | 16 | 16 | 190 |
| 80 | 98 | 95 | 90 | 50 | 36 | 22 | 10,0 | 16 | 16 | 210 |
| 100 | 118 | 115 | 110 | 60 | 41 | 27 | 10,0 | 20 | 20 | 230 |
| 125 | 139 | 140 | 130 | 70 | 50 | 30 | 10,0 | 25 | 25 | 275 |

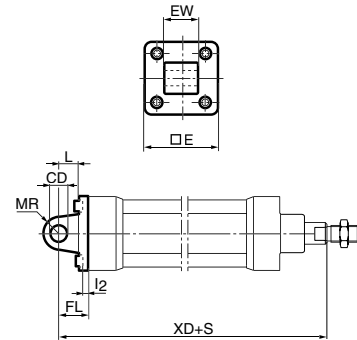
S = Stroke length * Does not apply to cylinders with lock unit




| Type | Description | For mounting screws in stainless steel see page 51 | Cyl. bore Ø mm | Weight kg | Order code |
|---|--|--|----------------|-----------|---|
| Clevis bracket MP4  | Intended for flexible mounting of cylinder. Clevis bracket MP4 can be combined with clevis bracket MP2. Materials Clevis bracket: Surface-treated aluminium, black Mounting screws acc. to DIN 912: Zinc-plated steel 8.8 Supplied complete with mounting screws for attachment to cylinder. | | 32 | 0,09 | P1C-4KME P1C-4LME P1C-4MME P1C-4NME P1C-4PME P1C-4QME P1C-4RME |
| | | | 40 | 0,13 | |
| | | | 50 | 0,17 | |
| | | | 63 | 0,36 | |
| | | | 80 | 0,46 | |
| | | | 100 | 0,83 | |
| | | | 125 | 1,53 | |

| Cyl. bore mm | E mm | EW mm | FL mm | L mm | I2 mm | CD mm | MR mm | XD* mm |
|--------------|------|-------|-------|------|-------|-------|-------|--------|
| 32 | 45 | 26 | 22 | 13 | 5,5 | 10 | 10 | 142 |
| 40 | 52 | 28 | 25 | 16 | 5,5 | 12 | 12 | 160 |
| 50 | 65 | 32 | 27 | 16 | 6,5 | 12 | 12 | 170 |
| 63 | 75 | 40 | 32 | 21 | 6,5 | 16 | 16 | 190 |
| 80 | 95 | 50 | 36 | 22 | 10,0 | 16 | 16 | 210 |
| 100 | 115 | 60 | 41 | 27 | 10,0 | 20 | 20 | 230 |
| 125 | 140 | 70 | 50 | 30 | 10,0 | 25 | 25 | 275 |

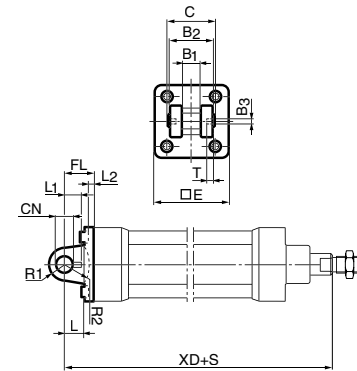
S = Stroke length * Does not apply to cylinders with lock unit




| | | | | | |
|---|---|--|-----|------|--|
| Clevis bracket AB6  | Intended for flexible mounting of cylinder. Clevis bracket GA can be combined with pivot bracket with swivel bearing, swivel eye bracket and swivel rod eye. Materials Clevis bracket: Surface-treated 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. | | 32 | 0,09 | P1C-4KMCA P1C-4LMCA P1C-4MMCA P1C-4NMCA P1C-4PMCA P1C-4QMCA P1C-4RMCA |
| | | | 40 | 0,13 | |
| | | | 50 | 0,17 | |
| | | | 63 | 0,36 | |
| | | | 80 | 0,58 | |
| | | | 100 | 0,89 | |
| | | | 125 | 1,75 | |

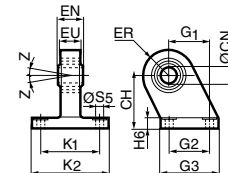
| Cyl. bore mm | C mm | E mm | B2 mm | B1 mm | T mm | B3 mm | R2 mm | L1 mm | FL mm | I2 mm | L mm | CN mm | R1 mm | XD* mm |
|--------------|------|------|-------|-------|------|-------|-------|-------|-------|-------|------|-------|-------|--------|
| 32 | 41 | 45 | 34 | 14 | 3 | 3,3 | 17 | 11,5 | 22 | 5,5 | 12 | 10 | 11 | 142 |
| 40 | 48 | 52 | 40 | 16 | 4 | 4,3 | 20 | 12,0 | 25 | 5,5 | 15 | 12 | 13 | 160 |
| 50 | 54 | 65 | 45 | 21 | 4 | 4,3 | 22 | 14,0 | 27 | 6,5 | 17 | 16 | 18 | 170 |
| 63 | 60 | 75 | 51 | 21 | 4 | 4,3 | 25 | 14,0 | 32 | 6,5 | 20 | 16 | 18 | 190 |
| 80 | 75 | 95 | 65 | 25 | 4 | 4,3 | 30 | 16,0 | 36 | 10,0 | 20 | 20 | 22 | 210 |
| 100 | 85 | 115 | 75 | 25 | 4 | 4,3 | 32 | 16,0 | 41 | 10,0 | 25 | 20 | 22 | 230 |
| 125 | 110 | 140 | 97 | 37 | 6 | 6,3 | 42 | 24,0 | 50 | 10,0 | 30 | 30 | 30 | 275 |


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



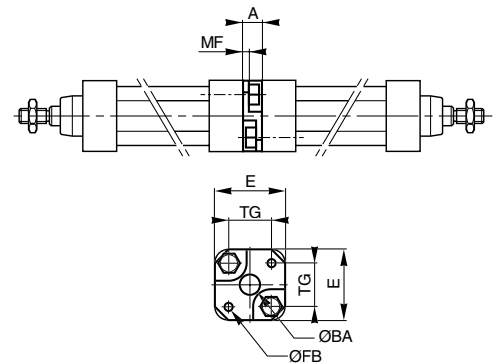
| Type | Description | For mounting screws in stainless steel see page 51 | Cyl. bore Ø mm | Weight kg | Order code |
|---|---|--|----------------|-----------|---|
| Pivot bracket with swivel bearing CS7  | Intended for use together with clevis bracket GA. | | 32 | 0,18 | P1C-4KMA P1C-4LMA P1C-4MMA P1C-4NMA P1C-4PMA P1C-4QMA P1C-4RMA |
| | Material | | 40 | 0,25 | |
| | Pivot bracket: Surface-treated steel, black | | 50 | 0,47 | |
| | Swivel bearing acc. to DIN 648K: Hardened steel | | 63 | 0,57 | |
| | | | 80 | 1,05 | |
| | | | 100 | 1,42 | |
| | | | 125 | 3,10 | |


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



| 3 and 4 positions flange JP1 | Mounting kit for back to back mounted cylinders, 3 and 4 position cylinders. | | Cyl. bore mm | Weight kg | Order code |
|--|--|--|--------------|-----------|--|
|  | Material: | | 32 | 0,060 | P1E-6KB0 P1E-6LB0 P1E-6MB0 P1E-6NB0 P1E-6PB0 P1E-6QB0 |
| | Mounting: Aluminium | | 40 | 0,078 | |
| | Mounting screws: Zinc-plated steel 8.8 | | 50 | 0,162 | |
| | | | 63 | 0,194 | |
| | | | 80 | 0,450 | |
| | | | 100 | 0,672 | |

