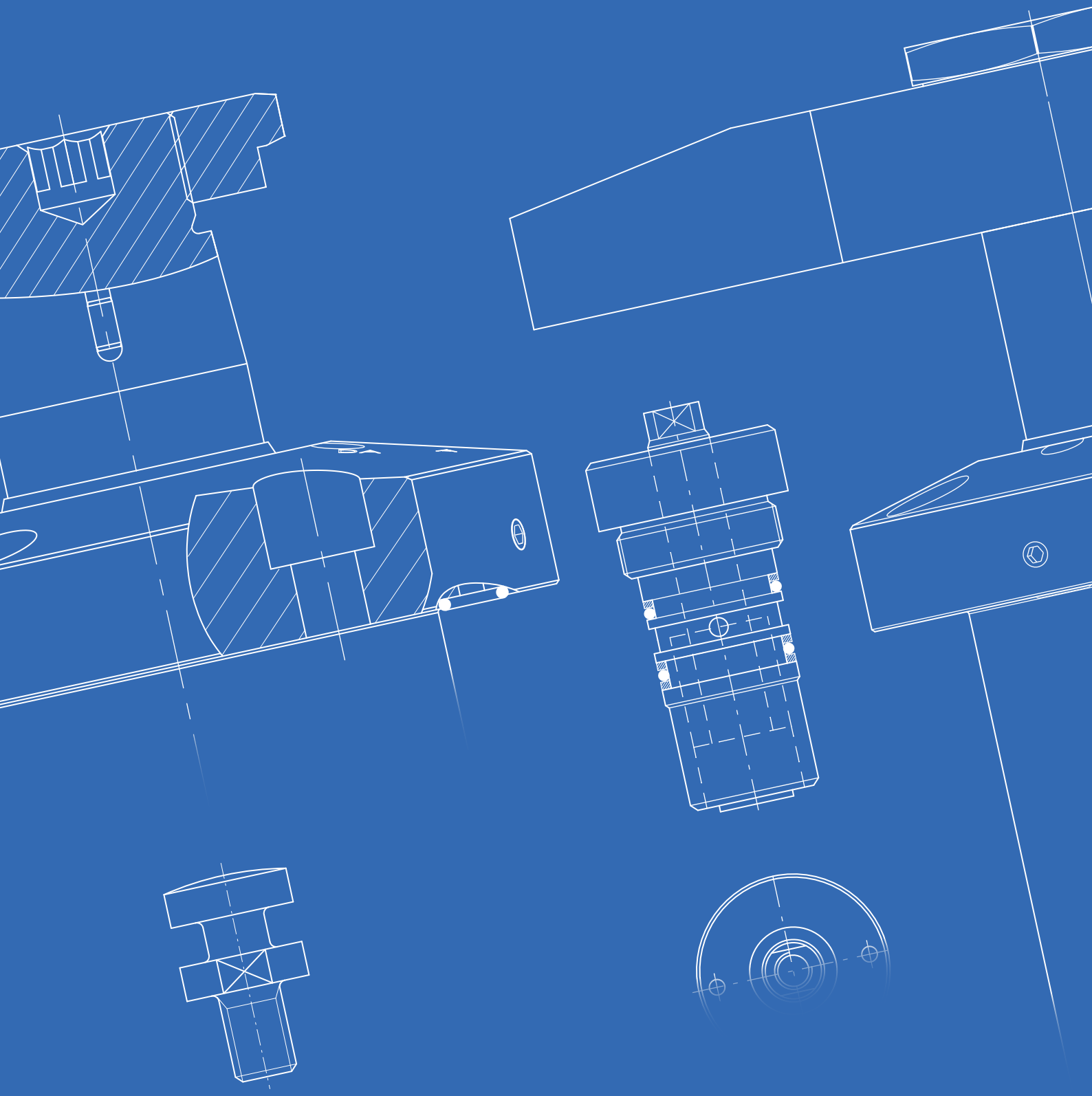
micromat

WIR GEBEN HALT!



# CATALOG

micromat
WIR GEBEN HALT!

YOUR RELIABLE PARTNER FOR

# CLAMPING TECHNOLOGY

# CYLINDER TECHNOLOGY

# CUSTOM-MADE PRODUCTS

AND

# ACCESSORIES

# YOUR RELIABLE PARTNER

# FOR HYDRAULIC CLAMPING SOLUTIONS

Since 1989 we have been developing and manufacturing high quality hydraulic clamping elements in Germany for our customers world wide.

MICROMAT products are mainly used in the area of tool construction, equipment construction, machine constructions, casting technology and the automotive industry internationally.

Every day we are working to offer you the best possible service in the shortest time and make innovative solutions available to you for fast provision of data. Our goal is to offer our customers, in a cooperative partnership, a customized solution. No matter which branch you are from or whether you are a wholesaler – challenge us! We are here for you!

VOITH

Voith Turbo H+L
Hydraulik GmbH
Rutesheim

Micromat
Spannhydraulik GmbH
Rutesheim

QUIRI

Duttlenheim
France

## 2019

Online swing clamp configurator
**In 9 steps to the desired swing clamp**

## 2014

Cooperation with the Quiri Group in Duttlenheim, France

## 2004

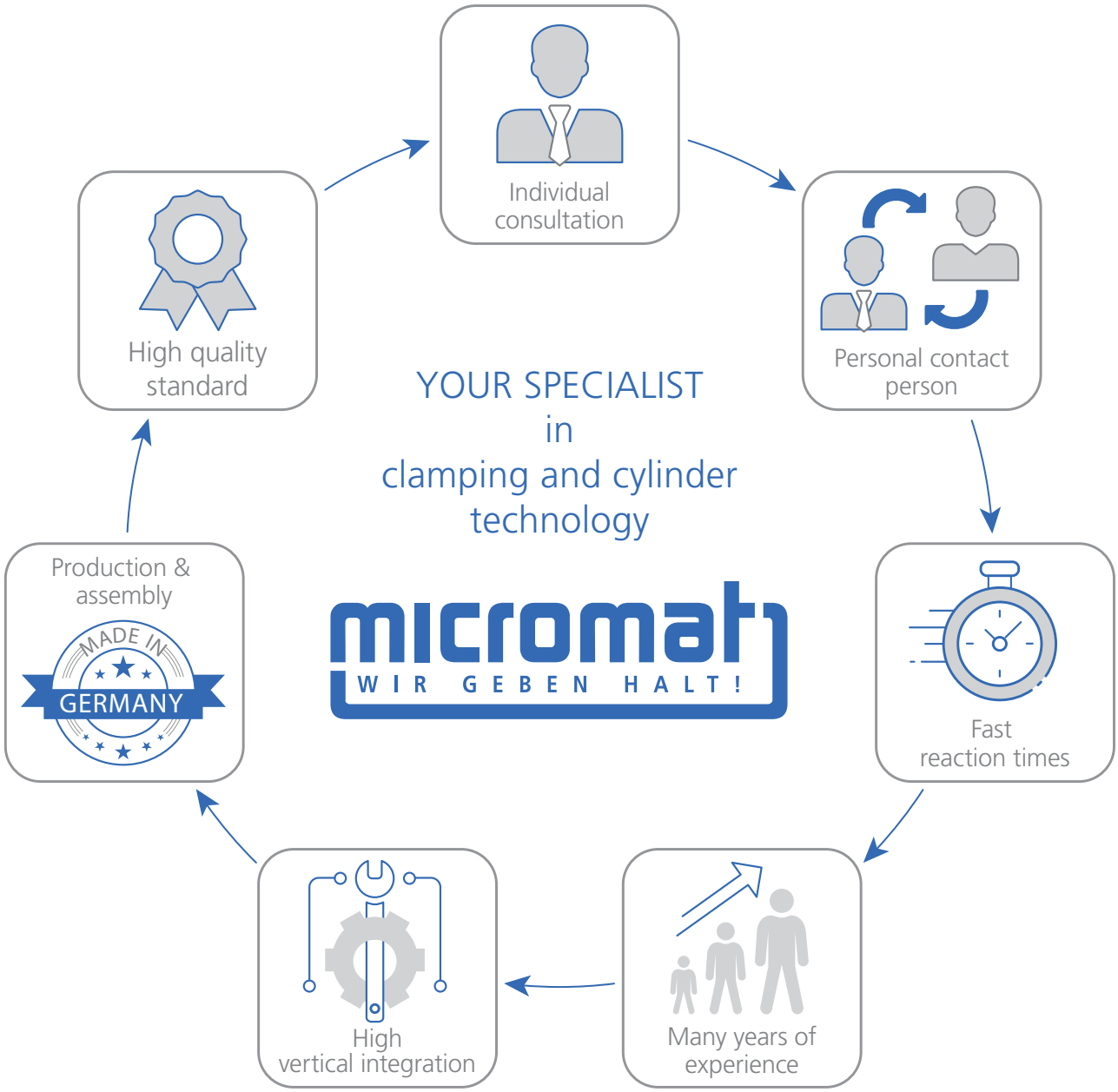
Merger with Voith H+L Hydraulik GmbH in Rutesheim, Germany and move to new headquarters on Siemensstraße 15, Rutesheim, Germany 71277

## 1991

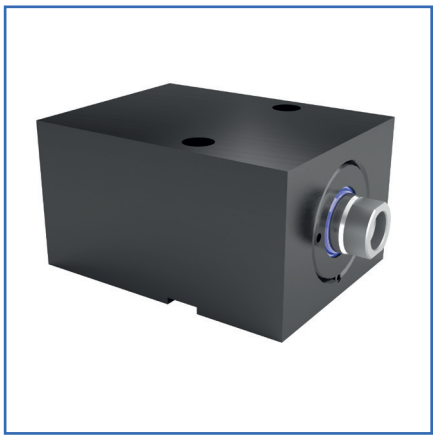
New construction and move into the building on Dieselstraße 10, Malmsheim, Germany 71272

## 1989

Company founding in a garage in 71272 Malmsheim by the present Managing Director


Individual consultation
Personal contact person
Fast reaction times
Many years of experience
High vertical integration
Production & assembly
MADE IN GERMANY
High quality standard
YOUR SPECIALIST in clamping and cylinder technology
micromat
WIR GEBEN HALT!

## CLAMPING TECHNOLOGY



## CYLINDER TECHNOLOGY

## CUSTOM-MADE PRODUCTS

## ACCESSORIES

micromat
WIR GEBEN HALT!

# SWING CLAMP

## WITHOUT SWIVEL STROKE

## HOW DO YOU CONFIGURE YOUR SWING CLAMP?

In the following you will find a simplified overview for putting together our products.
For more information and our online configurator, please go to our website www.micromat.de

### 1 How is the swing clamp flanged?

Select a housing shape.

M ☐☐☐

### 2 What type of clamping arm is used?

Select a head shape.

M620 - ☐

### 3 What clamping force is required?

Select the size.

M620 - K1:10 - ☐

### 4 Which stroke is required?

Select the linear stroke.

M620 - K1:10 - 018 - ☐

### 5 Should the clamping arm be indexed?

**Select an indexing (only cone design).**

If no indexing is selected, continue to 7.

M620 - K1:10 - 018 - 08 - ☐

### 6 Where will it be clamped?

Select the clamping point.

***M620 - K1:10 - 018 - 08 - X - ☐**

### 7 In which direction should it be swiveled?

Select the swivel direction for to the clamping point.

***M610 - K1:10 - 018 - 08 - X - 0 - ☐**

M610 - K1:10 - 018 - 08 - 0 - ☐

### 8 How far should the clamping arm swivel?

Select the swivel angle from the clamping point.

***M620 - K1:10 - 018 - 08 - X - 0 - L - ☐**

M620 - K1:10 - 018 - 08 - 0 - L - ☐

### 9 Additional protection with hot chips?

Select the type of stripper.

***M620 - K1:10 - 018 - 08 - X - 0 - L 45 - ☐**

M620 - K1:10 - 018 - 08 - 0 - L 45 - ☐

**Your order designation:** **M620 - K1:10 - 018 - 08 - X - 0 - L 45 - M**

M620 - K1:10 - 018 - 08 - 0 - L 45

*** With indexing.**

| ID | DESCRIPTION |
|---|---|
| Housing shape | M600 = Head flange with male threads and pipe thread connection<br>M620 = Head flange with O-ring connection<br>M630 = Base flange with O-ring connection<br>M640 = Block construction with O-ring connection<br>M650 = Cartridge design<br>M680 = Head flange with O-ring connection |
| Head shape | K1:10 = Head cone 1:10<br>K15 = Head cone 15°<br>PA = Pendulum eye head<br>GK = Rod clevis head |
| Size (piston Ø in mm) | 018<br>025<br>028<br>036<br>042 |
| Linear stroke | 8 mm (only size 18)<br>12 mm<br>15 mm (only size 18)<br>25 mm<br>30 mm (only size 18)<br>40 mm |
| Indexing | Empty = No indexing<br>X = Indexing |
| Clamping point | From -90° to +90° (1° increments) |
| Swivel direction | L = left R = right |
| Swivel angle | Swivel angle 0°–90° (1 ° increments) |
| Metal stripper | Empty = no metal stripper, M = Metal stripper |

## GENERAL DESCRIPTION

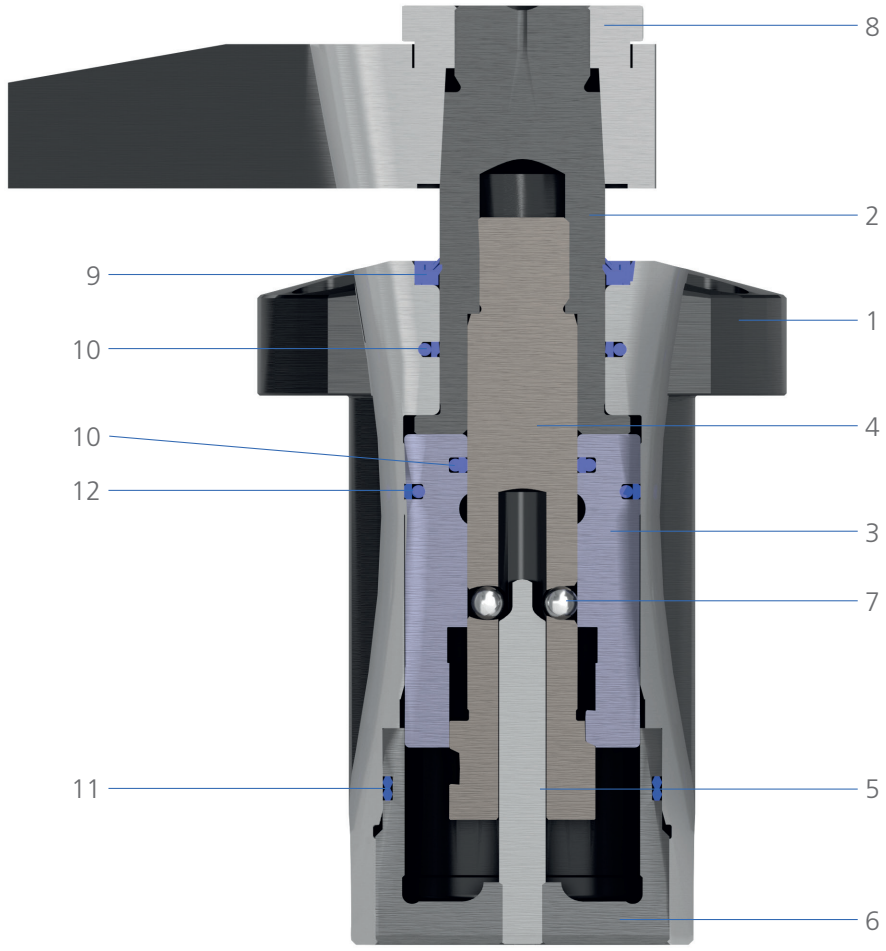
Swivel clamp cylinders enable fast and problem-free placing and removal of the workpiece, since the clamping locations are free in the relaxed condition of the cylinder. Due to the reduction of the throughput times resulting from this, the efficiency of the production process is increased.

Micromat Swivel Clamps do not cause any axial movement during the swivel movement. This reduces the requires space for the swivel process to a minimum. Thus it is also possible, for example, to swing in small spaces and to clamp workpieces even in closely spaced grooves.

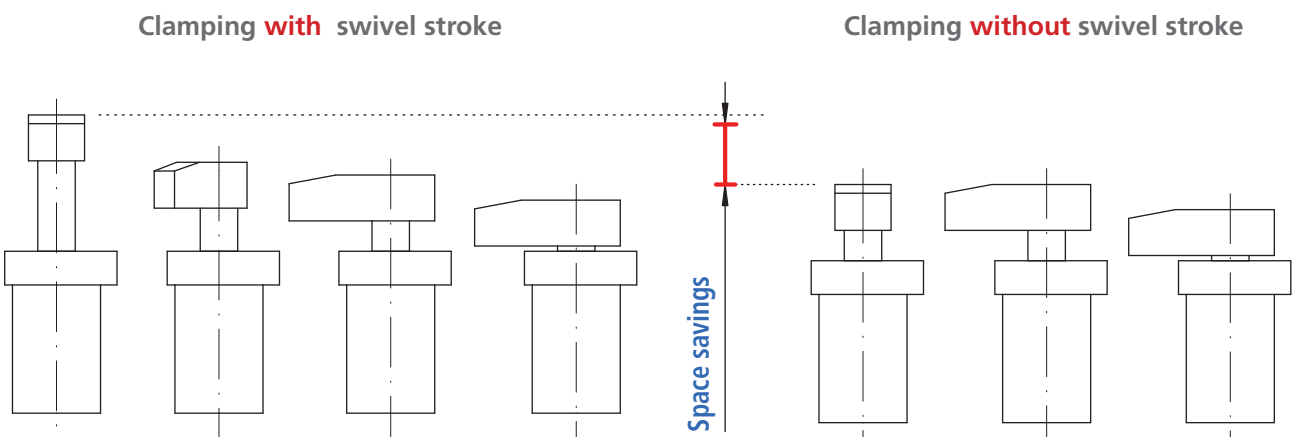
## STRUCTURE OF THE SWING CLAMP

- Housing bronzed, piston rod guide induction hardened
- Piston ARCOR treated
- Swing clamps are equipped with ventilation screws (not all sizes)
- Very stable swiveling system
- All swing clamps are available with clamping arm indexing.

1 Swing clamp housing
2 Arcor pistons (with or without indexing)
3 Swivel ring
4 Swivel pistons
5 Ball guide
6 Screwed connection
7 Steel ball
8 Tensioning arm nut
9 Stripper
10 Rod seals
11 Static seal
12 Piston seal



## SPECIAL FEATURE OF THIS SYSTEM




Swivel Clamps without swivel stroke do not cause any axial movement during the swivel movement. This reduces the requires space for the swivel process to a minimum. Thanks to swiveling at the level, It is no problem to swing in and clamp workpieces in small spaces or closely spaced ribs.

Furthermore, Micromat swing clamps without swivel stroke offer an integrated safety system during overhead processing. The clamp executes its axial movement with a sudden drop in pressure in the hydraulic system. The mechanical block of the rotation prevents the unscrewing of the cylinder and the workpiece falling out.

## FUNCTIONAL PRINCIPLE OF SWING CLAMP WITHOUT SWING STROKE

If pressure is applied to the swing clamp at connection A, first a special grooved swivel ring moves down and causes a rotating movement of the piston. During this rotating movement the piston is mechanically blocked in the axial direction by steel balls. As soon as the swivel ring has reached its end position and therefore the swivel movement of the piston has stopped, the lock is released – the piston can now execute its clamping stroke downward. When releasing the function is executed exactly in reverse. The piston first moves in the axial direction upward and then swivels back into its initial position.

**Due to the unique design of the MICROMAT swivel clamp and the hydraulic-mechanical separated function of the rotation movement and linear stroke, the “fall protection” is already integrated into the swing clamp and thus offers the highest degree of safety.**

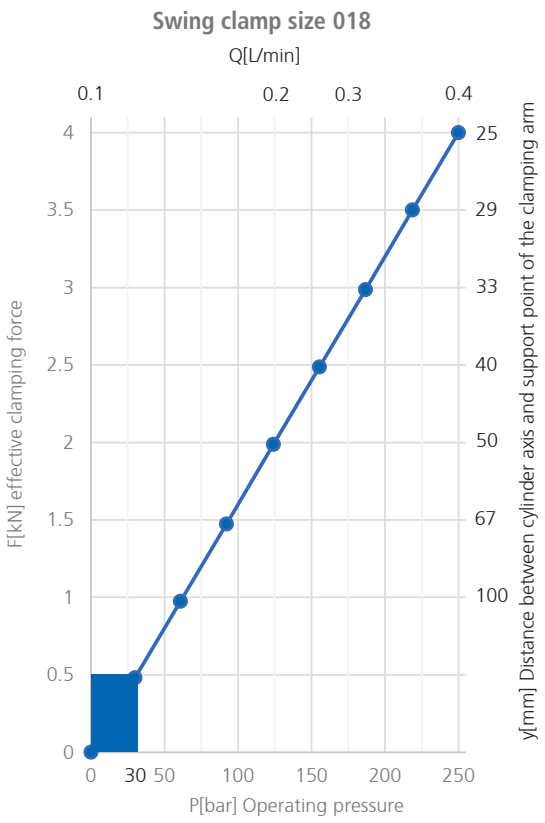
## TECHNICAL VALUES

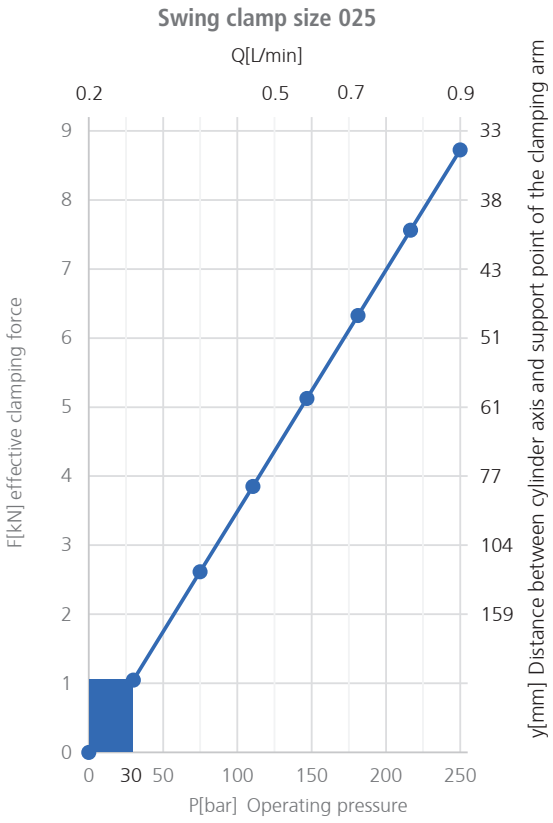
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rod diameter | mm | 18 | | | 25 | | | 36 | | | 42 | |
| Piston diameter | mm | 25 | | | 35 | | | 50 | | | 60 | |
| Swivel angle | ° | 0°–90° (1° increments) | | | | | | | | | | |
| Clamping pressure area | cm² | 2.4 | | | 4.7 | | | 9.5 | | | 14.4 | |
| Releasing pressure area | cm² | 4.9 | | | 9.6 | | | 19.6 | | | 28.3 | |
| Clamping volume | cm³ | 5.7 | 7.3 | 10.9 | 14.6 | 20.7 | 27.8 | 40.1 | 52.4 | 66.5 | 70.4 | 89.1 | 110.8 |
| Releasing volume | cm³ | 7.7 | 11.1 | 18.5 | 20.5 | 33 | 47.4 | 52.3 | 77.8 | 107.3 | 87 | 123.8 | 166.2 |
| Volumes are dependent on the size, the linear stroke and the swivel angle. Given here with 90° swivel angle | | | | | | | | | | | | | |
| Axial pressure force at 100 bar without losses | kN | 2.4 | | | 4.7 | | | 9.5 | | | 14.4 | |
| Effective clamping force | kN | See clamping diagram | | | | | | | | | | |
| Maximum allowable volume flow | l/min | 0.4 | | | 0.9 | | | 2 | | | 3 | |
| Maximum pressure | bar | 250* | | | | | | | | | | |
| Minimum pressure | bar | 30 | | | | | | | | | | |
| Maximum temperature | °C | 70** | | | | | | | | | | |

* Maximum pressure of 250 bar only with short clamping arm (see clamping diagram)

** For temperatures above 70°C, please contact us.

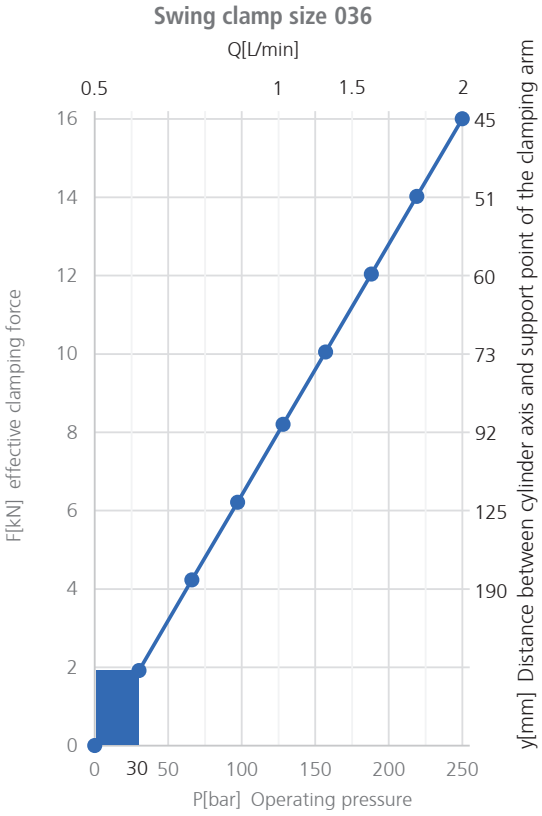
## CLAMPING DIAGRAM

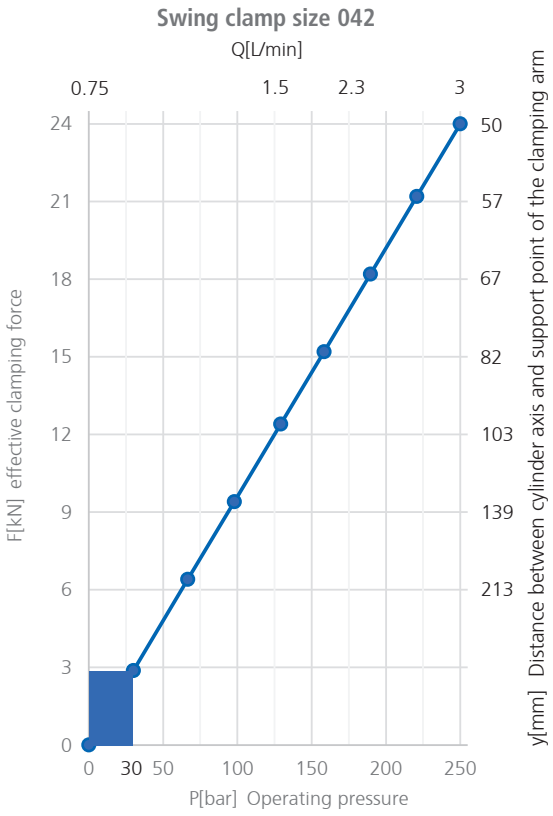



The maximum allowable operating pressure and the resulting effective clamping force and the volume flow are dependent on the clamping arm length.

# CLAMPING DIAGRAM



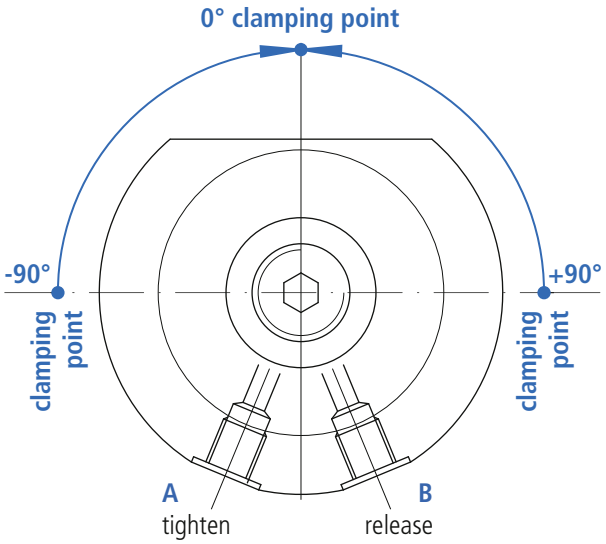

The maximum forces are given for a pressure of 250 bar. This pressure is only allowed for the shortest clamping arm. The maximum clamping force (as well as the maximum pressure) decrease proportionally to the lengthening of the clamping arm. The maximum allowable volume flow (speed during extension or retraction) decreases with the inertia of the clamping arm.

*For standard clamping arms please follow the values of the diagram.*

*For the use of custom clamping arms please contact us.*

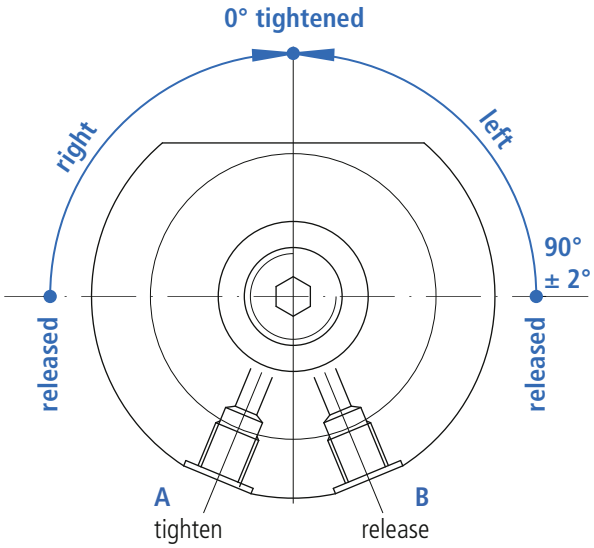
## LOCATION OF CLAMPING POINT

The named clamping point can, as shown in the illustration, be selected between +90° and -90° (1° increments).




## SWIVEL DIRECTION AND ANGLE OF ROTATION

The named swivel direction is defined by the movement from tensioned to released state, view from above (rod side)




Swivel direction right = clockwise

Swivel direction left = counterclockwise

The angle of rotation in this view is: 90° ± 2°.

All angles of rotation between 0° and 90° can be selected (1° increments). The selection of the swivel angle can always be selected from 0° to 90° regardless of the location of the clamping point.

## INDEXING

When selecting with indexing a cylinder pin is placed at the desired location of the piston.

Thus the clamping arm is secured against twisting.

