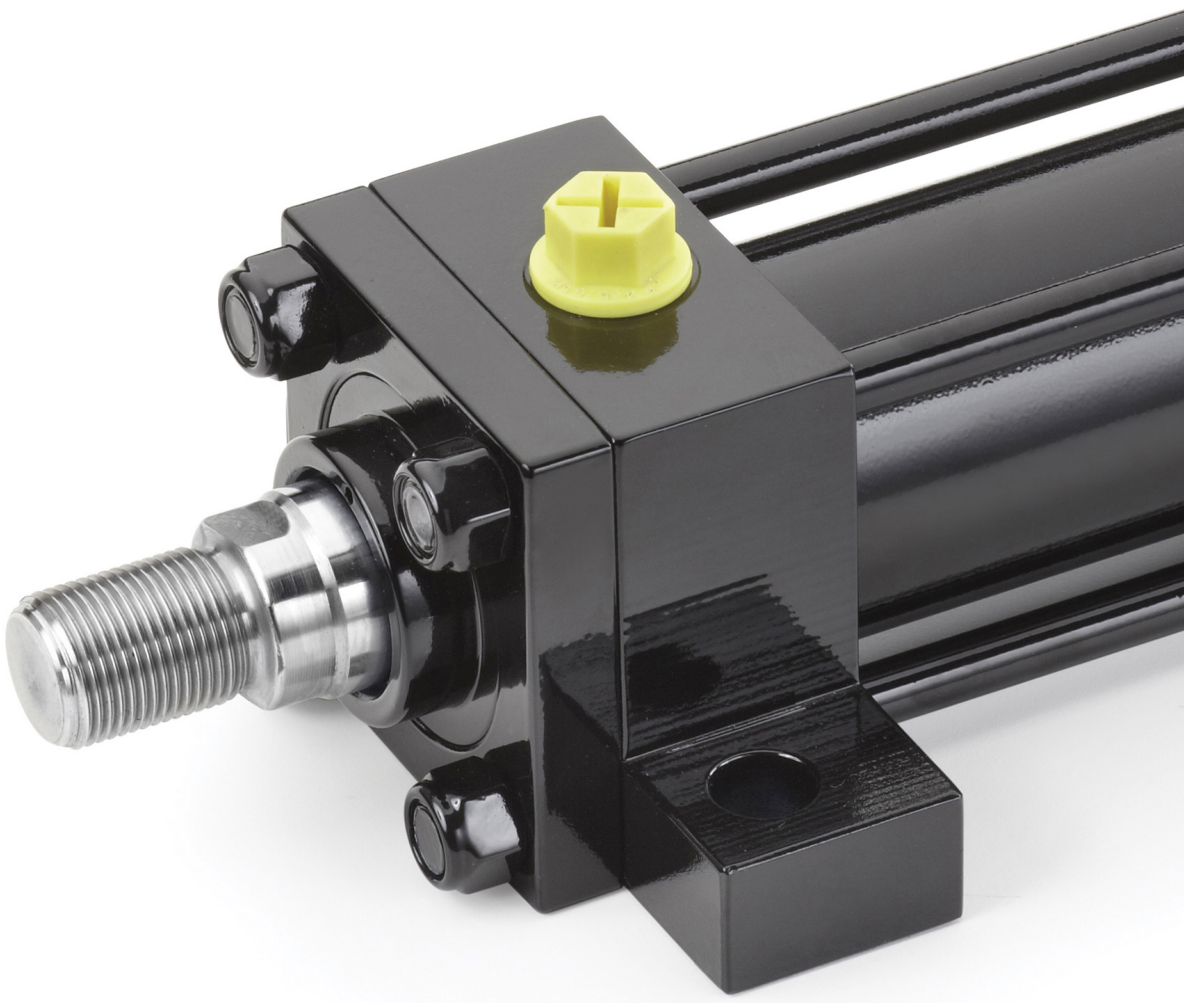
# CH
# CYLINDERS SERIES

**STANDARD ISO 6020/2 - 1991 -**
DIN 24554 160 BAR COMPACT SERIES



GRICES HYDRAULIC CYLINDERS

# CH CYLINDERS SERIES

**STANDARD ISO 6020/2 - 1991 -**
DIN 24554 160 BAR COMPACT SERIES

The CH series follows International standards **ISO 6020/2 and DIN 24554**. The compact construction with squared heads and tie rod fits to every kind of industrial application with continuous nominal pressure up to 16 MPa.

The choice of selected materials, the severe controls of 100% of all cylinders produced and the quality of the means of production, allows us to reach high standards of quality, reliability and enduring product performance.
The seals used, supplied by premium suppliers, grant high performance and international availability.

The wide range of seals, allows us to offer cylinders for applications with different kinds of hydraulic fluids, speed, frequency and operating temperature.

Our production includes the optional integration of **position transducers** *(see CHT series)* and **adjustable magnetic sensors** *(see CHM series)*.

**Technical characteristics:**

- Standard ISO 6020/2 and DIN 24554.
- Nominal pressure 16 MPa (continuous operation)
- Maximum pressure 25 MPa
- Bore: 25-200 mm
- Stroke: up to 4000 mm
- Working temperature from -20°C to +150°C according to the chosen fluid and seals
- Up to 3 rod diameter per bore
- Single or double rod
- 14 Mounting styles Ref. ISO MP1 - MP3 - MS2 - MT1 - MT2 - MT4 - ME5 - ME6 - MP5 - MX6 - MX2 - MX5 - MX3 - MX1
- Wide choice of rod end accessories

**Options:**

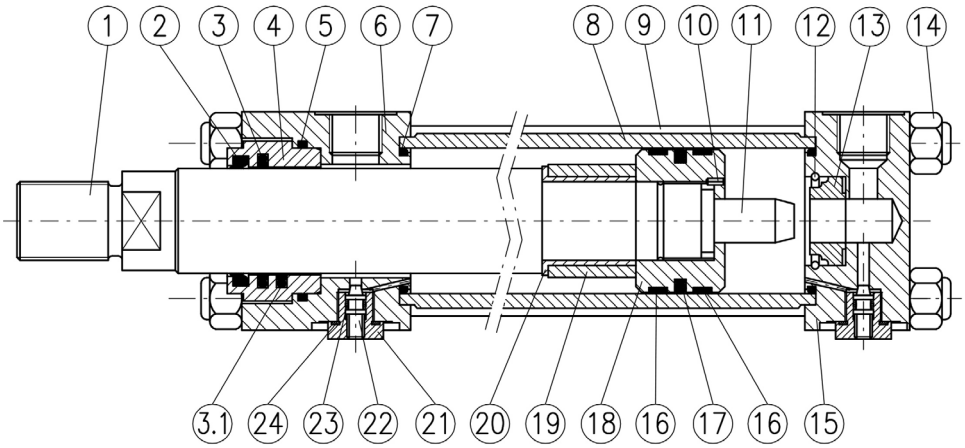
- Fixed or adjustable cushions
- Wide range of seals to suit speed, frequency, temperature and fluid specification
- Proximity sensor integrated in cylinder heads
- Integrated position transducer *(see CHT series)* with analog or digital output
- Adjustable magnetic sensors *(see CHM series)*
- Air bleeds
- Rod treatment : chromed, induction hardened and chromed, nickel-chromed, inox
- Drainage

**EPC Cylinder configurator**

This is an innovative tool that allows the client to configure CH cylinders in a rapid and intuitive way, guiding the technician through the choices of all the options available.

Once the cylinder code is defined, the EPC software provides 2D, 3D and PDF drawings, and gives the user the possibility to save projects and request offers. With the complete access, reserved to the purchasing department, it is possible to make orders directly. For all orders received through EPC an extra discount will be applied.

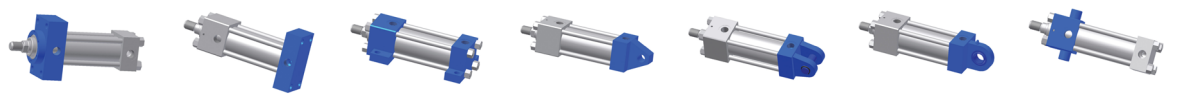
**Login at:** http://configuratore.grices.it/



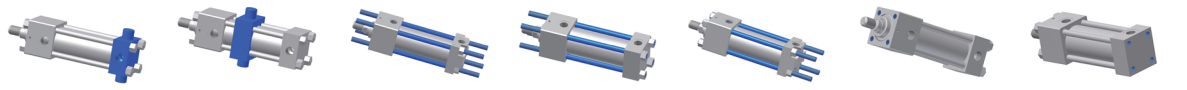

| N° | ITEM | MATERIAL |
|---|---|---|
| **1** | Rod | Chromium-plated steel |
| **2** | Dust scraper | Polyurethane / PTFE |
| **3** | Rod seal | Polyurethane / PTFE |
| **3.1** | 2nd Rod seal (option L) | NBR e PTFE |
| **4** | Guide sleeve | Spheroidal cast iron |
| **5** | O-Ring + PBK | NBR + Polyurethane |
| **6** | Head | Steel |
| **7** | O-Ring + PBK | NBR + Polyurethane |
| **8** | Body | Steel |
| **9** | Tie rod | Steel |
| **10** | Safety pin | Steel |
| **11** | Cushioning spur | Steel |
| **12** | Toroidal ring | Steel |
| **13** | Rear cushioning | Bronze |
| **14** | Self-braking nut | Steel |
| **15** | Rear head | Steel |
| **16** | Slide ring | PTFE |
| **17** | Piston seal | Polyurethane / PTFE |
| **18** | Piston | Steel |
| **19** | Front cushioning sleeve | Steel |
| **20** | Spacer | Steel |
| **21** | Locknut | Steel |
| **22** | Adjustment needle | Steel |
| **23** | O-Ring + PBN | NBR + Polyurethane |
| **24** | O-Ring seal | NBR |

## Mounting style

**FA** ISO ME5 | **FP** ISO ME6 | **PI** ISO MS2 | **CM** ISO MP3 | **CF** ISO MP1 | **CS** ISO MP5 | **OA** ISO MT1



**OP** ISO MT2 | **OI** ISO MT4 | **AP** ISO MX1 | **TA** ISO MX3 | **TP** ISO MX2 | **ZA** ISO MX5 | **ZP** ISO MX6



# TECHNICAL CHARACTERISTICS

**STANDARD ISO 6020/2 - 1991 -**
DIN 24554 160 BAR COMPACT SERIES

## CHOOSING THE PRODUCTION SERIES

In order to identify the production series, make sure that, while the plant is working, the operating pressures indicated for each series are not exceeded. The general dimensioning of the cylinder ensures wide safety margins. Do not exceed the maximum pressure value that corresponds to the test pressure, considering also any overpressure caused by throttle valves in the circuits and/or by vertical loads with downward rods and end of stroke cushioning *(see paragraph 1.8)*.

We recommend to adopt strokes longer by a few millimeters than the working stroke, in order to prevent the use of the cylinder's internal stops as a mechanical end of stroke. Also check that the expected working temperature and speed are consistent with the type of seals installed.

## 1.1 HYDRAULIC CYLINDERS – SERIES CH

The CH hydraulic cylinders, dimensioned according to standard ISO 6020/2 - DIN 24554, represent the future use of hydraulic actuators;

- Manufactured according to CNC technology, with top-quality materials, they provide maximum reliability and duration.
- The use of standard components during assembly facilitates the replacement of any worn components.
- They can be equipped with progressive cushions of rear and front end of stroke, consisting of self-centering spurs that can slow-down gradually the masses concerned, even of considerable size.
- The seals used are standard, and provide reliability and easy availability on the market.
- The available seals selection fits different speed, frequency, temperature and fluid conditions.

## 1.2 RANGE OF USE OF CH CYLINDERS

Nominal pressure 16 MPa *(continuous operation)*
Maximal pressure 25 MPa

## 1.3 CYLINDER BODY

The cylinder body is made up of a top-quality thick steel tube, either cold drawn or hot laminated, with elevated thickness and accurate internal surface (roughness RA ≤ 0.4 micron, diameter tolerance H8).
The strict quality controls of materials and the precision of manufacturing assure high straightness, concentricity and finishing.

## 1.4 ROD

Rods are made with top-quality steel and coated with hard chrome. This surface treatment ensures proper protection against any damage and corrosion, favouring the seals' endurance. The minimum surface finish is 0.2 micron.
Rods with strong chrome filling, induction-hardened, inox/chromed or made of special steel, can be manufactured on demand.