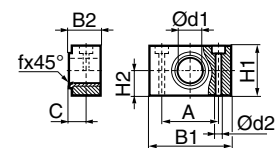
| Cyl. bore mm | E mm | TG mm | ØFB mm | MF mm | A mm | ØBA mm |
|--------------|------|-------|--------|-------|------|--------|
| 32 | 50 | 32,5 | 6,5 | 5 | 16 | 30 |
| 40 | 60 | 38,0 | 6,5 | 5 | 16 | 35 |
| 50 | 66 | 46,5 | 8,5 | 6 | 20 | 40 |
| 63 | 80 | 56,5 | 8,5 | 6 | 20 | 45 |
| 80 | 100 | 72,0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



| Pivot brackets AT4 for MT* trunnion | Intended for use together with centre trunnion MT4. | | Cyl. bore mm | Weight kg | Order code |
|---|---|--|--------------|-----------|--|
|  | Material | | 32 | 0,04* | 9301054261 9301054262 9301054262 9301054262 9301054264 9301054264 9301054266 9301054266 |
| | Pivot bracket: Surface-treated aluminium | | 40 | 0,07* | |
| | Bearing acc. to DIN 1850 C: Sintered oil-bronze bushing | | 50 | 0,07* | |
| | | | 63 | 0,12* | |
| | | | 80 | 0,12* | |
| | | | 100 | 0,21* | |
| | | | 125 | 0,21* | |

* Weight per item.

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



| Type | Description | For mounting screws in stainless steel see page 51 | Cyl. bore Ø mm | Weight kg | Order code |
|--------------------------------------|--|--|----------------|-----------|---------------------------|
| Centre trunnion MT4 for P1D-S | Intended for articulated mounting of cylinder. This mounting is available for the P1D Standard and for the tie-rod design of P1D. The trunnion is factory-fitted in the centre of the cylinder or at an optional location specified by the XV-measure – see the order code key. Combined with pivot bracket for MT4. Material: Trunnion: zinc plated steel | | 32 | 0,13 | See order code key |
| | | | 40 | 0,31 | |
| | | | 50 | 0,37 | |
| | | | 63 | 0,69 | |
| | | | 80 | 0,89 | |
| | | | 100 | 1,58 | |
| 125 | 2,60 | | | | |

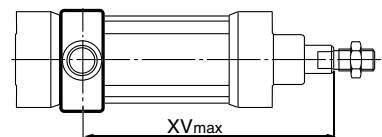
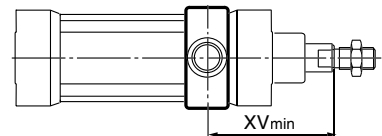
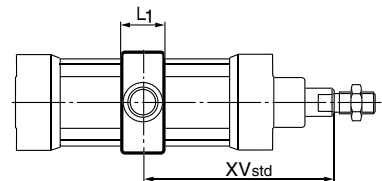
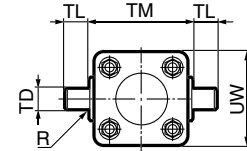


Centre trunnion MT4 for P1D-T

Trunnion centred
The centre trunnion for the P1D-S and P1D-T is ordered with letter D in position 17 (no dimension specified in positions 18-20). See the order code key.

Trunnion with optional location
The centre trunnion for the P1D-S and P1D-T is ordered with letter G in position 17 and desired XV-measure (3-digit measure in mm) in positions 18-20. See the order code key.

Trunnion loose
P1D-S can also be ordered with the centre trunnion loosely fitted to the cylinder (not fixed in position). This allows the position to be established at the time of installation.
Ordered with letter G in position 17 and 000 in positions 18-20. Please refer to the order code key.



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

$XV_{std} = X1 + \text{Stroke length}/2$, $XV_{max} = X2 + \text{Stroke length}$

Flange trunnion 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. At your choice, you can order a complete cylinder with factory-fitted flange mounted trunnion – see the order code key.
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

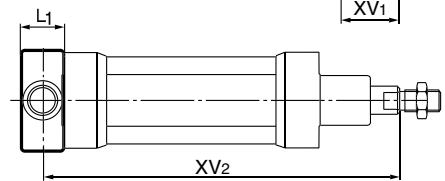
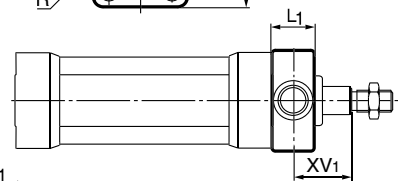
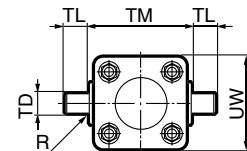



- P1D-4KMYF**
- P1D-4LMYF**
- P1D-4MMYF**
- P1D-4NMYF**
- P1D-4PMYF**
- P1D-4QMYF**


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

$XV_2 = X + \text{Stroke length}$ * Does not apply to cylinders with lock unit,

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



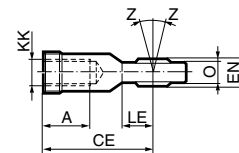
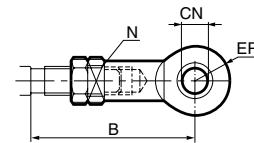
| Type | Description | Cyl. bore Ø mm | Weight kg | Order code |
|---|---|-------------------|--------------|---|
|  | Swivel rod eye for articulated mounting of cylinder. Swivel rod eye can be combined with clevis bracket GA. Maintenance-free. Materials Swivel rod eye: Zinc-plated steel Swivel bearing according to DIN 648K: Hardened steel | 32 | 0,08 | P1C-4KRS P1C-4LRS P1C-4MRS P1C-4MRS P1C-4PRS P1C-4PRS P1C-4RRS |
| | | 40 | 0,12 | |
| | | 50 | 0,25 | |
| | | 63 | 0,25 | |
| | | 80 | 0,46 | |
| | | 100 | 0,46 | |
| 125 | 1,28 | | | |


| | | | | |
|---|--|-----|------|---|
|  | Stainless-steel swivel rod eye for articulated mounting of cylinder. Swivel rod eye can be combined with clevis bracket GA. Maintenance-free. Materials Swivel rod eye: Stainless steel Swivel bearing according to DIN 648K: Stainless steel | 32 | 0,08 | P1S-4JRT P1S-4LRT P1S-4MRT P1S-4MRT P1S-4PRT P1S-4PRT P1S-4RRT |
| | | 40 | 0,12 | |
| | | 50 | 0,25 | |
| | | 63 | 0,25 | |
| | | 80 | 0,46 | |
| | | 100 | 0,46 | |
| 125 | 1,28 | | | |


Use stainless steel nut with stainless steel swivel rod eye.

According to ISO 8139

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



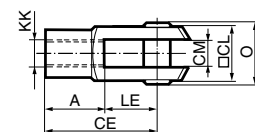
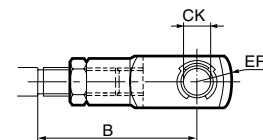
| | | | | |
|---|---|-----|------|---|
|  | Clevis for articulated mounting of cylinder. Material Clevis, clip: Galvanized steel Pin: Hardened steel | 32 | 0,09 | P1C-4KRC P1C-4LRC P1C-4MRC P1C-4MRC P1C-4PRC P1C-4PRC P1C-4RRC |
| | | 40 | 0,15 | |
| | | 50 | 0,35 | |
| | | 63 | 0,35 | |
| | | 80 | 0,75 | |
| | | 100 | 0,75 | |
| 125 | 2,10 | | | |


| | | | | |
|---|---|-----|------|---|
|  | Stainless-steel clevis for articulated mounting of cylinder. Material Clevis: Stainless steel Pin: Stainless steel Circlips according to DIN 471: Stainless steel | 32 | 0,09 | P1S-4JRD P1S-4LRD P1S-4MRD P1S-4MRD P1S-4PRD P1S-4PRD P1S-4RRD |
| | | 40 | 0,15 | |
| | | 50 | 0,35 | |
| | | 63 | 0,35 | |
| | | 80 | 0,75 | |
| | | 100 | 0,75 | |
| 125 | 2,10 | | | |

Use stainless steel nut with stainless steel swivel rod eye.