## METAL STRIPPER

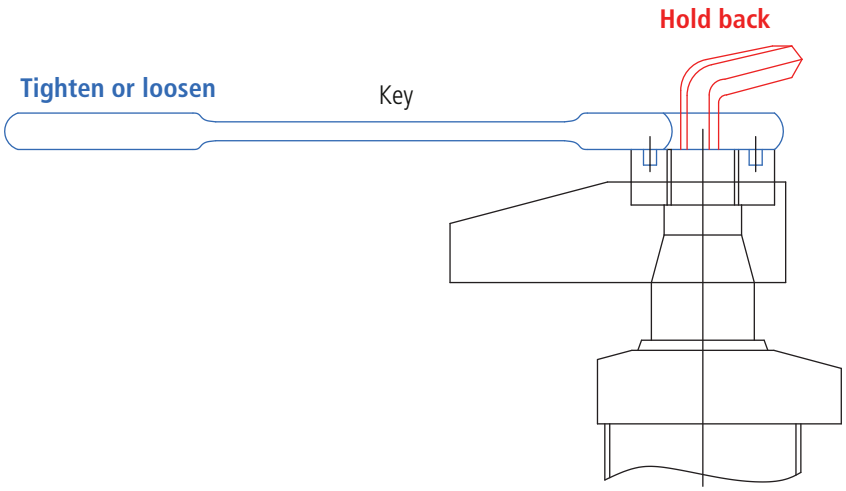
The MICROMAT- swing clamp is supplied standard with a PU stripper. This has high chemical resistance against most cooling and cutting emulsions. A metal stripper can be used optionally for all housing shapes.

The metal stripper is then used if the stripper must be protected from coarse or hot chips.

This is selected in the last step of the swing clamp configuration.

# CLAMPING ARM ASSEMBLY

The upper end of the rod is designed for the fastening of the clamping arm with cone and threads. During the assembly of the clamping arm, the piston rod must absolutely be held back so that the torque does not damage the internal mechanism.



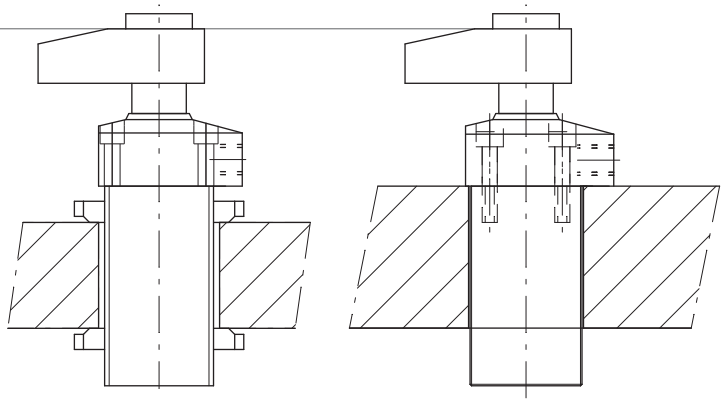

**There are two options for doing this:**

– hold back the piston rod with the aid of an Allen wrench (see figure)
– clamp the clamping arm in a vise and tighten the nut.

## M600

**Fastening:** Grooved nut or
4 screws on head flange

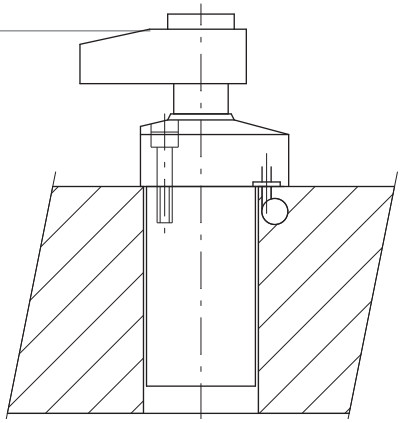
**Provision:** Pipe thread connection



## M620

**Fastening:** 4 screws on head flange

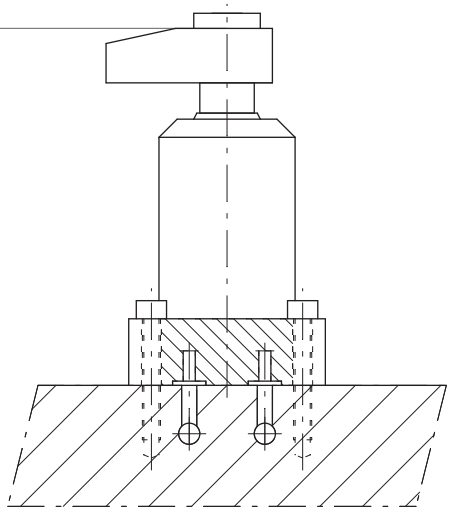
**Provision:** O-ring seat in head flange



## M630

**Fastening:** 4 screws on base flange

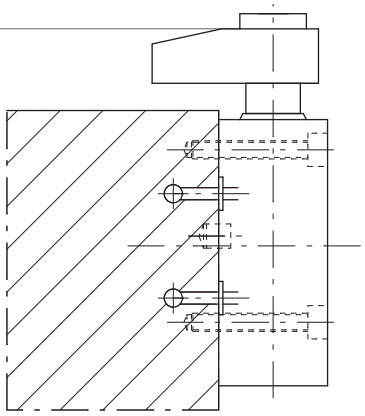
**Provision:** O-ring seat in base flange



## M640

**Fastening:** 4 screws on housing

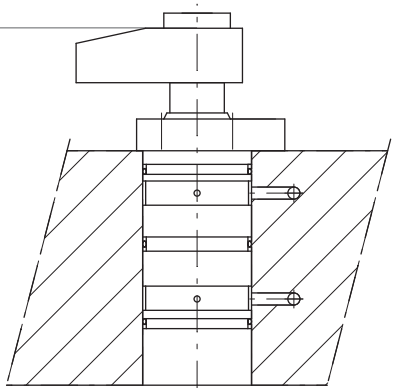
**Provision:** O-ring seat on the housing side



## M650

**Fastening:** 4 screws on head flange

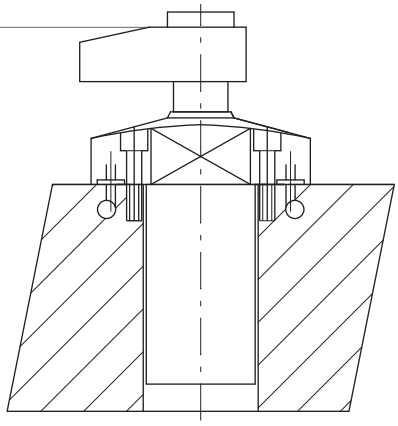
**Provision:** Installation design
(Cartridge design)



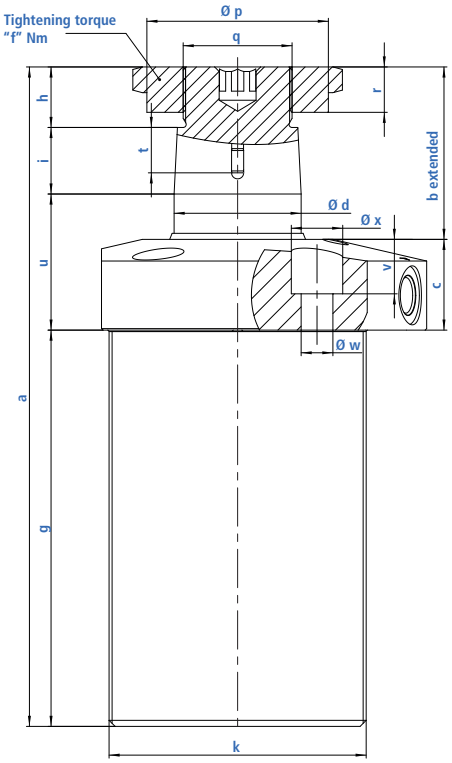
## M680

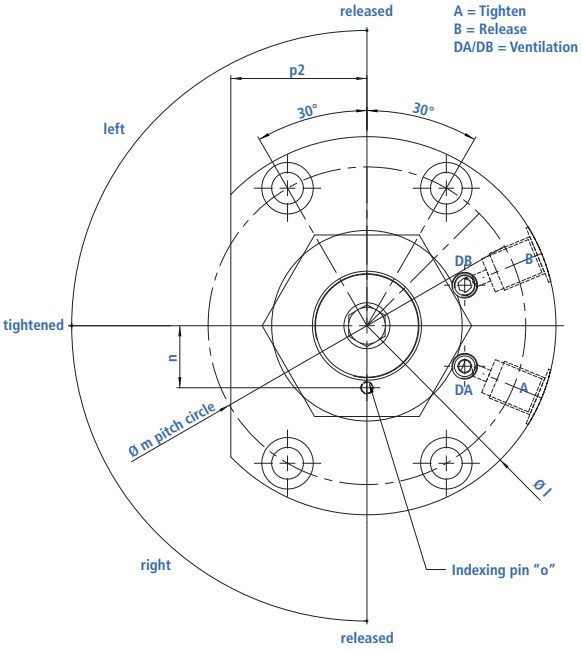
**Fastening:** 4 screws on head flange

**Provision:** O-ring seat in head flange



## HEAD SHAPE CONE 1:10



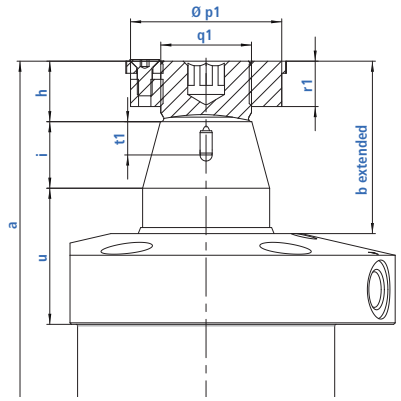




## FEATURES

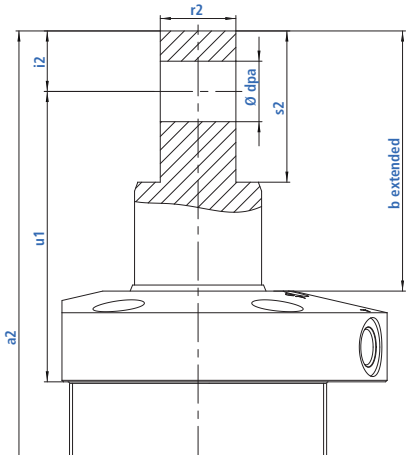
- Cylindrical housing with male threads, head flange and 4 fastening bores
- Pipe thread connections on the side
- 4 sizes with 3 stroke areas each
- 4 Standard shapes available
- Swivel angle between 0° and 90° in 1° increments available as standard
- No swivel stroke
- With or without indexing available (only with cone design)
- Direction of rotation can be selected right or left
- Clamping point freely selectable (Cone design with indexing, rod clevis and pendulum eye)

## OTHER STANDARD HEAD SHAPES

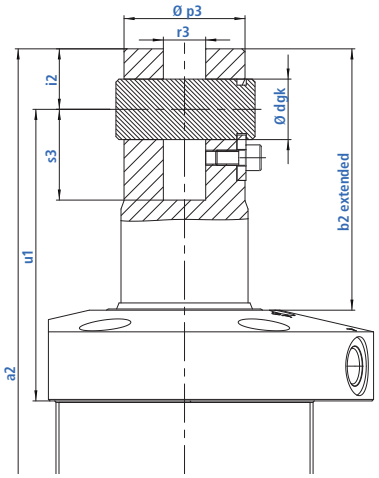
### Cone 15°




### Pendulum eye




### Rod clevis




*All dimensions in extended state.* *2D and 3D data is found at: https://micromat.partcommunity.com*

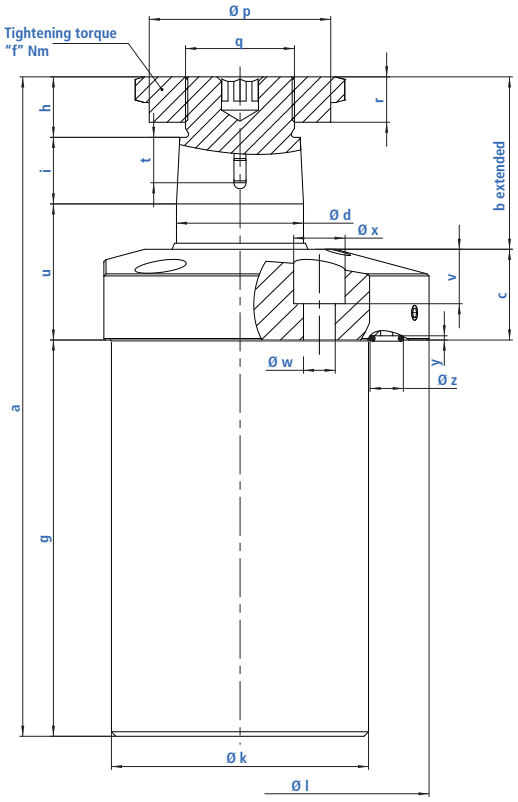
# GENERAL DATA M600

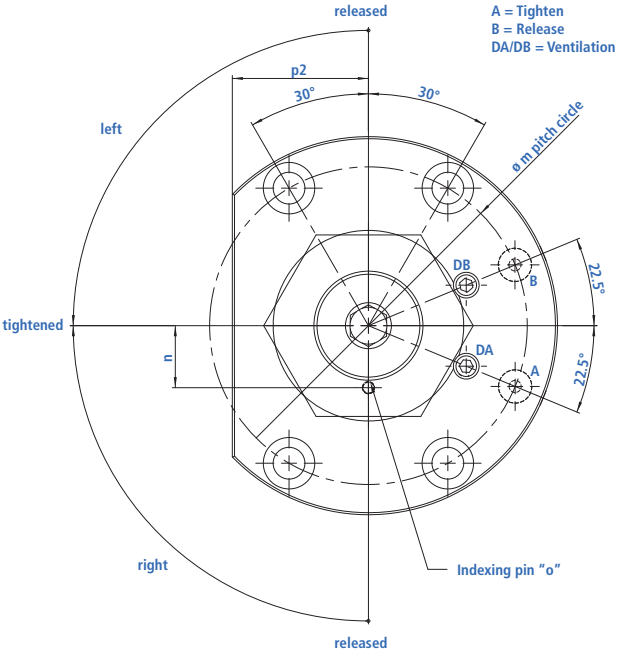
| Size | mm | 018 | | | 025 | | | 036 | | | 042 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stroke length | mm | 8 | 15 | 30 | 12 | 25 | 40 | 12 | 25 | 40 | 12 | 25 | 40 |
| Swivel stroke | mm | 0 | | | 0 | | | 0 | | | 0 | | |
| Rod diameter | mm | 18 | | | 25 | | | 36 | | | 42 | | |
| Piston diameter | mm | 25 | | | 35 | | | 50 | | | 60 | | |
| Swivel angle | ° | 0°–90° (1° increments) | | | | | | | | | | | |
| A/B | | G1/8" | | | G1/4" | | | G1/4" | | | G1/4" | | |
| c | mm | 22 | | | 26 | | | 28 | | | 30 | | |
| Ø d | mm | 18 | | | 25 | | | 36 | | | 42 | | |
| Stroke e Stroke length selectable in 1 mm increments (exterior dimension remains the same) | mm | 4–8 | 9–15 | 16–30 | 12–7 | 13–25 | 26–40 | 12–7 | 13–25 | 26–40 | 12–7 | 13–25 | 26–40 |
| f | Nm | 20 | | | 50 | | | 140 | | | 270 | | |
| g | mm | 66 | 80 | 110 | 81 | 107 | 137 | 114 | 140 | 170 | 131 | 157 | 187 |
| k | mm | M36 x 1.5 | | | M52 x 1.5 | | | M72 x 2 | | | M85 x 2 | | |
| l | mm | 58 | | | 76 | | | 110 | | | 125 | | |
| m | mm | 47 | | | 63 | | | 90 | | | 105 | | |
| n | mm | 9.3 | | | 12.8 | | | 17.5 | | | 20.5 | | |
| o | mm | ø 3x5 | | | ø 3x5 | | | ø 4x8 | | | ø 4x8 | | |
| p2 | mm | 20 | | | 28 | | | 38 | | | 45 | | |
| v | mm | 9 | | | 10 | | | 17 | | | 18 | | |
| Ø w | mm | 5.5 | | | 6.5 | | | 10.5 | | | 10.5 | | |
| x | mm | 50 | | | 65 | | | 86 | | | 96 | | |

| Design head shape | | CONE 1:10 & CONE 15° | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| a | mm | 121 | 142 | 187 | 152 | 191 | 236 | 195 | 234 | 279 | 218 | 257 | 302 |
| b extended | mm | 33 | 40 | 55 | 45 | 58 | 73 | 53 | 66 | 81 | 57 | 70 | 85 |
| h | mm | 13 | | | 16 | | | 18 | | | 20 | | |
| i | mm | 10 | | | 14 | | | 20 | | | 22 | | |
| Ø p | mm | 24 | | | 32 | | | 46 | | | 60 | | |
| Ø p1 | mm | 22 | | | 30 | | | 40 | | | 50 | | |
| q | mm | M16 x 1.5 | | | M22 x 1.5 | | | M30 x 1.5 | | | M36 x 1.5 | | |
| q1 | mm | M12 x 1.5 | | | M16 x 1.5 | | | M24 x 1.5 | | | M30 x 1.5 | | |
| r | mm | 9 | | | 10.7 | | | 13 | | | 15 | | |
| r1 | mm | 8.4 | | | 10.6 | | | 12.5 | | | 15 | | |
| t | mm | 8 | | | 12 | | | 13 | | | 15 | | |
| t1 | mm | 8 | | | 8 | | | 11 | | | 11 | | |
| u | mm | 32 | 39 | 54 | 41 | 54 | 69 | 43 | 56 | 71 | 45 | 58 | 73 |

| Design head shape | | PENDULUM EYE & ROD CLEVIS | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| a2 | mm | 125 | 146 | 191 | 160 | 199 | 244 | 215 | 254 | 299 | 234 | 273 | 318 |
| b2 extended | mm | 37 | 44 | 59 | 53 | 66 | 81 | 73 | 86 | 101 | 73 | 86 | 101 |
| Ø $d_{pa}$ | mm | 8H8 | | | 12H8 | | | 16H8 | | | 20H8 | | |
| Ø $d_{gk}$ | mm | 8g6 | | | 12g6 | | | 14g6 | | | 20g6 | | |
| i2 | mm | 10 | | | 13 | | | 20 | | | 20 | | |
| Ø p3 | mm | 17.5 | | | 24 | | | 34 | | | 40 | | |
| r2 | mm | 10-0.05 | | | 15-0.05 | | | 25-0.05 | | | 25-0.1 | | |
| r3 | mm | 8+0.01+0.05 | | | 10+0.01+0.05 | | | 12+0.01+0.05 | | | 14+0.01+0.05 | | |
| s2 | mm | 23 | | | 33 | | | 50 | | | 50 | | |
| s3 | mm | 12-0.05 | | | 20-0.05 | | | 30-0.05 | | | 30-0.05 | | |
| u1 | mm | 49 | 56 | 71 | 66 | 79 | 94 | 81 | 94 | 109 | 83 | 96 | 111 |

## HEAD SHAPE CONE 1:10



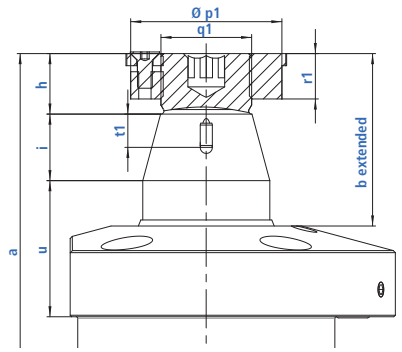




## FEATURES

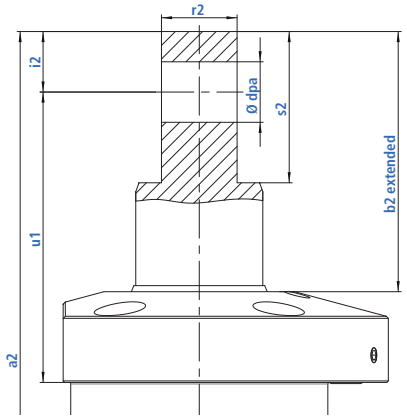
- Cylindrical housing with head flange
- O-ring connections on the flange underside
- 4 sizes with 3 stroke areas each
- 4 Standard shapes available
- Swivel angle between 0° and 90° in 1° increments available as standard
- No swivel stroke
- With or without indexing available (only with cone design)
- Direction of rotation can be selected right or left
- Clamping point freely selectable (Cone design with indexing, rod clevis and pendulum eye)

## OTHER STANDARD HEAD SHAPES

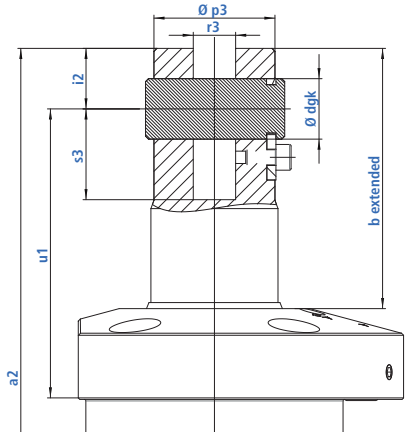
### Cone 15°




### Pendulum eye




### Rod clevis




*All dimensions in extended state.* *2D and 3D data is found at: https://micromat.partcommunity.com*

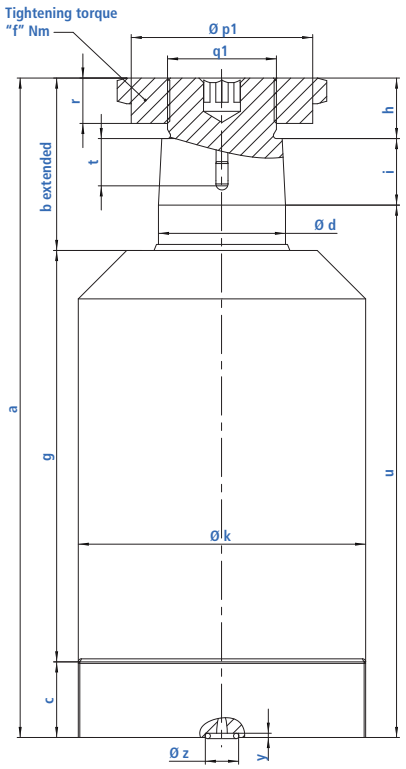
# GENERAL DATA M620

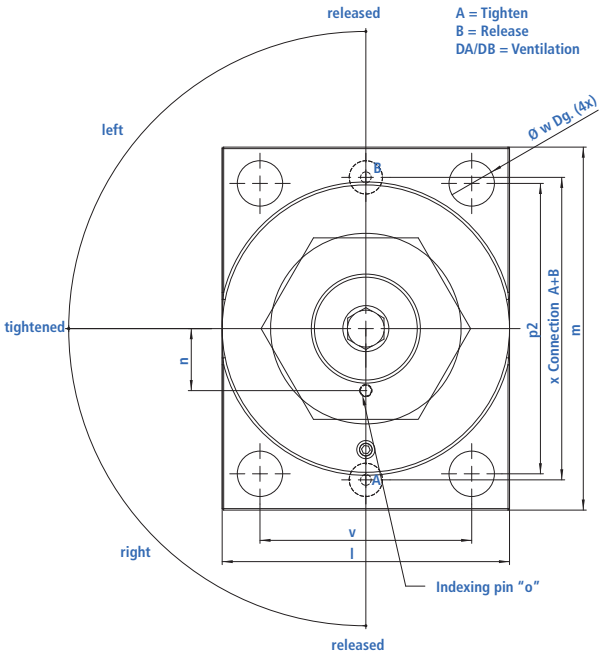
| Size | mm | 018 | | | 025 | | | 036 | | | 042 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stroke length | mm | 8 | 15 | 30 | 12 | 25 | 40 | 12 | 25 | 40 | 12 | 25 | 40 |
| Swivel stroke | mm | 0 | | | 0 | | | 0 | | | 0 | | |
| Rod diameter | mm | 18 | | | 25 | | | 36 | | | 42 | | |
| Piston diameter | mm | 25 | | | 35 | | | 50 | | | 60 | | |
| Swivel angle | ° | 0°–90° (1° increments) | | | | | | | | | | | |
| c | mm | 22 | | | 26 | | | 28 | | | 30 | | |
| Ø d | mm | 18 | | | 25 | | | 36 | | | 42 | | |
| Stroke e Stroke length selectable in 1 mm increments (exterior dimension remains the same) | mm | 4–8 | 9–15 | 16–30 | 12–7 | 13–25 | 26–40 | 12–7 | 13–25 | 26–40 | 12–7 | 13–25 | 26–40 |
| f | Nm | 20 | | | 50 | | | 140 | | | 270 | | |
| g | mm | 66 | 80 | 110 | 81 | 107 | 137 | 114 | 140 | 170 | 131 | 157 | 187 |
| Ø k | mm | 36 | | | 52 | | | 72 | | | 85 | | |
| Ø l | mm | 58 | | | 76 | | | 110 | | | 125 | | |
| Ø m | mm | 47 | | | 63 | | | 90 | | | 105 | | |
| n | mm | 9.3 | | | 12.8 | | | 17.5 | | | 20.5 | | |
| o | mm | ø 3x5 | | | ø 3x5 | | | ø 4x8 | | | ø 4x8 | | |
| p2 | mm | 20 | | | 28 | | | 38 | | | 45 | | |
| v | mm | 9 | | | 10 | | | 17 | | | 18 | | |
| Ø w | mm | 5.5 | | | 6.5 | | | 10.5 | | | 10.5 | | |
| Ø x | mm | 9 | | | 10.5 | | | 17 | | | 17 | | |
| y | mm | 1.4 | | | 1.4 | | | 1.4 | | | 1.4 | | |
| Ø z | mm | 8.8 | | | 8.8 | | | 11 | | | 11 | | |

| Design head shape | | CONE 1:10 & CONE 15° | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| a | mm | 121 | 142 | 187 | 152 | 191 | 236 | 195 | 234 | 279 | 218 | 257 | 302 |
| b extended | mm | 33 | 40 | 55 | 45 | 58 | 73 | 53 | 66 | 81 | 57 | 70 | 85 |
| h | mm | 13 | | | 16 | | | 18 | | | 20 | | |
| i | mm | 10 | | | 14 | | | 20 | | | 22 | | |
| Ø p | mm | 24 | | | 32 | | | 46 | | | 60 | | |
| Ø p1 | mm | 22 | | | 30 | | | 40 | | | 50 | | |
| q | mm | M16 x 1.5 | | | M22 x 1.5 | | | M30 x 1.5 | | | M36 x 1.5 | | |
| q1 | mm | M12 x 1.5 | | | M16 x 1.5 | | | M24 x 1.5 | | | M30 x 1.5 | | |
| r | mm | 9 | | | 10.7 | | | 13 | | | 15 | | |
| r1 | mm | 5.9 | | | 7.3 | | | 12.5 | | | 15 | | |
| t | mm | 8 | | | 12 | | | 13 | | | 15 | | |
| t1 | mm | 8 | | | 8 | | | 11 | | | 11 | | |
| u | mm | 32 | 39 | 54 | 41 | 54 | 69 | 43 | 56 | 71 | 45 | 58 | 73 |

| Design head shape | | PENDULUM EYE & ROD CLEVIS | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| a2 | mm | 125 | 146 | 191 | 160 | 199 | 244 | 215 | 254 | 299 | 234 | 273 | 318 |
| b2 extended | mm | 37 | 44 | 59 | 53 | 66 | 81 | 73 | 86 | 101 | 73 | 86 | 101 |
| Ø $d_{pa}$ | mm | 8H8 | | | 12H8 | | | 16H8 | | | 20H8 | | |
| Ø $d_{gk}$ | mm | 8g6 | | | 12g6 | | | 14g6 | | | 20g6 | | |
| i2 | mm | 10 | | | 13 | | | 20 | | | 20 | | |
| Ø p3 | mm | 17.5 | | | 24 | | | 34 | | | 40 | | |
| r2 | mm | 10-0.05 | | | 15-0.05 | | | 25-0.05 | | | 25-0.1 | | |
| r3 | mm | 8+0.01+0.05 | | | 10+0.01+0.05 | | | 12+0.01+0.05 | | | 14+0.01+0.05 | | |
| s2 | mm | 23 | | | 33 | | | 50 | | | 50 | | |
| s3 | mm | 12-0.05 | | | 20-0.05 | | | 30-0.05 | | | 30-0.05 | | |
| u1 | mm | 49 | 56 | 71 | 66 | 79 | 94 | 81 | 94 | 109 | 83 | 96 | 111 |

## HEAD SHAPE CONE 1:10



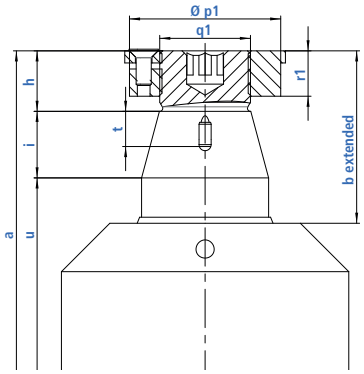




## FEATURES

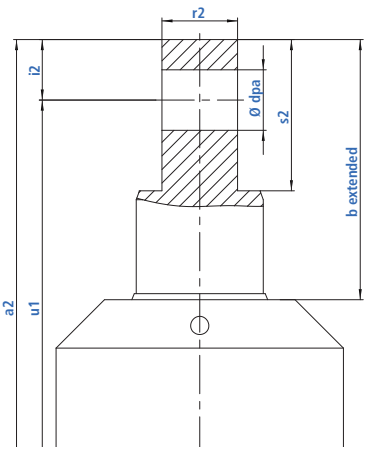
- Cylindrical housing with base flange
- O-ring connections on the flange underside
- 4 sizes with 3 stroke areas each
- 4 Standard shapes available
- Swivel angle between 0° and 90° in 1° increments available as standard
- No swivel stroke
- With or without indexing available (only with cone design)
- Direction of rotation can be selected right or left
- Clamping point freely selectable (Cone design with indexing, rod clevis and pendulum eye)

## OTHER STANDARD HEAD SHAPES

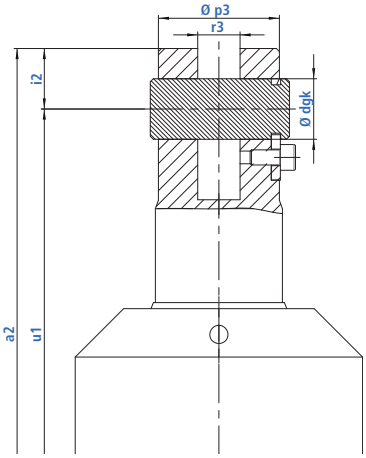
### Cone 15°




### Pendulum eye




### Rod clevis




*All dimensions in extended state.* *2D and 3D data is found at: https://micromat.partcommunity.com*