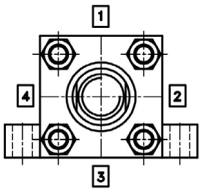
## 1.5 HEADS

Heads are made of steel and are to ensure perfect concentricity between the cylinder body, the rod bearing and the rod.
Wide inner passages are manufactured to minimize any load loss when the fluid is conveyed.

## 1.6 POSITION OF CONNECTIONS, AIR VENTS AND DAMPING REGULATION

Oil ports and cushioning standard positions are the following:

| MOUNTING STYLE | | FRONT HEAD Q | REAR HEAD R |
|---|---|---|---|
| TA - TP - AP - FA - FP - CS - CM - CF OI - OA - OP - ZA - ZP | Oil port | 1 | 1 |
| | Cushioning | 3 | 3 |
| PI | Oil port | 1 | 1 |
| | Cushioning | 2 | 2 |




In order to define all possible combinations of oil ports, cushioning, air bleeds and sensors, refer to the configurator.
**Login at: http://configuratore.grices.it/**

## 1.7 PISTON

The piston is made with a special material, specially processed to ensure a concentric guide between rod cushioning bushing, cylinder body and head cushioning bushing. A large part of the radial surface is in contact with the cylinder body. This confers considerable stability, so that any rod bending, caused by external radial loads, is minimized.

## 1.8 END OF STROKE BRAKING

The end of stroke braking is usually adopted on all cylinders working at a speed > 0.1 m/sec., or when loads in vertical direction are activated. This braking is also a safety device in case of failure of servo-systems control equipment. The ratio below makes it possible to promptly calculate, based on the cylinder bore (cushioning section), the supply pressure, the cushioning length and the working speed, as well as the mass that can be cushioned by every single cylinder. This reaction limits the overpressure value to 250 bar, protecting the cylinder's components that are under stress during braking.

$$M = \frac{(p_2 \cdot S - p_1 \cdot A) \cdot 2 \cdot L_f}{V_0^2} \cdot 10^{-2} \quad [kg]$$

**$P_1$ -** supply pressure (bar)
**$P_2$ -** maximum pressure 250 (bar)
**$V_0$ -** working speed (m/s)
**S -** cushioning section **$S_1$** or **$S_2$** ($cm^2$)
**$L_f$ -** cushioning length **$L_{f1}$** or **$L_{f2}$** (mm)
**A -** piston area ($cm^2$)

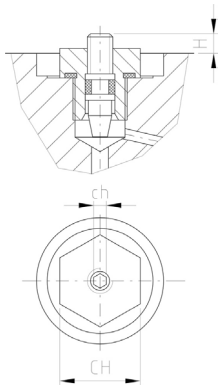
The cushioned mass values obtained from this ratio are simply theoretical, and Grices accepts no responsibility for the use of this ratio. The data to be inserted in the ratio to calculate the mass that can be cushioned may be obtained from the following table.

| Bore (mm) | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|
| **$S_1$ ($cm^2$)** rod forward | 1,77 | 3,52 | 5,50 | 7,68 | 13,07 | 21,98 | 35,51 | 51,81 | 98,94 | 144,37 |
| **$S_2$ ($cm^2$)** rod backward | 4,52 | 6,91 | 11,43 | 18,5 | 29,39 | 46,45 | 74,70 | 118,86 | 190,79 | 303,83 |
| **$L_{f1}$ (mm)** rod forward | 19 | 19 | 28 | 29 | 29 | 29 | 31 | 31 | 35 | 38 |
| **$L_{f2}$ (mm)** rod backward | 19 | 19 | 28 | 29 | 29 | 29 | 29 | 29 | 40 | 40 |
| **A ($cm^2$)** | 4,9 | 8 | 12,6 | 19,6 | 31,2 | 50,3 | 78,5 | 122,7 | 201,1 | 314,2 |

## 1.9 DAMPING ADJUSTMENT

For a precise cushioning adjustment, both ends of the cylinder are equipped with control valves, equipped a system that prevents their accidental removal. For cylinders with bores 25 - 32, these valves are not available. The table below shows the dimensions and typology of such devices, based on the cylinder bore.

| Bore | Hmax (mm) | CH (mm) | ch (mm) |
|---|---|---|---|
| **25 - 32** | Fixed braking | | |
| **40** | 9 | 19 | 3 |
| **50** | 6,5 | 19 | 3 |
| **63** | 3,5 | 19 | 3 |
| **80** | 3,5 | 19 | 3 |
| **100** | 3,5 | 19 | 3 |
| **125** | 0 | 19 | 3 |
| **160** | 0 | 19 | 3 |
| **200** | 0 | 19 | 3 |

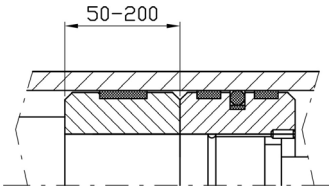


## 1.10 SPACERS

Cylinders with strokes > 1000mm should equipped with spacers of adequate design that increase the rod and piston guide, in order to reduce any overload phenomena and premature wear.

The spacer allows to increase the contact surface between piston and cylinder body, improving the system rigidity. The table below indicates the spacer length based on stroke; for the stroke values not included in the table, contact our technicians. As a general rule, spacers are not mounted on cylinders when strokes are < 1000mm and on cylinders subjected to only one pulling action.

| STROKE (mm) | 1001 a 1500 | 1501 a 2000 | 2001 a 2500 | 2501 a 3000 |
|---|---|---|---|---|
| Spacer symbol | 1 | 2 | 3 | 4 |
| Length (mm) | 50 | 100 | 150 | 200 |




## 1.11 SEALS

The sealing system must be chosen according to the working conditions of the cylinder: speed, fluid type and temperature. Our cylinders feature seals provided with seats conforming to the ISO 7425 norm. That allows our cylinders to work under the heaviest conditions, such as very low or high speed, heavy working, mineral or synthetic fluids. The type of seals to be used in the relevant working conditions are indicated below.

- **TYPE A: (STANDARD)** usually supplied in the absence of particular recommendations, considerable sealing at low pressure, to be used for speeds up to 0.5 m/sec., at temperatures ranging between –20 and +80°C, operation with mineral oil, air, nitrogen.
- **TYPE B: (LOW FRICTION)** anti-friction, not recommended when loads are to be held in position, and recommended at speeds up to 4 m/sec., at temperatures ranging between –20 and +80°C, operation with mineral oil, air, nitrogen.
- **TYPE C: (LOW FRICTION, VITON)** anti-friction, not recommended when loads are to be held in position, and recommended at speeds up to 4 m/sec., at temperatures ranging between –20 and +135°C, operation with phosphoric ester-based fire-retardant fluids.
- **TYPE E: (NBR+PTFE)** anti-friction, not recommended when loads are to be held in position, and recommended at speeds up to 4 m/sec., at temperatures ranging between –20 and +60°C, operation with water-glycol.

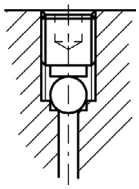
## 1.12 OIL PORTS

In order to reduce any turbulence and water hammer in the cylinder's connecting pipes as much as possible, we recommend that you ensure that the oil speed does not exceed 6 m/sec. The maximum flow rates that can be obtained with these criteria are shown in the table below.

| OIL PORT Ø | 1/4" | 3/8" | 1/2" | 3/4" | 1" | 1 1/4" |
|---|---|---|---|---|---|---|
| MAX. FLOW RATE (l/mm) | 14 | 28 | 48 | 63 | 102 | 162 |

## 1.13 AIR BLEEDS

Air bleeds are provided on demand on both ends of the cylinder. Bleeds are mounted inside the head and the bottom, so as to be protected from any accidental removal, as shown in the figure on the right.
To drain the system, unscrew the nut, discharge the air and close it again, carefully checking its sealing.

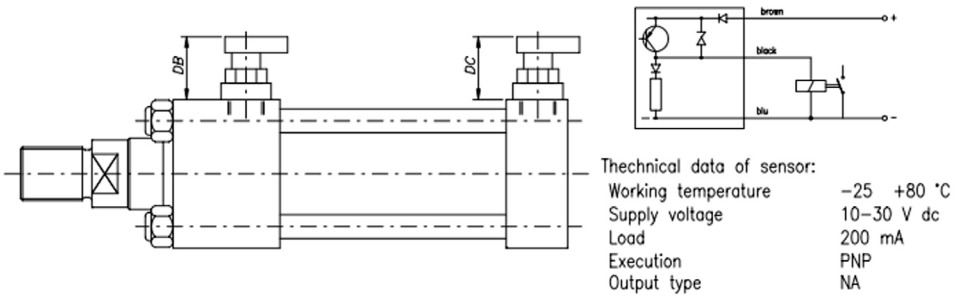


## 1.14 DRAINAGE

The drainage on the rod seal ensures better sealing at high speed, in particular in cylinders with strokes > 2000mm or in applications where the rod side chamber is constantly under pressure. The drainage port (1/8") is usually positioned on the same axis of the supply port and must be directly connected to the tank.
***For any further explanations on this matter, please contact our Technical Department.***

## 1.15 PROXIMITY SENSORS

When the piston position needs to be detected in any hydraulic system, proximity sensors can be mounted directly in the cylinder heads. The operating temperature is –25 to +80°C. Allowed dynamic pressure 350 bar. The sensor is provided with a built-in amplifier, with direct supply (10 to 30Vdc)with an analog PNP output for 200mA max., supplied complete with connector with a 4m long cable. Sensors can be mounted on head and bottom for bores from 40mm up to 200mm, and are arranged on side 2 of the cylinder. With feet mounting (PI), sensors are positioned on side 4 . They make it possible to obtain an electric signal near the end of stroke positioning of the piston.




Thechnical data of sensor:

| | |
|---|---|
| Working temperature | –25 +80 °C |
| Supply voltage | 10–30 V dc |
| Load | 200 mA |
| Execution | PNP |
| Output type | NA |

| Bore | DB max (mm) | DC max (mm) |
|---|---|---|
| **40** | 77 | 67 |
| **50** | 75 | 71 |
| **63** | 72 | 65 |
| **80** | 74 | 71 |
| **100** | 73 | 65 |
| **125** | 71 | 51 |
| **160** | 71 | 34 |
| **200** | 67 | 20 |

**Restrictions:**

- In OA and FA executions, the sensor is mounted on the head on side 3, facing the supply, and does not allow the mounting of cushioning adjustment;
- In PI execution (bores 40 – 50 – 63), sensors must be removed for fastening the feet's screws and then re-mounted. For all bores in presence of air bleeds they are arranged on the side of the cushioning adjustment;
- In OP and FP executions, the sensor is mounted on the bottom on side 3 facing the supply, and does not allow the mounting of cushioning adjustment;
- For 25 and 32mm bores, the proximity sensors are not provided.

## 1.15 STROKE TOLERANCE

| **STROKE** | mm | 0-500 | 501-1500 | 1501-3000 | oltre 3000 |
|---|---|---|---|---|---|
| **TOLLERANCE** | mm | ±1 | ±2 | ±3 | ±4,5 |

## 1.16 TIE RODS TORQUE

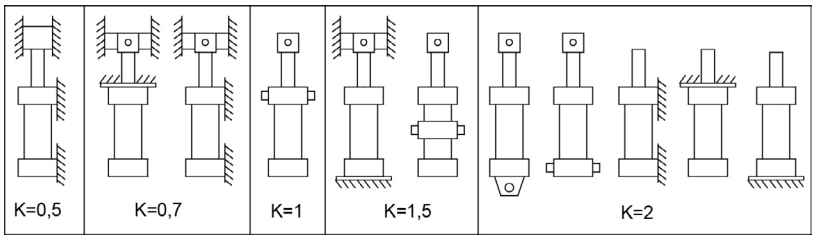
| **BORE** | **mm** | **25** | **32** | **40** | **50** | **63** | **80** | **100** | **125** | **160** | **200** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **TIE ROD** | mm | M5x0,8 | M6x1 | M8x1 | M12x1,25 | M12x1,25 | M16X1,5 | M16X1,5 | M22x1,5 | M27x2 | M30X2 |
| **TORQUE** | Nm | 4,5-5 | 7,6-9 | 19-20,5 | 68-71 | 68-71 | 160-165 | 160-165 | 450-455 | 815-830 | 1140-1155 |

## 2.1 PEAK LOAD

When the cylinder is working under compression, check the rod diameter at peak load. **Table 1** shows the most common types of restriction. Each of them is associated to a coefficient **K**. The maximum stroke of cylinder **L** multiplied by coefficient **K** produces the **LV** value (virtual length, **LV = L*K**). **Graph 2** indicates the rod's minimum diameter, based on load.
The point of intersection between **LV** in mm. and pushing force **F** in **KN** must be below the characteristic curve of the rod to be checked.