According to ISO 8140

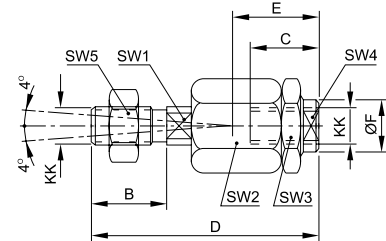
| Cyl. bore mm | A mm | B min mm | B max mm | CE mm | CK h11/E9 mm | CL mm | CM mm | ER mm | KK | LE mm | O mm |
|-----------------|---------|----------------|----------------|----------|--------------------|----------|----------|----------|----------|----------|---------|
| 32 | 20 | 45,0 | 52 | 40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





| Type | Description | Cyl. bore Ø mm | Weight kg | Order code |
|---|--|-------------------|--------------|---|
| Flexo coupling PM5  | Flexo coupling for articulated mounting of piston rod. Flexo fitting is intended to take up axial angle errors within a range of ±4°. Material Flexo coupling, nut: Zinc-plated steel | 32 | 0,21 | P1C-4KRF P1C-4LRF P1C-4MRF P1C-4MRF P1C-4PRF P1C-4PRF P1C-4RRF |
| | | 40 | 0,22 | |
| | | 50 | 0,67 | |
| | | 63 | 0,67 | |
| | | 80 | 0,72 | |
| | | 100 | 0,72 | |
| | | 125 | 1,80 | |


Supplied complete with galvanized adjustment nut.

| Cyl. bore mm | KK mm | B mm | C mm | D mm | E mm | ØF mm | SW1 mm | SW2 mm | SW3 mm | SW4 mm | SW5 mm |
|-----------------|----------|---------|---------|---------|---------|----------|-----------|-----------|-----------|-----------|-----------|
| 32 | M10x1.25 | 20 | 23 | 73 | 31 | 21 | 12 | 30 | 30 | 19 | 17 |
| 40 | M12x1.25 | 24 | 23 | 77 | 31 | 21 | 12 | 30 | 30 | 19 | 19 |
| 50 | M16x1.5 | 32 | 32 | 108 | 45 | 33.5 | 19 | 41 | 41 | 30 | 24 |
| 63 | M16x1.5 | 32 | 32 | 108 | 45 | 33.5 | 19 | 41 | 41 | 30 | 24 |
| 80 | M20x1.5 | 40 | 42 | 122 | 56 | 33.5 | 19 | 41 | 41 | 30 | 30 |
| 100 | M20x1.5 | 40 | 42 | 122 | 56 | 33.5 | 19 | 41 | 41 | 30 | 30 |
| 125 | M27x2 | 54 | 48 | 147 | 51 | 39 | 24 | 55 | 55 | 32 | 41 |



| | | | | |
|---|--|-----|-------|--|
| Nut MR9  | Intended for fixed mounting of accessories to the piston rod. Material: Zinc-plated steel All P1D cylinders are delivered with a zinc-plated steel piston rod nut, except P1D Ultra Clean, which is delivered with a stainless steel piston rod nut instead. | 32 | 0,007 | P14-4KRPZ P14-4LRPZ P14-4MRPZ P14-4MRPZ P14-4PRPZ P14-4PRPZ P14-4RRPZ |
| | | 40 | 0,010 | |
| | | 50 | 0,021 | |
| | | 63 | 0,021 | |
| | | 80 | 0,040 | |
| | | 100 | 0,040 | |
| | | 125 | 0,100 | |

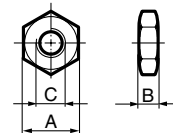
| | | | | |
|--|---|-----|-------|--|
| Stainless steel nut MR9  | Intended for fixed mounting of accessories to the piston rod. Material: Stainless steel A2 All P1D cylinders are delivered with a zinc-plated steel piston rod nut, except P1D Ultra Clean, which is delivered with a stainless steel piston rod nut instead. | 32 | 0,007 | P14-4KRPS P14-4LRPS P14-4MRPS P14-4MRPS P14-4PRPS P14-4PRPS P14-4RRPS |
| | | 40 | 0,010 | |
| | | 50 | 0,021 | |
| | | 63 | 0,021 | |
| | | 80 | 0,040 | |
| | | 100 | 0,040 | |
| | | 125 | 0,100 | |




| | | | | |
|---|--|-----|-------|--|
| 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 | 32 | 0,007 | P14-4KRPX P14-4LRPX P14-4MRPX P14-4MRPX P14-4PRPX P14-4PRPX P14-4RRPX |
| | | 40 | 0,010 | |
| | | 50 | 0,021 | |
| | | 63 | 0,021 | |
| | | 80 | 0,040 | |
| | | 100 | 0,040 | |
| | | 125 | 0,100 | |

According to DIN 439 B

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

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. Material: According to DIN 912, Stainless steel, A2 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. Material: According to DIN 6912, Stainless steel, A2 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 |
| Sealing plugs for end cover screws  | Set of 4 threaded plugs to be fitted in unused end cover screws. A rubber gasket is supplied with every plug. The seal off function is equal to IP67. The plugs can be used for all P1D cylinders to avoid collecting dirt and fluids in the end cover screw recesses. Material: Plug Polyamid PA Gasket Nitrile rubber 4 pcs per pack | 32 | 0,01 | 460104801 |
| | | 40 | 0,01 | 460104801 |
| | | 50 | 0,02 | 460104802 |
| | | 63 | 0,02 | 460104802 |
| | | 80 | 0,02 | 460104803 |
| | | 100 | 0,02 | 460104803 |
| | | 125 | 0,03 | 460104804 |

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

The P1D sensors can easily be installed from the side in the sensor groove, at any position along the piston stroke. The sensors are completely recessed and thus mechanically protected. Choose between electronic or reed sensors and several cable lengths and 8 mm and M12 connectors. The same standard sensors are used for all P1D versions.



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 10-18 V DC, ATEX sensor |
| Ripple | max 10% |
| Voltage drop | max 2,5 V |
| Load current | max 100 mA |
| Internal consumption | max 10 mA |
| Actuating distance | min 9 mm |
| Hysteresis | max 1,5 mm |
| Repeatability accuracy | max 0,2 mm |
| On/off switching frequency | max 5 kHz |
| On switching time | max 2 ms |
| Off switching time | max 2 ms |
| Encapsulation | IP 67 (EN 60529) |
| Temperature range | -25 °C to +75 °C -20 °C to +45 °C, ATEX sensor |
| Indication | LED, yellow |
| Material housing | PA 12 |
| Material screw | Stainless steel |
| Cable | PVC or PUR 3x0.25 mm ² see order code respectively |