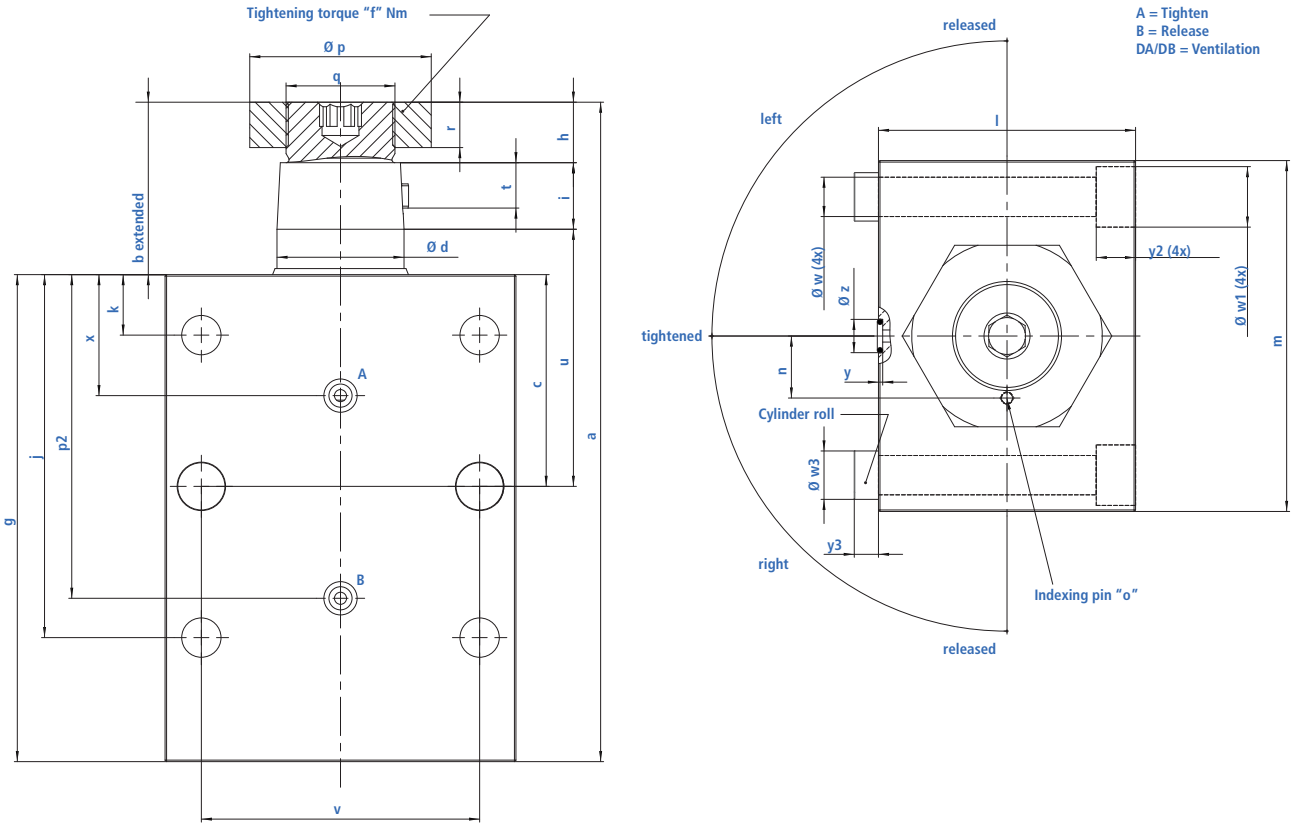
# GENERAL DATA M630

| Size | mm | 018 | | | 025 | | | 036 | | | 042 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stroke length | mm | 8 | 15 | 30 | 12 | 25 | 40 | 12 | 25 | 40 | 12 | 25 | 40 |
| Swivel stroke | mm | 0 | | | 0 | | | 0 | | | 0 | | |
| Rod diameter | mm | 18 | | | 25 | | | 36 | | | 42 | | |
| Piston diameter | mm | 25 | | | 35 | | | 50 | | | 60 | | |
| Swivel angle | ° | 0°–90° (1° increments) | | | | | | | | | | | |
| c | mm | 22 | | | 22 | | | 25 | | | 30 | | |
| Ø d | mm | 18 | | | 25 | | | 36 | | | 42 | | |
| Stroke e Stroke length selectable in 1 mm increments (exterior dimension remains the same) | mm | 4–8 | 9–15 | 16–30 | 12–7 | 13–25 | 26–40 | 12–7 | 13–25 | 26–40 | 12–7 | 13–25 | 26–40 |
| f | Nm | 20 | | | 50 | | | 140 | | | 270 | | |
| g | mm | 66 | 80 | 110 | 85 | 111 | 141 | 117 | 143 | 173 | 136 | 162 | 192 |
| Ø k | mm | 45 | | | 60 | | | 80 | | | 95 | | |
| l | mm | 45 | | | 63 | | | 80 | | | 95 | | |
| m | mm | 65 | | | 85 | | | 110 | | | 120 | | |
| n | mm | 9.3 | | | 12.8 | | | 17.5 | | | 20.5 | | |
| o | mm | ø 3x5 | | | ø 3x5 | | | ø 4x8 | | | ø 4x8 | | |
| p2 | mm | 50 | | | 65 | | | 86 | | | 100 | | |
| v | mm | 30 | | | 44 | | | 60 | | | 70 | | |
| Ø w | mm | 6.5 | | | 8.5 | | | 13 | | | 15 | | |
| x | mm | 48 | | | 64 | | | 86 | | | 100 | | |
| y | mm | 1.4 | | | 1.4 | | | 1.4 | | | 1.4 | | |
| Ø z | mm | 11 | | | 11 | | | 11 | | | 11 | | |

| Design head shape | | CONE 1:10 & CONE 15° | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| a | mm | 121 | 142 | 187 | 152 | 191 | 236 | 195 | 234 | 279 | 218 | 257 | 302 |
| b extended | mm | 33 | 40 | 55 | 45 | 58 | 73 | 53 | 66 | 81 | 57 | 70 | 85 |
| h | mm | 13 | | | 16 | | | 18 | | | 20 | | |
| i | mm | 10 | | | 14 | | | 20 | | | 22 | | |
| Ø p | mm | 24 | | | 32 | | | 46 | | | 60 | | |
| Ø p1 | mm | 22 | | | 30 | | | 40 | | | 50 | | |
| q | mm | M16 x 1.5 | | | M22 x 1.5 | | | M30 x 1.5 | | | M36 x 1.5 | | |
| q1 | mm | M12 x 1.5 | | | M16 x 1.5 | | | M24 x 1.5 | | | M30 x 1.5 | | |
| r | mm | 9 | | | 10.7 | | | 13 | | | 15 | | |
| r1 | mm | 5.9 | | | 7.3 | | | 12.5 | | | 15 | | |
| t | mm | 8 | | | 12 | | | 13 | | | 15 | | |
| t1 | mm | 8 | | | 8 | | | 11 | | | 11 | | |
| u | mm | 98 | 119 | 164 | 122 | 161 | 206 | 157 | 196 | 241 | 176 | 215 | 260 |

| Design head shape | | PENDULUM EYE & ROD CLEVIS | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| a2 | mm | 125 | 146 | 191 | 160 | 199 | 244 | 215 | 254 | 299 | 234 | 273 | 318 |
| b2 extended | mm | 37 | 44 | 59 | 53 | 66 | 81 | 73 | 86 | 101 | 73 | 86 | 101 |
| Ø $d_{pa}$ | mm | 8H8 | | | 12H8 | | | 16H8 | | | 20H8 | | |
| Ø $d_{gk}$ | mm | 8g6 | | | 12g6 | | | 14g6 | | | 20g6 | | |
| i2 | mm | 10 | | | 13 | | | 20 | | | 20 | | |
| Ø p3 | mm | 17.5 | | | 24 | | | 34 | | | 40 | | |
| r2 | mm | 10-0.05 | | | 15-0.05 | | | 25-0.05 | | | 25-0.1 | | |
| r3 | mm | 8+0.01+0.05 | | | 10+0.01+0.05 | | | 12+0.01+0.05 | | | 14+0.01+0.05 | | |
| s2 | mm | 23 | | | 33 | | | 50 | | | 50 | | |
| s3 | mm | 12-0.05 | | | 20-0.05 | | | 30-0.05 | | | 30-0.05 | | |
| u1 | mm | 115 | 136 | 181 | 147 | 186 | 231 | 195 | 234 | 279 | 214 | 253 | 298 |

## HEAD SHAPE CONE 1:10

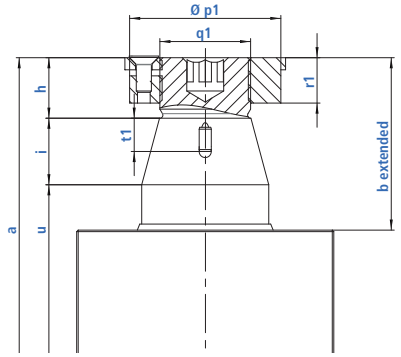



## FEATURES

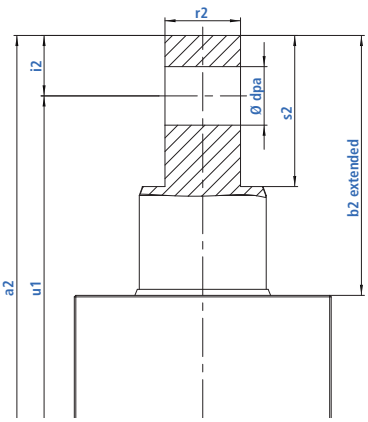
- Block construction with O-ring connection
- 4 sizes with 3 stroke areas each
- 4 Standard shapes available
- Swivel angle between 0° and 90° in 1° increments available as standard
- No swivel stroke
- With or without indexing available (only with cone design)
- Direction of rotation can be selected right or left
- Clamping point freely selectable (Cone design with indexing, rod clevis and pendulum eye)

## OTHER STANDARD HEAD SHAPES

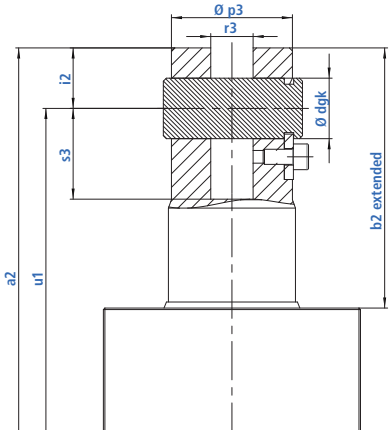
### Cone 15°




### Pendulum eye




### Rod clevis




*All dimensions in extended state.* *2D and 3D data is found at: https://micromat.partcommunity.com*

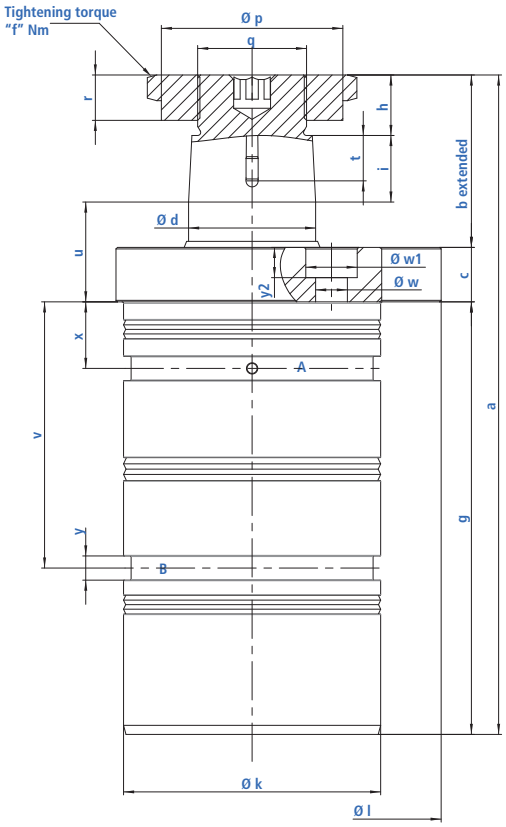
# GENERAL DATA M640

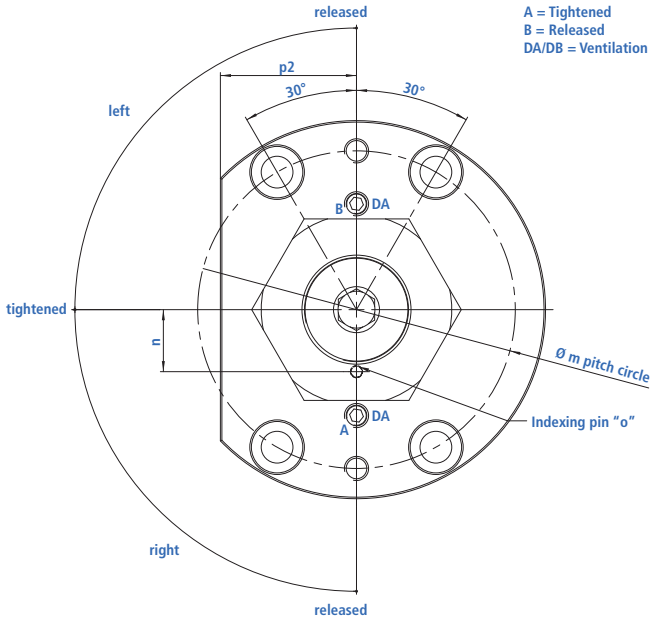
| Size | mm | 018 | | | 025 | | | 036 | | | 042 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stroke length | mm | 8 | 15 | 30 | 12 | 25 | 40 | 12 | 25 | 40 | 12 | 25 | 40 |
| Swivel stroke | mm | 0 | | | 0 | | | 0 | | | 0 | | |
| Rod diameter | mm | 18 | | | 25 | | | 36 | | | 42 | | |
| Piston diameter | mm | 25 | | | 35 | | | 50 | | | 60 | | |
| Swivel angle | ° | 0°–90° (1° increments) | | | | | | | | | | | |
| c | mm | 38.5 | | | 44.5 | | | 60 | | | 70 | | |
| Ø d | mm | 18 | | | 25 | | | 36 | | | 42 | | |
| Stroke e Stroke length selectable in 1 mm increments (exterior dimension remains the same) | mm | 4–8 | 9–15 | 16–30 | 12–7 | 13–25 | 26–40 | 12–7 | 13–25 | 26–40 | 12–7 | 13–25 | 26–40 |
| f | Nm | 20 | | | 50 | | | 140 | | | 270 | | |
| g | mm | 88 | 102 | 132 | 107 | 133 | 163 | 142 | 168 | 198 | 161 | 187 | 217 |
| j | mm | 67 | 74 | 89 | 77 | 90 | 105 | 105 | 118 | 133 | 120 | 133 | 148 |
| k | mm | 10 | | | 12 | | | 15 | | | 20 | | |
| l | mm | 36 | | | 52 | | | 72 | | | 85 | | |
| m | mm | 60 | | | 75 | | | 96 | | | 116 | | |
| n | mm | 9.3 | | | 12.8 | | | 17.5 | | | 20.5 | | |
| o | mm | ø 3x5 | | | ø 3x5 | | | ø 4x8 | | | ø 4x8 | | |
| p2 | mm | 59.25 | 66.25 | 81.25 | 68.5 | 81.5 | 96.5 | 94 | 107 | 122 | 107 | 120 | 135 |
| v | mm | 45 | | | 58 | | | 76 | | | 92 | | |
| Ø w | mm | 6.5 | | | 8.5 | | | 10.5 | | | 13 | | |
| Ø w1 | mm | 11 | | | 14 | | | 17 | | | 20 | | |
| Ø w3 | mm | 8 | | | 10 | | | 14 | | | 16 | | |
| x | mm | 24.5 | | | 28 | | | 34 | | | 40 | | |
| y | mm | 1.4 | | | 1.4 | | | 1.4 | | | 1.4 | | |
| y2 | mm | 6.5 | | | 8 | | | 11 | | | 13 | | |
| y3 | mm | 4 | | | 4.5 | | | 6 | | | 8 | | |
| Ø z | mm | 11 | | | 11 | | | 11 | | | 11 | | |

| Design head shape | | CONE 1:10 & CONE 15° | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| a | mm | 121 | 142 | 187 | 152 | 191 | 236 | 195 | 234 | 279 | 218 | 257 | 302 |
| b extended | mm | 33 | 40 | 55 | 45 | 58 | 73 | 53 | 66 | 81 | 57 | 70 | 85 |
| h | mm | 13 | | | 16 | | | 18 | | | 20 | | |
| i | mm | 10 | | | 14 | | | 20 | | | 22 | | |
| Ø p | mm | 24 | | | 32 | | | 46 | | | 60 | | |
| Ø p1 | mm | 22 | | | 30 | | | 40 | | | 50 | | |
| q | mm | M16 x 1.5 | | | M22 x 1.5 | | | M30 x 1.5 | | | M36 x 1.5 | | |
| q1 | mm | M12 x 1.5 | | | M16 x 1.5 | | | M24 x 1.5 | | | M30 x 1.5 | | |
| r | mm | 9 | | | 10.7 | | | 13 | | | 15 | | |
| r1 | mm | 8.4 | | | 10.6 | | | 12.5 | | | 15 | | |
| t | mm | 8 | | | 12 | | | 13 | | | 15 | | |
| t1 | mm | 8 | | | 8 | | | 11 | | | 11 | | |
| u | mm | 48.5 | 55.5 | 70.5 | 89.5 | 102.5 | 117.5 | 113 | 126 | 141 | 127 | 140 | 155 |

| Design head shape | | PENDULUM EYE & ROD CLEVIS | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| a2 | mm | 125 | 146 | 191 | 160 | 199 | 244 | 215 | 254 | 299 | 234 | 273 | 318 |
| b2 extended | mm | 37 | 44 | 59 | 53 | 66 | 81 | 73 | 86 | 101 | 73 | 86 | 101 |
| Ø $d_{pa}$ | mm | 8H8 | | | 12H8 | | | 16H8 | | | 20H8 | | |
| Ø $d_{gk}$ | mm | 8g6 | | | 12g6 | | | 14g6 | | | 20g6 | | |
| i2 | mm | 10 | | | 13 | | | 20 | | | 20 | | |
| Ø p3 | mm | 17.5 | | | 24 | | | 34 | | | 40 | | |
| r2 | mm | 10-0.05 | | | 15-0.05 | | | 25-0.05 | | | 25-0.1 | | |
| r3 | mm | 8+0.01+0.05 | | | 10+0.01+0.05 | | | 12+0.01+0.05 | | | 14+0.01+0.05 | | |
| s2 | mm | 23 | | | 33 | | | 50 | | | 50 | | |
| s3 | mm | 12-0.05 | | | 20-0.05 | | | 30-0.05 | | | 30-0.05 | | |
| u1 | mm | 65.5 | 72.5 | 87.5 | 84.5 | 97.5 | 112.5 | 113 | 126 | 141 | 123 | 136 | 151 |

## HEAD SHAPE CONE 1:10



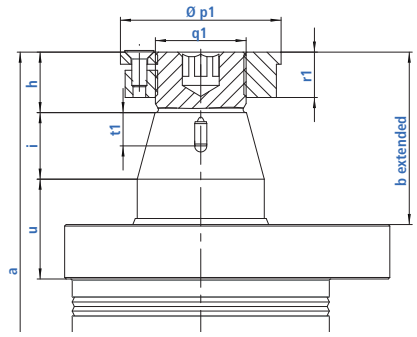




## FEATURES

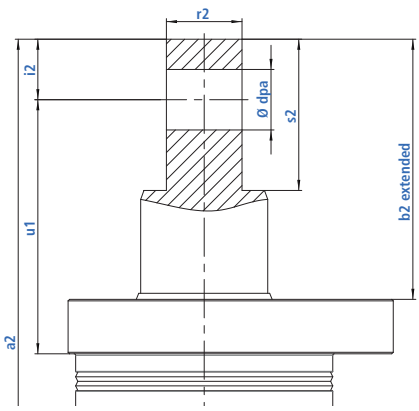
- Cartridge design
- 4 sizes with 3 stroke areas each
- 4 Standard shapes available
- Swivel angle between 0° and 90° in 1° increments available as standard
- No swivel stroke
- With or without indexing available (only with cone design)
- Direction of rotation can be selected right or left
- Clamping point freely selectable (Cone design with indexing, rod clevis and pendulum eye)

## OTHER STANDARD HEAD SHAPES

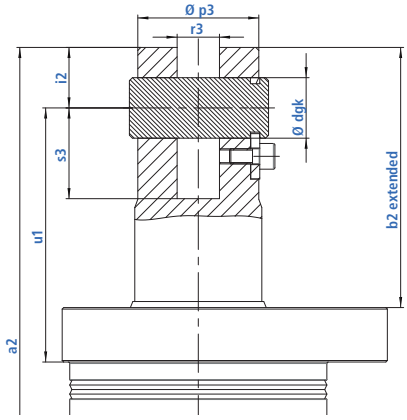
### Cone 15°




### Pendulum eye




### Rod clevis




*All dimensions in extended state.* *2D and 3D data is found at: https://micromat.partcommunity.com*

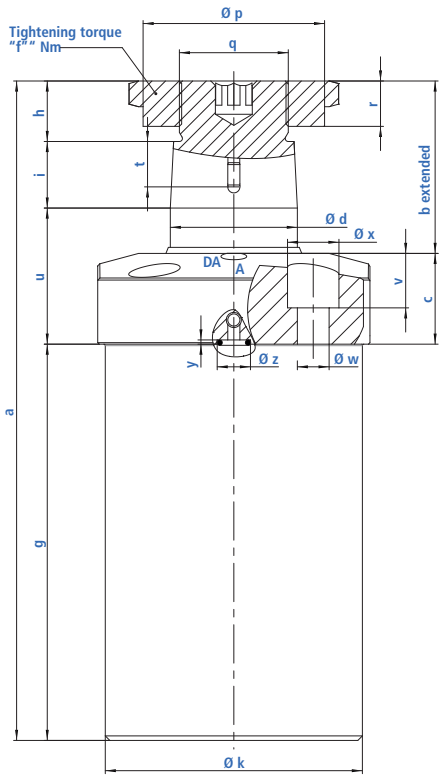
# GENERAL DATA M650

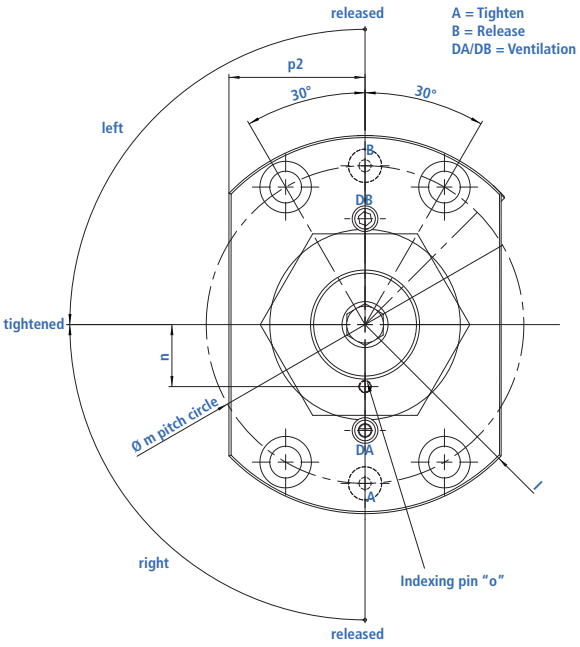
| Size | mm | 018 | | | 025 | | | 036 | | | 042 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stroke length | mm | 8 | 15 | 30 | 12 | 25 | 40 | 12 | 25 | 40 | 12 | 25 | 40 |
| Swivel stroke | mm | 0 | | | 0 | | | 0 | | | 0 | | |
| Rod diameter | mm | 18 | | | 25 | | | 36 | | | 42 | | |
| Piston diameter | mm | 25 | | | 35 | | | 50 | | | 60 | | |
| Swivel angle | ° | 0°–90° (1° increments) | | | | | | | | | | | |
| c | mm | 10.5 | | | 12 | | | 18 | | | 18 | | |
| Ø d | mm | 18 | | | 25 | | | 36 | | | 42 | | |
| Stroke e Stroke length selectable in 1 mm increments (exterior dimension remains the same) | mm | 4–8 | 9–15 | 16–30 | 12–7 | 13–25 | 26–40 | 12–7 | 13–25 | 26–40 | 12–7 | 13–25 | 26–40 |
| f | Nm | 20 | | | 50 | | | 140 | | | 270 | | |
| g | mm | 77.5 | 91.5 | 121.5 | 95 | 121 | 151 | 124 | 150 | 180 | 143 | 169 | 199 |
| Ø k | mm | 36f7 | | | 52f7 | | | 72f7 | | | 85f7 | | |
| Ø l | mm | 58 | | | 76 | | | 110 | | | 125 | | |
| m | mm | 47 | | | 63 | | | 90 | | | 105 | | |
| n | mm | 9.3 | | | 12.8 | | | 17.5 | | | 20.5 | | |
| o | mm | ø 3x5 | | | ø 3x5 | | | ø 4x8 | | | ø 4x8 | | |
| v | mm | 48.75 | 55.75 | 71 | 56 | 69 | 84 | 77 | 90 | 105 | 88 | 101 | 116 |
| Ø w | mm | 5.5 | | | 6.5 | | | 10.5 | | | 10.5 | | |
| Ø w1 | mm | 9 | | | 10.5 | | | 17 | | | 17 | | |
| x | mm | 14 | | | 16 | | | 17 | | | 22 | | |
| y | mm | 8 | | | 8 | | | 8 | | | 8 | | |

| Design head shape | | CONE 1:10 & CONE 15° | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| a | mm | 121 | 142 | 187 | 152 | 191 | 236 | 195 | 234 | 279 | 218 | 257 | 302 |
| b extended | mm | 33 | 40 | 55 | 45 | 58 | 73 | 53 | 66 | 81 | 57 | 70 | 85 |
| h | mm | 13 | | | 16 | | | 18 | | | 20 | | |
| i | mm | 10 | | | 14 | | | 20 | | | 22 | | |
| Ø p | mm | 24 | | | 32 | | | 46 | | | 60 | | |
| Ø p1 | mm | 22 | | | 30 | | | 40 | | | 50 | | |
| q | mm | M16 x 1.5 | | | M22 x 1.5 | | | M30 x 1.5 | | | M36 x 1.5 | | |
| q1 | mm | M12 x 1.5 | | | M16 x 1.5 | | | M24 x 1.5 | | | M30 x 1.5 | | |
| r | mm | 9 | | | 10.7 | | | 13 | | | 15 | | |
| r1 | mm | 8.4 | | | 10.6 | | | 12.5 | | | 15 | | |
| t | mm | 8 | | | 12 | | | 13 | | | 15 | | |
| t1 | mm | 8 | | | 8 | | | 11 | | | 11 | | |
| u | mm | 20.5 | 27.5 | 42.5 | 27 | 40 | 55 | 33 | 46 | 61 | 33 | 46 | 61 |

| Design head shape | | PENDULUM EYE & ROD CLEVIS | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| a2 | mm | 125 | 146 | 191 | 160 | 199 | 244 | 215 | 254 | 299 | 234 | 273 | 318 |
| b2 extended | mm | 37 | 44 | 59 | 53 | 66 | 81 | 73 | 86 | 101 | 73 | 86 | 101 |
| Ø $d_{pa}$ | mm | 8H8 | | | 12H8 | | | 16H8 | | | 20H8 | | |
| Ø $d_{gk}$ | mm | 8g6 | | | 12g6 | | | 14g6 | | | 20g6 | | |
| i2 | mm | 10 | | | 13 | | | 20 | | | 20 | | |
| Ø p3 | mm | 17.5 | | | 24 | | | 34 | | | 40 | | |
| r2 | mm | 10-0.05 | | | 15-0.05 | | | 25-0.05 | | | 25-0.1 | | |
| r3 | mm | 8+0.01+0.05 | | | 10+0.01+0.05 | | | 12+0.01+0.05 | | | 14+0.01+0.05 | | |
| s2 | mm | 23 | | | 33 | | | 50 | | | 50 | | |
| s3 | mm | 12-0.05 | | | 20-0.05 | | | 30-0.05 | | | 30-0.05 | | |
| u1 | mm | 37.5 | 44.5 | 59.5 | 52 | 65 | 80 | 71 | 84 | 99 | 71 | 84 | 99 |

## HEAD SHAPE CONE 1:10



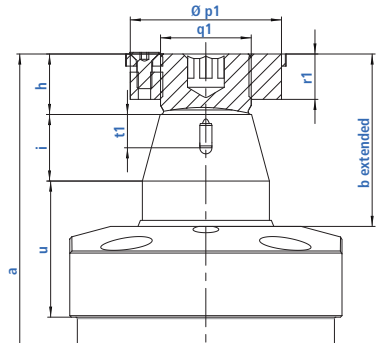




## FEATURES

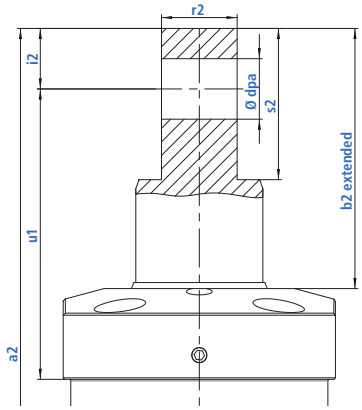
- Cylindrical housing with head flange
- O-ring connections on the flange underside
- 4 sizes with 3 stroke areas each
- 4 Standard shapes available
- Swivel angle between 0° and 90° in 1° increments available as standard
- No swivel stroke
- With or without indexing available (only with cone design)
- Direction of rotation can be selected right or left
- Clamping point freely selectable (Cone design with indexing, rod clevis and pendulum eye)

## OTHER STANDARD HEAD SHAPES

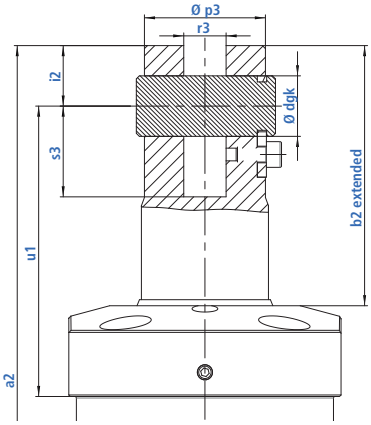
### Cone 15°




### Pendulum eye




### Rod clevis




*All dimensions in extended state.* *2D and 3D data is found at: https://micromat.partcommunity.com*