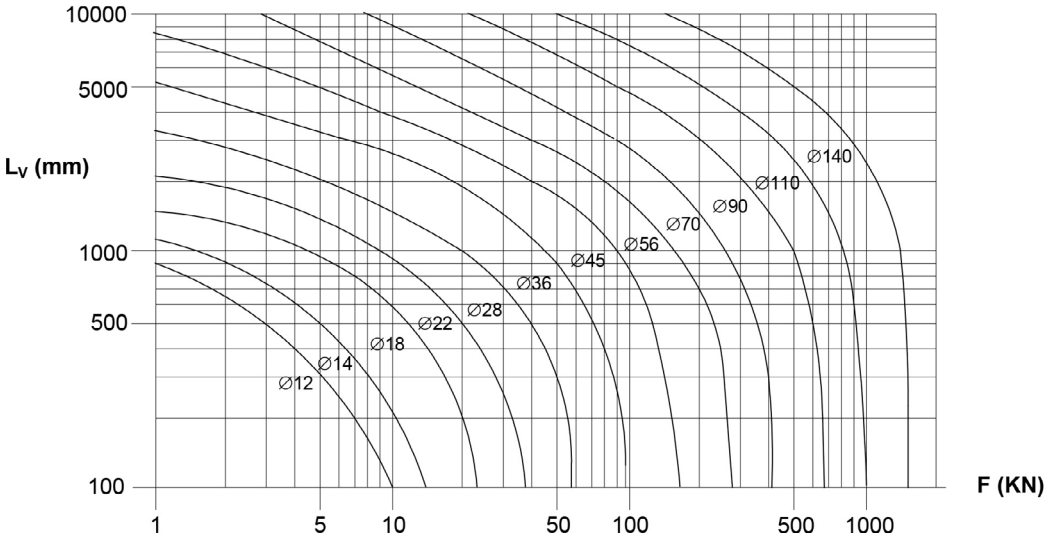
*Example:* cylinder **CH63/28/750/FA/00B** (front flange), that employs a **55 KN** load.
**Table 1** shows coefficient **K**, determined by the type of restriction **K = 2**, the virtual length is **LV = L*K LV = 750*2 = 1500 mm**.

**Table 1**



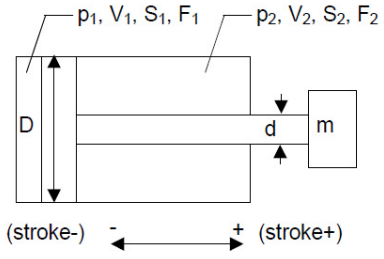

In **graph 2** you can check whether the point of intersection between **LV** and **F** is below the curve of rod Ø 28.
Since the stability condition has not been met, adopt the differential rod Ø 45. The cylinder **CH63/45/750FA00B** will be therefore selected, which meets the stability condition.

**Graph 2**




## 2.2 PRACTICAL UNIT OF MEASUREMENT

| DESCRIPTION | SYMBOL | UNIT OF MEASURE |
|---|---|---|
| Section | S | $cm^2$ |
| Pressure | p | bar |
| Ø piston | D | mm |
| Ø rod | d | mm |
| Speed | V | m/s |
| Capacity | Q | l/min |
| Load | m | kg |




**PUSHING FORCE (STROKE +)**
$F_1=(p_1 \cdot S_1)$ (Kg)

**PULLING FORCE (STROKE -)**
$F_2=(p_2 \cdot S_2)$ (Kg)

**PUSHING SPEED (STROKE +)**
$V_1=Q/(6 \cdot S_1)$ (m/s)

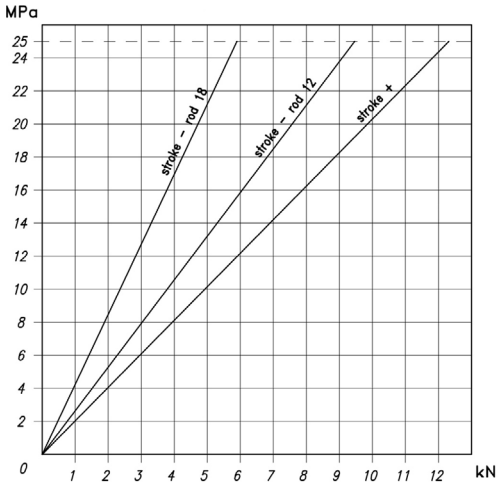
**PULLING SPEED (STROKE -)**
$V_2=Q/(6 \cdot S_2)$ (m/s)

$$S_1 = \frac{\pi \bullet D^2}{4 \bullet 100} \ (cm^2)$$

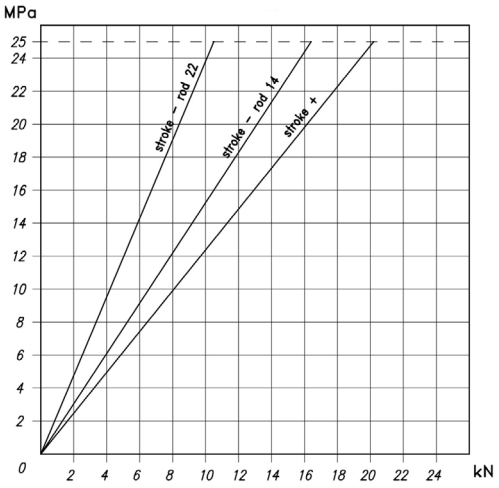
$$S_2 = \frac{\pi \bullet (D^2 - d^2)}{4 \bullet 100} \ (cm^2)$$

# FORCE PRESSURE DIAGRAMS

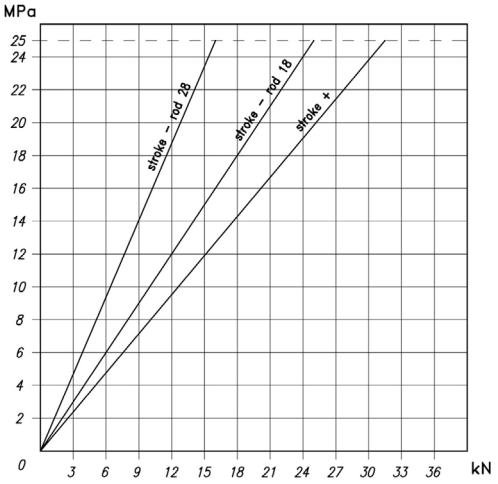
## Bore 25



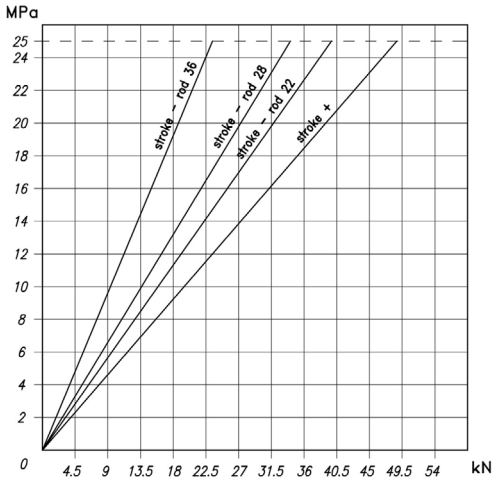

## Bore 32



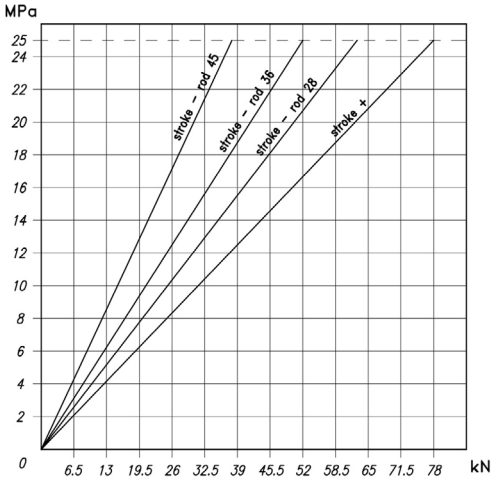

## Bore 40



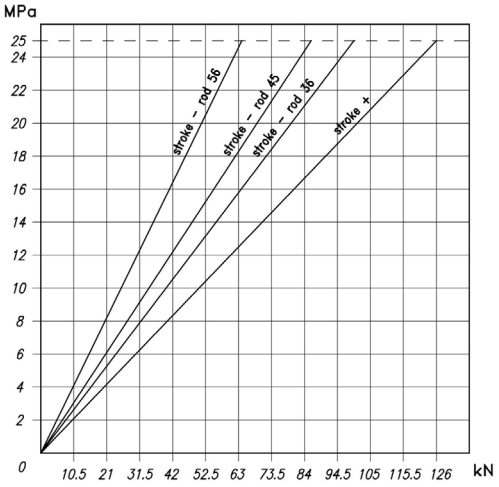

## Bore 50



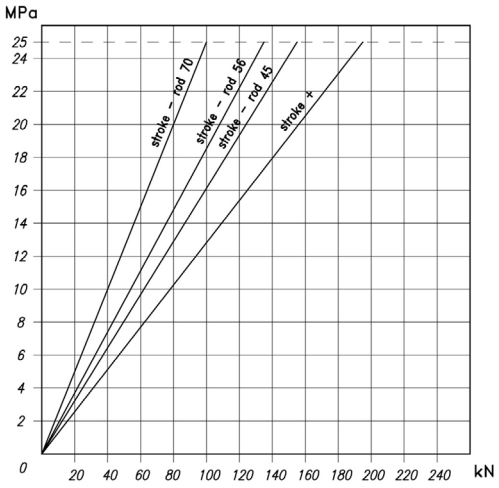

## Bore 63



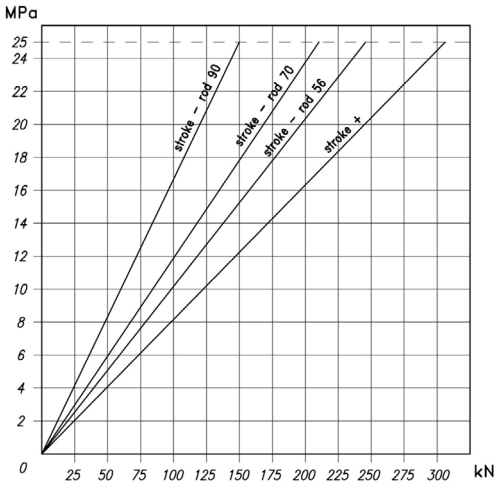

## Bore 80



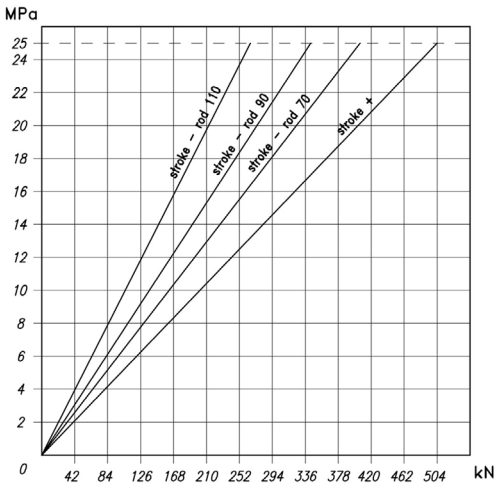
## Bore 100



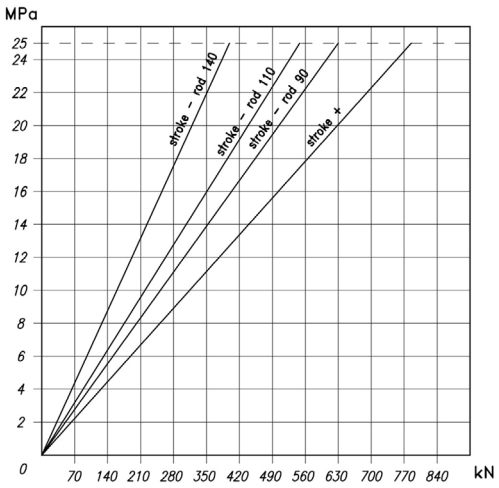

## Bore 125




## Bore 160




## Bore 200



## 3.1 BUILT-IN PLATES

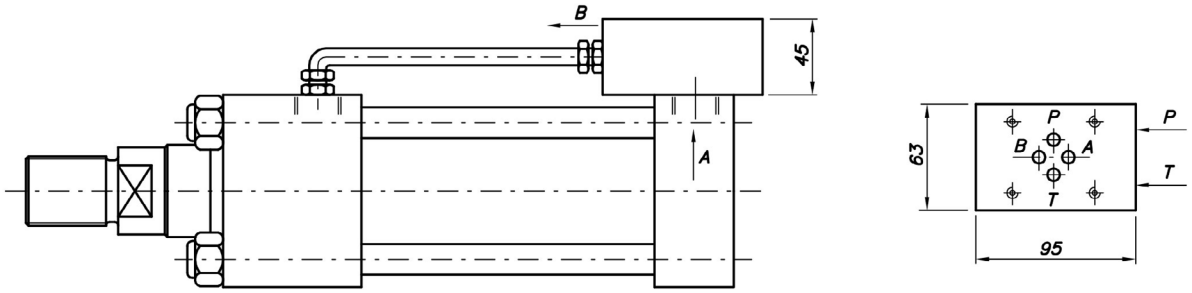
The CH cylinders can be provided with ISO/Cetop plate (03, 05), for mounting the valves directly on the cylinder.