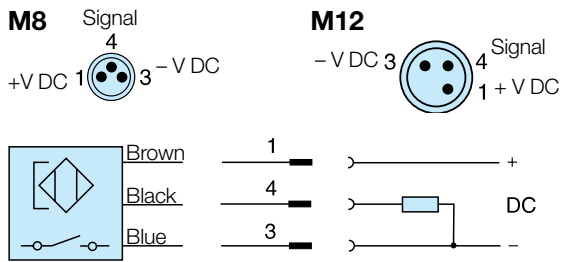
Reed sensors

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

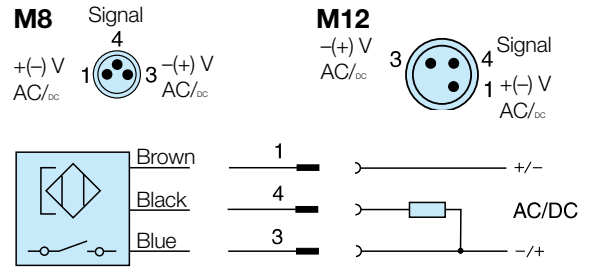
Technical data

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

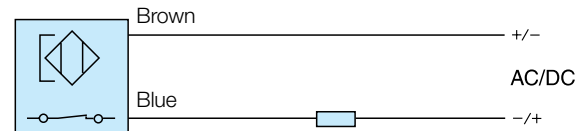
Electronic sensors



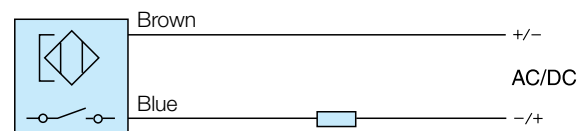
Reed sensors



P8S-GCFPX

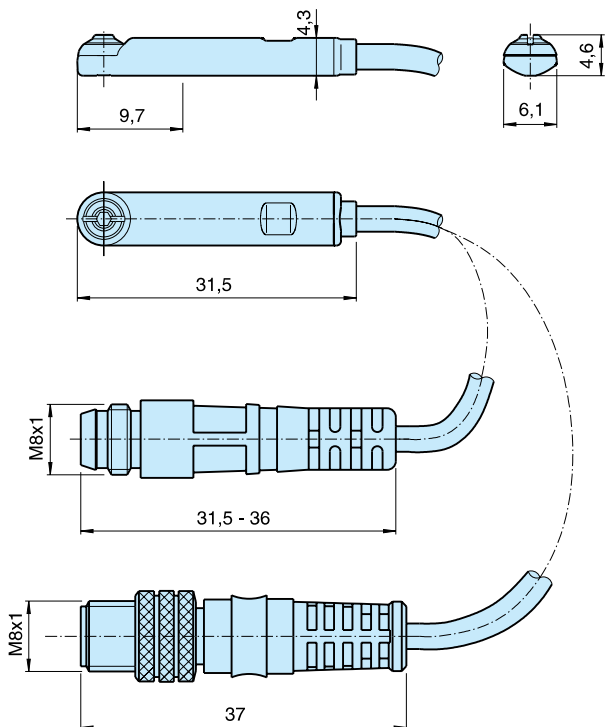


P8S-GRFLX / P8S-GRFLX2

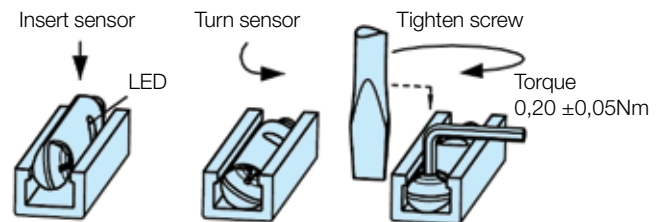


Dimensions (mm)

Sensors



Sensor Installation



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 |



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.



| 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.

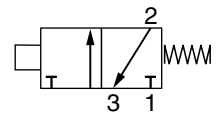
To avoid interference, there must be a minimum spacing of 15 mm to steel details.

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.

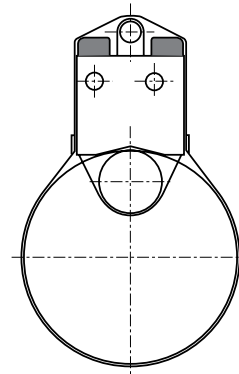
Technical data:

- 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 NI 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)

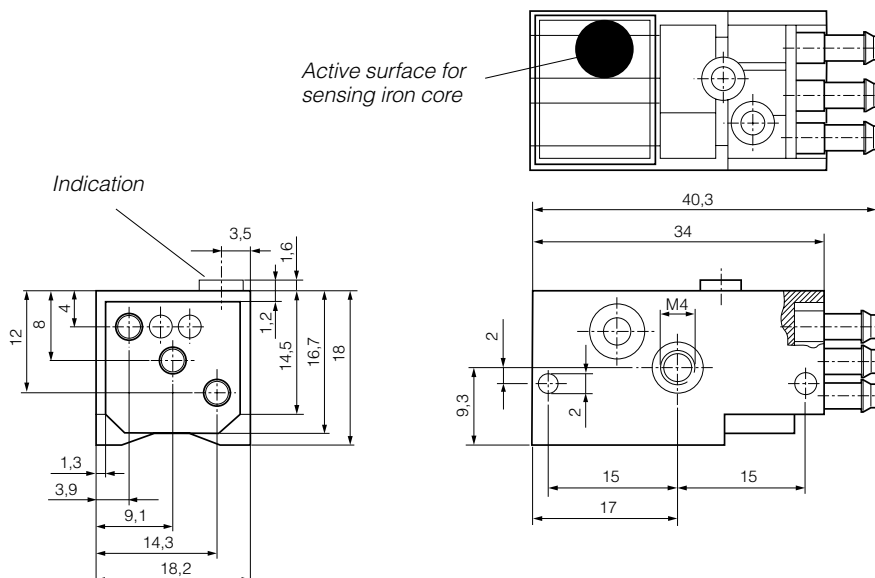


| Description | Weight kg | Order code |
|------------------|-----------|-----------------|
| Pneumatic sensor | 0,02 | P8S-A34X |
| Cylinder fixing | 0,01 | P8S-AMA1 |

Cylinder fixing



Dimensions (mm)



Order Key Code (* 20 digits only for options)

15 digit order code

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

20 digit order code *

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

5 Valid only for P1D-S***MS-****, see ATEX information

6-7-8

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

6 For 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 | | | | | | | | |
|---|---|-------------------------------|-------------|----------------------------|-------------|-------------|----------------------------|-------------|--|
| <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="background-color: #FFD700;">Standard</th><th style="background-color: #FFD700;">Stainless steel³⁾</th></tr> <tr> <td style="text-align: center;">Std scraper</td><td style="text-align: center;">HDPE scraper⁴⁾</td></tr> <tr> <td style="text-align: center;">FPM scraper</td><td style="text-align: center;">Std scraper</td></tr> <tr> <td style="text-align: center;">HDPE scraper⁴⁾</td><td style="text-align: center;">FPM scraper</td></tr> </table> | Standard | Stainless steel ³⁾ | Std scraper | HDPE scraper ⁴⁾ | FPM scraper | Std scraper | HDPE scraper ⁴⁾ | FPM scraper | |
| Standard | Stainless steel ³⁾ | | | | | | | | |
| Std scraper | HDPE scraper ⁴⁾ | | | | | | | | |
| FPM scraper | Std scraper | | | | | | | | |
| HDPE scraper ⁴⁾ | FPM scraper | | | | | | | | |
| M D V A H W | Double-acting | | | | | | | | |
| F E B G Y Z | Double-acting through rod | | | | | | | | |
| 2 6 8 - - - | 3 and 4 position cylinders (Only for Tie Rod) | | | | | | | | |
| C K L - - - | Tandem (Only for Tie Rod) | | | | | | | | |