# GENERAL DATA M680

| Size | mm | 018 | | | 025 | | | 036 | | | 042 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stroke length | mm | 8 | 15 | 30 | 12 | 25 | 40 | 12 | 25 | 40 | 12 | 25 | 40 |
| Swivel stroke | mm | 0 | | | 0 | | | 0 | | | 0 | | |
| Rod diameter | mm | 18 | | | 25 | | | 36 | | | 42 | | |
| Piston diameter | mm | 25 | | | 35 | | | 50 | | | 60 | | |
| Swivel angle | ° | 0°–90° (1° increments) | | | | | | | | | | | |
| c | mm | 22 | | | 26 | | | 28 | | | 30 | | |
| Ø d | mm | 18 | | | 25 | | | 36 | | | 42 | | |
| Stroke e Stroke length selectable in 1 mm increments (exterior dimension remains the same) | mm | 4–8 | 9–15 | 16–30 | 12–7 | 13–25 | 26–40 | 12–7 | 13–25 | 26–40 | 12–7 | 13–25 | 26–40 |
| f | Nm | 20 | | | 50 | | | 140 | | | 270 | | |
| g | mm | 66 | 80 | 110 | 81 | 107 | 137 | 114 | 140 | 170 | 131 | 157 | 187 |
| Ø k | mm | 36 | | | 52 | | | 72 | | | 85 | | |
| Ø l | mm | 58 | | | 76 | | | 110 | | | 125 | | |
| Ø m | mm | 47 | | | 63 | | | 90 | | | 105 | | |
| n | mm | 9.3 | | | 12.8 | | | 17.5 | | | 20.5 | | |
| o | mm | ø 3x5 | | | ø 3x5 | | | ø 4x8 | | | ø 4x8 | | |
| p2 | mm | 20 | | | 28 | | | 38 | | | 45 | | |
| v | mm | 9 | | | 10 | | | 17 | | | 18 | | |
| Ø w | mm | 5.5 | | | 6.5 | | | 10.5 | | | 10.5 | | |
| Ø x | mm | 9 | | | 10.5 | | | 17 | | | 17 | | |
| y | mm | 1.4 | | | 1.4 | | | 1.4 | | | 1.4 | | |
| Ø z | mm | 8.8 | | | 8.8 | | | 11 | | | 11 | | |

| Design head shape | | CONE 1:10 & CONE 15° | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| a | mm | 121 | 142 | 187 | 152 | 191 | 236 | 195 | 234 | 279 | 218 | 257 | 302 |
| b extended | mm | 33 | 40 | 55 | 45 | 58 | 73 | 53 | 66 | 81 | 57 | 70 | 85 |
| h | mm | 13 | | | 16 | | | 18 | | | 20 | | |
| i | mm | 10 | | | 14 | | | 20 | | | 22 | | |
| Ø p | mm | 24 | | | 32 | | | 46 | | | 60 | | |
| Ø p1 | mm | 22 | | | 30 | | | 40 | | | 50 | | |
| q | mm | M16 x 1.5 | | | M22 x 1.5 | | | M30 x 1.5 | | | M36 x 1.5 | | |
| q1 | mm | M12 x 1.5 | | | M16 x 1.5 | | | M24 x 1.5 | | | M30 x 1.5 | | |
| r | mm | 9 | | | 10.7 | | | 13 | | | 15 | | |
| r1 | mm | 5.9 | | | 7.3 | | | 12.5 | | | 15 | | |
| t | mm | 8 | | | 12 | | | 13 | | | 15 | | |
| t1 | mm | 8 | | | 8 | | | 11 | | | 11 | | |
| u | mm | 32 | 39 | 54 | 41 | 54 | 69 | 43 | 56 | 71 | 45 | 58 | 73 |

| Design head shape | | PENDULUM EYE & ROD CLEVIS | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| a2 | mm | 125 | 146 | 191 | 160 | 199 | 244 | 215 | 254 | 299 | 234 | 273 | 318 |
| b2 extended | mm | 37 | 44 | 59 | 53 | 66 | 81 | 73 | 86 | 101 | 73 | 86 | 101 |
| Ø $d_{pa}$ | mm | 8H8 | | | 12H8 | | | 16H8 | | | 20H8 | | |
| Ø $d_{gk}$ | mm | 8g6 | | | 12g6 | | | 14g6 | | | 20g6 | | |
| i2 | mm | 10 | | | 13 | | | 20 | | | 20 | | |
| Ø p3 | mm | 17.5 | | | 24 | | | 34 | | | 40 | | |
| r2 | mm | 10-0.05 | | | 15-0.05 | | | 25-0.05 | | | 25-0.1 | | |
| r3 | mm | 8+0.01+0.05 | | | 10+0.01+0.05 | | | 12+0.01+0.05 | | | 14+0.01+0.05 | | |
| s2 | mm | 23 | | | 33 | | | 50 | | | 50 | | |
| s3 | mm | 12-0.05 | | | 20-0.05 | | | 30-0.05 | | | 30-0.05 | | |
| u1 | mm | 49 | 56 | 71 | 66 | 79 | 94 | 81 | 94 | 109 | 83 | 96 | 111 |

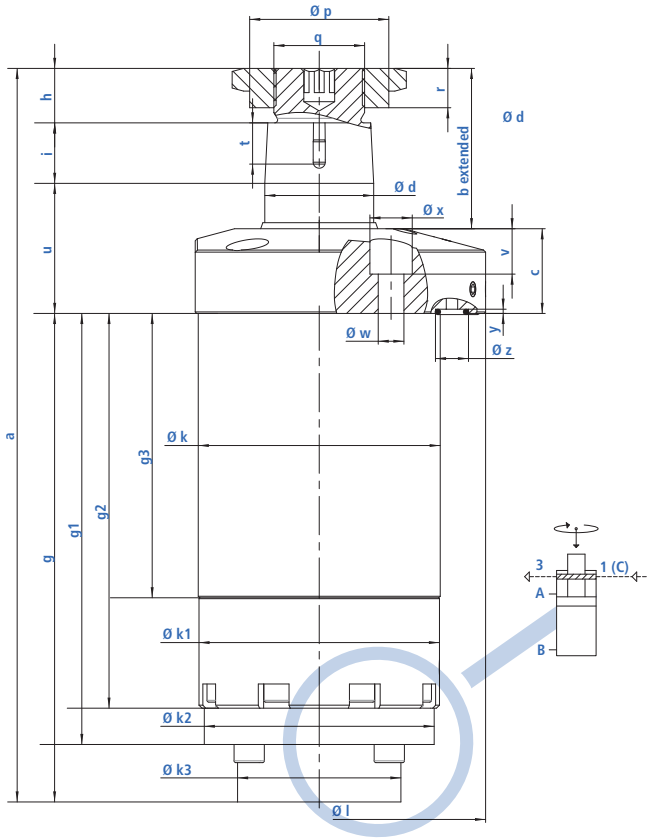
micromat

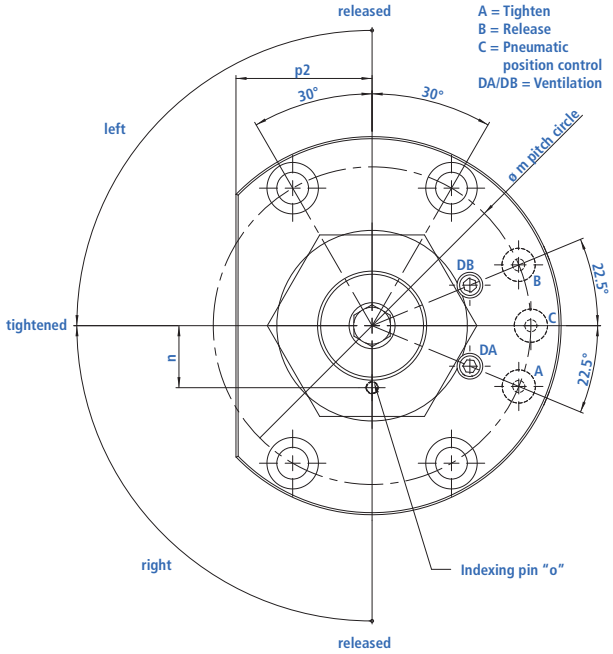
WIR GEBEN HALT!

# SWING CLAMP

## WITHOUT SWIVEL STROKE TRIGGERED WITH QUERY

## HEAD SHAPE CONE 1:10



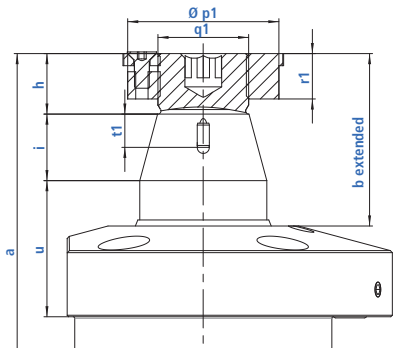




## FEATURES

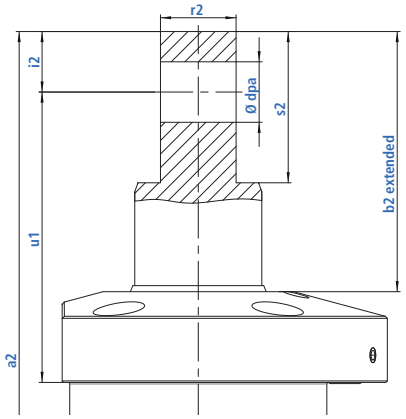
- Cylindrical housing with head flange
- O-ring connections on the flange underside
- Query triggered via air purge
- 2 sizes with 2 stroke areas each
- 4 Standard head shapes available
- Swivel angle between 0° and 90° in 1° increments available as standard
- No swivel stroke
- With or without indexing available (only with cone design)
- Direction of rotation can be selected right or left
- Clamping point freely selectable (Cone design with indexing, rod clevis and pendulum eye)

## OTHER STANDARD HEAD SHAPES

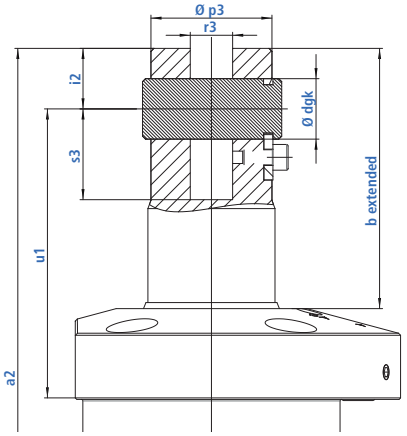
### Cone 15°




### Pendulum eye




### Rod clevis




*All dimensions in extended state.* *2D and 3D data is found at: https://micromat.partcommunity.com*

# GENERAL DATA M622

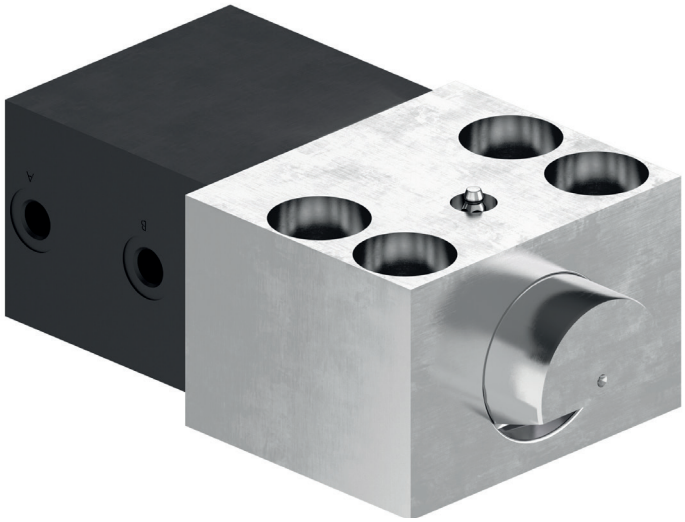
| Size | mm | 028 | | 036 | |
|---|---|---|---|---|---|
| Stroke length | mm | 12 | 25 | 12 | 25 |
| Swivel stroke | mm | 0 | | 0 | |
| Rod diameter | mm | 28 | | 36 | |
| Piston diameter | mm | 40 | | 50 | |
| Swivel angle | ° | 0°–90° (1° increments) | | | |
| Clamping pressure area | $cm^2$ | 6.4 | | 9.5 | |
| Releasing pressure area | $cm^2$ | 12.6 | | 19.6 | |
| Clamping volume | $cm^3$ | 22.3 | 29.7 | 40.1 | 52.4 |
| Releasing volume | $cm^3$ | 30.6 | 46 | 52.3 | 77.8 |
| Axial pressure force at 100 bar without losses | kN | 6.4 | | 9.5 | |
| Maximum allowable volume flow | l/min | 0.9 | | 2 | |
| Maximum pressure | bar | 250 | | | |
| Minimum pressure | bar | 30 | | | |
| c | mm | 27 | | 28 | |
| Ø d | mm | 28 | | 36 | |
| Stroke e Stroke length selectable in 1 mm increments (exterior dimension remains the same) | mm | 12–7 | 13–25 | 12–7 | 13–25 |
| f | Nm | 50 | | 140 | |
| g | mm | 150.5 | 189.5 | 161.5 | 200.5 |
| g1 | mm | 142 | 168 | 142.5 | 168.5 |
| g2 | mm | 119 | 145 | 130.5 | 156.5 |
| g3 | mm | 85 | 98 | 94 | 107 |
| Ø k | mm | 65 | | 80 | |
| Ø k1 | mm | 64.6 | | 79.5 | |
| Ø k2 | mm | 64 | | 76 | |
| Ø k3 | mm | 45 | | 54 | |
| Ø l | mm | 95 | | 110 | |
| Ø m | mm | 80 | | 95 | |
| n | mm | 13.9 | | 17.5 | |
| o | mm | ø 3x5 | | ø 4x8 | |
| p2 | mm | 33.5 | | 41 | |
| v | mm | 15 | | 15 | |
| Ø w | mm | 8.5 | | 8.5 | |
| Ø x | mm | 14 | | 14 | |
| y | mm | 1.5 | | 1.5 | |
| Ø z | mm | 11 | | 11 | |

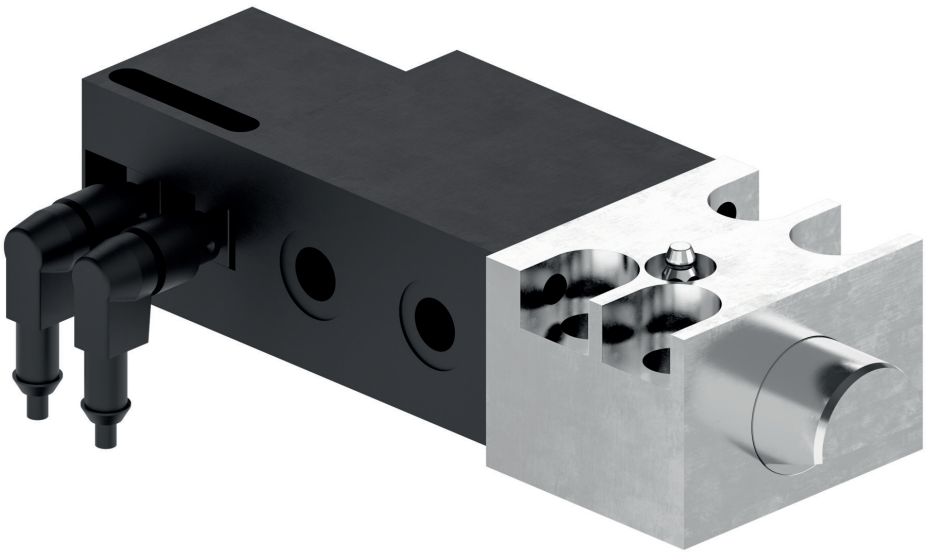
| Design head shape | | Cone 1:10 | | Cone 15° | |
|---|---|---|---|---|---|
| a | mm | 224.5 | 276.5 | 242.5 | 294.5 |
| b extended | mm | 47 | 60 | 53 | 66 |
| h | mm | 16 | | 18 | |
| i | mm | 16 | | 20 | |
| Ø p | mm | 32 | | 46 | |
| Ø p1 | mm | 30 | | 40 | |
| q | mm | M22 x 1.5 | | M30 x 1.5 | |
| q1 | mm | M16 x 1.5 | | M24 x 1.5 | |
| r | mm | 10.7 | | 13 | |
| r1 | mm | 7.3 | | 12.5 | |
| t | mm | 13.5 | | 13 | |
| t1 | mm | 10 | | 11 | |
| u | mm | 42 | 55 | 43 | 56 |

| Design head shape | | Pendulum eye | | Rod clevis | |
|---|---|---|---|---|---|
| a2 | mm | 231.5 | 283.5 | 262.5 | 314.5 |
| b2 extended | mm | 54 | 67 | 73 | 86 |
| Ø $d_{pa}$ | mm | 12H8 | | 16H8 | |
| Ø $d_{gk}$ | mm | 12g6 | | 14g6 | |
| i2 | mm | 13 | | 20 | |
| Ø p3 | mm | 26.5 | | 34 | |
| r2 | mm | 15-0.05 | | 25-0.05 | |
| r3 | mm | 10+0.01+0.05 | | 12+0.01+0.05 | |
| s2 | mm | 33 | | 50 | |
| s3 | mm | 20-0.05 | | 30-0.05 | |
| u1 | mm | 68 | 81 | 81 | 94 |

micromat

WIR GEBEN HALT!





# WEDGE CLAMPING ELEMENTS

## AREA OF USE

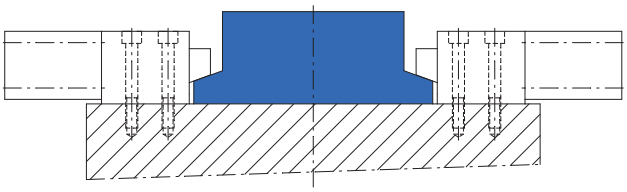
Tools with beveled clamping edge are securely clamped with wedge clamping elements and also held with drop of pressure. The elements haven especially proven valuable with tools for pressure die casting machines and other pressing tools.

## DESCRIPTION

A guide element is flanged with clamping bolts on a double-acting block cylinder. The bevel of the tool is clamped with the bevel of the clamping bolt. Through construction with a large wedge angle the tool is held self-locking, also larger clamping edge tolerances are bridged.

## FEATURES

- Strokes of 20–40 mm
- Clamping force up to 630 kN
- Compact design
- Max. operating pressure 275 / 350 bar
- Design with or without position monitor
- Pistons made of case hardened steel



## IMPORTANT INSTRUCTIONS

Due to the transverse forces occurring while clamping with wedge clamping elements, the tools must be secured against moving, for example with positioning pins or stop elements.
The elements must be constructed in a way to protect against the penetration of dirt, chips, coolant, etc.
Lubrication of the wedge pins in the intervals adapted to the operating conditions must only be done in the retracted state.
In case of operating error the clamping pins are completely retracted into the housing and the tool part can fall out due to this.

## POSITION MONITOR

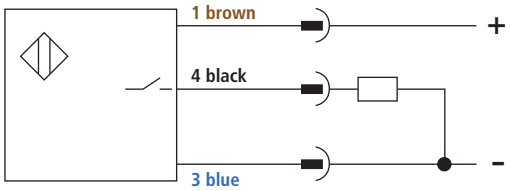
When using a position monitor the appropriate conditions of use and protective measures must be taken into account and ensured.

### TECHNICAL DATA PROXIMITY SWITCH

| | |
|---|---|
| Switching function | Closing |
| Output technology | PNP |
| Minimum spacing of the switching positions | 13 mm |
| Ambient temperature | -25° C to +70° C |
| Operating voltage | 10 to 30 V DC |
| Residual ripple | Ω 15% |
| Continuous current | Max. 200 mA |
| Nominal switching distance | 1.5 mm |
| Short circuit test | Yes |
| Housing material | Steel, rust-free |

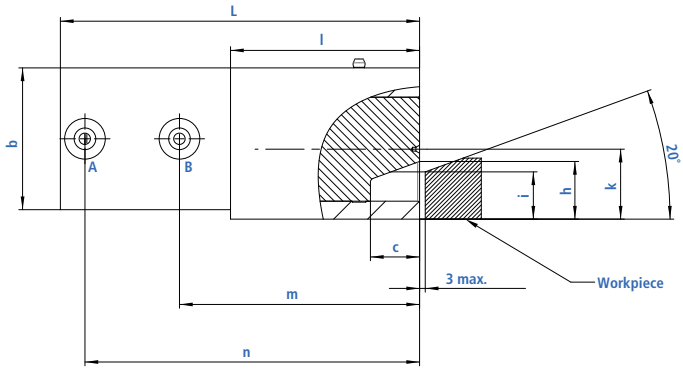
### PROXIMITY SWITCH

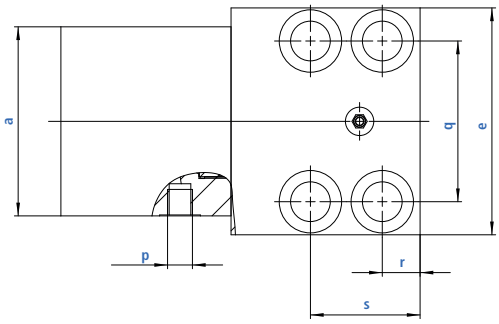
Connection circuit diagram

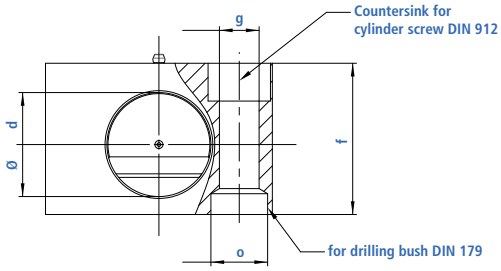



*On request other designs of the switches are available in addition to the ones given here.*

# WEDGE CLAMPING ELEMENT M530 · WITHOUT POSITION MONITOR




Clamping force: Force with which the tool/the mold is clamped against the support.

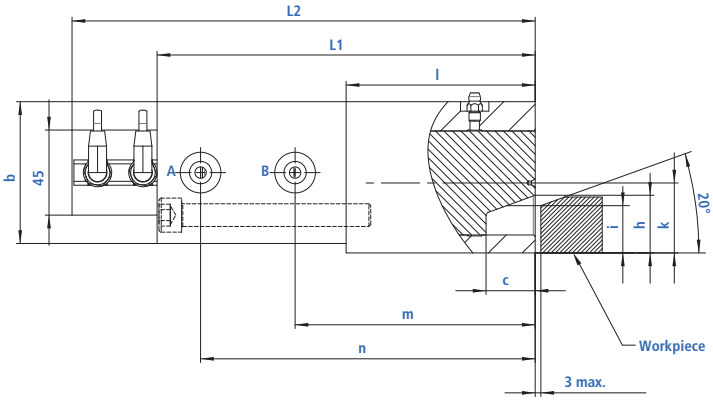
Retaining force: Force which the clamping element and fastening with screw quality 8.8 can accept, correct material and correct geometry of the holder assumed.

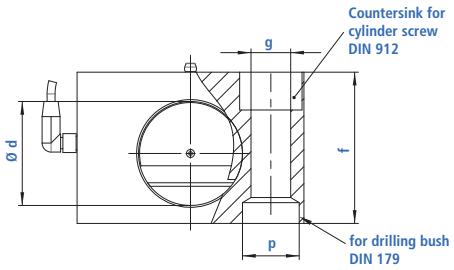
## TECHNICAL VALUES

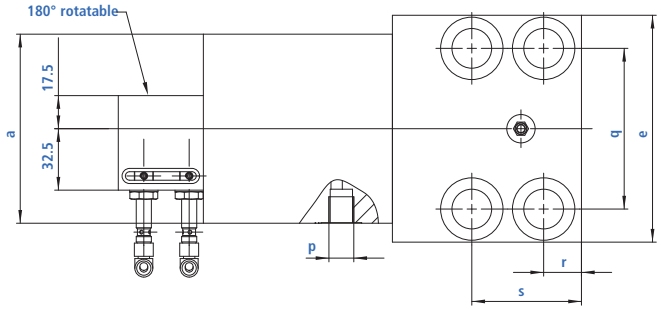
| Cylinder piston Ø D | mm | 25 | 40 | 50 | 63 | 80 | 100 | 125 |
|---|---|---|---|---|---|---|---|---|
| Max stroke | mm | 20 | 25 | 25 | 30 | 32 | 40 | 40 |
| Maximum operating pressure | bar | 350 | 275 | 350 | 350 | 350 | 350 | 350 |
| Max. clamping force | kN | 25 | 50 | 100 | 160 | 250 | 400 | 630 |
| Retaining force (Screw quality 8.8) | kN | 35 | 65 | 130 | 210 | 320 | 520 | 820 |
| a | mm | 65 | 85 | 100 | 125 | 160 | 200 | 230 |
| b | mm | 45 | 63 | 75 | 95 | 120 | 150 | 180 |
| c | mm | 20 | 25 | 26 | 32 | 40 | 45 | 50 |
| d | mm | 30 | 40 | 55 | 70 | 80 | 100 | 125 |
| e | mm | 70 | 95 | 120 | 150 | 200 | 240 | 280 |
| f | mm | 48 | 65 | 80 | 105 | 125 | 160 | 190 |
| g Ø | mm | 13 | 17 | 21 | 26 | 33 | 39 | 45 |
| h | mm | 19.5 | 23.5 | 30.5 | 37 | 38 | 60 | 70 |
| i | mm | 15 | 18 | 25 | 30 | 30 | 50 | 60 |
| k | mm | 21.5 | 28 | 37 | 49 | 55 | 75 | 85 |
| l | | 58 | 78 | 100 | 125 | 150 | 180 | 225 |
| L | mm | 122 | 157 | 190 | 227 | 267 | 310 | 375 |
| m | mm | 76 | 102 | 127 | 151 | 184 | 215 | 272 |
| n | mm | 111 | 146 | 177 | 210 | 246 | 285 | 344 |
| o Ø H7 x depth | mm | 18 x 7 | 26 x 9 | 30 x 11 | 35 x 11 | 48 x 13 | 55 x 16 | 62 x 16 |
| p | | G 1/4 | G 1/4 | G 1/4 | G 1/2 | G 1/2 | G 1/2 | G 1/2 |
| q (+/- 0.02 for Ø o) | mm | 48 | 65 | 85 | 106 | 140 | 180 | 210 |
| r | mm | 14 | 16 | 20 | 25 | 26 | 32 | 38 |
| s | mm | 38 | 46 | 58 | 75 | 78 | 95 | 108 |

| Order no. | | 530-1-025 | 530-1-040 | 530-1-050 | 530-1-063 | 530-1-080 | 530-1-100 | 530-1-125 |
|---|---|---|---|---|---|---|---|---|

# WEDGE CLAMPING ELEMENT M531 · WITH POSITION MONITOR




Clamping force: Force with which the tool/the mold is clamped against the support.

Retaining force: Force which the clamping element and fastening with screw quality 8.8 can accept, correct material and correct geometry of the holder assumed.

## TECHNICAL VALUES

| Cylinder piston Ø D | mm | 25 | 40 | 50 | 63 | 80 | 100 | 125 |
|---|---|---|---|---|---|---|---|---|
| Max stroke | mm | 20 | 25 | 25 | 30 | 32 | 40 | 40 |
| Maximum operating pressure | bar | 350 | 275 | 350 | 350 | 350 | 350 | 350 |
| Max. clamping force | kN | 25 | 50 | 100 | 160 | 250 | 400 | 630 |
| Retaining force (Screw quality 8.8) | kN | 35 | 65 | 130 | 210 | 320 | 520 | 820 |
| a | mm | 65 | 85 | 100 | 125 | 160 | 200 | 230 |
| b | mm | 45 | 63 | 75 | 95 | 120 | 150 | 180 |
| c | mm | 20 | 25 | 26 | 32 | 40 | 45 | 50 |
| d | mm | 30 | 40 | 55 | 70 | 80 | 100 | 125 |
| e | mm | 70 | 95 | 120 | 150 | 200 | 240 | 280 |
| f | mm | 48 | 65 | 80 | 105 | 125 | 160 | 190 |
| g Ø | mm | 13 | 17 | 21 | 26 | 33 | 39 | 45 |
| h | mm | 19.5 | 23.5 | 30.5 | 37 | 38 | 60 | 70 |
| i | mm | 15 | 18 | 25 | 30 | 30 | 50 | 60 |
| k | mm | 21.5 | 28 | 37 | 49 | 55 | 75 | 85 |
| l | | 58 | 78 | 100 | 125 | 150 | 180 | 225 |
| L1 | mm | 134 | 168 | 200 | 235 | 270 | 310 | 375 |
| L2 | mm | 169 | 211 | 245 | 280 | 325 | 365 | 430 |
| m | mm | 76 | 102 | 127 | 151 | 184 | 215 | 272 |
| n | mm | 111 | 146 | 177 | 210 | 246 | 285 | 344 |
| o Ø H7 x depth | mm | 18 x 7 | 26 x 9 | 30 x 11 | 35 x 11 | 48 x 13 | 55 x 16 | 62 x 16 |
| p | | G 1/4 | G 1/4 | G 1/4 | G 1/2 | G 1/2 | G 1/2 | G 1/2 |
| q (+/- 0.02 for Ø o) | mm | 48 | 65 | 85 | 106 | 140 | 180 | 210 |
| r | mm | 14 | 16 | 20 | 25 | 26 | 32 | 38 |
| s | mm | 38 | 46 | 58 | 75 | 78 | 95 | 108 |

| Order no. | | 531-1-025 | 531-1-040 | 531-1-050 | 531-1-063 | 531-1-080 | 531-1-100 | 531-1-125 |
|---|---|---|---|---|---|---|---|---|

*Wedge clamping element with position monitor at rear (monitoring on the side on request).*

micromat
WIR GEBEN HALT!

# PLUG-IN CLAMPING ELEMENT

## AREA OF USE

The hydraulic plug-in unit is designed for small and average presses up to 700 tons pressing force. It is suitable both for upper and lower tool clamping and required tools with straight clamping edges. The plug-in unit is pushed in manually into the machine T groove. This flexible type of use enables clamping of various tool sizes. By using intermediate plates, the plug-in unit can also be used with various clamping edge thicknesses.

## DESIGN

The clamping thickness area that can be covered with the clamping element is designed so that it is adequate for most applications. However, if the clamping thickness is not adequate, it can be heightened by the use of intermediate plates.

## FEATURES

- Ideal transmission of force
- Clamping force from 19 kN to 78 kN
- Compact shape
- Simple assembly
- Suitable for large clamping edge tolerances
- Operating temperature maximum 80°C
- Operating pressure maximum 400 bar

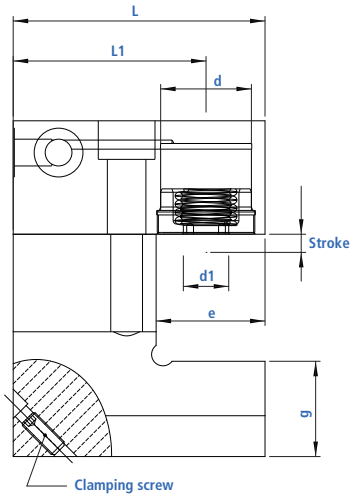
## FUNCTION

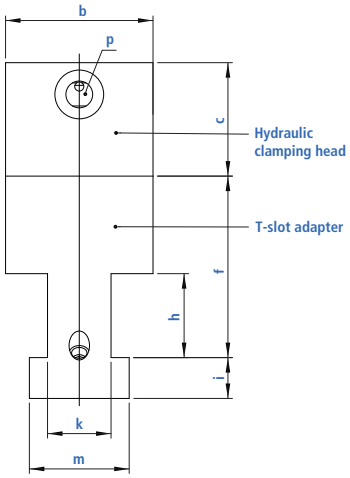
A single-acting hydraulic cylinder with return spring transmits the required clamping force on the tool. The release cycle is done after switching over the hydraulic valve with the aid of a return spring. The hydraulically driven clamping cylinder directly generates the necessary clamping force. The hydraulic pressure must be maintained during the entire clamping cycle for this.