CH cylinder with ISO/Cetop plate 03

- Can be mounted on cylinders with 40 to 200mm bores and minimum stroke 100 mm.
- P and T connections are of 3/8" BSP type.

*For further details, contact our Technical Department.*

*NG03*

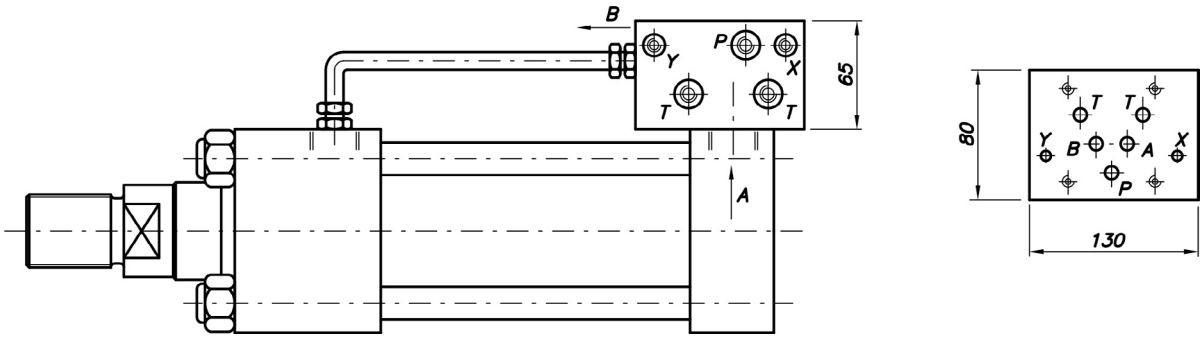



CH cylinder with ISO/Cetop plate 05

- Can be mounted on cylinders with 40 to 200mm bores and minimum stroke 150 mm.
- P and T connections are of 3⁄4" BSP type, X and Y connections are of 1/4" BSP type.

*For further details, contact our Technical Department.*

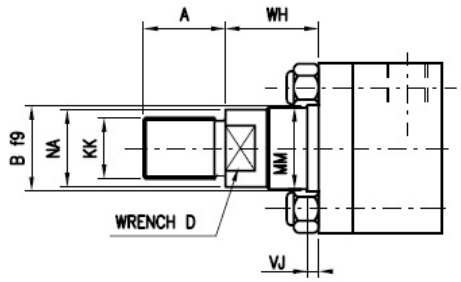
*NG05*



# DIMENSIONS OF THE ROD END

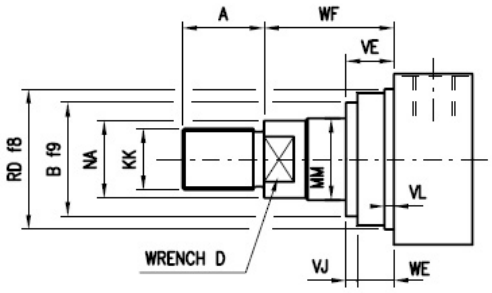
Rod end, type M and D

All, apart from FA fastening (ISO ME5)



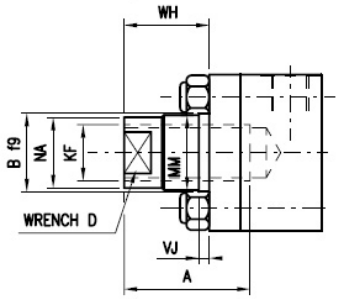

Rod end, type M and D

FA fastening (ISO ME5)



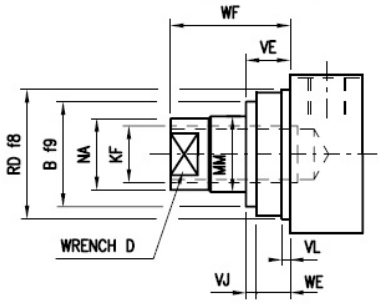

Rod end, type F

All, apart from FA fastening (ISO ME5)




Rod end, type F

FA fastening (ISO ME5)

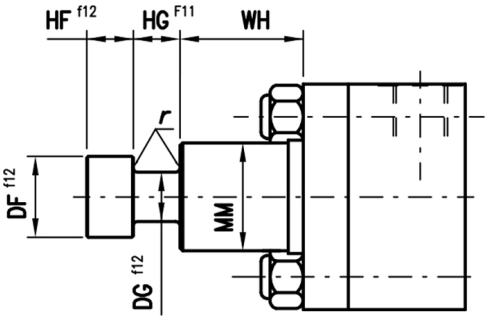



| BORE | N° rod | MM rod | Type M ISO 6020/2 (1991) | | Type D DIN 24554 | | Type F | | B | D | NA | WF | WH | VE | VJ | EXECUTION | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | KK | A | KK | A | KF | A | | | | | | | | VL min | RD | VJ | WE |
| 25 | 1 | 12 | M10x1,25 | 14 | M10x1,25 | 14 | M8x1 | 14 | 24 | 10 | 11 | 25 | 15 | 16 | 6 | 3 | 38 | 6 | 10 |
| | 2 | 18 | M14x1,5 | 18 | M10x1,25 | 14 | M12x1,25 | 18 | 30 | 15 | 17 | 25 | 15 | 16 | 6 | | | | |
| 32 | 1 | 14 | M12x1,25 | 16 | M12x1,25 | 16 | M10x1,25 | 16 | 26 | 12 | 13 | 35 | 25 | 22 | 12 | 3 | 42 | 12 | 10 |
| | 2 | 22 | M16x1,5 | 22 | M12x1,25 | 16 | M16x1,5 | 22 | 34 | 18 | 21 | 35 | 25 | 22 | 12 | | | | |
| 40 | 1 | 18 | M14x1,5 | 18 | M14x1,5 | 18 | M12x1,25 | 18 | 30 | 15 | 17 | 35 | 25 | 22 | 6 | 3 | 62 | 12 | 10 |
| | 2 | 28 | M20x1,5 | 28 | M14x1,5 | 18 | M20x1,5 | 28 | 42 | 22 | 26 | 35 | 25 | 22 | 12 | | | | |
| 50 | 1 | 22 | M16x1,5 | 22 | - | - | M16x1,5 | 22 | 34 | 18 | 21 | 41 | 25 | 25 | 9 | 4 | 74 | 9 | 16 |
| | 2 | 36 | M27x2 | 36 | M16x1,5 | 22 | M27x2 | 36 | 50 | 30 | 34 | 41 | 25 | 25 | 9 | | | | |
| | 3* | 28* | M20x1,5 | 28 | M16x1,5 | 22 | M20x1,5 | 28 | 42 | 22 | 26 | 41 | 25 | 25 | 9 | | | | |
| 63 | 1 | 28 | M20x1,5 | 28 | - | - | M20x1,5 | 28 | 42 | 22 | 26 | 48 | 32 | 28 | 12 | 4 | 75 | 12 | 16 |
| | 2 | 45 | M33x2 | 45 | M20x1,5 | 28 | M33x2 | 45 | 60 | 39 | 43 | 48 | 32 | 29 | 13 | | 88 | 13 | |
| | 3* | 36* | M27x2 | 36 | M20x1,5 | 28 | M27x2 | 36 | 50 | 30 | 34 | 48 | 32 | 29 | 13 | | | | |
| 80 | 1 | 36 | M27x2 | 36 | - | - | M27x2 | 36 | 50 | 30 | 34 | 51 | 31 | 29 | 9 | 4 | 82 | 9 | 20 |
| | 2 | 56 | M42x2 | 56 | M27x2 | 36 | M42x2 | 56 | 72 | 48 | 54 | 51 | 31 | 29 | 9 | | 105 | | |
| | 3* | 45* | M33x2 | 45 | M27x2 | 36 | M33x2 | 45 | 60 | 39 | 43 | 51 | 31 | 29 | 9 | | | | |
| 100 | 1 | 45 | M33x2 | 45 | - | - | M33x2 | 45 | 60 | 39 | 43 | 57 | 35 | 32 | 10 | 5 | 92 | 10 | 22 |
| | 2 | 70 | M48x2 | 63 | M33x2 | 45 | M48x2 | 63 | 88 | 62 | 68 | 57 | 35 | 32 | 10 | | 125 | | |
| | 3* | 56* | M42x2 | 56 | M33x2 | 45 | M42x2 | 56 | 72 | 48 | 54 | 57 | 35 | 32 | 10 | | | | |
| 125 | 1 | 56 | M42x2 | 56 | - | - | M42x2 | 56 | 72 | 48 | 54 | 57 | 35 | 32 | 10 | 5 | 105 | 10 | 22 |
| | 2 | 90 | M64x3 | 85 | M42x2 | 56 | M64x3 | 85 | 108 | 80 | 88 | 57 | 35 | 32 | 10 | | 150 | | |
| | 3* | 70* | M48x2 | 63 | M42x2 | 56 | M48x2 | 63 | 88 | 62 | 68 | 57 | 35 | 32 | 10 | | | | |
| 160 | 1 | 70 | M48x2 | 63 | - | - | M48x2 | 63 | 88 | 62 | 68 | 57 | 32 | 32 | 7 | 5 | 125 | 7 | 25 |
| | 2 | 110 | M80x3 | 95 | M48x2 | 63 | M80x3 | 95 | 133 | 100 | 108 | 57 | 32 | 32 | 7 | | 170 | | |
| | 3* | 90* | M64x3 | 85 | M48x2 | 63 | M64x3 | 85 | 108 | 80 | 88 | 57 | 32 | 32 | 7 | | | | |
| 200 | 1 | 90 | M64x3 | 85 | - | - | M64x3 | 85 | 108 | 80 | 88 | 57 | 32 | 32 | 7 | 5 | 150 | 7 | 25 |
| | 2 | 140 | M100x3 | 112 | M64x3 | 85 | M100x3 | 112 | 163 | 128 | 138 | 57 | 32 | 32 | 7 | | 210 | | |
| | 3* | 110* | M80x3 | 95 | M64x3 | 85 | M80x3 | 95 | 133 | 100 | 108 | 57 | 32 | 32 | 7 | | | | |

** Diameters not ISO-DIN*

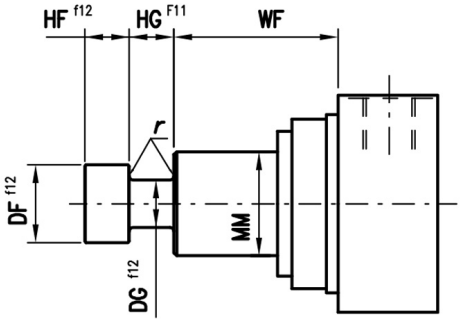
Hammer head

All except FA mounting style (ISO ME5)




Hammer head

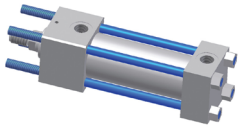
FA mounting style (ISO ME5)