10

| Piston rod material | Seals | | | | | | | | |
|--|-----------------------|-----------------------|---------------------------------|---------------------------------|----------|----------|----------|----------|--|
| <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">Stainless steel</td><td style="text-align: center;">Chromium-plated steel</td><td style="text-align: center;">Acid-proof steel</td><td style="text-align: center;">Chromium plated stainless steel</td></tr> <tr> <td style="text-align: center;">S</td><td style="text-align: center;">C</td><td style="text-align: center;">M</td><td style="text-align: center;">R</td></tr> </table> | Stainless steel | Chromium-plated steel | Acid-proof steel | Chromium plated stainless steel | S | C | M | R | |
| Stainless steel | Chromium-plated steel | Acid-proof steel | Chromium plated stainless steel | | | | | | |
| S | C | M | R | | | | | | |
| Standard temperature -20°C to +80°C | | | | | | | | | |

S and M not in combination with rod lock device

11

| Options |
|--|
| - G threads |
| 0 Air actuated (P1D-V) |
| 1 Electrically actuated (P1D-V) |
| N Ultra Clean design only |
| T 2 T slots on top Pro Clean design only |
| Y 2 T slots on right Pro Clean design only |
| W 2 T slots on bottom Pro Clean design only |
| V 2 T slots on left Pro Clean design only |

For P1D-C Pro Clean version, cylinder is showed piston rod in the front and air ports on the top for choosing the right face for the position of the 2 T slots

12-13-14-15

| Stroke (mm) e.g. 0100 = 100 mm |
|---------------------------------------|
| Optional stroke lengths up to 2800 mm |

16

| Option |
|---|
| N No mounting or used for P1D-T 3 and 4 position cylinders |

17-18-19-20

| Stroke (mm) e.g. 0100 = 100 mm |
|--|
| The longest stroke in a P1D-T 3 and 4 position cylinders |

In accordance with digit 16

17-18-19-20

| Centre trunnion ^{5) 6)} | | |
|----------------------------------|-----------|---|
| 90° | 0° | See page 48 for orientation details |
| D | 6 | Centre trunnion MT4, mid position NNN digits 18-19-20 |
| G | 7 | Trunnion MT4, optional pos. XV-meas. digits 18-19-20 |

19

| Piston rod thread ⁷⁾ | |
|---------------------------------|----------------------------|
| N | According to ISO-standard |
| 6 | Internal piston rod thread |

20

| Valve function | |
|---------------------------------------|--|
| Electrically actuated internal supply | |
| F | Elec-Elec, 5/2 |
| H | Elec-Spring, 5/2 |
| K | Spring-Elec, 5/2 ⁸⁾ |
| M | Elec-Elec, 5/3, closed centre position |
| Q | Elec-Elec, 5/3, vented centre |
| S | Elec-Elec, 5/3, pressurised centre |

Information notes

- 1) P1D Ultra Clean without sensor function (No magnet in). P1D-C Pro Clean with sensor function (2 T slots on one face)
- 2) Only for piston rod material type C and R.
- 3) If stainless steel end cover screws are selected, the piston rod nut is also supplied in stainless steel.
- 4) For operation with dry piston rod. Intended for variants P1D-S, P1D-C, P1D-T and P1D-V.
- 5) Shaft or pivots square to or in line with the cylinder air ports.
- 6) Not for the P1D-C Pro Clean version. P1D-C Ultra Clean in bore sizes 32 to 80 mm and strokes up to 700 mm. Longer stroke length on request. Shaft square to 90° with ports only.
- 7) Code N for piston rod thread according to the ISO-standard. Other threads on request.
- 8) Piston in extended position with unactuated valve.

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 mm | P1D cylinder version | | | |
|----------------|--|--|---|--|
| | Standard ** P1D-S, P1D-T, P1D-C, P1D-V, P1D-F, P1D-H | High Temp P1D-S, P1D-T, P1D-C, P1D-V and P1D-F | Low Temp P1D-S, P1D-T, P1D-C, P1D-V and P1D-F | Hydraulic P1D-S, P1D-T, P1D-C, P1D-V and P1D-F |
| 32 | P1D-6KRN | P1D-6KRF * | P1D-6KRL * | P1D-6KRH * |
| 40 | P1D-6LRN | P1D-6LRF | P1D-6LRL | P1D-6LRH |
| 50 | P1D-6MRN | P1D-6MRF * | P1D-6MRL * | P1D-6MRH * |
| 63 | P1D-6NRN | P1D-6NRF | P1D-6NRL | P1D-6NRH |
| 80 | P1D-6PRN | P1D-6PRF | P1D-6PRL | P1D-6PRH |
| 100 | P1D-6QRN | P1D-6QRF | P1D-6QRL | P1D-6QRH |
| 125 | P1D-6RRN | P1D-6RRF | P1D-6RRL | P1D-6RRH |

| Cyl.bore mm | P1D cylinder version | | | |
|----------------|---|---|--|---|
| | Standard temperature with FPM scraper ring * P1D-S, P1D-T, P1D-C, P1D-V, P1D-F | Standard temperature with HDPE scraper ring * P1D-S, P1D-T, P1D-C, P1D-V and P1D-F | Standard temperature with metal scraper ring * P1D-S, P1D-T, P1D-C, P1D-V and P1D-F | Standard temperature with piston rod locking P1D-L, P1D-D, P1D-4 |
| 32 | P1D-6KRV | P1D-6KRD | P1D-6KRQ | P1D-6KRNL |
| 40 | P1D-6LRV | P1D-6LRD | P1D-6LRQ | P1D-6LRNL |
| 50 | P1D-6MRV | P1D-6MRD | P1D-6MRQ | P1D-6MRNL |
| 63 | P1D-6NRV | P1D-6NRD | P1D-6NRQ | P1D-6NRNL |
| 80 | P1D-6PRV | P1D-6PRD | P1D-6PRQ | P1D-6PRNL |
| 100 | P1D-6QRV | P1D-6QRD | P1D-6QRQ | P1D-6QRNL |
| 125 | P1D-6RRV | P1D-6RRD | P1D-6RRQ | P1D-6RRNL |







| Cyl.bore mm | P1D cylinder version |
|----------------|---|
| | Standard temperature with through piston rod |
| 32 | P1D-6KRNF |
| 40 | P1D-6LRNF |
| 50 | P1D-6MRNF |
| 63 | P1D-6NRNF |
| 80 | P1D-6PRNF |
| 100 | P1D-6QRNF |
| 125 | P1D-6RRNF |