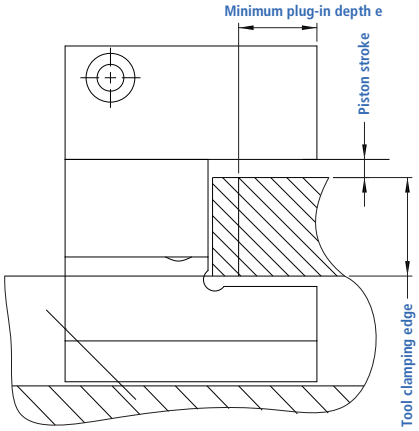
**FUNCTIONAL DIMENSION F IS CALCULATED FROM**

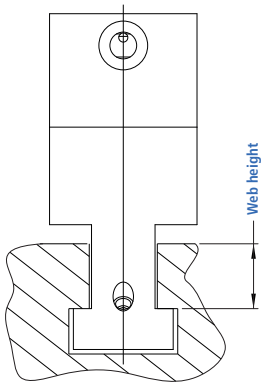
½ stroke **+** tool clamping edge height **+** web height of the T groove

# PLUG-IN CLAMPING ELEMENT




## TECHNICAL VALUES

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Cylinder piston Ø D | mm | 25 | 25 | 32 | 40 | 32 | 40 | 50 |
| T groove according to DIN 650 | mm | 18 | 22 | 22 | 22 | 28 | 28 | 28 |
| Max stroke | mm | 8 | 8 | 8 | 8 | 8 | 8 | 12 |
| Max. operating pressure | bar | 400 | 400 | 400 | 400 | 400 | 400 | 400 |
| Max. clamping force | kN | 19.2 | 19.2 | 32 | 50 | 32 | 50 | 78 |
| b | mm | 65 | 65 | 65 | 65 | 65 | 65 | 80 |
| c | mm | 40 | 40 | 47 | 50 | 47 | 50 | 75 |
| Ø d1 | mm | 15 | 15 | 15 | 20 | 15 | 20 | 25 |
| e | mm | 23 | 23 | 28 | 31 | 28 | 31 | 38 |
| e1 | mm | 32 | 32 | 41 | 48 | 41 | 48 | 60 |
| g | mm | 24 | 32 | 32 | 32 | 42 | 42 | 42 |
| h | mm | 25 | 30 | 30 | 30 | 37 | 37 | 37 |
| i | mm | 10 | 14 | 14 | 14 | 18 | 18 | 18 |
| k (h9) | mm | 18 | 22 | 22 | 22 | 28 | 28 | 18 |
| L | mm | 95 | 95 | 104 | 111 | 104 | 111 | 132 |
| L1 | mm | 77 | 77 | 81 | 85 | 81 | 85 | 99 |
| m | mm | 28 | 35 | 35 | 35 | 44 | 44 | 44 |
| f min | mm | 42 | 50 | 50 | 50 | 55 | 55 | 60 |
| f max | mm | 90 | 106 | 106 | 106 | 106 | 112 | 117 |
| p | mm | G1/4 | G1/4 | G1/4 | G1/4 | G1/4 | G1/4 | G1/4 |

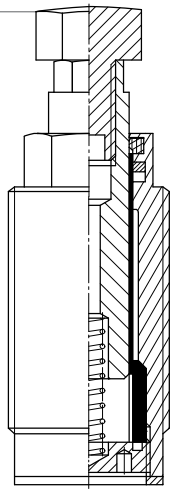
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Order no. | | M 546-1-025-f | M 546-2-025-f | M 546-2-032-f | M 546-2-040-f | M 546-3-032-f | M 546-3-040-f | M 546-3-050-f |

micromat

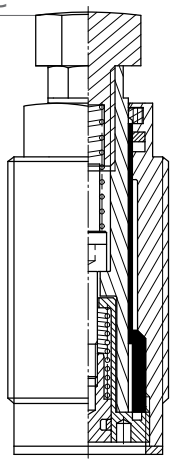
WIR GEBEN HALT!

# SUPPORT ELEMENT

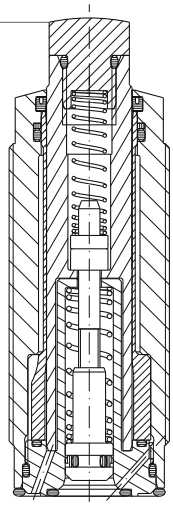
## AVVR – Contact force through spring



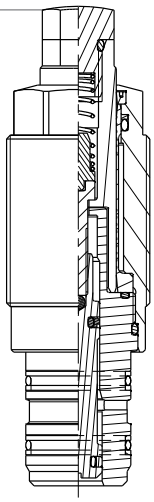
## AVVH – Extend piston through oil pressure



## AVHE – Single-acting with ventilation



## AVVD – Double-acting



# GENERAL DESCRIPTION

Support elements are used to support workpieces, in order to prevent bending and vibration during machining. The screw-in design enables space saving direction installation in the equipment body. The hydraulic feed is done via drilled channels.

## STRUCTURE OF SUPPORT ELEMENT

- Housing bronzed
- Piston rod Arcor treated
- Very compact design
- Hydraulic extending
- Metal strip edge against penetration of chips
- Sealed against penetration of liquids

## FUNCTIONAL PRINCIPLE OF SCREW-IN SUPPORT ELEMENT

In the housing of the screw-in support elements there is a thin-walled clamping sleeve made of corrosion resistant material, which with pressurization circularly clamps the movable support pins.

The support pins are placed on the workpiece either by spring force or a combination of spring force with oil pressure.

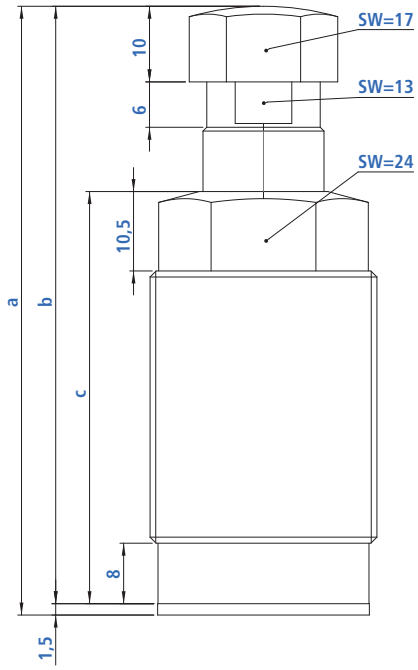
## TECHNICAL VALUES

| Designation | | AVVR 13 C8 | AVVR 14 C8 | AVVH 13 C8 | AVVH 13 C15 | AVVH 14 C8 | AVVH 14 C15 | AVHE 11 C08 | AVHE 11 C15 | AVHE 12 C08 |
|---|---|---|---|---|---|---|---|---|---|---|
| Rod diameter | mm | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
| Lift | mm | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 15 | 8 |
| Allowable volume flow | $cm^3/s$ | - | - | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Recommended minimum pressure | bar | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| Maximum pressure | bar | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 |
| Stroke volumes extended | $cm^3$ | - | - | - | - | - | - | 0.5 | 1 | 0.5 |
| Allowable temperature | °C | 0–70 | 0–70 | 0–70 | 0–70 | 0–70 | 0–70 | 0–70 | 0–70 | 0–70 |
| Maximum purge air | bar | - | - | - | - | - | - | 0.5 | 0.5 | 0.5 |
| Elastic length change | mm/kN | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Installation torque | Nm | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| Weight | kg | 0.22 | 0.22 | 0.22 | 0.25 | 0.22 | 0.25 | 0.3 | 0.4 | 0.3 |

| Designation | | AVHE 12 C15 | AVHE 21 C10 | AVHE 31 C10 | AVHE 41 C16 | AVVD 11 C08 | AVVD 11 C15 | AVVD 12 08 | AVVD 12 C15 |
|---|---|---|---|---|---|---|---|---|---|
| Rod diameter | mm | 16 | 20 | 28 | 36 | 16 | 16 | 16 | 16 |
| Lift | mm | 15 | 10 | 10 | 16 | 8 | 15 | 8 | 15 |
| Allowable volume flow | $cm^3/s$ | 25 | 25 | 25 | 35 | 25 | 25 | 25 | 25 |
| Recommended minimum pressure | bar | 160 | 50 | 50 | 50 | 160 | 160 | 160 | 160 |
| Maximum pressure | bar | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 |
| Stroke volumes extended | $cm^3$ | 1 | 0.8 | 1.5 | 5 | 6.3 | 11.9 | 6.3 | 11.9 |
| Allowable temperature | °C | 0–70 | 0–70 | 0–70 | 0–70 | 0–70 | 0–70 | 0–70 | 0–70 |
| Maximum purge air | bar | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Elastic length change | mm/kN | 4 | 3.5 | 2.5 | 2.5 | 4 | 4 | 4 | 4 |
| Installation torque | Nm | 60 | 100 | 200 | 400 | 60 | 60 | 60 | 60 |
| Weight | kg | 0.4 | 0.5 | 1 | 2 | 0.34 | 0.39 | 0.39 | 0.44 |

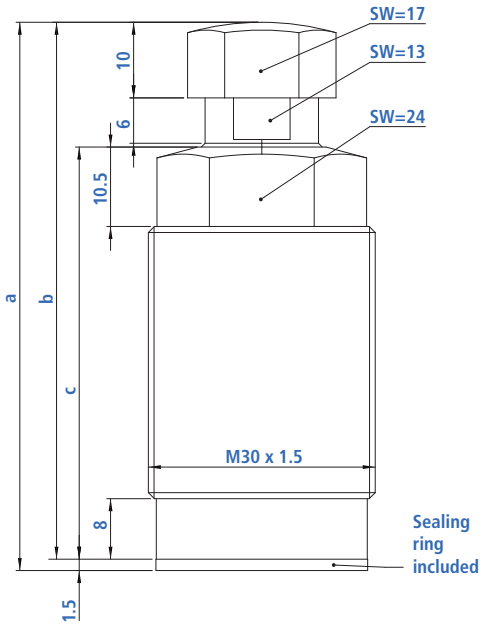
## AVVR

– Contact force through spring




## AVVH

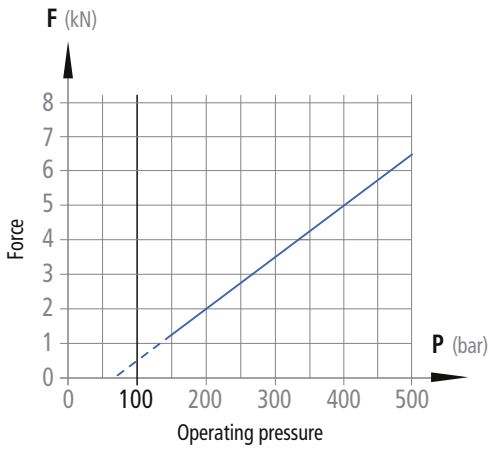
– Extend piston through oil pressure
– Contact force through spring



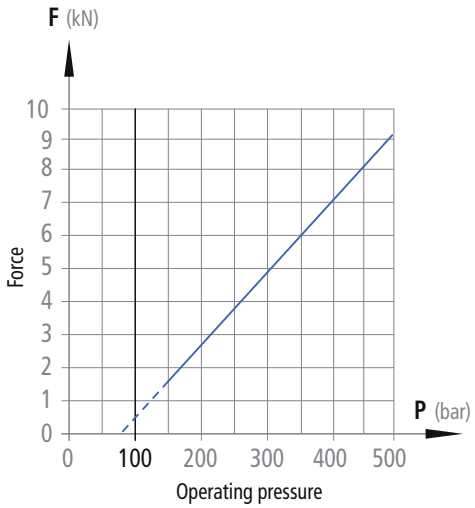

| Model | | AVVR 13 C8 | AVVR 14 C8 | | AVVH 13 C8 | AVVH 13 C15 | AVVH 14 C8 | AVVH 14 C15 |
|---|---|---|---|---|---|---|---|---|
| Allowable loading force at 500 bar | kN | 6.5 | 10.5 | | 6.5 | 6.5 | 10.5 | 10.5 |
| Lift | mm | 8 | 8 | | 8 | 15 | 8 | 15 |
| a | mm | 80.5 | 90.5 | | 72.5 | 79.5 | 82.5 | 89.5 |
| b | mm | 79 | 89 | | 71 | 78 | 81 | 88 |
| c | mm | 54.5 | 64.5 | | 54.5 | 61.5 | 64.5 | 71.5 |
| Spring force min./max. | N | 8 – 13 | 8 – 13 | | 10 – 23 | 10 – 23 | 10 – 23 | 10 – 23 |
| Order no. | | 751 113/700 | 751 109/700 | | 751 113/100 | 751 136/100 | 751 109/100 | 751 157/100 |

## Allowable loading force F depending on the operating pressure p

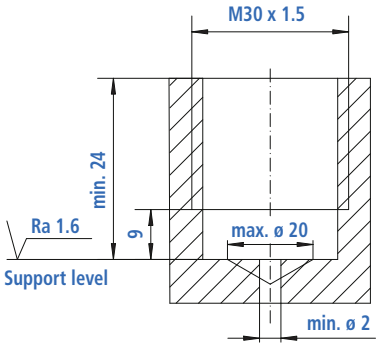
AVVR 13 C8 | AVVH 13 C8 | AVVH 13 C15



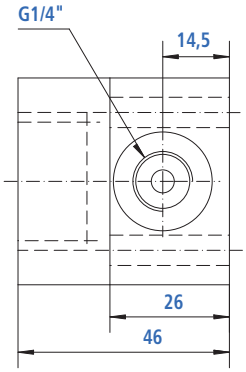

AVVR 14 C8 | AVVH 14 C8 | AVVH 14 C15

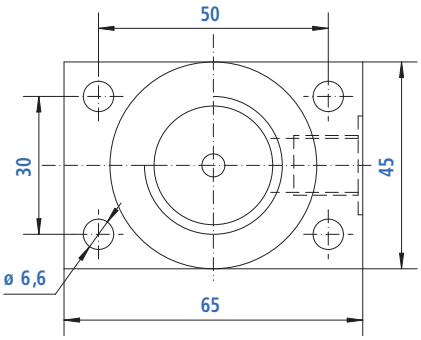


## Installation space machining dimension:

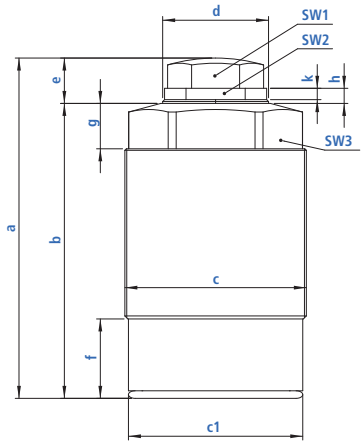



## Connection block: 751 109/050



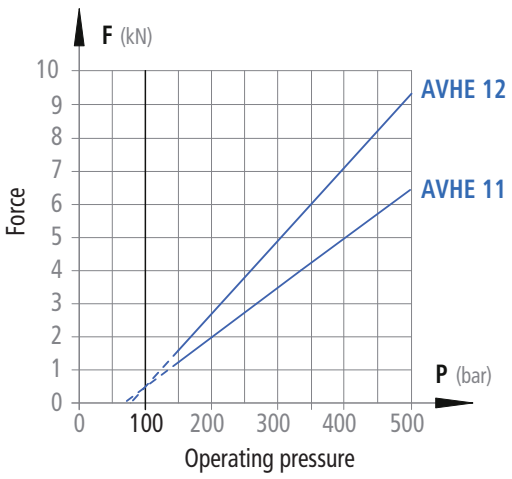
## AVHE



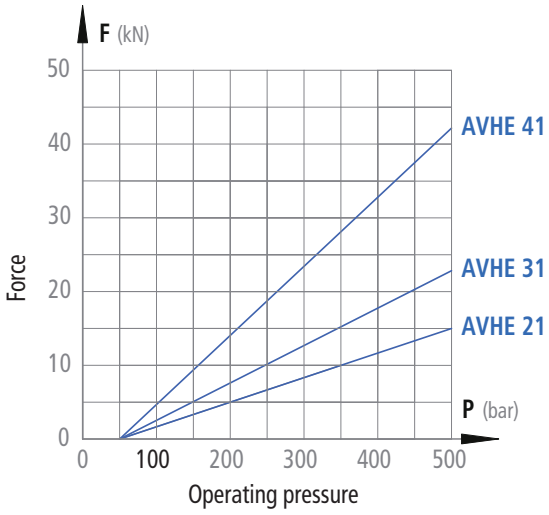

| Model | | AVHE 11 C8 | AVHE 11 C15 | AVHE 12 C8 | AVHE 12 C15 | AVHE 21 C10 | AVHE 31 C10 | AVHE 41 C16 |
|---|---|---|---|---|---|---|---|---|
| Allowable loading force at 500 bar | kN | 6.5 | 6.5 | 9.5 | 9.5 | 15 | 23.5 | 42 |
| Lift | mm | 8 | 15 | 8 | 15 | 15 | 8 | 16 |
| a | mm | 75.5 | 79.5 | 82.5 | 89.5 | 86 | 90 | 115 |
| b | mm | 59 | 66 | 59 | 66 | 72.5 | 78 | 102.5 |
| c | | M30x1.5 | M30x1.5 | M30x1.6 | M30x1.7 | M36x1.5 | M48x1.5 | M60x1.5 |
| c1 | mm | 28.1 | 28.1 | 28.1 | 28.1 | 34.1 | 46.1 | 58.1 |
| d | mm | 16 | 16 | 16 | 16 | 20 | 28 | 36 |
| e | mm | 15 | 15 | 15 | 15 | 13 | 12 | 12.5 |
| f | mm | 9.5 | 9.5 | 9.5 | 9.5 | 17.5 | 21 | 21 |
| g | mm | 10 | 10 | 10 | 10 | 12 | 12 | 18 |
| h | mm | 6.5 | 6.5 | 6.5 | 6.5 | 6 | 4 | 4.5 |
| k | mm | 5.5 | 5.5 | 5.5 | 5.5 | 5 | 3 | 4 |
| SW1 | mm | 13 | 13 | 13 | 13 | 30 | 41 | 50 |
| SW2 | mm | 13 | 13 | 13 | 13 | 17 | 22 | 30 |
| SW3 | mm | 24 | 24 | 24 | 24 | 19 | 22 | 22 |
| Spring force min./max. | N | 11 – 18 | 10 – 23 | 11 – 18 | 10 – 23 | 13 – 25 | 24 – 39 | 38 – 61 |
| Order no. | | 751 113/500 | 751 136/700 | 751 109/100 | 751 157/100 | 751 169/100 | 751 170/100 | 751 172/100 |

## Allowable loading force F depending on the operating pressure p

AVHE 11 | AVHE 12

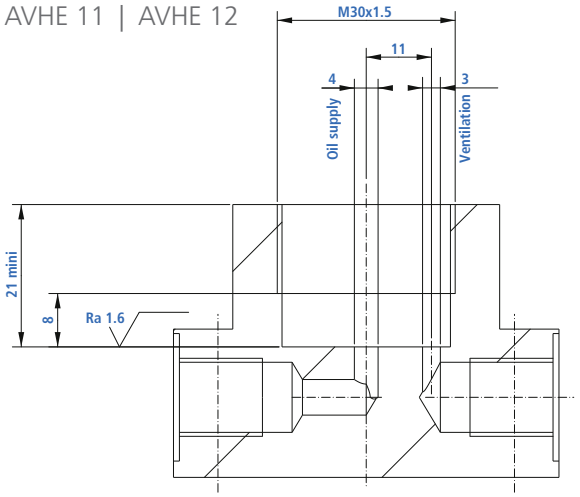



AVHE 21 | AVHE 31 | AVHE 41

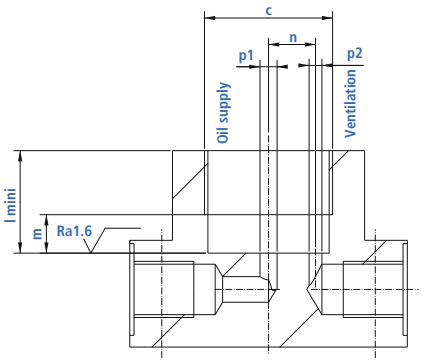


## Installation space machining dimension

AVHE 11 | AVHE 12

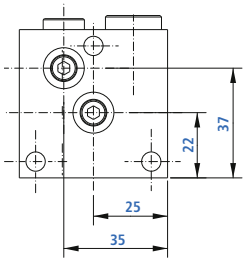


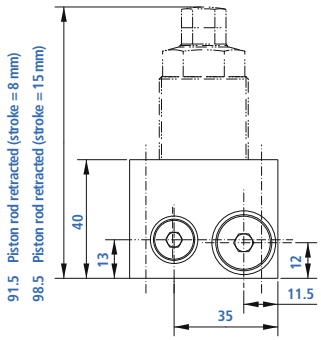

AVHE 21 | AVHE 31 | AVHE 41

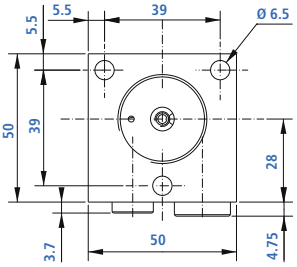



## Connection block: 834 B63/000

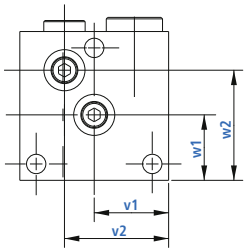
AVHE 11 | AVHE 12

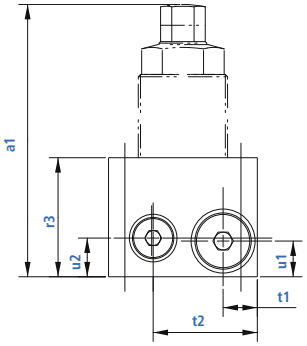


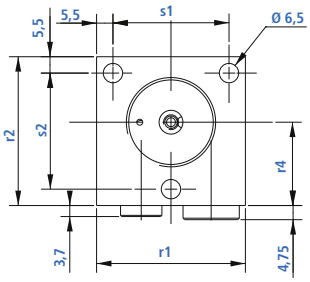




AVHE 21 | AVHE 31 | AVHE 41



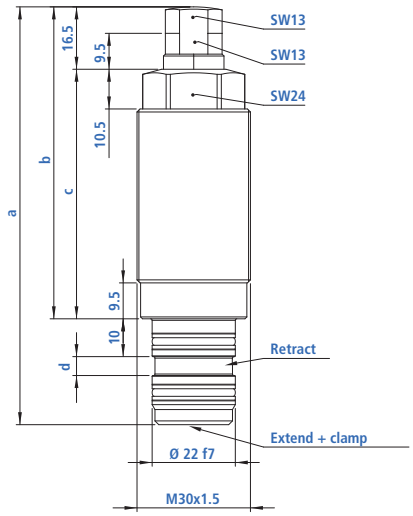




| Model | | AVHE 21 | AVHE 31 | AVHE 41 |
|---|---|---|---|---|
| a1 | mm | 106 | 107 | 132 |
| c | | M36x1.5 | M48x1.5 | M60x1.5 |
| l | mm | 35 | 42 | 46 |
| m | mm | 15 | 17 | 16 |
| n | mm | 12 | 16 | 22 |
| p1 | mm | 4 | 4 | 4 |
| p2 | mm | 3 | 3 | 3 |
| r1 | mm | 50 | 60 | 68 |
| r2 | mm | 55 | 68 | 80 |
| r3 | mm | 55 | 60 | 63 |
| r4 | mm | 30.5 | 39 | 43 |

| Model | | AVHE 21 | AVHE 31 | AVHE 41 |
|---|---|---|---|---|
| s1 | mm | 39 | 49 | 57 |
| s2 | mm | 44 | 59 | 69 |
| t1 | mm | 11.5 | 12 | 12 |
| t2 | mm | 37 | 47 | 56 |
| u1 | mm | 12 | 12 | 12 |
| u2 | mm | 12 | 12 | 12 |
| v1 | mm | 25 | 30 | 34 |
| v2 | mm | 37 | 47 | 56 |
| w1 | mm | 24.5 | 31 | 37 |
| w2 | mm | 40.5 | 40.5 | 58 |
| Order no. | | 834 B67/000 | 834 B65/000 | 834 B66/000 |

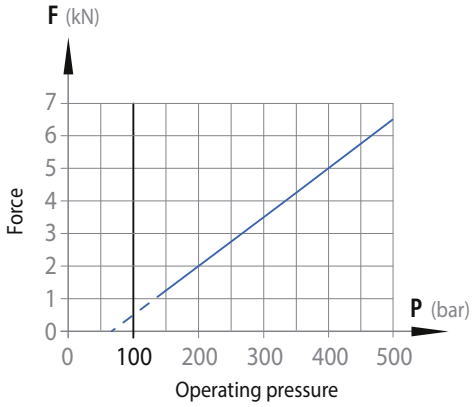
## AVVD



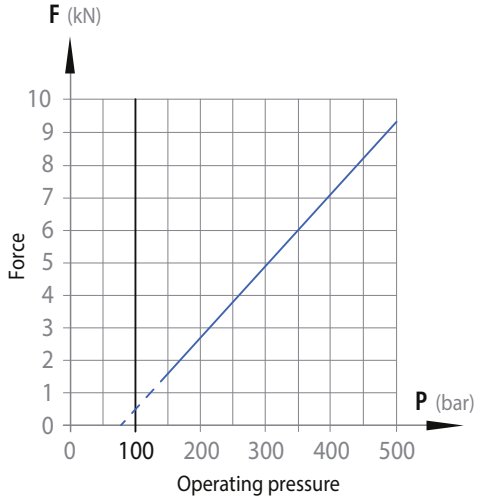

| Model | | AVVD 11 C8 | AVVD 11 C15 | AVVD 12 C8 | AVVD 12 C15 |
|---|---|---|---|---|---|
| Allowable loading force at 500 bar | kN | 6.5 | 6.5 | 9.5 | 9.5 |
| Lift | mm | 8 | 15 | 8 | 15 |
| a | mm | 100.5 | 113 | 110.5 | 123 |
| b | mm | 72.5 | 79.5 | 82.5 | 89.5 |
| c | mm | 56 | 63 | 66 | 73 |
| d | mm | 5 | 8 | 5 | 8 |
| Spring force min./max. | N | 11 – 18 | 8 – 18 | 11 – 18 | 8 – 18 |
| Order no. | | 751 113/600 | 751 136/600 | 751 109/600 | 751 157/600 |

## Allowable loading force F depending on the operating pressure p

AVVD 11

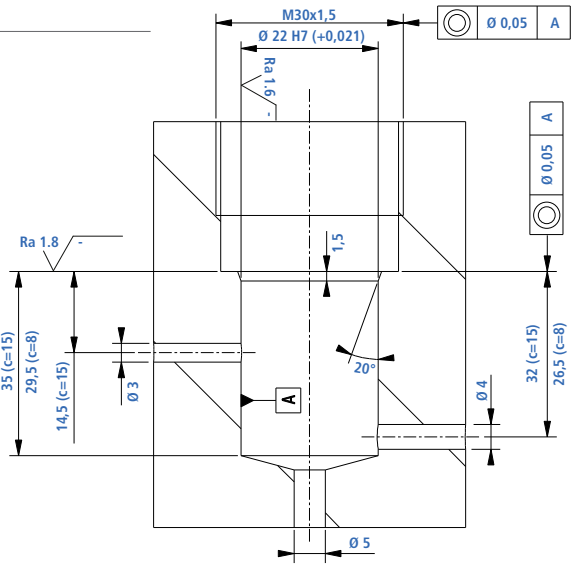



AVVD 12



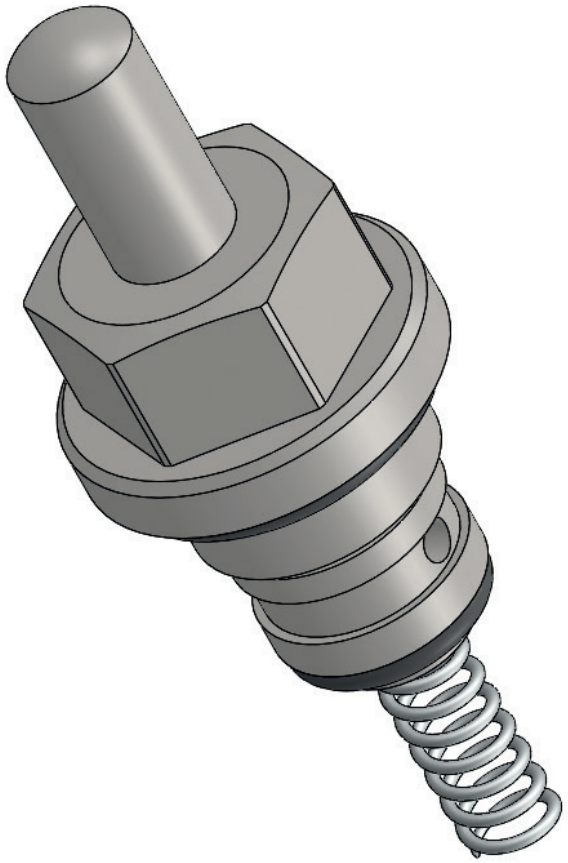

## Installation space machining dimension

AVVD 11 | AVVD 12



micromat

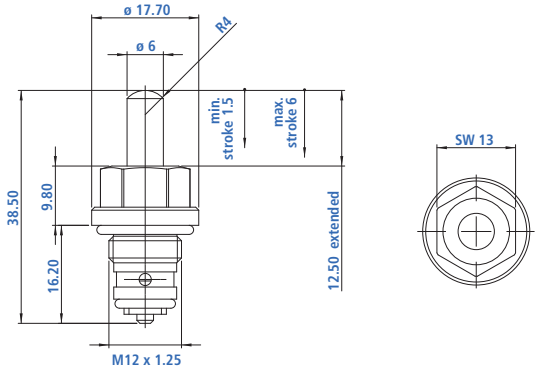
WIR GEBEN HALT!

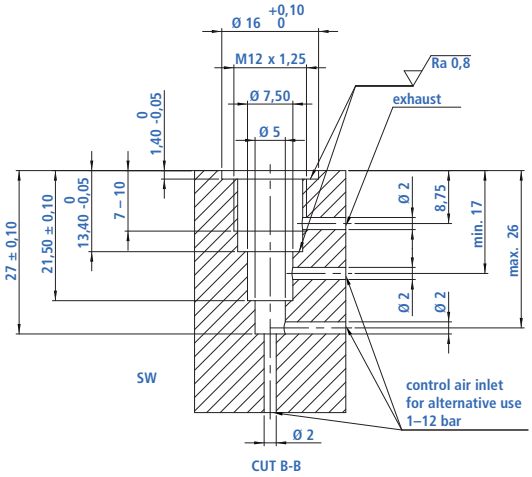


# VALVES

# PNEUMATIC CLAMPING QUERY FOR ROBOT SUPPORTED MANUFACTURING

This simple, compact and reliable valve was developed especially for equipment construction. In combination with our swing clamps it checks the position of the swivel arm or the presence of a workpiece in the device.