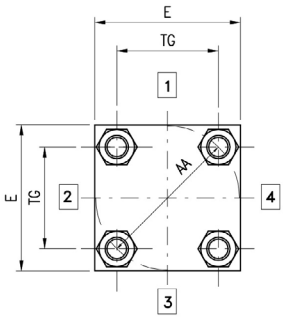


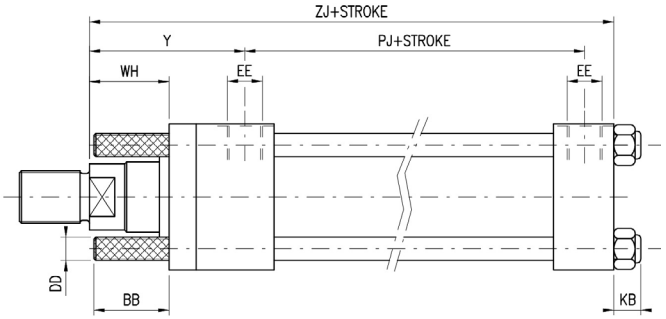

| BORE | MM rod | DF | DG | HF | HG | r | WF | WH | Pmax. Traction Bar |
|---|---|---|---|---|---|---|---|---|---|
| **32** | 22 | 18 | 11 | 8 | 8 | 0,5 | 35 | 25 | 160 |
| **40** | 28 | 22 | 14 | 10 | 10 | 0,5 | 35 | 25 | 160 |
| **50** | 28 | 22 | 14 | 10 | 10 | 0,5 | 41 | 25 | 100 |
| | 36 | 28 | 18 | 12,5 | 12,5 | 0,8 | 41 | 25 | 160 |
| **63** | 36 | 28 | 18 | 12,5 | 12,5 | 0,8 | 48 | 32 | 100 |
| | 45 | 35 | 22 | 16 | 16 | 0,8 | 48 | 32 | 160 |
| **80** | 45 | 35 | 22 | 16 | 16 | 0,8 | 51 | 31 | 100 |
| | 56 | 45 | 28 | 20 | 20 | 1,2 | 51 | 31 | 160 |
| **100** | 56 | 45 | 28 | 20 | 20 | 1,2 | 57 | 35 | 100 |
| | 70 | 56 | 35 | 25 | 25 | 1,2 | 57 | 35 | 160 |
| **125** | 70 | 56 | 35 | 25 | 25 | 1,2 | 57 | 35 | 100 |
| | 90 | 78 | 45 | 30 | 30 | 1,5 | 57 | 35 | 160 |
| **160** | 90 | 78 | 45 | 30 | 30 | 1,5 | 57 | 32 | 100 |
| | 110 | 106 | 65 | 35 | 35 | 1,5 | 57 | 32 | 160 |
| **200** | 110 | 106 | 65 | 35 | 35 | 1,5 | 57 | 32 | 100 |
| | 140 | 136 | 70 | 45 | 45 | 1,5 | 57 | 32 | 160 |

*For bores and rods excluded from the chart, contact our Technical Department.*

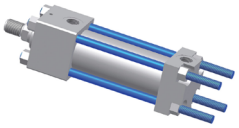
## TA ISO type MX3

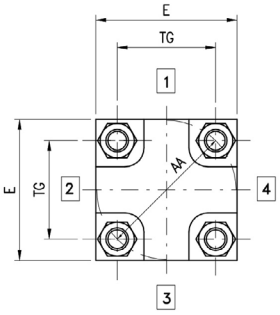


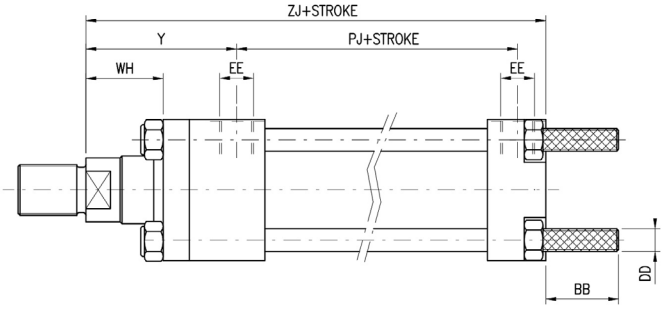


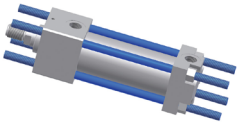

## TP ISO type MX2

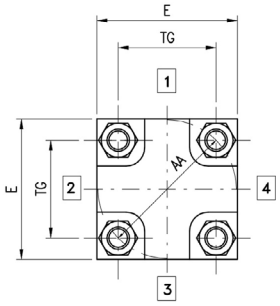


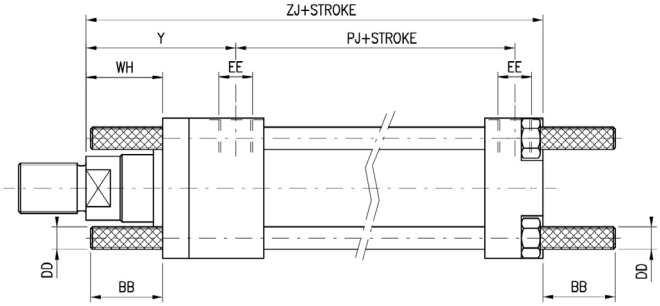



## AP ISO type MX1



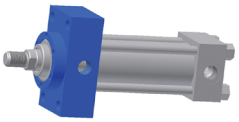


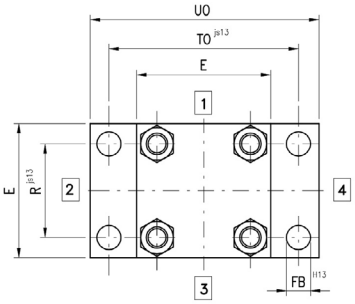



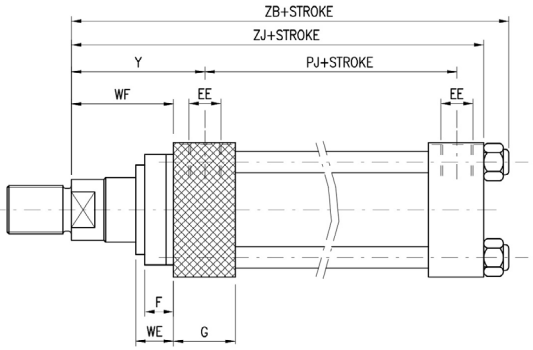

| BORE | AA | BB | DD | E | EE | KB | TG | WH | ZJ | Y | PJ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **25** | 40 | 19 | M5x0,8 | 40* | 1/4" | 6,8 | 28,3 | 15 | 114 | 50 | 53 |
| **32** | 47 | 24 | M6x1 | 45* | 1/4" | 7,8 | 33,2 | 25 | 128 | 60 | 56 |
| **40** | 59 | 35 | M8x1 | 60 | 3/8" | 10,6 | 41,7 | 25 | 153 | 62 | 73 |
| **50** | 74 | 46 | M12x1,25 | 75 | 1/2" | 14,8 | 52,3 | 25 | 159 | 67 | 74 |
| **63** | 91 | 46 | M12x1,25 | 90 | 1/2" | 14,8 | 64,3 | 32 | 168 | 71 | 80 |
| **80** | 117 | 59 | M16x1.5 | 115 | 3/4" | 18 | 82,7 | 31 | 190 | 77 | 93 |
| **100** | 137 | 59 | M16X1,5 | 126 | 3/4" | 18 | 96,9 | 35 | 203 | 82 | 101 |
| **125** | 178 | 81 | M22x1,5 | 165 | 1" | 25 | 125,9 | 35 | 232 | 86 | 117 |
| **160** | 219 | 92 | M27x2 | 196 | 1" | 30,8 | 154,9 | 32 | 245 | 86 | 121 |
| **200** | 269 | 115 | M30x2 | 240 | 1 1/4" | 33,2 | 190,2 | 32 | 299 | 98 | 158,5 |