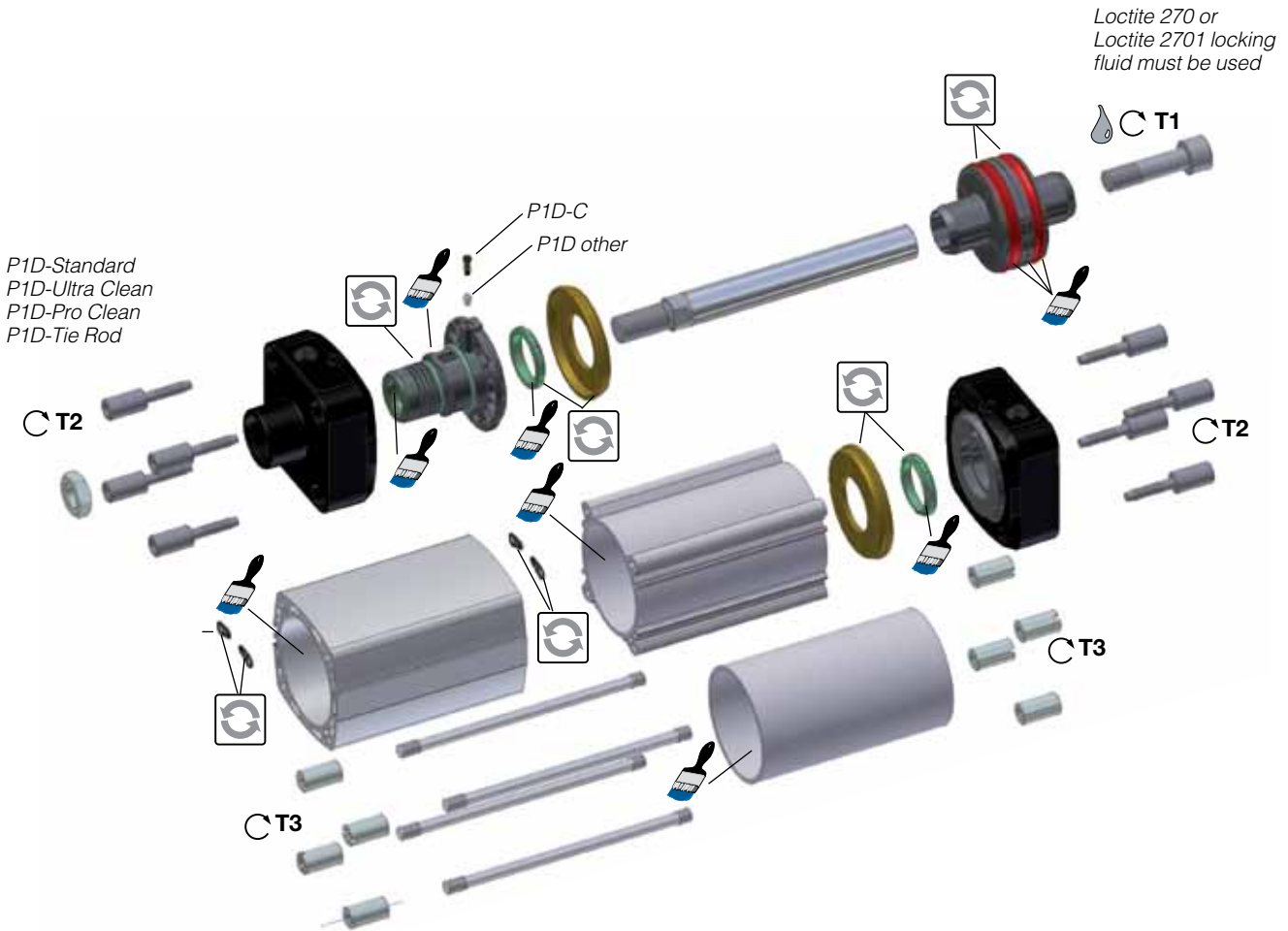
** Not for P1D-B cylinders
 * Not for P1D-X cylinders







please refer to the relevant technical catalogues.

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

P1D Seal kits

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



| Cyl.-dia mm | Plastic piston T1 | Alu. piston T1 |  NV mm |  T2 Nm |  NV mm |  T3 Nm |  NV mm |  NV mm |
|----------------|-------------------------|----------------------|---|---|---|---|---|---|
| | Nm | Nm | | | | | | |
| 32 | 4,5 | 15 | 6 | 8 | 6 | 6 | 6 | |
| 40 | 11 | 30 | 8 | 8 | 6 | 6 | 6 | |
| 50 | 20 | 40 | 10 | 20 | 8 | 11 | 8 | |
| 63 | 20 | 40 | 10 | 20 | 8 | 11 | 8 | |
| 80 | 40 | 120 | 14 | 20 | 6 | 20 | | 3x16 |
| 100 | 120 | 120 | 14 | 20 | 6 | 20 | | 3x16 |
| 125 | 120 | 120 | 14 | 70 | 8 | 40 | | 4x18 |

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 |

| Piston rod* |
|--|
| D Standard external thread |
| G Standard internal thread |
| H Through rod ext. threads |
| J Through rod int. threads |
| F Dynamic locking device ext. |
| K Dynamic locking device int. |
| E Static locking device ext. |
| C Static locking device int. |
| Cylinder barrel |
| A Standard profile |
| B Cylindrical (for tie rod) |
| N Smooth profile (without T slots) |
| M Smooth profile (2 open T slots on one side) |
| Tie rod |
| T Tie rod (order 4 for a cylinder) |

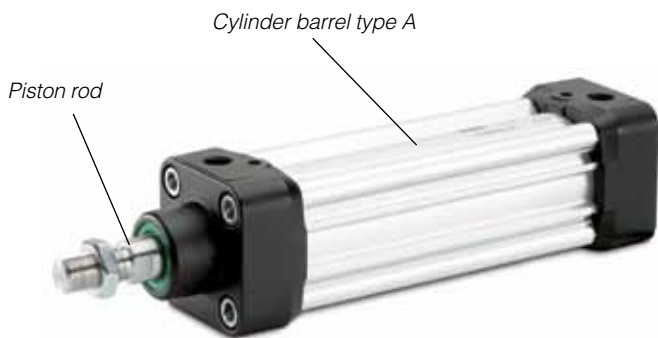
| Piston rod |
|---|
| G Stainless steel |
| H Hard-chromium plated |
| J Acid-resistant steel |
| K Chromium plated stainless |
| Cylinder barrel |
| A Aluminium |
| Tie rods |
| V Stainless steel (order 4 for a cylinder) |

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

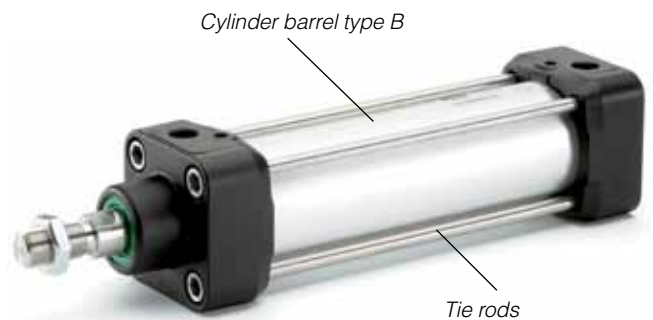
| Stroke** (mm) e.g. 0100 = 100 mm |
|----------------------------------|
| Any stroke up to max. 2800 mm. |

** 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.

P1D with standard profile



P1D with tie rods



P1D without T slots

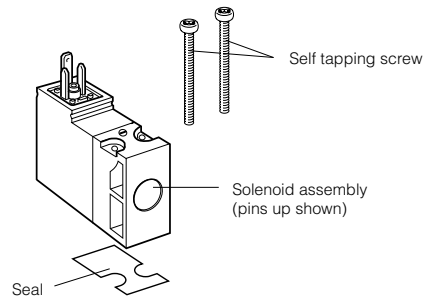


P1D with 2 open T slots



15mm Solenoid Operators

Electrical connection EN175301-803 C/ISO15217 (Ex DIN 43650C)