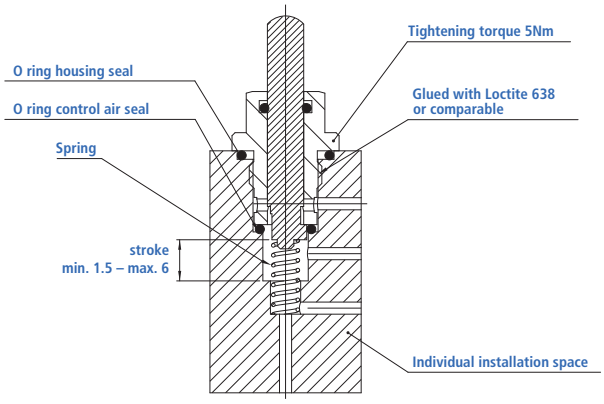



# INCLUDED IN SCOPE OF DELIVERY OF 10-11606:

- O ring housing seal
- O ring control air seal
- Spring
- Spacing bushing

## DESIGN DRAWING OF VALVE SEAT




# MATERIALS

Control piston: hardened and ground

Valve body: hardened and honed

# ASSEMBLY INSTRUCTIONS

Tightening torque valve body 5Nm. After tightening, check the smooth movement of the piston. Loosen if necessary. Glue housing with Loctite 638 or comparable.

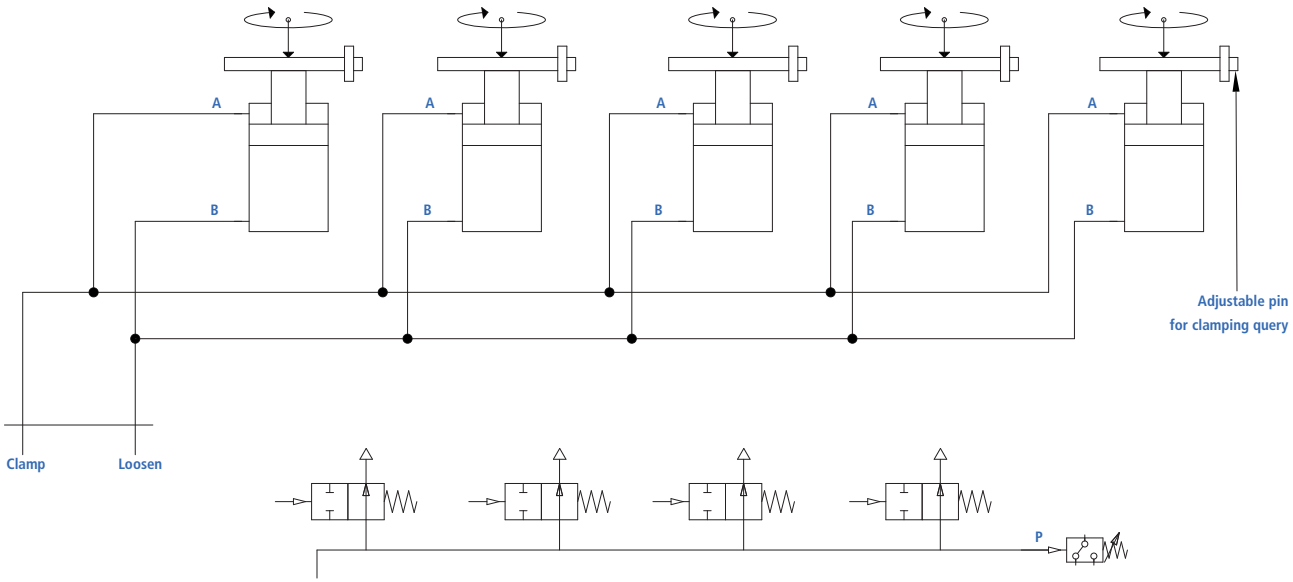
# INSTRUCTIONS FOR SETTING THE PNEUMATIC POSITION CONTROL

Important instructions: The maximum stroke of the valve is 6mm. A clamping stroke of 2 to 3 mm is recommended, the valve already closes completely after 1.5 mm stroke.

For the problem-free operation of the clamping arm control valves a precise air flow feed before the valve controlled pressure monitor is required.

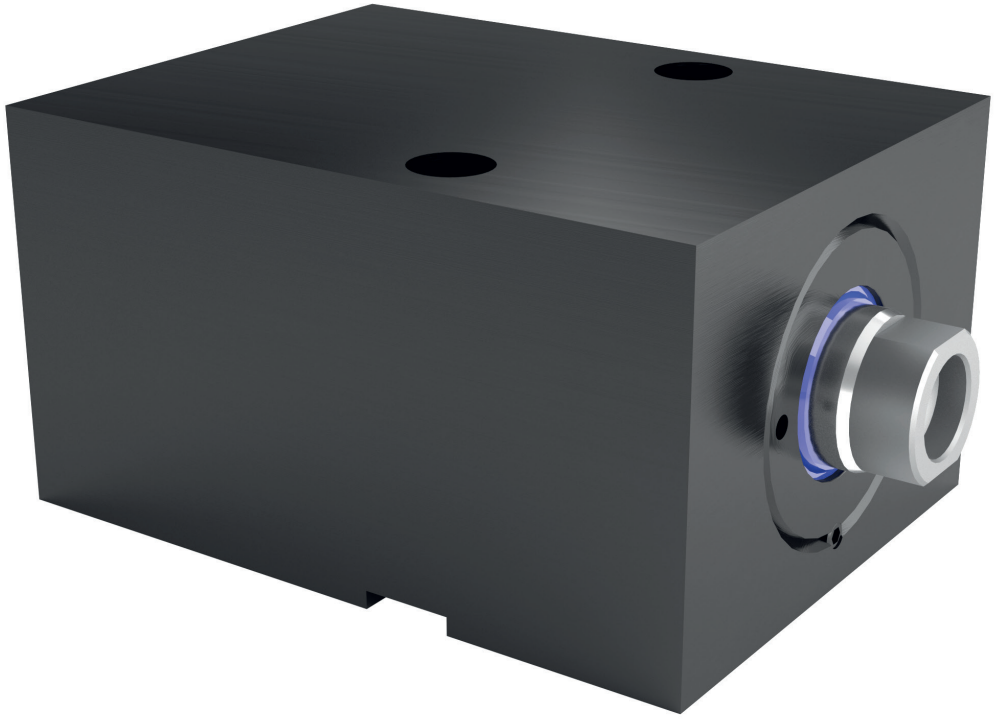
1. Close all query valves 10-11606 except one.
2. Close the volume flow control valve completely, in order to interrupt the air flow.
3. Now open the volume flow control valve again and increase the pressure slowly, in order to set the release point of the pressure monitor for the clamping pressure.
4. Close the volume flow control valve slowly, until no alarm or signal more messages from the pressure monitor. (pressure drop)
5. By opening and closing the query valve 10-11606 it is checked whether the release pressure on the pressure monitor is reached and this again builds up.

## PNEUMATIC CIRCUIT DIAGRAM



micromat

WIR GEBEN HALT!



# CYLINDER TECHNOLOGY

# BLOCK CYLINDER

## SINGLE-ACTING WITH STEEL HOUSING

**M501**
– Transverse bores
– Pipe thread connection
– With spring return

**M502**
– Transverse bores
– Pipe thread connection
– Without spring return

**M503**
– Longitudinal bores
– Pipe thread connection
– With spring return

**M504**
– Longitudinal bores
– Pipe thread connection
– Without spring return

## DOUBLE-ACTING WITH STEEL HOUSING

**M505**
– Transverse bores
– Pipe thread connection

**M506**
– Longitudinal bores
– Pipe thread connection

**M507**
– Longitudinal bores
– O-ring connection, side

**M508**
– Transverse bores
– O-ring connection, rod side

**M509**
– Transverse bores
– O-ring connection, rod side

**M520**
– Through piston rod for position monitor

## DOUBLE-ACTING WITH ALUMINUM HOUSING

**M521**
– Longitudinal and transverse bores
– Pipe thread connection

**M522**
– Transverse bores
– O-ring connection, side

**M523**
– Longitudinal bores
– O-ring connection, rod side

**M524**
– Longitudinal bores
– O-ring connection, base side

# ROUND CYLINDER

## HOLLOW PISTON CYLINDER

### SINGLE-ACTING

**M710** – Male threads
– With spring return

**M711** – Without male threads
– With spring return

### DOUBLE-ACTING

**M712** – Male threads

**M713** – Without male threads

## CLAMPING CYLINDER

**M720B** – With spherical piston

**M720G** – With female threads on piston

## SCREW-IN CYLINDER

### DOUBLE-ACTING

**M730B** – With spherical piston

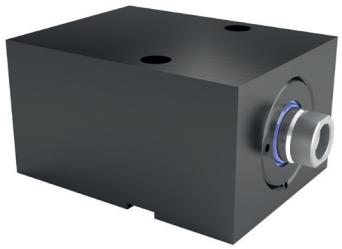
**M730G** – With female threads on piston

**M731** – With head flange
– Female threads on piston

# GENERAL DESCRIPTION

Block cylinders can present the ideal solution due to their large range of force with compact design dimensions and thanks to short and precise cycle times for many manufacturing tasks. With functions such as

- positioning
- clamp
- embossing
- stamping
- riveting
- clamping
- closing
- opening
- bending
- drawing



they have also been proven in automobile, machine and mold construction, as well as in the filed of injection molding.

## DESIGN

| | |
|---|---|
| Housing: | Material C45k bronzed, piston bore rolled or honed |
| Pistons: | Material case hardened steel, one piece, piston rod seal in tandem design |
| Dimensional tolerances: | As long as not otherwise indicated, according to DIN 7168-m |

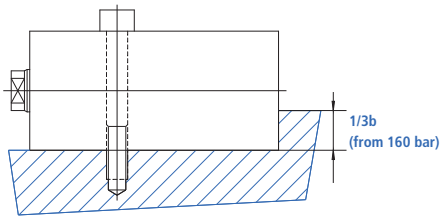
## GENERAL INFORMATION

| | | |
|---|---|---|
| Force range: | Up to above 1000 kN | |
| Standard strokes: | Of 8–200 mm | |
| Installation position: | As required | |
| Piston speed: | Vmax 0.5 m/s | |
| Max. operating pressure: | 500 bar | |
| Operating temperature: | Standard | –10 to +60°C, |
| | Viton: | on request |
| Piston transverse force: | Should be avoided, in no case > 5 % of the cylinder force | |
| Medium: | Mineral oil according to DIN 51524 | |

# TECHNICAL INFORMATION

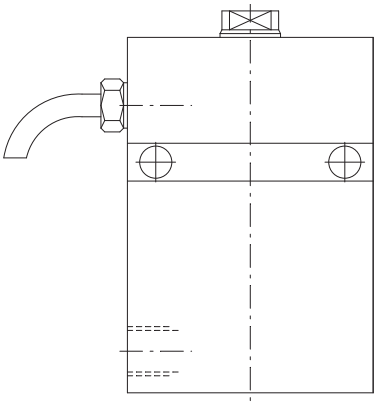
### FASTENING

With fastening using transverse bores above an operating pressure of 160 bar he cylinder must be supported on the back or by slot nuts.




### VENTILATION OF THE SPRING CHAMBER WITH SINGLE-ACTING DESIGN

If aggressive cutting and cooling liquids should get into the spring chamber through the sinter metal filter, a ventilation hose must be connected and laid in a protected location.



### TECHNICAL DATA

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pistons Ø D | mm | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 | 200 |
| Rods Ø D | mm | 10 | 14 | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 |
| Effective piston area, pressing | $cm^2$ | 2 | 3.1 | 4.9 | 8 | 12.5 | 19.6 | 31.1 | 50.3 | 78.4 | 122.7 | 201 | 314.1 |
| Effective piston area, pulling | $cm^2$ | 1.2 | 1.6 | 2.9 | 4.9 | 7.7 | 11.6 | 18.6 | 30.6 | 47.4 | 72.4 | 122.5 | 191.4 |
| Compression force (100 bar) | kN | 2 | 3.1 | 4.9 | 8 | 12.5 | 19.6 | 31.1 | 50.3 | 78.4 | 122.7 | 201 | 314.1 |
| Tensile force (100 bar) | kN | 1.2 | 1.6 | 2.9 | 4.9 | 7.7 | 11.6 | 18.6 | 30.6 | 47.4 | 72.4 | 122.5 | 191.4 |

# CUSTOM DESIGN

High temperature design with Viton: For temperatures above 100°C.
Order example: M501-2-020-V

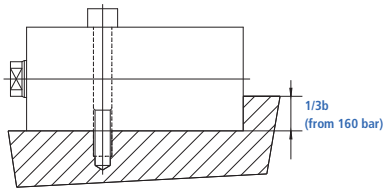
Stroke shortening during extension: By using a spacing disk the stroke is shortened
Order example: M501-2-020-30

Male threads on the piston rod: Desired threads are made on the piston rod ends
Order example: M501-2-020-M8 x 15 (Total length = L + 15 mm)

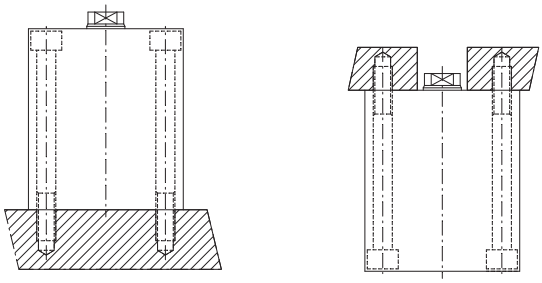
Inductive proximity switch: Placing inductive proximity switch on the stroke start and stroke end
Order example: M505-2-20-N

Punching cylinder: Placing guide elements on pistons and screwed connection
Order example: M505-2-20-ST

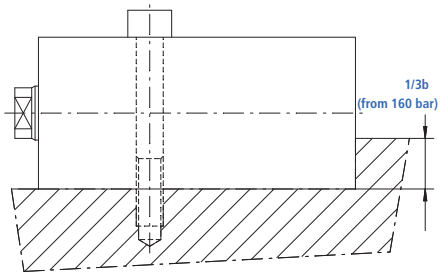
## FASTENING / CONNECTION TYPES



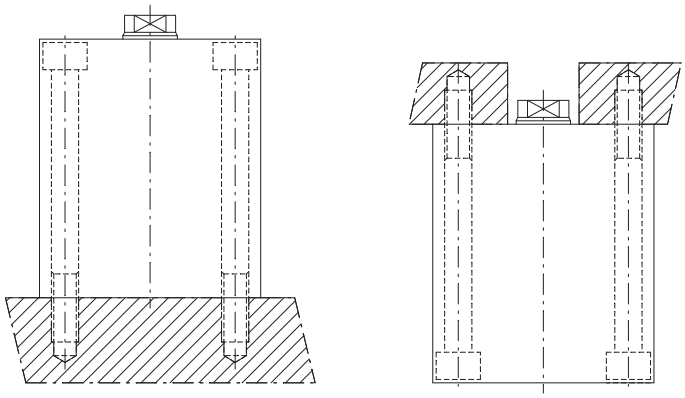

M501 · M502



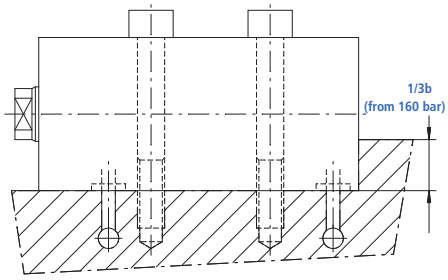
M503 · M504



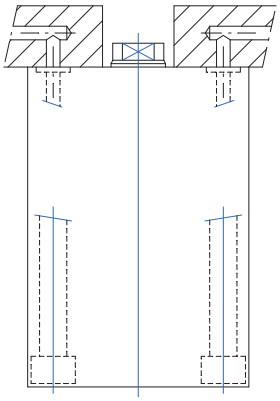

M505



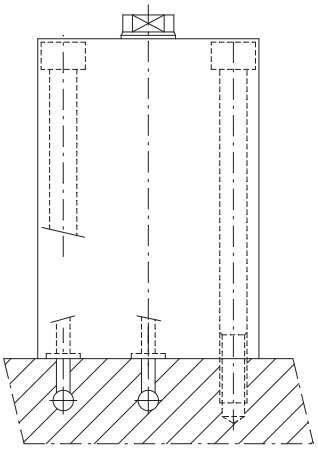
M506



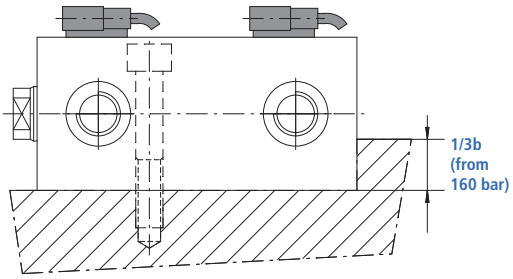

M507



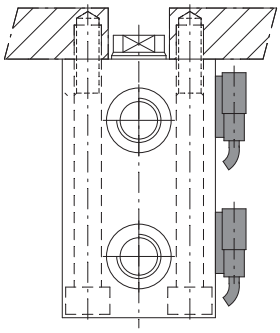
M508



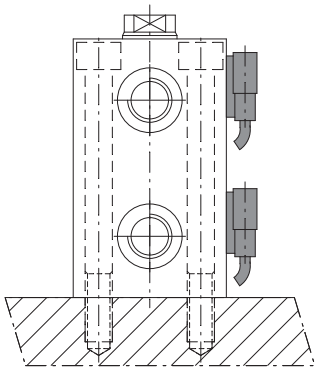
M509



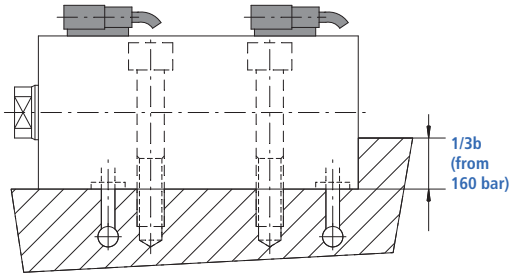

M521



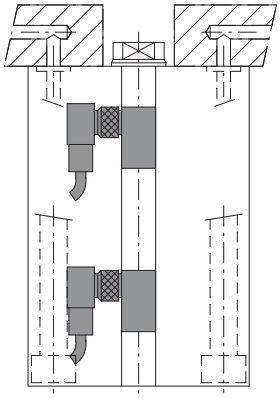
M521



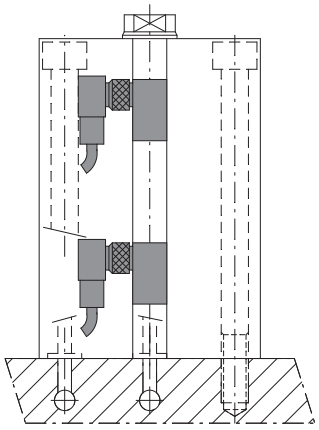
M521




M522

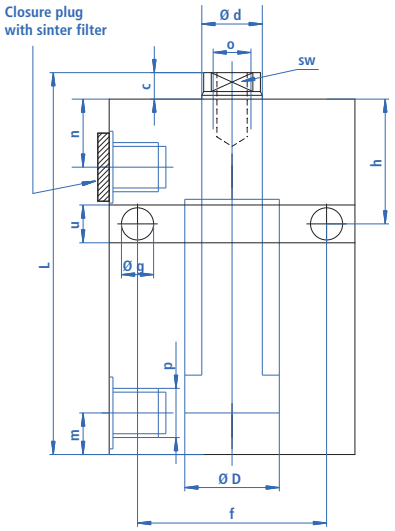


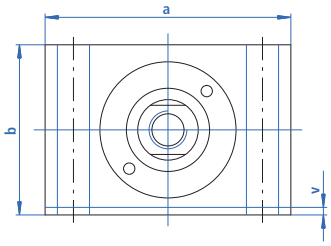
M523



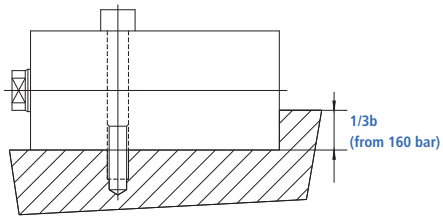
M524

# STEEL-BLOCK CYLINDER · SINGLE-ACTING · M501




**FASTENING**




## TECHNICAL DATA M501

| Pistons Ø D | mm | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|
| Rods Ø D | mm | 10 | 14 | 16 | 20 | 25 | 32 | 40 | 50 | 63 |
| a | mm | 60 | 60 | 65 | 75 | 85 | 100 | 125 | 160 | 200 |
| b | mm | 35 | 35 | 45 | 55 | 63 | 75 | 95 | 120 | 150 |
| c | mm | 6 | 7 | 7 | 10 | 10 | 10 | 14 | 14 | 15 |
| f | mm | 30 | 40 | 50 | 55 | 63 | 76 | 95 | 120 | 158 |
| g Ø | mm | 6.5 | 6.5 | 8.5 | 10.5 | 10.5 | 13 | 17 | 21 | 25 |
| h | mm | 30 | 30 | 33 | 38 | 40 | 44 | 50 | 60 | 64 |
| m | mm | 11 | 11 | 11 | 11 | 11 | 13 | 17 | 21 | 25 |
| n | mm | 16.5 | 17 | 18 | 22 | 24 | 27 | 26 | 34 | 35 |
| o x thread depth | | M6 x 12 | M8 x 15 | M10 x 15 | M12 x 15 | M16 X 25 | M20 X 30 | M27 X 40 | M30 X 40 | M42 x 60 |
| p | mm | G 1/4 | G 1/4 | G 1/4 | G 1/4 | G 1/4 | G 1/4 | G 1/2 | G 1/2 | G 1/2 |
| u | mm | 8 | 8 | 10 | 12 | 12 | 16 | 20 | 24 | 28 |
| v | mm | 2 | 2 | 2 | 3 | 3 | 5 | 5 | 7 | 7 |
| sw | mm | 8 | 10 | 13 | 17 | 22 | 27 | 36 | 46 | 55 |

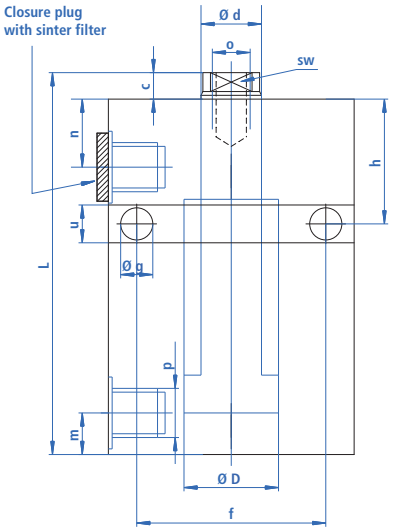
## ORDER NUMBER OVERVIEW

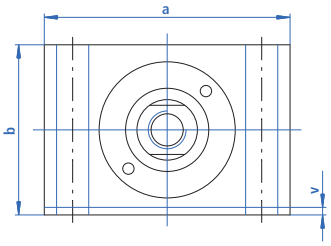
| Pistons Ø D | Compression force at 100 bar | Spring return force at 100 bar | Stroke ±1 | | Total length L | |
|---|---|---|---|---|---|---|
| mm | kN | kN | mm | | mm | |
| **016** | 2 | 50 | 8 | 20 | 62 | 97 |
| **020** | 3.1 | 100 | 8 | 20 | 68 | 102 |
| **025** | 4.9 | 140 | 8 | 20 | 71 | 101 |
| **032** | 8 | 190 | 10 | 20 | 85 | 110 |
| **040** | 12.5 | 250 | 10 | 20 | 89 | 114 |
| **050** | 19.6 | 400 | 12 | 20 | 100 | 125 |
| **063** | 31.1 | 400 | 12 | 25 | 116 | 149 |
| **080** | 50.3 | 720 | 12 | 32 | 131 | 179 |
| **100** | 78.4 | 1100 | 12 | 32 | 145 | 205 |
| | | | **1** | **2** | **1** | **2** |

ORDER NUMBER: M501 - **Y** - **XXX**

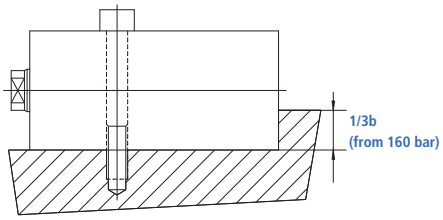
*2D and 3D data is found at: https://micromat.partcommunity.com*

# STEEL-BLOCK CYLINDER · SINGLE-ACTING · M502




**FASTENING**




## TECHNICAL DATA M502

| Pistons Ø D | mm | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|
| Rods Ø D | mm | 10 | 14 | 16 | 20 | 25 | 32 | 40 | 50 | 63 |
| a | mm | 60 | 60 | 65 | 75 | 85 | 100 | 125 | 160 | 200 |
| b | mm | 35 | 35 | 45 | 55 | 63 | 75 | 95 | 120 | 150 |
| c | mm | 6 | 7 | 7 | 10 | 10 | 10 | 14 | 14 | 15 |
| f | mm | 30 | 40 | 50 | 55 | 63 | 76 | 95 | 120 | 158 |
| g Ø | mm | 6.5 | 6.5 | 8.5 | 10.5 | 10.5 | 13 | 17 | 21 | 25 |
| h | mm | 30 | 30 | 33 | 38 | 40 | 44 | 50 | 60 | 64 |
| m | mm | 11 | 11 | 11 | 11 | 11 | 13 | 17 | 21 | 25 |
| n | mm | 16.5 | 17 | 18 | 22 | 24 | 27 | 26 | 34 | 35 |
| o x thread depth | | M6 x 12 | M8 x 15 | M10 x 15 | M12 x 15 | M16 X 25 | M20 X 30 | M27 X 40 | M30 X 40 | M42 x 60 |
| p | mm | G 1/4 | G 1/4 | G 1/4 | G 1/4 | G 1/4 | G 1/4 | G 1/2 | G 1/2 | G 1/2 |
| u | mm | 8 | 8 | 10 | 12 | 12 | 16 | 20 | 24 | 28 |
| v | mm | 2 | 2 | 2 | 3 | 3 | 5 | 5 | 7 | 7 |
| sw | mm | 8 | 10 | 13 | 17 | 22 | 27 | 36 | 46 | 55 |

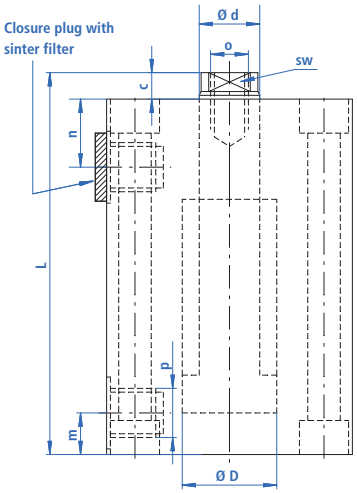
## ORDER NUMBER OVERVIEW

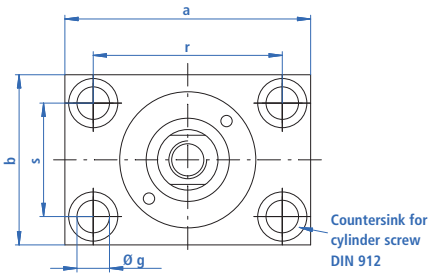
| Pistons Ø D | Compression force at 100 bar | Stroke ±1 | | Total length L | |
|---|---|---|---|---|---|
| mm | kN | mm | | mm | |
| **016** | 2 | 16 | 50 | 62 | 97 |
| **020** | 3.1 | 16 | 50 | 68 | 102 |
| **025** | 4.9 | 20 | 50 | 71 | 101 |
| **032** | 8 | 25 | 50 | 85 | 110 |
| **040** | 12.5 | 25 | 50 | 89 | 114 |
| **050** | 19.6 | 25 | 50 | 100 | 125 |
| **063** | 31.1 | 30 | 63 | 116 | 149 |
| **080** | 50.3 | 32 | 80 | 131 | 179 |
| **100** | 78.4 | 40 | 100 | 145 | 205 |
| | | **1** | **2** | **1** | **2** |

ORDER NUMBER: M502 - **Y** - **XXX**

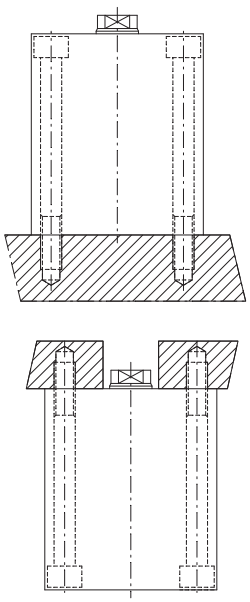
*2D and 3D data is found at: https://micromat.partcommunity.com*

# STEEL-BLOCK CYLINDER · SINGLE-ACTING · M503




**FASTENING**



## TECHNICAL DATA M503

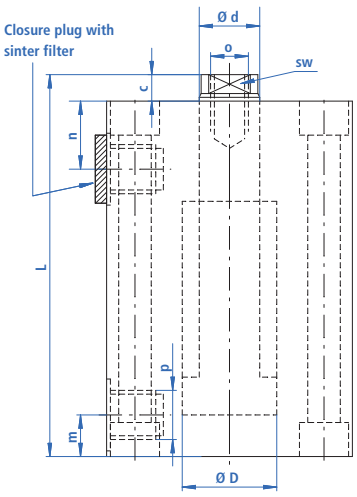
| Pistons Ø D | mm | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|
| Rods Ø D | mm | 10 | 14 | 16 | 20 | 25 | 32 | 40 | 50 | 63 |
| a | mm | 60 | 60 | 65 | 75 | 85 | 100 | 125 | 160 | 200 |
| b | mm | 35 | 35 | 45 | 55 | 63 | 75 | 95 | 120 | 150 |
| c | mm | 6 | 7 | 7 | 10 | 10 | 10 | 14 | 14 | 15 |
| g Ø | mm | 6.5 | 6.5 | 8.5 | 10.5 | 10.5 | 13 | 17 | 21 | 25 |
| m | mm | 11 | 11 | 11 | 11 | 11 | 13 | 17 | 21 | 25 |
| n | mm | 16.5 | 17 | 18 | 22 | 24 | 27 | 26 | 34 | 35 |
| o x thread depth | | M6 x 12 | M8 x 15 | M10 x 15 | M12 x 15 | M16 X 25 | M20 X 30 | M27 X 40 | M30 X 40 | M42 x 60 |
| p | | G 1/4 | G 1/4 | G 1/4 | G 1/4 | G 1/4 | G 1/4 | G 1/2 | G 1/2 | G 1/2 |
| r | mm | 40 | 40 | 50 | 55 | 63 | 76 | 95 | 120 | 158 |
| s | mm | 22 | 22 | 30 | 35 | 40 | 45 | 65 | 80 | 108 |
| sw | mm | 8 | 10 | 13 | 17 | 22 | 27 | 36 | 46 | 55 |