** On bores 25 and 32 the head is increased by 5mm to house the connection.*

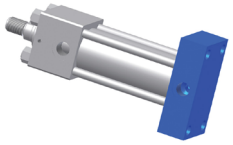
## FA ISO type ME5

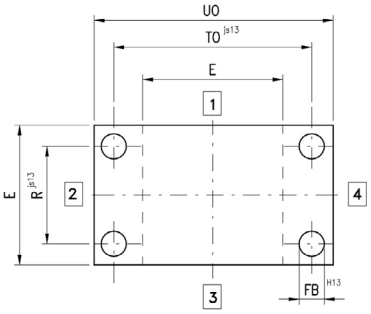


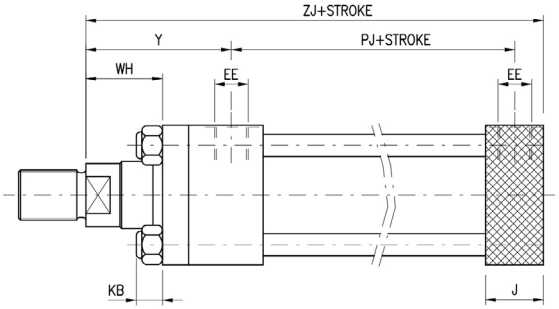


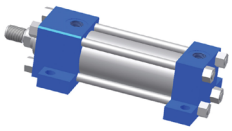

## FP ISO type ME6

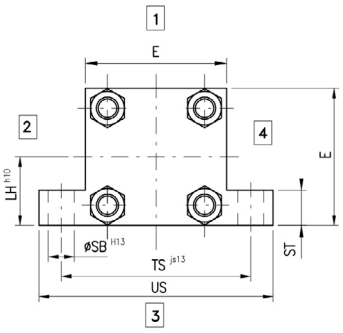


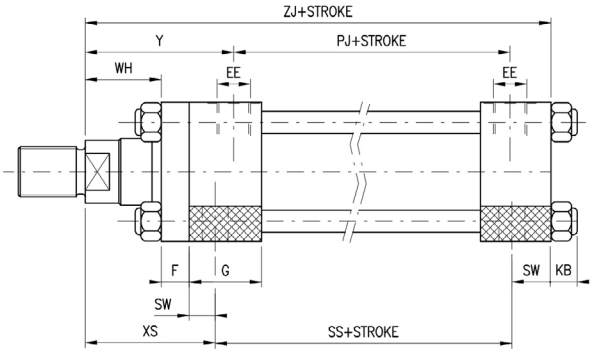



## PI ISO type MS2



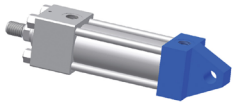


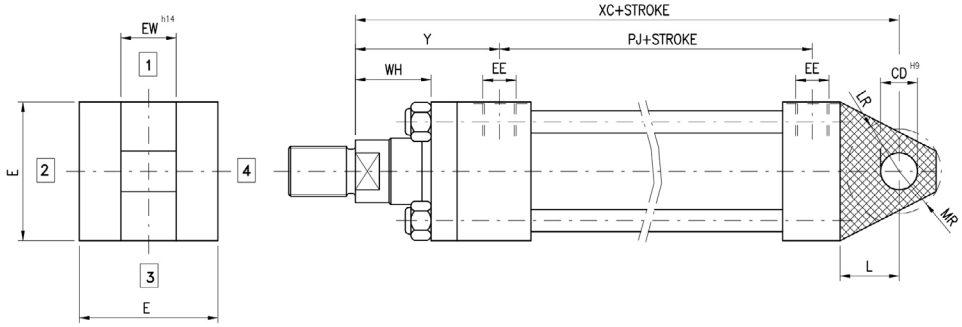




| BORE | E | EE | F | FB | G | G1 | J | KB | LH | R | SB | SS | ST | SW | TO | TS | UO | US | VE | WF | WH | XS | ZB | ZJ | Y | PJ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **25** | 40* | 1/4" | 10 | 5,5 | 25 | 40 | 25 | 6,8 | 19 | 27 | 6,6 | 73 | 8,5 | 8 | 51 | 54 | 65 | 72 | 16 | 25 | 15 | 33 | 121 | 114 | 50 | 53 |
| **32** | 45* | 1/4" | 10 | 6,6 | 25 | 40 | 25 | 7,8 | 22 | 33 | 9 | 73 | 12,5 | 10 | 58 | 63 | 70 | 84 | 22 | 35 | 25 | 45 | 136 | 128 | 60 | 56 |
| **40** | 60 | 3/8" | 10 | 11 | 38 | 45 | 38 | 10,6 | 31 | 41 | 11 | 98 | 12,5 | 10 | 87 | 83 | 110 | 103 | 22 | 35 | 25 | 45 | 164 | 153 | 62 | 73 |
| **50** | 75 | 1/2" | 16 | 14 | 38 | 45 | 38 | 14,8 | 37 | 52 | 14 | 92 | 19 | 13 | 105 | 102 | 130 | 127 | 25 | 41 | 25 | 54 | 174 | 159 | 67 | 74 |
| **63** | 90 | 1/2" | 16 | 14 | 38 | 45 | 38 | 14,8 | 44 | 65 | 18 | 86 | 26 | 17 | 117 | 124 | 145 | 161 | 29 | 48 | 32 | 65 | 183 | 168 | 71 | 80 |
| **80** | 115 | 3/4" | 20 | 18 | 45 | 50 | 45 | 18 | 57 | 83 | 18 | 105 | 26 | 17 | 149 | 149 | 180 | 186 | 29 | 51 | 31 | 68 | 208 | 190 | 77 | 93 |
| **100** | 126 | 3/4" | 22 | 18 | 45 | 50 | 45 | 18 | 63 | 97 | 26 | 102 | 32 | 22 | 162 | 172 | 200 | 216 | 32 | 57 | 35 | 79 | 221 | 203 | 82 | 101 |
| **125** | 165 | 1" | 22 | 22 | 58 | 58 | 58 | 25 | 82 | 126 | 26 | 131 | 32 | 22 | 208 | 210 | 250 | 254 | 32 | 57 | 35 | 79 | 257 | 232 | 86 | 117 |
| **160** | 196 | 1" | 25 | 26 | 58 | 58 | 58 | 30,8 | 101 | 155 | 33 | 130 | 38 | 29 | 253 | 260 | 300 | 318 | 32 | 57 | 32 | 86 | 276 | 245 | 86 | 121 |
| **200** | 240 | 1 1/4" | 25 | 33 | 76 | 76 | 76 | 33,2 | 122 | 190 | 39 | 172 | 44 | 35 | 300 | 311 | 360 | 381 | 32 | 57 | 32 | 92 | 332 | 299 | 98 | 158,5 |

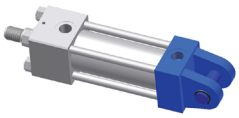
** On bores 25 and 32 the head is increased by 5mm to house the connection.*

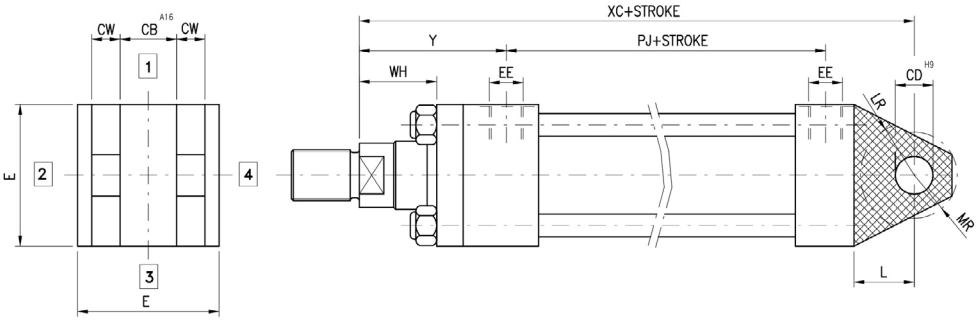
## CM ISO type MP3



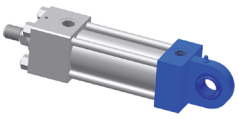


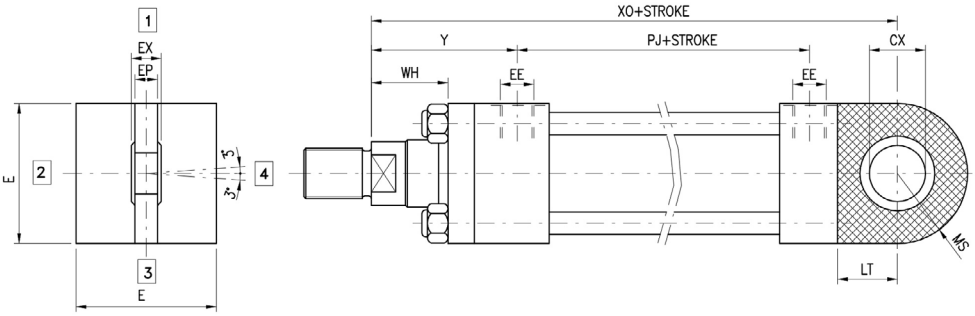

## CF ISO type MP1






## CS ISO type MP5

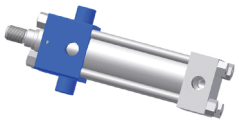


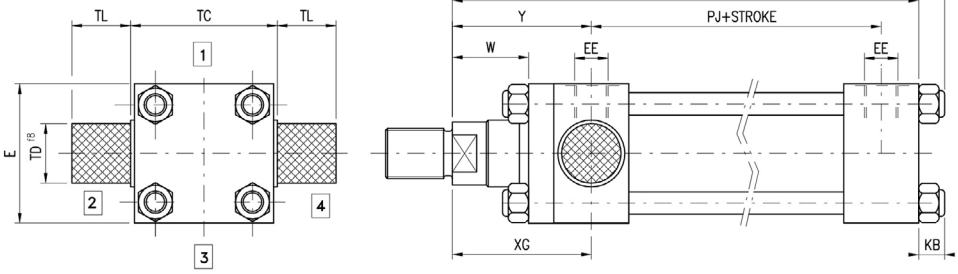



| BORE | CB | CD | CW | CX | E | EE | EP | EW | EX | L | LR | LT | MR | MS | WH | XC | XO | Y | PJ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **25** | 12 | 10 | 6 | 12 | 40* | 1/4" | 8 | 12 | 10 | 13 | 12 | 16 | 12 | 20 | 15 | 127 | 130 | 50 | 53 |
| **32** | 16 | 12 | 8 | 16 | 45* | 1/4" | 11 | 16 | 14 | 19 | 17 | 20 | 17 | 22,5 | 25 | 147 | 148 | 60 | 56 |
| **40** | 20 | 14 | 10 | 20 | 60 | 3/8" | 13 | 20 | 16 | 19 | 17 | 25 | 17 | 29 | 25 | 172 | 178 | 62 | 73 |
| **50** | 30 | 20 | 15 | 25 | 75 | 1/2" | 17 | 30 | 20 | 32 | 29 | 31 | 29 | 33 | 25 | 191 | 190 | 67 | 74 |
| **63** | 30 | 20 | 15 | 30 | 90 | 1/2" | 19 | 30 | 22 | 32 | 29 | 38 | 29 | 40 | 32 | 200 | 206 | 71 | 80 |
| **80** | 40 | 28 | 20 | 40 | 115 | 3/4" | 23 | 40 | 28 | 39 | 34 | 48 | 34 | 50 | 31 | 229 | 238 | 77 | 93 |
| **100** | 50 | 36 | 25 | 50 | 126 | 3/4" | 30 | 50 | 35 | 54 | 50 | 58 | 50 | 62 | 35 | 257 | 261 | 82 | 101 |
| **125** | 60 | 45 | 30 | 60 | 165 | 1" | 38 | 60 | 44 | 57 | 53 | 72 | 53 | 80 | 35 | 289 | 304 | 86 | 117 |
| **160** | 70 | 56 | 35 | 80 | 196 | 1" | 47 | 70 | 55 | 78 | 59 | 107 | 59 | 98 | 32 | 308 | 337 | 86 | 121 |
| **200** | 80 | 70 | 40 | 100 | 240 | 1 1/4" | 57 | 80 | 70 | 97 | 78 | 131 | 78 | 120 | 32 | 381 | 415 | 98 | 158,5 |

** On bores 25 and 32 the head is increased by 5mm to house the connection.*

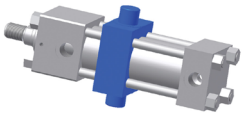
# OA ISO type MT1

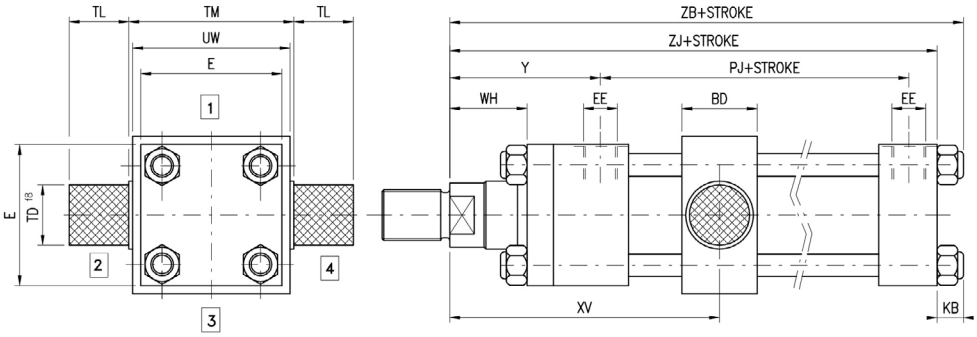




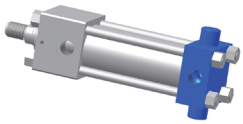

*Note: for bores 100 to 200 the head and the flange consist in one single piece and the tie rods are screwed directly on the head.*

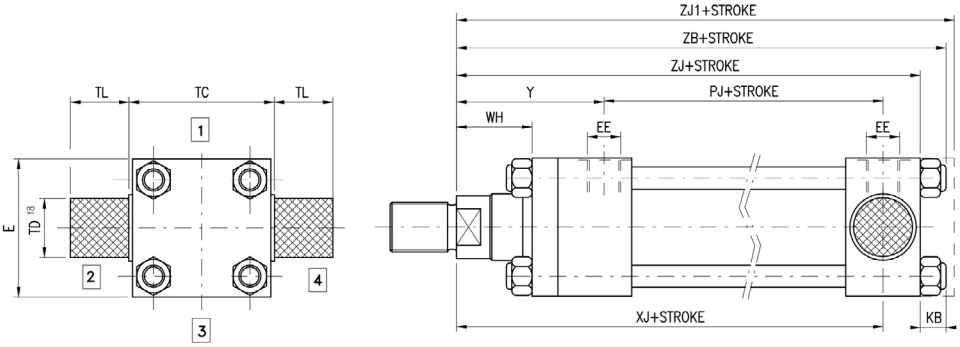
# OI ISO type MT4






# OP ISO type MT2



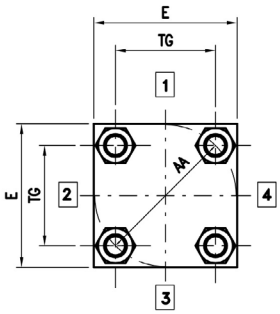


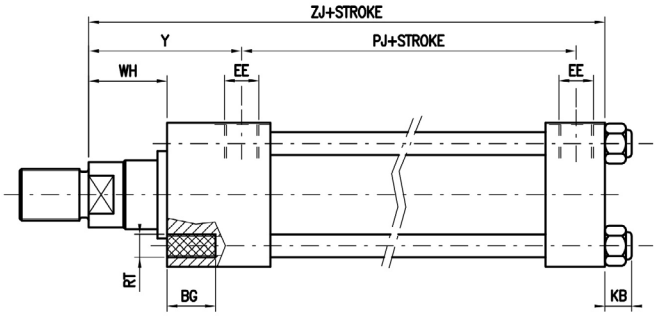

*Note: for bores 100 to 200 the tie rods are screwed on the bottom head and the ZB quote become ZJ1*

| BORE | BD | E | EE | KB | TC | TD | TL | TM | UW | WH | XG | XJ | XV min | XV max | ZJ | ZJ1 | ZB | Y | PJ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **25** | 20 | 40* | 1/4" | 6,8 | 38 | 12 | 10 | 48 | 46 | 15 | 44 | 101 | 82 | 72+stroke | 114 | - | 121 | 50 | 53 |
| **32** | 25 | 45* | 1/4" | 7,8 | 44 | 16 | 12 | 55 | 53 | 25 | 54 | 115 | 96 | 82+stroke | 128 | - | 136 | 60 | 56 |
| **40** | 30 | 60 | 3/8" | 10,6 | 63 | 20 | 16 | 76 | 74 | 25 | 57 | 134 | 107 | 88+stroke | 153 | - | 164 | 62 | 73 |
| **50** | 40 | 75 | 1/2" | 14,8 | 76 | 25 | 20 | 89 | 87 | 25 | 64 | 140 | 117 | 90+stroke | 159 | - | 174 | 67 | 74 |
| **63** | 40 | 90 | 1/2" | 14,8 | 89 | 32 | 25 | 100 | 98 | 32 | 70 | 149 | 132 | 91+stroke | 168 | - | 183 | 71 | 80 |
| **80** | 48 | 115 | 3/4" | 18 | 114 | 40 | 32 | 127 | 125 | 31 | 76 | 168 | 147 | 99+stroke | 190 | - | 200 | 77 | 93 |
| **100** | 58 | 126 | 3/4" | 18 | 127 | 50 | 40 | 140 | 138 | 35 | 71 | 187 | 158 | 107+stroke | 203 | 216 | - | 82 | 101 |
| **125** | 68 | 165 | 1" | 25 | 165 | 63 | 50 | 178 | 175 | 35 | 75 | 209 | 180 | 109+stroke | 232 | 244 | - | 86 | 117 |
| **160** | 88 | 196 | 1" | 30,8 | 203 | 80 | 63 | 215 | 212 | 32 | 75 | 230 | 198 | 104+stroke | 245 | 273 | - | 86 | 121 |
| **200** | 108 | 240 | 1 1/4" | 33,2 | 241 | 100 | 80 | 279 | 276 | 32 | 85 | 276 | 226 | 130+stroke | 299 | 331 | - | 98 | 158,5 |