Solenoids 15 mm NC, standard

| | Voltage | Weight Kg | Order code Without manual override | Weight Kg | Order code Override, blue, non locking flush | Weight Kg | Order code Override, yellow, locking flush |
|--|-------------------------------|--------------|--|--------------|---|--------------|---|
| | 12 VDC | 0,038 | P2E-KV32B0 | 0,038 | P2E-KV32B1 | 0,038 | P2E-KV32B2 |
| | 24 VDC | 0,038 | P2E-KV32C0 | 0,038 | P2E-KV32C1 | 0,038 | P2E-KV32C2 |
| | 48 VDC | 0,038 | P2E-KV32D0 | 0,038 | P2E-KV32D1 | 0,038 | P2E-KV32D2 |
| | 24 VAC 50Hz | 0,038 | P2E-KV31C0 | 0,038 | P2E-KV31C1 | 0,038 | P2E-KV31C2 |
| | 48 VAC 50/60Hz | 0,038 | P2E-KV34D0 | 0,038 | P2E-KV34D1 | 0,038 | P2E-KV34D2 |
| | 115 VAC 50Hz/ 120 VAC 60Hz | 0,038 | P2E-KV31F0 | 0,038 | P2E-KV31F1 | 0,038 | P2E-KV31F2 |
| | 230 VAC 50Hz/ 240 VAC 60Hz | 0,038 | P2E-KV31J0 | 0,038 | P2E-KV31J1 | 0,038 | P2E-KV31J2 |
| | | | | | | | |
| | Voltage | Weight Kg | Order code Without manual override | Weight Kg | Order code Override extended, non locking flush | Weight Kg | Order code Override extended, locking flush |
| | 24 VDC | 0,038 | P2E-KV32C3 | 0,038 | P2E-KV32C4 | 0,038 | P2E-KV32C5 |
| | 24 VAC 50Hz | 0,038 | P2E-KV31C3 | 0,038 | P2E-KV31C4 | 0,038 | P2E-KV31C5 |
| | | | | | | | |

Solenoids 15 mm NC, mobile

(Note! Mounting screws included in basic valve)

| | Voltage | Weight Kg | Order code Without manual override | Weight Kg | Order code Override, blue, non locking flush |
|--|----------|--------------|--|--------------|--|
| | 12 VDC | 0,038 | P2E-MV35B0 | 0,038 | P2E-MV35B1 |
| | 24 VDC | 0,038 | P2E-MV35C0 | 0,038 | P2E-MV35C1 |
| | 37,5 VDC | 0,038 | P2E-MV35W0 | 0,038 | P2E-MV35W1 |
| | 48 VDC | 0,038 | P2E-MV35D0 | 0,038 | P2E-MV35D1 |
| | 72 VDC | 0,038 | P2E-MV35T0 | 0,038 | P2E-MV35T1 |
| | 78 VDC | 0,038 | P2E-MV35Y0 | 0,038 | P2E-MV35Y1 |
| | 96 VDC | 0,038 | P2E-MV35V0 | 0,038 | P2E-MV35V1 |
| | 110 VDC | 0,038 | P2E-MV35E0 | 0,038 | P2E-MV35E1 |

Solenoid Connectors / Cable Plugs EN175301-803

| | Description | Order code 15mm Form C/ISO15217 |
|--|---|---------------------------------------|
| With large headed screw suitable for mounting in inaccessible or recess position | Standard IP65 | P8C-C |
| | 24V DC LED and protection IP65 | P8C-C26C |
| | 110V AC LED and protection IP65 | P8C-C21E |
| With standard screw | Standard IP65 without flying lead | P8C-D |
| | With LED and protection 24V AC/DC | P8C-D26C |
| | With LED and protection 110V AC/DC | P8C-D21E |
| With cable | Standard with 2m cable IP65 | P8L-C2 |
| | Standard with 5m cable IP65 | P8L-C5 |
| | 24V AC/DC, 2m cable LED and protection IP65 | P8L-C226C |
| | 24V AC/DC, 5m cable LED and protection IP65 | P8L-C526C |
| | 24V AC/DC, 10m cable LED and protection IP65 | P8L-CA26C |
| | 110V AC/DC, 2m cable LED and protection IP65 | P8L-C221E |
| | 110V AC/DC, 5m cable LED and protection IP65 | P8L-C521E |

Air Reservoirs

The Air Reservoirs is produced by a cylinder tube and two standard rear end covers. The reservoirs is kept together with standard end cover screws and sealed with standard static end cover seals. It's available in two versions, one with foot bracket and one without.

Material specification

Body extrusion: Natural colour, anodised aluminium
 End covers: Black anodised aluminium
 End cover screws: Zinc plated steel 8.8.
 Seals: PUR

Operation data
 Working pressure: Max 10 bar,
 Working Temperature: Max 80°C

Important
 Pressure Equipment Directive.
 According (PED) to the directive 97/23/EC, for uncertified pressure vessels: Max Working pressure x Volume maximized to 50 Bar x Litre, i.e. max 10 bar and 5 litres volume.
 In accordance we therefore maximized the volume to max 5 litres

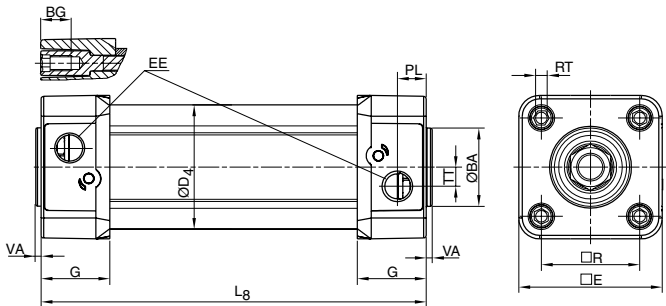


Order codes

| Volume cm ³ | Without foot bracket. | With foot bracket |
|------------------------|------------------------|------------------------|
| 75 | P1DVS032MA-0050 | P1DVS032MB-0050 |
| 280 | P1DVS050MA-0100 | P1DVS050MB-0100 |
| 480 | P1DVS050MA-0200 | P1DVS050MB-0200 |
| 1030 | P1DVS080MA-0160 | P1DVS080MB-0160 |
| 1870 | P1DVS080MA-0320 | P1DVS080MB-0320 |
| 3090 | P1DVS125MA-0200 | P1DVS125MB-0200 |
| 4680 | P1DVS125MA-0320 | P1DVS125MB-0320 |

Using of Air Reservoirs

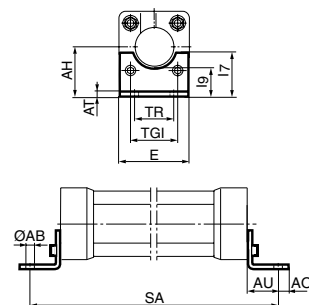
Air reservoirs are used, e.g. together with throttle valves to achieve a timer function in a pneumatic system. The delay of time will be varies by changing the throttle valve and by the size of air reservoir.
 With a well functional throttle valve and a suitable air reservoir it would be possible to achieve a accuracy of ± 5%..
 The reservoir is also used to equal pressure various into the system and to handling short extreme air consumptions without functional disorders.
 The air reservoirs could also be used together with check valve in order to retain a pressure which is essential, for example safety reasons.



Dimensions (mm)

| Order codes | BA | BG | D4 | E | EE | G | L8 | PL | R | RT | TT | VA |
|-----------------|----|----|-------|-------|------|------|-----|------|-------|-----|------|-----|
| | mm | mm | mm | mm | mm | mm | mm | mm | mm | | mm | mm |
| P1DVS032MA-0050 | 30 | 16 | 45,0 | 50,0 | G1/8 | 28,5 | 144 | 13,0 | 32,5 | M6 | 4,5 | 3,5 |
| P1DVS050MA-0100 | 40 | 16 | 60,7 | 69,4 | G1/4 | 33,5 | 206 | 14,0 | 46,5 | M8 | 7,5 | 3,5 |
| P1DVS050MA-0200 | 40 | 16 | 60,7 | 69,4 | G1/4 | 33,5 | 306 | 14,0 | 46,5 | M8 | 7,5 | 3,5 |
| P1DVS080MA-0160 | 45 | 17 | 86,7 | 99,4 | G3/8 | 39,5 | 288 | 16,0 | 72,0 | M10 | 15,0 | 3,5 |
| P1DVS080MA-0320 | 45 | 17 | 86,7 | 99,4 | G3/8 | 39,5 | 458 | 16,0 | 72,0 | M10 | 15,0 | 3,5 |
| P1DVS125MA-0200 | 60 | 20 | 134,0 | 139,0 | G1/2 | 51,0 | 360 | 28,0 | 110,0 | M12 | 17,5 | 5,5 |
| P1DVS125MA-0320 | 60 | 20 | 134,0 | 139,0 | G1/2 | 51,0 | 480 | 28,0 | 110,0 | M12 | 17,5 | 5,5 |