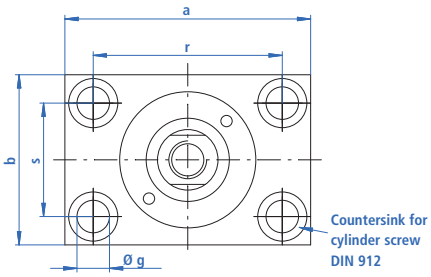
## ORDER NUMBER OVERVIEW

| Pistons Ø D | Compression force at 100 bar | Spring return force | Stroke ±1 | | Total length L | |
|---|---|---|---|---|---|---|
| mm | kN | kN | mm | | mm | |
| **016** | 2 | 50 | 8 | 20 | 62 | 97 |
| **020** | 3.1 | 100 | 8 | 20 | 68 | 102 |
| **025** | 4.9 | 140 | 8 | 20 | 71 | 101 |
| **032** | 8 | 190 | 10 | 20 | 85 | 110 |
| **040** | 12.5 | 250 | 10 | 20 | 89 | 114 |
| **050** | 19.6 | 400 | 12 | 20 | 100 | 125 |
| **063** | 31.1 | 400 | 12 | 25 | 116 | 149 |
| **080** | 50.3 | 720 | 12 | 32 | 131 | 179 |
| **100** | 78.4 | 1100 | 12 | 32 | 145 | 205 |
| | | | **1** | **2** | **1** | **2** |

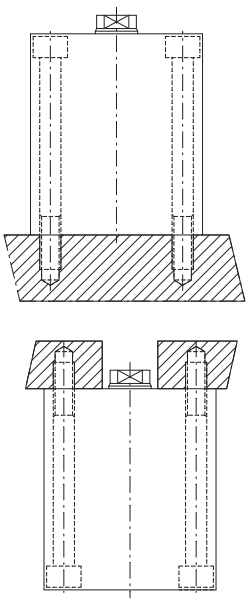
ORDER NUMBER: M503 - **Y** - **XXX**

*2D and 3D data is found at: https://micromat.partcommunity.com*




**FASTENING**



## TECHNICAL DATA M504

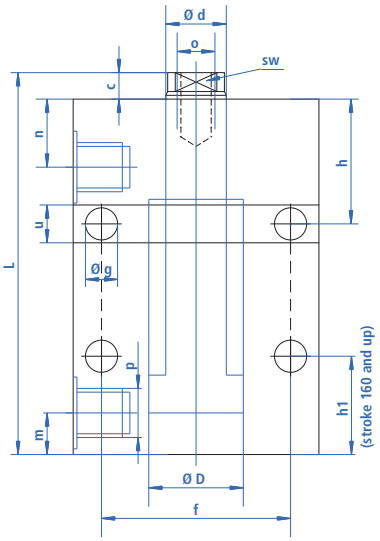
| Pistons Ø D | mm | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|
| Rods Ø D | mm | 10 | 14 | 16 | 20 | 25 | 32 | 40 | 50 | 63 |
| a | mm | 60 | 60 | 65 | 75 | 85 | 100 | 125 | 160 | 200 |
| b | mm | 35 | 35 | 45 | 55 | 63 | 75 | 95 | 120 | 150 |
| c | mm | 6 | 7 | 7 | 10 | 10 | 10 | 14 | 14 | 15 |
| g Ø | mm | 6.5 | 6.5 | 8.5 | 10.5 | 10.5 | 13 | 17 | 21 | 25 |
| m | mm | 11 | 11 | 11 | 11 | 11 | 13 | 17 | 21 | 25 |
| n | mm | 16.5 | 17 | 18 | 22 | 24 | 27 | 26 | 34 | 35 |
| o x thread depth | | M6 x 12 | M8 x 15 | M10 x 15 | M12 x 15 | M16 X 25 | M20 X 30 | M27 X 40 | M30 X 40 | M42 x 60 |
| p | | G 1/4 | G 1/4 | G 1/4 | G 1/4 | G 1/4 | G 1/4 | G 1/2 | G 1/2 | G 1/2 |
| r | mm | 40 | 40 | 50 | 55 | 63 | 76 | 95 | 120 | 158 |
| s | mm | 22 | 22 | 30 | 35 | 40 | 45 | 65 | 80 | 108 |
| sw | mm | 8 | 10 | 13 | 17 | 22 | 27 | 36 | 46 | 55 |

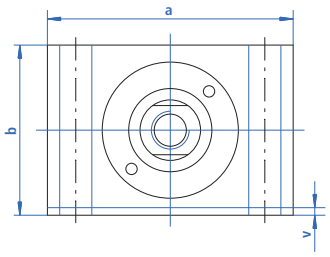
## ORDER NUMBER OVERVIEW

| Pistons Ø D | Compression force at 100 bar | Stroke ±1 | | Total length L | |
|---|---|---|---|---|---|
| mm | kN | mm | | mm | |
| **016** | 2 | 16 | 50 | 62 | 97 |
| **020** | 3.1 | 16 | 50 | 68 | 102 |
| **025** | 4.9 | 20 | 50 | 71 | 101 |
| **032** | 8 | 25 | 50 | 85 | 110 |
| **040** | 12.5 | 25 | 50 | 89 | 114 |
| **050** | 19.6 | 25 | 50 | 100 | 125 |
| **063** | 31.1 | 30 | 63 | 116 | 149 |
| **080** | 50.3 | 32 | 80 | 131 | 179 |
| **100** | 78.4 | 40 | 100 | 145 | 205 |
| | | **1** | **2** | **1** | **2** |

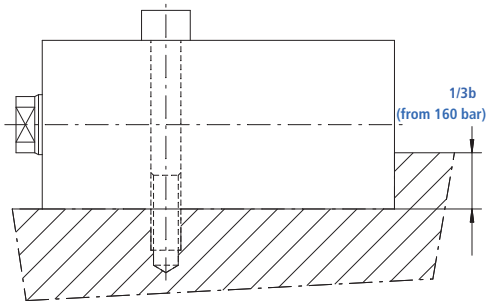
ORDER NUMBER: M504 - **Y** - **XXX**

*2D and 3D data is found at: https://micromat.partcommunity.com*




**FASTENING**




## TECHNICAL DATA M505

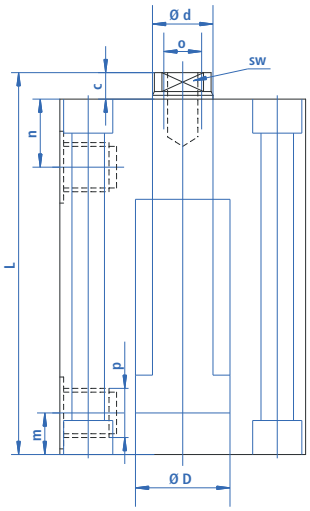
| Pistons Ø D | mm | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rods Ø D | mm | 10 | 14 | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 |
| a | mm | 60 | 60 | 65 | 75 | 85 | 100 | 125 | 160 | 200 | 230 | 300 |
| b | mm | 35 | 35 | 45 | 55 | 63 | 75 | 95 | 120 | 150 | 180 | 230 |
| c | mm | 6 | 7 | 7 | 10 | 10 | 10 | 14 | 14 | 15 | 16 | 22 |
| f | mm | 30 | 40 | 50 | 55 | 63 | 76 | 95 | 120 | 158 | 180 | 230 |
| g Ø | mm | 6.5 | 6.5 | 8.5 | 10.5 | 10.5 | 13 | 17 | 21 | 25 | 32 | 39 |
| h | mm | 30 | 30 | 33 | 38 | 40 | 44 | 50 | 60 | 64 | 82 | 92 |
| h1 (stroke 160 and up) | mm | – | – | 26 | 27 | 27 | 30 | 41 | 47 | 54 | 66 | 77 |
| m | mm | 11 | 11 | 11 | 11 | 11 | 13 | 17 | 21 | 25 | 31 | 39 |
| n | mm | 16.5 | 17 | 18 | 22 | 24 | 27 | 26 | 34 | 35 | 47 | 55 |
| o x thread depth | | M6 x 12 | M8 x 15 | M10 x 15 | M12 x 15 | M16 X 25 | M20 X 30 | M27 X 40 | M30 X 40 | M42 x 60 | M48 X 70 | M56 x 80 |
| p | mm | G 1/4 | G 1/4 | G 1/4 | G 1/4 | G 1/4 | G 1/4 | G 1/2 | G 1/2 | G 1/2 | G 1/2 | G 1/2 |
| u | mm | 8 | 8 | 10 | 12 | 12 | 16 | 20 | 24 | 28 | 35 | 42 |
| v | mm | 2 | 2 | 2 | 3 | 3 | 5 | 5 | 7 | 7 | 7 | 7 |
| sw | mm | 8 | 10 | 13 | 17 | 22 | 27 | 36 | 46 | 55 | 70 | 90 |

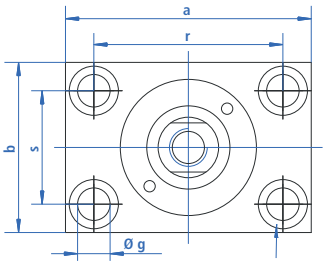
## ORDER NUMBER OVERVIEW

| Pistons Ø D | Comp. force at 100 bar | Tensile force at 100 bar | Stroke ±1 | | | | | Total length L | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | kN | kN | mm | | | | | mm | | | | |
| **016** | 2 | 1.2 | 16 | 50 | 100 | | | | | 150 | 97 | 62 |
| **020** | 3.1 | 1.6 | 16 | 50 | 100 | | | | | 155 | 102 | 68 |
| **025** | 4.9 | 2.9 | 20 | 50 | 100 | 160 | | | 214 | 151 | 101 | 71 |
| **032** | 8 | 4.9 | 25 | 50 | 100 | 160 | 200 | 263 | 223 | 160 | 110 | 85 |
| **040** | 12.5 | 7.7 | 25 | 50 | 100 | 160 | 200 | 267 | 227 | 164 | 114 | 89 |
| **050** | 19.6 | 11.6 | 25 | 50 | 100 | 160 | 200 | 278 | 238 | 175 | 125 | 100 |
| **063** | 31.1 | 18.6 | 30 | 63 | 100 | 160 | 200 | 290 | 250 | 186 | 149 | 116 |
| **080** | 50.3 | 30.6 | 32 | 80 | 100 | 160 | 200 | 303 | 263 | 199 | 179 | 131 |
| **100** | 78.4 | 47.4 | 40 | 100 | | 160 | 200 | 309 | 269 | | 205 | 145 |
| **125** | 122.7 | 72.4 | 40 | 100 | | 160 | 200 | 330 | 290 | | 226 | 166 |
| **160** | 201 | 122.5 | 40 | 100 | | 160 | 200 | 354 | 314 | | 250 | 190 |
| | | | **1** | **2** | **3** | **4** | **5** | **5** | **4** | **3** | **2** | **1** |

ORDER NUMBER: M505 - **Y** - **XXX**

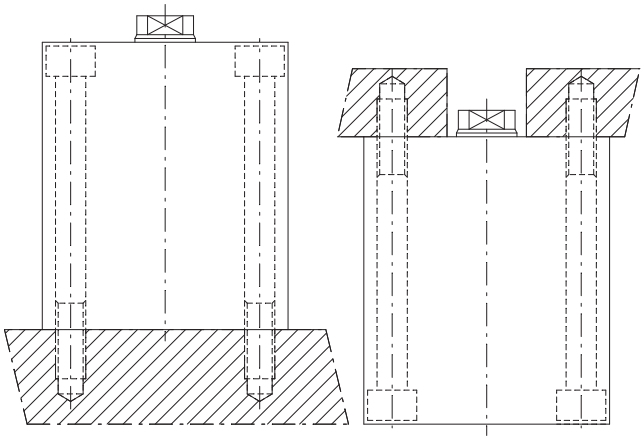
*2D and 3D data is found at: https://micromat.partcommunity.com*




Countersink for
cylinder screw DIN 912
For stroke 160 / 200 both sides threads i

**FASTENING**



## TECHNICAL DATA M506

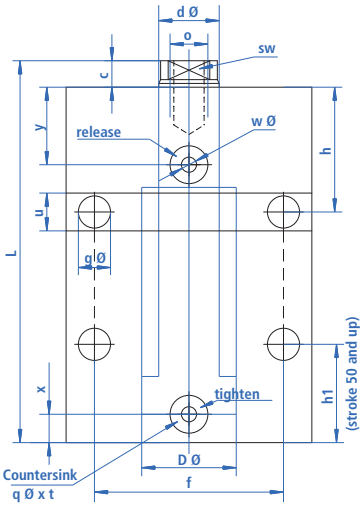
| Pistons Ø D | mm | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rods Ø D | mm | 10 | 14 | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 |
| a | mm | 60 | 60 | 65 | 75 | 85 | 100 | 125 | 160 | 200 | 230 | 300 |
| b | mm | 35 | 35 | 45 | 55 | 63 | 75 | 95 | 120 | 150 | 180 | 230 |
| c | mm | 6 | 7 | 7 | 10 | 10 | 10 | 14 | 14 | 15 | 16 | 22 |
| g Ø | mm | 6.5 | 6.5 | 8.5 | 10.5 | 10.5 | 13 | 17 | 21 | 25 | 32 | 39 |
| m | mm | 11 | 11 | 11 | 11 | 11 | 13 | 17 | 21 | 25 | 31 | 39 |
| n | mm | 16.5 | 17 | 18 | 22 | 24 | 27 | 26 | 34 | 35 | 47 | 55 |
| o x thread depth | | M6 x 12 | M8 x 15 | M10 x 15 | M12 x 15 | M16 X 25 | M20 X 30 | M27 X 40 | M30 X 40 | M42 X 60 | M48 X 70 | M56 x 80 |
| p | | G 1/4 | G 1/4 | G 1/4 | G 1/4 | G 1/4 | G 1/4 | G 1/2 | G 1/2 | G 1/2 | G 1/2 | G 1/2 |
| r | mm | 40 | 40 | 50 | 55 | 63 | 76 | 95 | 120 | 158 | 180 | 230 |
| s | mm | 22 | 22 | 30 | 35 | 40 | 45 | 65 | 80 | 108 | 130 | 160 |
| sw | mm | 8 | 10 | 13 | 17 | 22 | 27 | 36 | 46 | 55 | 70 | 90 |

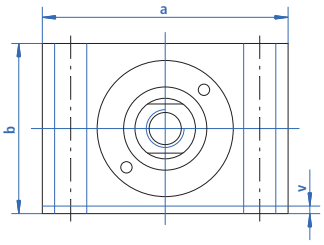
## ORDER NUMBER OVERVIEW

| Pistons Ø D | Comp. force at 100 bar | Tensile force at 100 bar | Stroke ±1 | | | | | Total length L | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | kN | kN | mm | | | | | mm | | | | |
| **016** | 2 | 1.2 | 16 | 50 | 100 | | | | | 150 | 97 | 62 |
| **020** | 3.1 | 1.6 | 16 | 50 | 100 | | | | | 155 | 102 | 68 |
| **025** | 4.9 | 2.9 | 20 | 50 | 100 | 160 | | | 214 | 151 | 101 | 71 |
| **032** | 8 | 4.9 | 25 | 50 | 100 | 160 | 200 | 263 | 223 | 160 | 110 | 85 |
| **040** | 12.5 | 7.7 | 25 | 50 | 100 | 160 | 200 | 267 | 227 | 164 | 114 | 89 |
| **050** | 19.6 | 11.6 | 25 | 50 | 100 | 160 | 200 | 278 | 238 | 175 | 125 | 100 |
| **063** | 31.1 | 18.6 | 30 | 63 | 100 | 160 | 200 | 290 | 250 | 186 | 149 | 116 |
| **080** | 50.3 | 30.6 | 32 | 80 | 100 | 160 | 200 | 303 | 263 | 199 | 179 | 131 |
| **100** | 78.4 | 47.4 | 40 | 100 | | 160 | 200 | 309 | 269 | | 205 | 145 |
| **125** | 122.7 | 72.4 | 40 | 100 | | 160 | 200 | 330 | 290 | | 226 | 166 |
| **160** | 201 | 122.5 | 40 | 100 | | 160 | 200 | 354 | 314 | | 250 | 190 |
| | | | **1** | **2** | **3** | **4** | **5** | **5** | **4** | **3** | **2** | **1** |

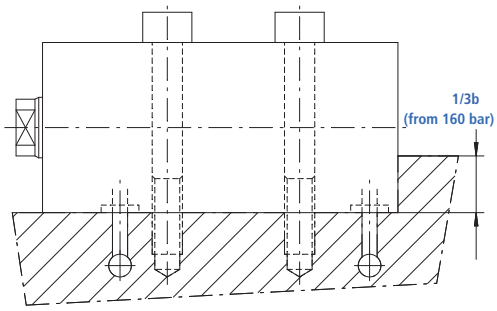
ORDER NUMBER: M506 - **Y** - **XXX**

*2D and 3D data is found at: https://micromat.partcommunity.com*




FASTENING




## TECHNICAL DATA M507

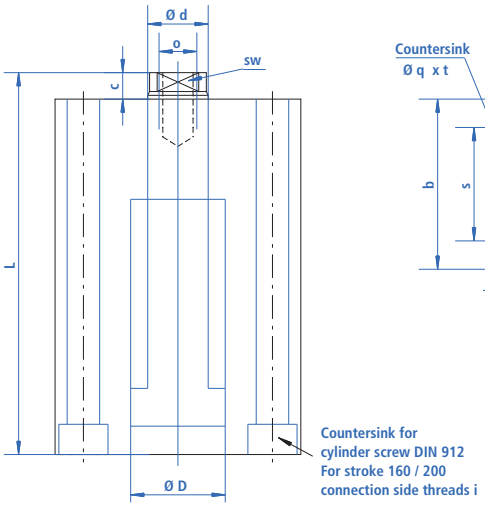
| Pistons Ø D | mm | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Rods Ø D | mm | 10 | 14 | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 |
| a | mm | 60 | 60 | 65 | 75 | 85 | 100 | 125 | 160 | 200 | 230 |
| b | mm | 35 | 35 | 45 | 55 | 63 | 75 | 95 | 120 | 150 | 180 |
| c | mm | 6 | 7 | 7 | 10 | 10 | 10 | 14 | 14 | 15 | 16 |
| f | mm | 30 | 40 | 50 | 55 | 63 | 76 | 95 | 120 | 158 | 180 |
| g Ø | mm | 6.5 | 6.5 | 8.5 | 10.5 | 10.5 | 13 | 17 | 21 | 25 | 32 |
| h | mm | 30 | 30 | 33 | 38 | 40 | 44 | 50 | 60 | 64 | 82 |
| h1 (stroke 50 mm and up) | mm | 24.5 | 26 | 26 | 27 | 27 | 30 | 41 | 47 | 54 | 66 |
| o x thread depth | | M6 x 12 | M8 x 15 | M10 x 15 | M12 x 15 | M16 x 25 | M20 x 30 | M27 x 40 | M30 x 40 | M42 x 60 | M48 x 70 |
| qØ x t | mm | 9.8x1.1 | 9.8x1.1 | 9.8x1.1 | 9.8x1.1 | 9.8x1.1 | 10.8x1.1 | 13.8x1.5 | 13.8x1.5 | 13.8x1.5 | 13.8x1.5 |
| u | mm | 8 | 8 | 10 | 12 | 12 | 16 | 20 | 24 | 28 | 35 |
| v | mm | 2 | 2 | 2 | 3 | 3 | 5 | 5 | 7 | 7 | 7 |
| w Ø | mm | 3.5 | 3.5 | 4 | 5 | 6 | 6 | 8 | 8 | 8 | 8 |
| x | mm | 7 | 7.5 | 7.5 | 10 | 10 | 13 | 16 | 21 | 25 | 31 |
| y | mm | 20.5 | 20.5 | 21 | 25 | 27 | 29.5 | 32 | 39 | 40 | 47 |
| O-ring | mm | 7x1.5 | 7x1.5 | 7x1.5 | 7x1.5 | 7x1.5 | 8x1.5 | 10x2 | 10x2 | 10x2 | 10x2 |
| sw | mm | 8 | 10 | 13 | 17 | 22 | 27 | 36 | 46 | 55 | 70 |

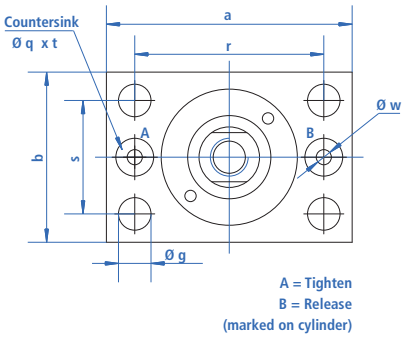
## ORDER NUMBER OVERVIEW

| Pistons Ø D | Comp. force at 100 bar | Tensile force at 100 bar | Stroke ±1 | | | | | Total length L | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | kN | kN | mm | | | | | mm | | | | |
| **016** | 2 | 1.2 | 16 | 50 | 100 | | | | | 150 | 97 | 62 |
| **020** | 3.1 | 1.6 | 16 | 50 | 100 | | | | | 155 | 102 | 68 |
| **025** | 4.9 | 2.9 | 20 | 50 | 100 | 160 | | | 214 | 151 | 101 | 71 |
| **032** | 8 | 4.9 | 25 | 50 | 100 | 160 | 200 | 263 | 223 | 160 | 110 | 85 |
| **040** | 12.5 | 7.7 | 25 | 50 | 100 | 160 | 200 | 267 | 227 | 164 | 114 | 89 |
| **050** | 19.6 | 11.6 | 25 | 50 | 100 | 160 | 200 | 278 | 238 | 175 | 125 | 100 |
| **063** | 31.1 | 18.6 | 30 | 63 | 100 | 160 | 200 | 290 | 250 | 186 | 149 | 116 |
| **080** | 50.3 | 30.6 | 32 | 80 | 100 | 160 | 200 | 303 | 263 | 199 | 179 | 131 |
| **100** | 78.4 | 47.4 | 40 | 100 | | 160 | 200 | 309 | 269 | | 205 | 145 |
| **125** | 122.7 | 72.4 | 40 | 100 | | 160 | 200 | 330 | 290 | | 226 | 166 |
| | | | **1** | **2** | **3** | **4** | **5** | **5** | **4** | **3** | **2** | **1** |

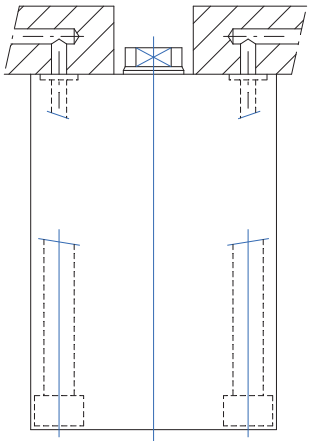
ORDER NUMBER: M507 - **Y** - **XXX**

*2D and 3D data is found at: https://micromat.partcommunity.com*




**FASTENING**



## TECHNICAL DATA M508

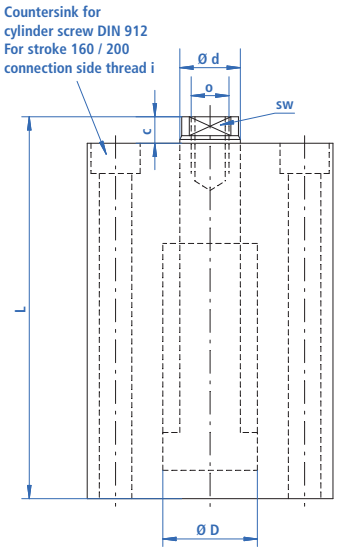
| Pistons Ø D | mm | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Rods Ø D | mm | 10 | 14 | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 |
| a | mm | 60 | 60 | 65 | 75 | 85 | 100 | 125 | 160 | 200 | 230 |
| b | mm | 35 | 35 | 45 | 55 | 63 | 75 | 95 | 120 | 150 | 180 |
| c | mm | 6 | 7 | 7 | 10 | 10 | 10 | 14 | 14 | 15 | 16 |
| g Ø | mm | 6.5 | 6.5 | 8.5 | 10.5 | 10.5 | 13 | 17 | 21 | 25 | 32 |
| i (only stroke 160/200) | | - | - | M8 x 12 | M10 x 15 | M10x15 | M12 x 18 | M16 x 24 | M20 x 30 | M24 x 36 | M30 x 45 |
| o x thread depth | | M6 x 12 | M8 x 15 | M10 x 15 | M12 x 15 | M16 x 25 | M20 x 30 | M27 x 40 | M30 x 40 | M42 x 60 | M48 x 70 |
| qØ x t | mm | 9.8x1.1 | 9.8x1.1 | 9.8x1.1 | 9.8x1.1 | 9.8x1.1 | 10.8x1.1 | 13.8x1.5 | 13.8x1.5 | 13.8x1.5 | 13.8x1.5 |
| r | mm | 40 | 40 | 50 | 55 | 63 | 76 | 95 | 120 | 158 | 180 |
| s | mm | 22 | 22 | 30 | 35 | 40 | 45 | 65 | 80 | 108 | 130 |
| w Ø | mm | 3.5 | 3.5 | 4 | 5 | 6 | 6 | 8 | 8 | 8 | 8 |
| O-ring | mm | 7x1.5 | 7x1.5 | 7x1.5 | 7x1.5 | 7x1.5 | 8x1.5 | 10x2 | 10x2 | 10x2 | 10x2 |
| sw | mm | 8 | 10 | 13 | 17 | 22 | 27 | 36 | 46 | 55 | 70 |

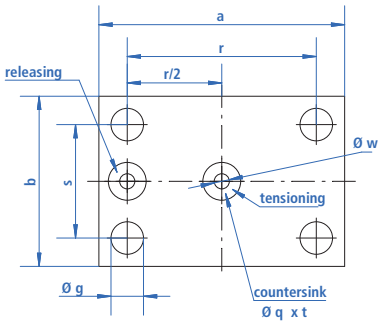
## ORDER NUMBER OVERVIEW

| Pistons Ø D | Compr. force at 100 bar | Tensile force at 100 bar | Stroke ±1 | | | | | Total length L | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | kN | kN | mm | | | | | mm | | | | |
| **016** | 2 | 1.2 | 16 | 50 | 100 | | | | | 150 | 97 | 62 |
| **020** | 3.1 | 1.6 | 16 | 50 | 100 | | | | | 155 | 102 | 68 |
| **025** | 4.9 | 2.9 | 20 | 50 | 100 | 160 | | | 214 | 151 | 101 | 71 |
| **032** | 8 | 4.9 | 25 | 50 | 100 | 160 | 200 | 263 | 223 | 160 | 110 | 85 |
| **040** | 12.5 | 7.7 | 25 | 50 | 100 | 160 | 200 | 267 | 227 | 164 | 114 | 89 |
| **050** | 19.6 | 11.6 | 25 | 50 | 100 | 160 | 200 | 278 | 238 | 175 | 125 | 100 |
| **063** | 31.1 | 18.6 | 30 | 63 | 100 | 160 | 200 | 290 | 250 | 186 | 149 | 116 |
| **080** | 50.3 | 30.6 | 32 | 80 | 100 | 160 | 200 | 303 | 263 | 199 | 179 | 131 |
| **100** | 78.4 | 47.4 | 40 | 100 | | 160 | 200 | 309 | 269 | | 205 | 145 |
| **125** | 122.7 | 72.4 | 40 | 100 | | 160 | 200 | 330 | 290 | | 226 | 166 |
| | | | **1** | **2** | **3** | **4** | **5** | **5** | **4** | **3** | **2** | **1** |

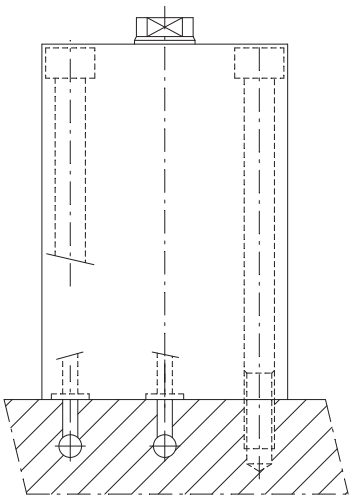
ORDER NUMBER: M508 - **Y** - **XXX**

*2D and 3D data is found at: https://micromat.partcommunity.com*




**FASTENING**



## TECHNICAL DATA M509

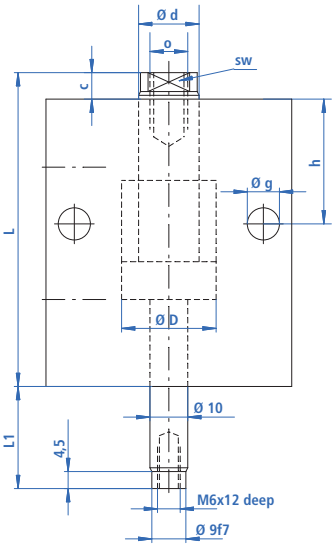
| Pistons Ø D | mm | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Rods Ø D | mm | 10 | 14 | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 |
| a | mm | 60 | 60 | 65 | 75 | 85 | 100 | 125 | 160 | 200 | 230 |
| b | mm | 35 | 35 | 45 | 55 | 63 | 75 | 95 | 120 | 150 | 180 |
| c | mm | 6 | 7 | 7 | 10 | 10 | 10 | 14 | 14 | 15 | 16 |
| g Ø | mm | 6.5 | 6.5 | 8.5 | 10.5 | 10.5 | 13 | 17 | 21 | 25 | 32 |
| i (only stroke 160/200) | | - | - | M8 x 12 | M10 x 15 | M10 x 15 | M12 x 18 | M16 x 24 | M20 x 30 | M24 x 36 | M30 x 45 |
| o x thread depth | | M6 x 12 | M8 x 15 | M10 x 15 | M12 x 15 | M16 x 25 | M20 x 30 | M27 x 40 | M30 x 40 | M42 x 60 | M48 x 70 |
| qØ x t | mm | 9.8 x 1.1 | 9.8 x 1.1 | 9.8 x 1.1 | 9.8 x 1.1 | 9.8 x 1.1 | 10.8 x 1.1 | 13.8 x 1.5 | 13.8 x 1.5 | 13.8 x 1.5 | 13.8 x 1.5 |
| r | mm | 40 | 40 | 50 | 55 | 63 | 76 | 95 | 120 | 158 | 180 |
| s | mm | 22 | 22 | 30 | 35 | 40 | 45 | 65 | 80 | 108 | 130 |
| w Ø | mm | 3.5 | 3.5 | 4 | 5 | 6 | 6 | 8 | 8 | 8 | 8 |
| O-ring | mm | 7 x 1.5 | 7 x 1.5 | 7 x 1.5 | 7 x 1.5 | 7 x 1.5 | 8 x 1.5 | 10 x 2 | 10 x 2 | 10 x 2 | 10 x 2 |
| sw | mm | 8 | 10 | 13 | 17 | 22 | 27 | 36 | 46 | 55 | 70 |