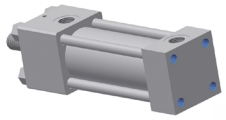
** On bores 25 and 32 the head is increased by 5mm to house the connection.*

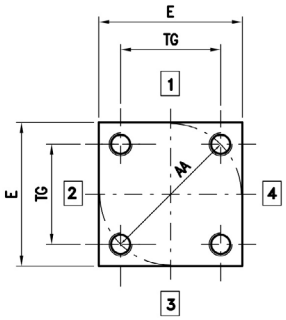
# ZA ISO type MX5

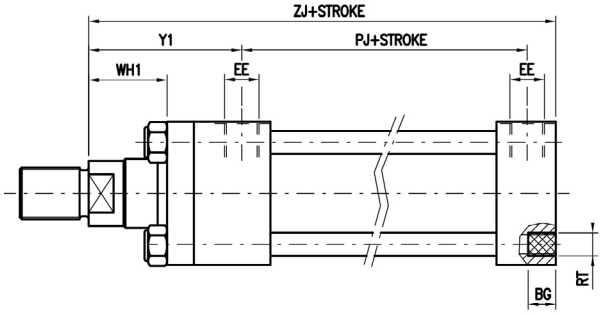



# ZP ISO type MX6



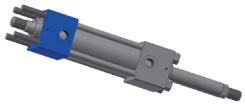


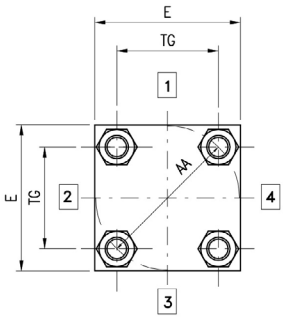



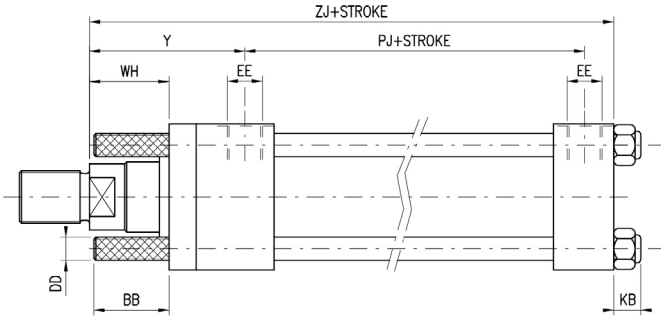

| BORE | AA | BG min | E | EE | KB | RT | TG | WH | WH1 | ZJ | Y | Y1 | PJ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **25** | 40 | 8 | 40* | 1/4" | 6,8 | M5x0,8 | 28,3 | 15 | 15 | 114 | 50 | 50 | 53 |
| **32** | 47 | 9 | 45* | 1/4" | 7,8 | M6x1 | 33,2 | 25 | 25 | 128 | 60 | 60 | 56 |
| **40** | 59 | 12 | 60 | 3/8" | 10,6 | M8x1,25 | 41,7 | 25 | 25 | 153 | 62 | 62 | 73 |
| **50** | 74 | 18 | 75 | 1/2" | 14,8 | M12x1,75 | 52,3 | 25 | 25 | 159 | 67 | 67 | 74 |
| **63** | 91 | 18 | 90 | 1/2" | 14,8 | M12x1,75 | 64,3 | 32 | 32 | 168 | 71 | 71 | 80 |
| **80** | 117 | 24 | 115 | 3/4" | 18 | M16x2 | 82,7 | 31 | 31 | 190 | 77 | 77 | 93 |
| **100** | 137 | 24 | 126 | 3/4" | 18 | M16X2 | 96,9 | 35 | 35 | 203 | 82 | 82 | 101 |
| **125** | 178 | 27 | 165 | 1" | 25 | M22x2,5 | 125,9 | 35 | 35 | 232 | 86 | 86 | 117 |
| **160** | 219 | 32 | 196 | 1" | 30,8 | M27x3 | 154,9 | 32 | 25 | 245 | 86 | 79 | 121 |
| **200** | 269 | 40 | 240 | 1 1/4" | 33,2 | M30x3,5 | 190,2 | 32 | 28 | 299 | 98 | 94 | 158,5 |

** On bores 25 and 32 the head is increased by 5mm to house the connection.*

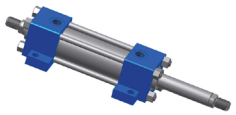
# TA ISO type MX3

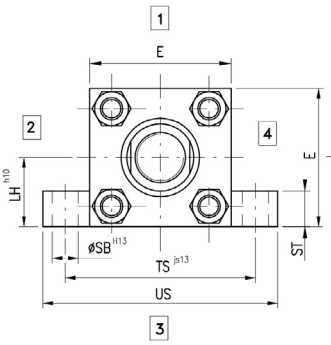


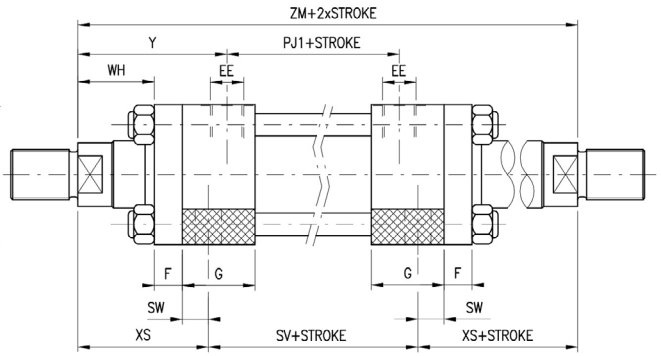


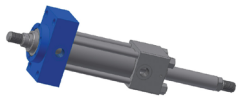

# PI ISO type MS2

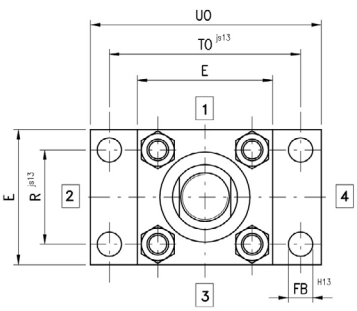


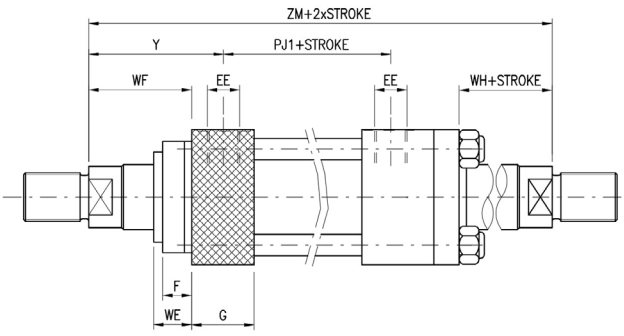



# FA ISO type ME5



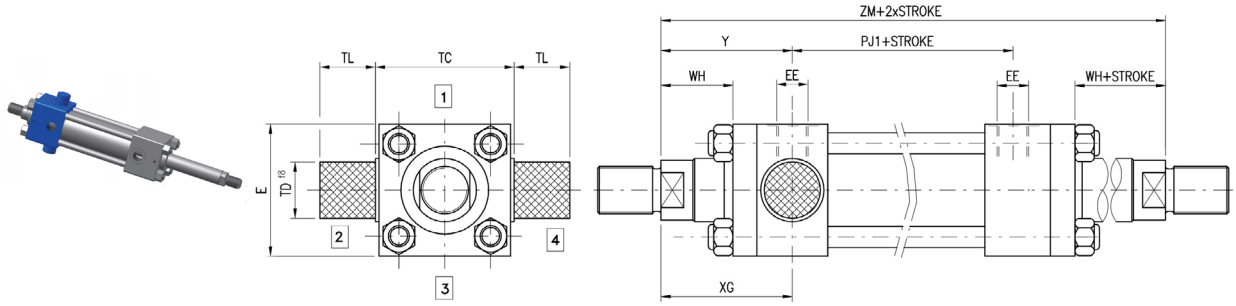



| BORE | BB | DD | E | EE | F | FB | G | G1 | LH | R | SB | ST | SV | SW | TG | TO | TS | UO | US | VE | WF | WH | XS | ZM | Y | PJ1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **25** | 19 | M5x0,8 | 40* | 1/4" | 10 | 5,5 | 25 | 40 | 19 | 27 | 6,6 | 8,5 | 88 | 8 | 28,3 | 51 | 54 | 65 | 72 | 16 | 25 | 15 | 33 | 154 | 50 | 54 |
| **32** | 24 | M6x1 | 45* | 1/4" | 10 | 6,6 | 25 | 40 | 22 | 33 | 9 | 12,5 | 88 | 10 | 33,2 | 58 | 63 | 70 | 84 | 22 | 35 | 25 | 45 | 178 | 60 | 58 |
| **40** | 35 | M8x1 | 60 | 3/8" | 10 | 11 | 38 | 45 | 31 | 41 | 11 | 12,5 | 105 | 10 | 41,7 | 87 | 83 | 110 | 103 | 22 | 35 | 25 | 45 | 195 | 62 | 71 |
| **50** | 46 | M12x1,25 | 75 | 1/2" | 16 | 14 | 38 | 45 | 37 | 52 | 14 | 19 | 99 | 13 | 52,3 | 105 | 102 | 130 | 127 | 25 | 41 | 25 | 54 | 207 | 67 | 73 |
| **63** | 46 | M12x1,25 | 90 | 1/2" | 16 | 14 | 38 | 45 | 44 | 65 | 18 | 26 | 93 | 17 | 64,3 | 117 | 124 | 145 | 161 | 29 | 48 | 32 | 65 | 223 | 71 | 81 |
| **80** | 59 | M16x1.5 | 115 | 3/4" | 20 | 18 | 45 | 50 | 57 | 83 | 18 | 26 | 110 | 17 | 82,7 | 149 | 149 | 180 | 186 | 29 | 51 | 31 | 68 | 246 | 77 | 92 |
| **100** | 59 | M16X1,5 | 126 | 3/4" | 22 | 18 | 45 | 50 | 63 | 97 | 26 | 32 | 107 | 22 | 96,9 | 162 | 172 | 200 | 216 | 32 | 57 | 35 | 79 | 265 | 82 | 101 |
| **125** | 81 | M22x1,5 | 165 | 1" | 22 | 22 | 58 | 58 | 82 | 126 | 26 | 32 | 131 | 22 | 125,9 | 208 | 210 | 250 | 254 | 32 | 57 | 35 | 79 | 289 | 86 | 117 |
| **160** | 92 | M27x2 | 196 | 1" | 25 | 26 | 58 | 58 | 101 | 155 | 33 | 38 | 121 | 29 | 154,9 | 253 | 260 | 300 | 318 | 32 | 57 | 32 | 86 | 293 | 86 | 121 |
| **200** | 115 | M30x2 | 240 | 1 1/4" | 25 | 33 | 76 | 76 | 122 | 190 | 39 | 44 | 169 | 35 | 190,2 | 300 | 311 | 360 | 381 | 32 | 57 | 32 | 92 | 353 | 98 | 157 |