| Order codes | AB | TG1 | E | TR | AO | AU | AH | I7 | AT | I9 | SA |
|-----------------|----|-------|-----|----|----|----|----|----|-----|------|-----|
| | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm |
| P1DVS032MB-0050 | 7 | 32,5 | 45 | 32 | 10 | 24 | 32 | 30 | 4,5 | 17,0 | 192 |
| P1DVS050MB-0100 | 9 | 46,5 | 65 | 45 | 13 | 32 | 45 | 36 | 5,5 | 25,0 | 270 |
| P1DVS050MB-0200 | 9 | 46,5 | 65 | 45 | 13 | 32 | 45 | 36 | 5,5 | 25,0 | 370 |
| P1DVS080MB-0160 | 12 | 72,0 | 95 | 63 | 14 | 41 | 63 | 49 | 6,5 | 40,5 | 370 |
| P1DVS080MB-0320 | 12 | 72,0 | 95 | 63 | 14 | 41 | 63 | 49 | 6,5 | 40,5 | 530 |
| P1DVS125MB-0200 | 16 | 110,0 | 140 | 90 | 22 | 45 | 90 | 71 | 8,0 | 60,0 | 450 |
| P1DVS125MB-0320 | 16 | 110,0 | 140 | 90 | 22 | 45 | 90 | 71 | 8,0 | 60,0 | 570 |



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 | | | Mass Concentration mg/m ³ | Water | | Oil |
|----------------------|--|----------------|--------------|--------------------------------------|--------------------------|-------------------------|---|
| | Maximum number of particles per m ³ | | | | Vapour Pressure Dewpoint | Liquid g/m ³ | Total Oil (aerosol liquid and vapour) mg/m ³ |
| | 0,1 - 0,5 micron | 0,5 - 1 micron | 1 - 5 micron | | | | |
| 0 | As specified by the equipment user or supplier and more stringent than Class 1 | | | | | | |
| 1 | ≤ 20 000 | ≤ 400 | ≤ 10 | - | ≤ -70 °C | - | 0,01 |
| 2 | ≤ 400 000 | ≤ 6 000 | ≤ 100 | - | ≤ -40 °C | - | 0,1 |
| 3 | - | ≤ 90 000 | ≤ 1 000 | - | ≤ -20 °C | - | 1 |
| 4 | - | - | ≤ 10 000 | - | ≤ +3 °C | - | 5 |
| 5 | - | - | ≤ 100 000 | - | ≤ +7 °C | - | - |
| 6 | - | - | - | ≤ 5 | ≤ +10 °C | - | - |
| 7 | - | - | - | 5 - 10 | - | ≤ 0,5 | - |
| 8 | - | - | - | - | - | 0,5 - 5 | - |
| 9 | - | - | - | - | - | 5 - 10 | - |
| X | - | - | - | > 10 | - | > 10 | > 10 |

Specifying air purity in accordance with ISO8573-1:2010

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

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

ISO 8573-1:2010 Class 1.2.1

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

Class 1 - Particulate

In each cubic 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.**

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)

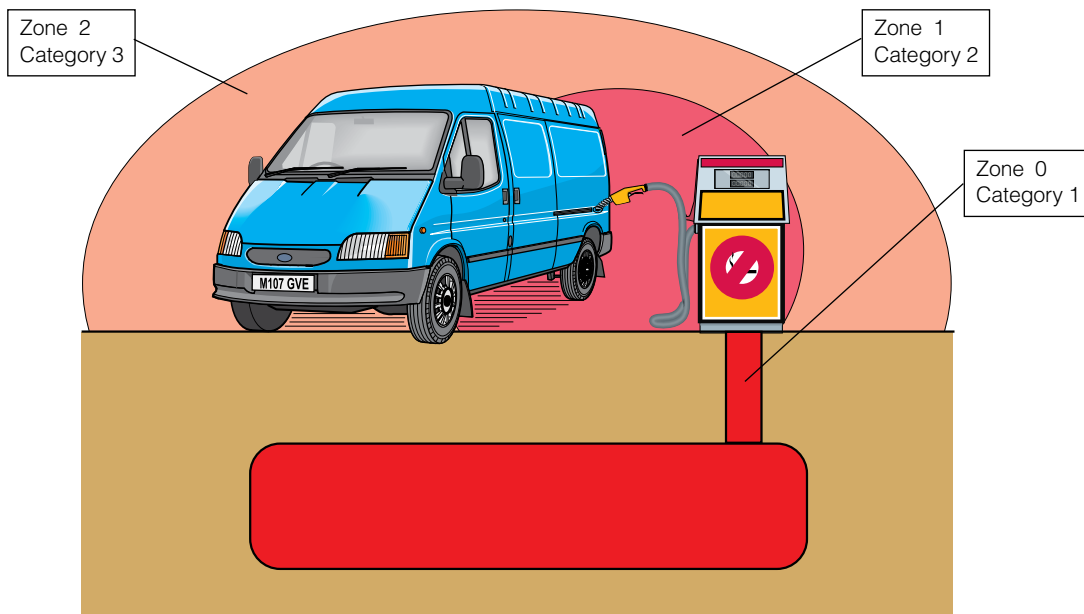
An atmosphere with the potential to become an explosive atmosphere during operating conditions and/or under the influence of the surroundings is defined as a **potentially explosive atmosphere**. Products covered by directive 94/9/EC are defined as intended for use in potentially explosive atmospheres.

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.

Introduction to the ATEX directive

Explosive atmospheres

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

| Level of protection | Category | | Type of protection | Operating specifications |
|---------------------|----------|----------|---|---|
| | Group I | Group II | | |
| 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 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) |

- 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

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

(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.

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

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.

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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.

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.

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





Safety instructions for the P1D-S cylinder with accessories

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

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

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

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

Real life applications

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

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

Checklist

Before using the cylinders in an Ex-area, you should check the following:

Do the specifications of the P1D-S cylinder match the Ex-classification of the area of use in accordance with directive 94/9/EC (previously ATEX 100a)

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

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

Installation requirements in Ex-areas

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

Inspecting cylinders during operation

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

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



- 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.

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

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

Instructions for use

Safety instructions

- Cylinder sensor ATEX classed for category II3G and II3D
- Ambient temperature $T_a = -20\text{ °C}$ to $+45\text{ °C}$
- Temperature class T4, or max. surface temperature of $T = 135\text{ °C}$
- 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 $T_a = 0\text{ °C}$ 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 $U_b = 18$ to 30 V DC

Max. load current $I_a \text{ d" } \ddot{U} 70\text{ mA}$

Ambient temperature: -20 °C to 45 °C

Commissioning

When connecting the sensor to a power source, please pay attention to the following

- a) the load data (operating voltage, continuous load current)
- b) the wiring diagram for the sensor

Maintenance

Our P8S-GPFLX/EX cylinder sensor is maintenance free, but the cable connections should be checked at regular intervals.

The sensor must be protected from UV radiation. The sensor must be kept clean on the outside, and a layer of dirt thicker than 1 mm must never be allowed to form. Strong solvents should not be used for cleaning as they may damage the sensor.

P8S-GPFLX/EX cylinder sensor



Communauté 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 °K .) X Must be installed in accordance with the installation manual.

3D

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

135 °C

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

IP67

Satisfies protection class IP67.

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

Components

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

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

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

Examples of components:

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

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