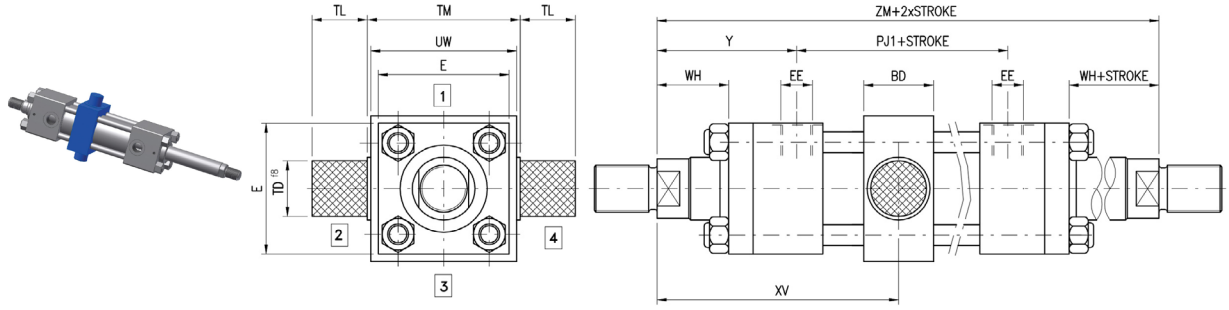
** On bores 25 and 32 the head is increased by 5mm to house the connection.*

# OA ISO type MT1

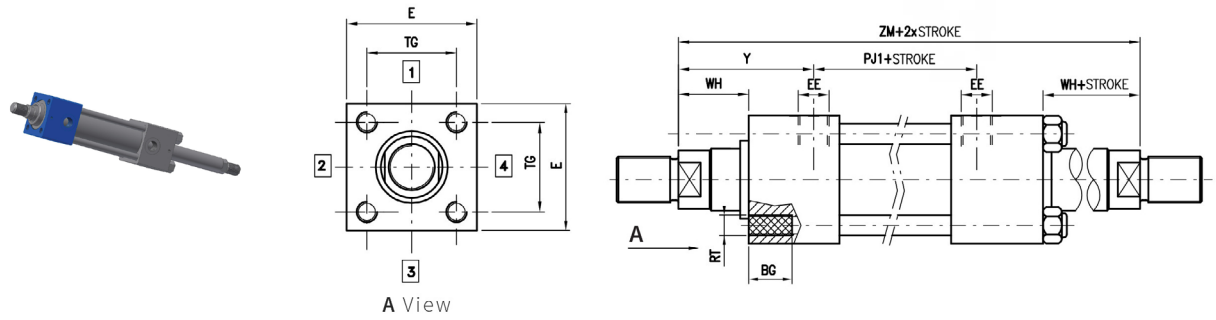



*Note: for bores 100 to 200 the head and the flange consist in one single piece and the tie rods are screwed directly on the head.*

# OI ISO type MT4




# ZA ISO type MX5




| BORE | BD | BG min | E | EE | RT | TC | TD | TG | TL | TM | UW | WH | XG | XV min | XV max | ZM | Y | PJ1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **25** | 20 | 8 | 40* | 1/4" | M5x0,8 | 38 | 12 | 28,3 | 10 | 48 | 46 | 15 | 44 | 82 | 72 + stroke | 154 | 50 | 54 |
| **32** | 25 | 9 | 45* | 1/4" | M6x1 | 44 | 16 | 33,2 | 12 | 55 | 53 | 25 | 54 | 96 | 82 + stroke | 178 | 60 | 58 |
| **40** | 30 | 12 | 60 | 3/8" | M8x1,25 | 63 | 20 | 41,7 | 16 | 76 | 74 | 25 | 57 | 107 | 88 + stroke | 195 | 62 | 71 |
| **50** | 40 | 18 | 75 | 1/2" | M12x1,75 | 76 | 25 | 52,3 | 20 | 89 | 87 | 25 | 64 | 117 | 90 + stroke | 207 | 67 | 73 |
| **63** | 40 | 18 | 90 | 1/2" | M12x1,75 | 89 | 32 | 64,3 | 25 | 100 | 98 | 32 | 70 | 132 | 91 + stroke | 223 | 71 | 81 |
| **80** | 48 | 24 | 115 | 3/4" | M16x2 | 114 | 40 | 82,7 | 32 | 127 | 125 | 31 | 76 | 147 | 99 + stroke | 246 | 77 | 92 |
| **100** | 58 | 24 | 126 | 3/4" | M16X2 | 127 | 50 | 96,9 | 40 | 140 | 138 | 35 | 71 | 158 | 107 + stroke | 265 | 82 | 101 |
| **125** | 68 | 27 | 165 | 1" | M22x2,5 | 165 | 63 | 125,9 | 50 | 178 | 175 | 35 | 75 | 180 | 109 + stroke | 289 | 86 | 117 |
| **160** | 88 | 32 | 196 | 1" | M27x3 | 203 | 80 | 154,9 | 63 | 215 | 212 | 32 | 75 | 198 | 104 + stroke | 293 | 86 | 121 |
| **200** | 108 | 40 | 240 | 1 1/4" | M30x3,5 | 241 | 100 | 190,2 | 80 | 279 | 276 | 32 | 85 | 226 | 125 + stroke | 353 | 98 | 157 |

** On bores 25 and 32 the head is increased by 5mm to house the connection.*

# EXAMPLE OF ORDER ACRONYM

## CH/40/28/0/100/OI01A0000000Q1000R100000XV...

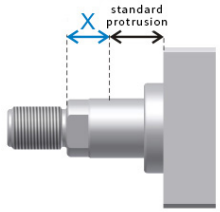
| CHARACTERISTIC | DESCRIPTION | SYM. | EXAMPLE |
|---|---|---|---|
| SERIES | Tie rod execution | CH | **CH**/ |
| BORE | Indicate mm | | CH/**40**/ |
| ROD | Indicate mm | | CH/40/**28**/ |
| ROD N°2 | Indicate mm (piston rod only) | | CH/40/28/**0**/ |
| STROKE | Indicate mm | | CH/40/28/0/**100**/ |
| EXECUTION | Rear + front protruding tie rods - MX1 | AP | CH/40/28/0/100/**OI** |
| | Front flange - ME5 | FA | |
| | Rear flange - ME6 | FP | |
| | Feet - MS2 | PI | |
| | Female hinge - MP1 | CF | |
| | Male hinge - MP3 | CM | |
| | Joint hinge -MP5 | CS | |
| | Front trunnion - MT1 | OA | |
| | Intermediate trunnion - MT4 | OI | |
| | Rear trunnion - MT2 | OP | |
| | Front protruding tie rods MX3 | TA | |
| | Rear protruding tie rods - MX2 | TP | |
| | Front treaded holes - MX5 | ZA | |
| | Rear treaded holes - MX6 | ZP | |
| CUSHIONING | None | 0 | CH/40/28/0/100/OI**0** |
| | Front cushioning | 1 | |
| | Rear cushioning | 2 | |
| | Front + rear cushioning | 3 | |
| SPACER | None | 0 | CH/40/28/0/100/OI0**1** |
| | 50 mm | 1 | |
| | 100 mm | 2 | |
| | 150 mm | 3 | |
| | 200 mm | 4 | |
| SEALS | Polyurethane (standard) | A | CH/40/28/0/100/OI01**A** |
| | Nitrile + PTFE (anti-friction) | B | |
| | Viton + PTFE (high temperatures) | C | |
| | Nitrile+carbographite(anti-friction water glycol) | E | |
| 1° ROD ENDS | Type M (standard) | 0 | CH/40/28/0/100/OI01A**0** |
| | Type D | D | |
| | Type F | F | |
| | Hammer head | U | |
| 2° ROD ENDS | Type M (standard) | 0 | CH/40/28/0/100/OI01A0**0** |
| | Type D | D | |
| | Type F | F | |
| | Hammer head | U | |
| AIR BLEEDS | None | 0 | CH/40/28/0/100/OI01A00**0** |
| | Front | G | |
| | Rear | H | |
| | Front + rear | I | |
| DOUBLE ROD SEAL | None | 0 | CH/40/28/0/100/OI01A000**0** |
| | Double rod seal | L | |
| DRAINAGE | None | 0 | CH/40/28/0/100/OI01A0000**0** |
| | Rod side | W | |

| CHARACTERISTIC | DESCRIPTION | SYM. | EXAMPLE |
|---|---|---|---|
| ROD TREATMENT | None | **0** | CH/40/28/0/100/OI01A00000**0** |
| | Heavy chromium-plated, 0.045mm thick, 100h salt mist ISO 3768 | **P** | |
| | Hardening and chromium-plating | **T** | |
| | Ni-CROMAX30 chromium-plated, nickelplated, ASTM B 117 1000h | **N** | |
| PROXIM. SENSORS | None | **0** | CH/40/28/0/100/OI01A0000000**0** |
| | Front | **X1** | |
| | Rear | **X2** | |
| | Front + rear | **X3** | |

| | | | | | |
|---|---|---|---|---|---|
| **FRONT HEAD** | | | | | |
| POS. OIL PORTS | Side **1** | Side **2** | Side **3** | Side **4** | CH/40/28/0/100/OI01A0000000**Q1** |
| POS. CUSHIONING | **0** if not requested | | | | CH/40/28/0/100/OI01A0000000Q1**0** |
| | Side **1** | Side **2** | Side **3** | Side **4** | |
| POS. AIR BLEED | **0** if not requested | | | | CH/40/28/0/100/OI01A0000000Q10**0** |
| | Side **1** | Side **2** | Side **3** | Side **4** | |
| POS. SENSOR | **0** if not requested | | | | CH/40/28/0/100/OI01A0000000Q100**0** |
| | Side **1** | Side **2** | Side **3** | Side **4** | |
| **REAR HEAD** | | | | | |
| POS. OIL PORTS | Side **1** | Side **2** | Side **3** | Side **4** | CH/40/28/0/100/OI01A0000000Q1000**R1** |
| POS. CUSHIONING | **0** if not requested | | | | CH/40/28/0/100/OI01A0000000Q1000R1**0** |
| | Side **1** | Side **2** | Side **3** | Side **4** | |
| POS. AIR BLEED | **0** if not requested | | | | CH/40/28/0/100/OI01A0000000Q1000R10**0** |
| | Side **1** | Side **2** | Side **3** | Side **4** | |
| POS. SENSOR | **0** if not requested | | | | CH/40/28/0/100/OI01A0000000Q1000R100**0** |
| | Side **1** | Side **2** | Side **3** | Side **4** | |
| *EXTRA ROD N°1 X1 QUOTE | Indicate mm | | | | CH/40/28/0/100/OI01A0000000Q1000R1000**0** |
| *EXTRA ROD N°2 X2 QUOTE | Indicate mm | | | | CH/40/28/0/100/OI01A0000000Q1000R10000**0** |
| XV QUOTE | Indicate mm (only version MT4) | | | | CH/40/28/0/100/OI01A0000000Q1000R100000**XV...** |

| | | | |
|---|---|---|---|
| **OPTIONS** | | | |
| HYDRAULIC PLATE | ISO Cetop 03 | **NG03** | *if requested, indicate at the end of the code* CH/40/28/0/100/OI01A0000000Q1000R100000XV.../**NG03** |
| | ISO Cetop 05 | **NG05** | |

**Specify the possible extra-rod (X) size in addition to the standard rod protrusion:*




***For further information on connections position, air bleeds and standard cushioning adjustment see paragraph 1.6.***

**Login at: http://configuratore.grices.it/**
Configure your cylinder in a quick and intuitive way choosing all the available options.

## Note

The indicated operating pressures are efficient for smooth applications without blows. For extreme loads or high operating pressures with high frequency, is necessary to use mounting styles and thread-rod links designed to be stress-resistant.
*For further information contact our Technical Department.*