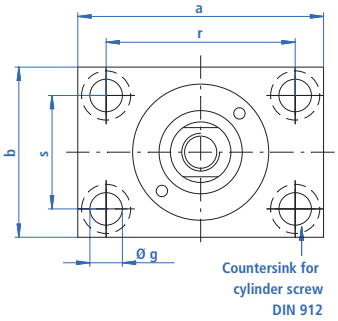
## ORDER NUMBER OVERVIEW

| Pistons Ø D | Comp. force at 100 bar | Tensile force at 100 bar | Stroke ±1 | | | | | Total length L | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | kN | kN | mm | | | | | mm | | | | |
| **016** | 2 | 1.2 | 16 | 50 | 100 | | | | | 150 | 97 | 62 |
| **020** | 3.1 | 1.6 | 16 | 50 | 100 | | | | | 155 | 102 | 68 |
| **025** | 4.9 | 2.9 | 20 | 50 | 100 | 160 | | | 214 | 151 | 101 | 71 |
| **032** | 8 | 4.9 | 25 | 50 | 100 | 160 | 200 | 263 | 223 | 160 | 110 | 85 |
| **040** | 12.5 | 7.7 | 25 | 50 | 100 | 160 | 200 | 267 | 227 | 164 | 114 | 89 |
| **050** | 19.6 | 11.6 | 25 | 50 | 100 | 160 | 200 | 278 | 238 | 175 | 125 | 100 |
| **063** | 31.1 | 18.6 | 30 | 63 | 100 | 160 | 200 | 290 | 250 | 186 | 149 | 116 |
| **080** | 50.3 | 30.6 | 32 | 80 | 100 | 160 | 200 | 303 | 263 | 199 | 179 | 131 |
| **100** | 78.4 | 47.4 | 40 | 100 | | 160 | 200 | 309 | 269 | | 205 | 145 |
| **125** | 122.7 | 72.4 | 40 | 100 | | 160 | 200 | 330 | 290 | | 226 | 166 |
| | | | **1** | **2** | **3** | **4** | **5** | **5** | **4** | **3** | **2** | **1** |

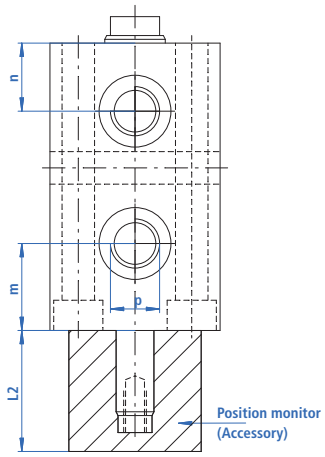
ORDER NUMBER: M509 - **Y** - **XXX**

*2D and 3D data is found at: https://micromat.partcommunity.com*




**FASTENING**




## TECHNICAL DATA M520

| Pistons Ø D | mm | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Rods Ø D | mm | 10 | 14 | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 |
| a | mm | 60 | 60 | 65 | 75 | 85 | 100 | 125 | 160 | 200 | 230 |
| b | mm | 35 | 35 | 45 | 55 | 63 | 75 | 95 | 120 | 150 | 180 |
| c | mm | 6 | 7 | 7 | 10 | 10 | 10 | 14 | 14 | 15 | 16 |
| g Ø | mm | 6.5 | 6.5 | 8.5 | 10.5 | 10.5 | 13 | 17 | 21 | 25 | 32 |
| i (only stroke 160/200) | | - | - | M8 x 12 | M10 x 15 | M10x15 | M12 x 18 | M16 x 24 | M20 x 30 | M24 x 36 | M30 x 45 |
| o x thread depth | | M6 x 12 | M8 x 15 | M10 x 15 | M12 x 15 | M16 x 25 | M20 x 30 | M27 x 40 | M30 x 40 | M42 x 60 | M48 x 70 |
| qØ x t | mm | 9.8x1.1 | 9.8x1.1 | 9.8x1.1 | 9.8x1.1 | 9.8x1.1 | 10.8x1.1 | 13.8x1.5 | 13.8x1.5 | 13.8x1.5 | 13.8x1.5 |
| r | mm | 40 | 40 | 50 | 55 | 63 | 76 | 95 | 120 | 158 | 180 |
| s | mm | 22 | 22 | 30 | 35 | 40 | 45 | 65 | 80 | 108 | 130 |
| w Ø | mm | 3.5 | 3.5 | 4 | 5 | 6 | 6 | 8 | 8 | 8 | 8 |
| O-ring | mm | 7x1.5 | 7x1.5 | 7x1.5 | 7x1.5 | 7x1.5 | 8x1.5 | 10x2 | 10x2 | 10x2 | 10x2 |
| sw | mm | 8 | 10 | 13 | 17 | 22 | 27 | 36 | 46 | 55 | 70 |

## ORDER NUMBER OVERVIEW

| Pistons Ø D | Compression force at 100 bar | Tensile force at 100 bar | Stroke ±1 | Total length L (without position monitor accessory) |
|---|---|---|---|---|
| mm | kN | kN | mm | mm |
| **025** | 4.9 | 2.9 | 20 | 110 |
| **032** | 8 | 4.9 | 25 | 128 |
| **040** | 12.5 | 7.7 | 25 | 132 |
| **050** | 19.6 | 11.6 | 25 | 142 |
| **063** | 31.1 | 18.6 | 30 | 161 |
| **080** | 50.3 | 30.6 | 32 | 181 |
| **100** | 78.4 | 47.4 | 40 | 192 |
| **125** | 122.7 | 72.4 | 40 | 213 |
| | | | **1** | **1** |

ORDER NUMBER: M509 - **Y** - **XXX**

*2D and 3D data is found at: https://micromat.partcommunity.com*

# GENERAL DESCRIPTION

Block cylinders can present the ideal solution due to their large range of force with compact design dimensions and thanks to short and precise cycle times for many manufacturing tasks.

With functions such as

- positioning
- clamp
- embossing
- stamping
- riveting
- clamping
- closing
- opening
- bending
- drawing

they have also been proven in automobile, machine and mold construction, as well as in the filed of injection molding.

With aluminum block cylinders the query of the position of the cylinder piston is possible via electronic magnet sensors.

The switches can be freely adjusted b moving along the grooves.

Aluminum block cylinders with position monitor are used with time- or cycle-bound clamping and releasing cycles and in automated systems.

## DESIGN

| | |
|---|---|
| Housing: | Material AlZnMgCu1.5<br>Piston bore rolled or honed |
| Pistons: | Material case hardened steel, one piece,<br>piston rod seal in tandem design |
| Dimensional tolerances: | As long as not otherwise indicated, according to DIN 7168-m |

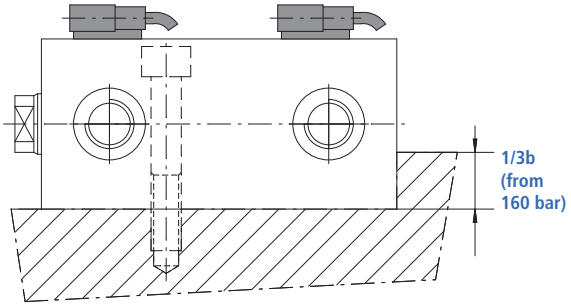
## GENERAL INFORMATION

| | |
|---|---|
| Force range: | Up to above 1000 kN |
| Standard strokes: | Of 20 – 100 mm |
| Installation position: | As required |
| Piston speed: | Vmax 0.5 m/s |
| Max. operating pressure: | 350 bar |
| Operating temperature: | Standard –10 to +60°C,<br>Viton: on request |
| Piston transverse force: | Should be avoided, in no case<br>> 5% of the cylinder force |
| Medium: | Mineral oil according to DIN 51524 |

# TECHNICAL INFORMATION

### FASTENING

With fastening using transverse bores above an operating pressure of 160 bar he cylinder must be supported on the back or by slot nuts.




### TECHNICAL DATA

| Pistons Ø D | mm | 25 | 32 | 40 | 50 | 63 |
|---|---|---|---|---|---|---|
| Rods Ø D | mm | 16 | 20 | 25 | 32 | 40 |
| Effective piston area, pressing | $cm^2$ | 4.9 | 8 | 12.5 | 19.6 | 31.1 |
| Effective piston area, pulling | $cm^2$ | 2.9 | 4.9 | 7.7 | 11.6 | 18.6 |
| Compression force (100 bar) | kN | 4.9 | 8 | 12.5 | 19.6 | 31.1 |
| Tensile force (100 bar) | kN | 2.9 | 4.9 | 7.7 | 11.6 | 18.6 |

# CUSTOM DESIGN

High temperature design with Viton: For temperatures above 100°C.
Order example: M521-2-020-V

Stroke shortening during extension: By using a spacing disk the stroke is shortened
Order example: M521-2-020-30

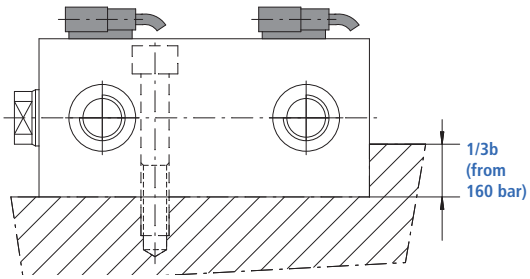
Male threads on the piston rod: Desired threads are made on the piston rod ends
Order example: M521-2-020-M8 x 15 (Total length = L + 15 mm)

Inductive proximity switch: Placing inductive proximity switch on the stroke start and stroke end
Order example: M521-2-20-N

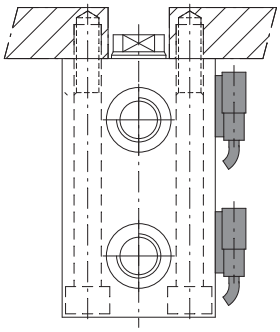
Punching cylinder: Placing guide elements on pistons and screwed connection
Order example: M521-2-20-S

# FASTENING / CONNECTION TYPES

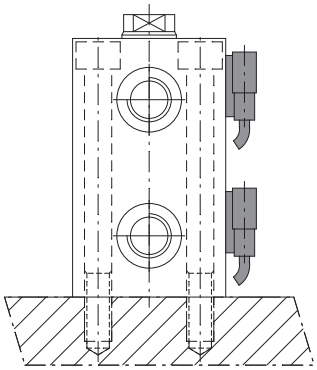
## PIPE THREADS




**M521**

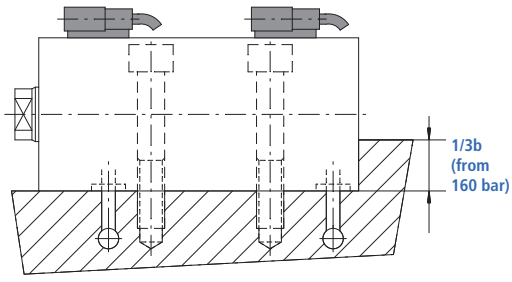


**M521**

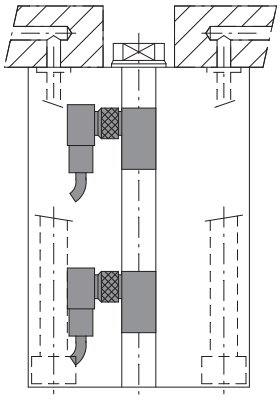


**M521**

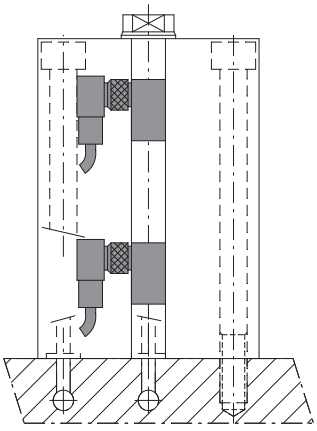
## O RING CONNECTION



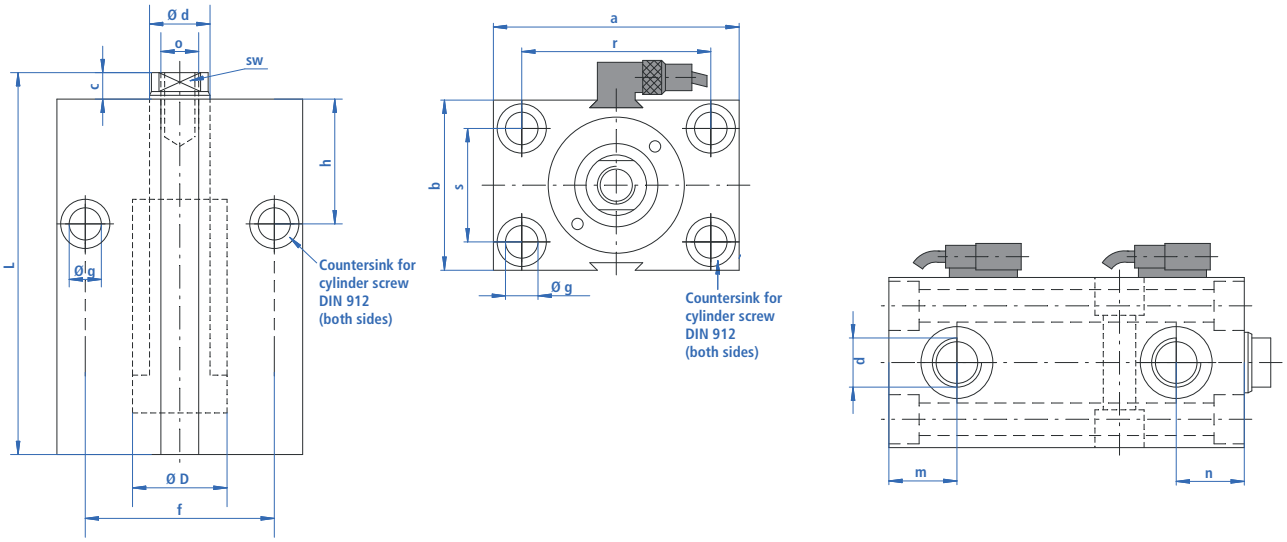

**M522**



**M523**



**M524**




## TECHNICAL DATA M521

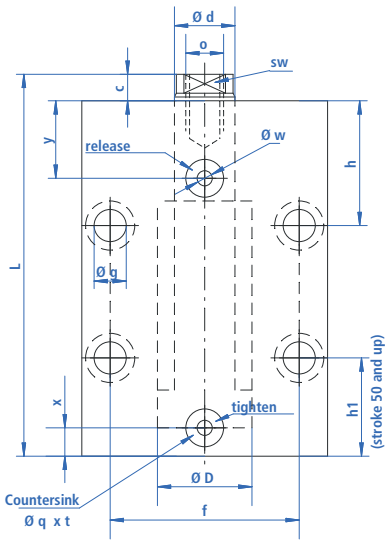
| Pistons Ø D | mm | 25 | 32 | 40 | 50 | 63 |
|---|---|---|---|---|---|---|
| Rods Ø D | mm | 16 | 20 | 25 | 32 | 40 |
| a | mm | 65 | 75 | 85 | 100 | 125 |
| b | mm | 45 | 55 | 63 | 75 | 95 |
| c | mm | 7 | 10 | 10 | 10 | 14 |
| f | mm | 50 | 55 | 63 | 76 | 95 |
| g Ø | mm | 8.5 | 10.5 | 10.5 | 13 | 17 |
| h | mm | 33 | 38 | 40 | 44 | 50 |
| m | mm | 18 | 20 | 21 | 21 | 26 |
| n | mm | 18 | 22 | 24 | 27 | 26 |
| o x thread depth | | M10 x 15 | M12 x 15 | M16 x 25 | M20 x 30 | M27 x 40 |
| p | mm | G 1/4 | G 1/4 | G 1/4 | G 1/4 | G 1/2 |
| r | mm | 50 | 55 | 63 | 76 | 95 |
| s | mm | 30 | 35 | 40 | 45 | 65 |
| sw | mm | 13 | 17 | 22 | 27 | 36 |

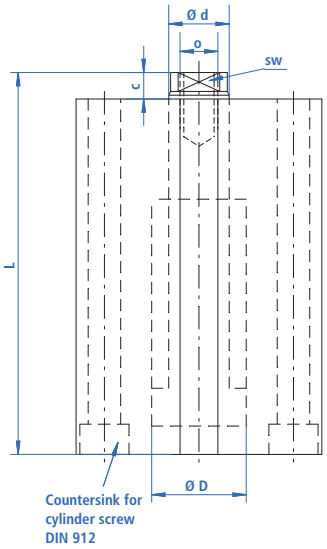
## ORDER NUMBER OVERVIEW

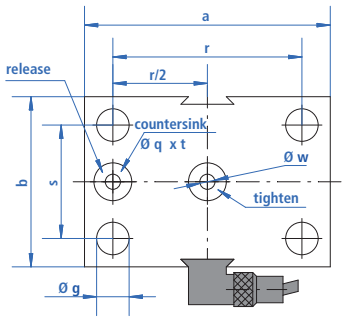
| Pistons Ø D | Comp. force at 100 bar | Tensile force at 100 bar | Stroke ±1 | | | Total length L | | |
|---|---|---|---|---|---|---|---|---|
| mm | kN | kN | mm | | | mm | | |
| **025** | 4.9 | 2.9 | 20 | 50 | 100 | 85 | 115 | 165 |
| **032** | 8 | 4.9 | 25 | 50 | 100 | 100 | 125 | 175 |
| **040** | 12.5 | 7.7 | 25 | 50 | 100 | 106 | 131 | 181 |
| **050** | 19.6 | 11.6 | 25 | 50 | 100 | 117 | 142 | 192 |
| **063** | 31.1 | 18.6 | 30 | 63 | 100 | 135 | 168 | 205 |
| | | | **1** | **2** | **3** | **1** | **2** | **3** |

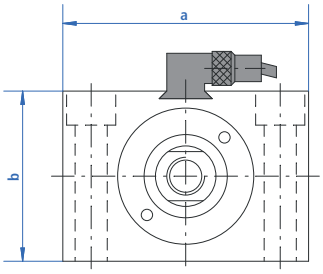
ORDER NUMBER: M521 - **Y** - **XXX**

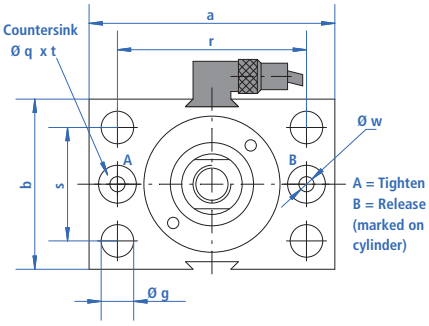
*2D and 3D data is found at: https://micromat.partcommunity.com*

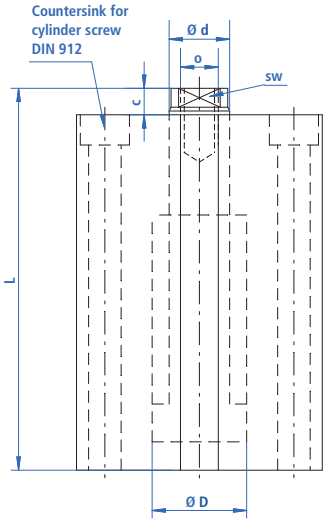



**M522** **M523** **M524**

## TECHNICAL DATA M522 | M523 | M524

| Pistons Ø D | mm | 25 | 32 | 40 | 50 | 63 |
|---|---|---|---|---|---|---|
| Rods Ø D | mm | 16 | 20 | 25 | 32 | 40 |
| a | mm | 65 | 75 | 85 | 100 | 125 |
| b | mm | 45 | 55 | 63 | 75 | 95 |
| c | mm | 7 | 10 | 10 | 10 | 14 |
| f | mm | 50 | 55 | 63 | 76 | 95 |
| g Ø | mm | 8.5 | 10.5 | 10.5 | 13 | 17 |
| h | mm | 33 | 38 | 40 | 44 | 50 |
| h1 (stroke 50 and up) | mm | 40 | 42 | 44 | 47 | 60 |
| x | mm | 21.5 | 25 | 27 | 30 | 35 |
| y | mm | 21 | 25 | 27 | 29.5 | 32 |
| o x thread depth | | M10 x 15 | M12 x 15 | M16 x 25 | M20 x 30 | M27 x 40 |
| q Ø x t | mm | 9.8 x 1.1 | 10.8 x 1.1 | 10.8 x 1.1 | 10.8 x 1.1 | 15.8 x 1.3 |
| r | mm | 50 | 55 | 63 | 76 | 95 |
| s | mm | 30 | 35 | 40 | 45 | 65 |
| w Ø | mm | 4 | 5 | 6 | 6 | 8 |
| O-ring | mm | 7 x 1.5 | 8 x 1.5 | 8 x 1.5 | 8 x 1.5 | 12.42 x 1.78 |
| sw | mm | 13 | 17 | 22 | 27 | 36 |

*2D and 3D data is found at: https://micromat.partcommunity.com*

## ORDER NUMBER OVERVIEW M522

| Pistons Ø D | Comp. force at 100 bar | Tensile force at 100 bar | Stroke ±1 | | | Total length L | | |
|---|---|---|---|---|---|---|---|---|
| mm | kN | kN | mm | | | mm | | |
| **025** | 4.9 | 2.9 | 20 | 50 | 100 | 85 | 115 | 165 |
| **032** | 8 | 4.9 | 25 | 50 | 100 | 100 | 125 | 175 |
| **040** | 12.5 | 7.7 | 25 | 50 | 100 | 106 | 131 | 181 |
| **050** | 19.6 | 11.6 | 25 | 50 | 100 | 117 | 142 | 192 |
| **063** | 31.1 | 18.6 | 30 | 63 | 100 | 135 | 168 | 205 |
| | | | **1** | **2** | **3** | **1** | **2** | **3** |

ORDER NUMBER: M522 - **Y** - **XXX**

## ORDER NUMBER OVERVIEW M523

| Pistons Ø D | Comp. force at 100 bar | Tensile force at 100 bar | Stroke ±1 | | | Total length L | | |
|---|---|---|---|---|---|---|---|---|
| mm | kN | kN | mm | | | mm | | |
| **025** | 4.9 | 2.9 | 20 | 50 | 100 | 85 | 115 | 165 |
| **032** | 8 | 4.9 | 25 | 50 | 100 | 100 | 125 | 175 |
| **040** | 12.5 | 7.7 | 25 | 50 | 100 | 106 | 131 | 181 |
| **050** | 19.6 | 11.6 | 25 | 50 | 100 | 117 | 142 | 192 |
| **063** | 31.1 | 18.6 | 30 | 63 | 100 | 135 | 168 | 205 |
| | | | **1** | **2** | **3** | **1** | **2** | **3** |

ORDER NUMBER: M523 - **Y** - **XXX**

## ORDER NUMBER OVERVIEW M524

| Pistons Ø D | Comp. force at 100 bar | Tensile force at 100 bar | Stroke ±1 | | | Total length L | | |
|---|---|---|---|---|---|---|---|---|
| mm | kN | kN | mm | | | mm | | |
| **025** | 4.9 | 2.9 | 20 | 50 | 100 | 85 | 115 | 165 |
| **032** | 8 | 4.9 | 25 | 50 | 100 | 100 | 125 | 175 |
| **040** | 12.5 | 7.7 | 25 | 50 | 100 | 106 | 131 | 181 |
| **050** | 19.6 | 11.6 | 25 | 50 | 100 | 117 | 142 | 192 |
| **063** | 31.1 | 18.6 | 30 | 63 | 100 | 135 | 168 | 205 |
| | | | **1** | **2** | **3** | **1** | **2** | **3** |

ORDER NUMBER: M523 - **Y** - **XXX**

## GENERAL DESCRIPTION

Round cylinders can be arranged close to each other due to their space-saving exterior shape and present the ideal solution for numerous manufacturing tasks. Frequent use in multiple clamping equipment in the automotive branch and in machine construction and mold making.

Typical tasks of the elements for this are positioning, clamping, embossing, stamping, riveting, closing, opening, bending or drawing of components.

**DESIGN**

| | |
|---|---|
| Housing: | Automotive steel bronzed, piston bore rolled or honed |
| Pistons: | Material case hardened steel, one piece, piston rod seal in tandem design |
| Dimensional tolerances: | As long as not otherwise indicated, according to DIN 7168-m |

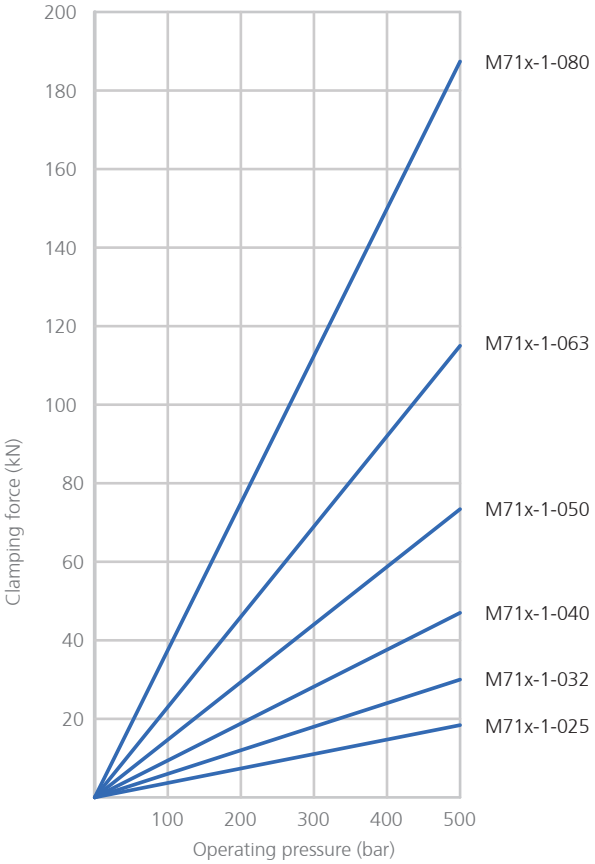
## HOLLOW PISTON CYLINDER

Hollow piston cylinders are often used in connection with mechanical clamping elements as tension and compression cylinders. Hollow piston cylinders have a spring return setting and the piston rods a HC thread for heli-coil use.

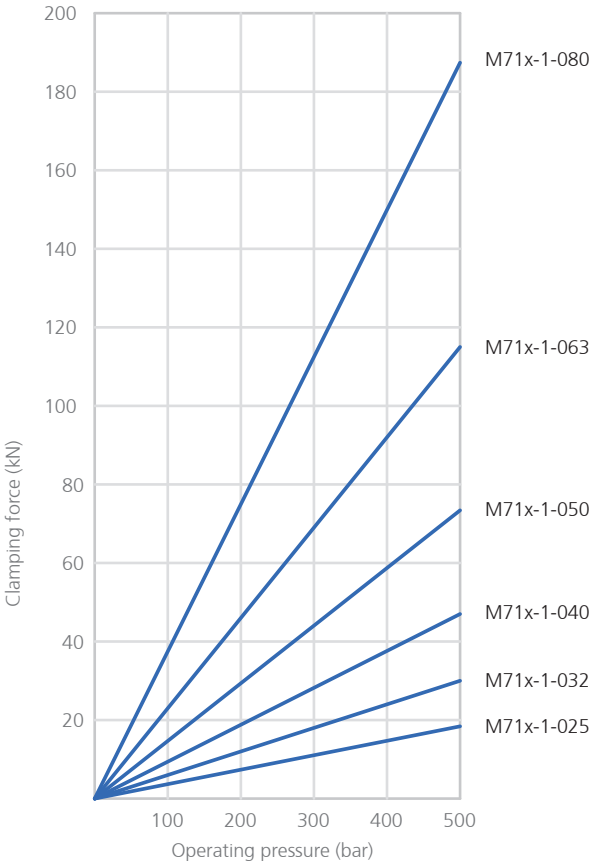
**GENERAL INFORMATION**

| | |
|---|---|
| Force range: | Clamping force up to 200 kN |
| Standard strokes: | Of 10–25 mm |
| Installation position: | Fastening through flanging or sticking on the pulling rod. |
| Piston speed: | Vmax 0.5 m/s |
| Max. operating pressure: | 500 bar |
| Operating temperature: | Standard: –10 to +60°C \| Viton: on request |
| Piston transverse force: | Should be avoided, in no case > 5 % of the cylinder force |
| Medium: | Mineral oil according to DIN 51524 |
| Models: | 24 models with/without male threads |
| Connections: | Pipe thread connection |

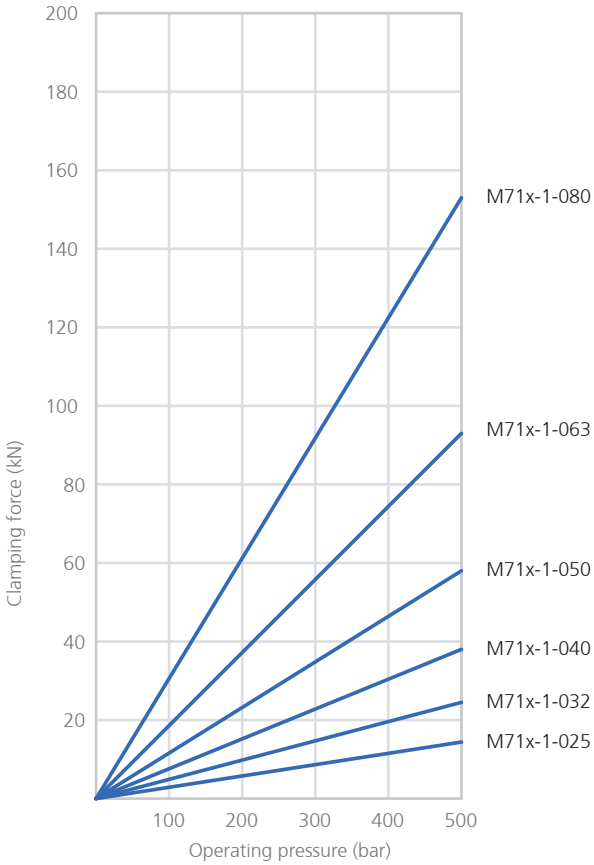
**Clamping force diagram** M710 | M711




**Forward stroke clamping force diagram** M712 | M713




**Return stroke clamping force diagram** M712 | M713



# CLAMPING AND SCREW-IN CYLINDERS

Clamping and screw-in cylinders are mainly used in multiple clamping devices and allow there a close arrangement of the individual elements, which double-acting design enables precise cycle times.

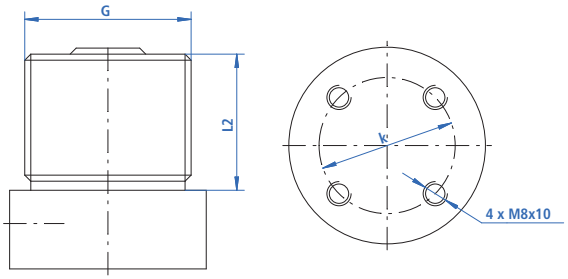
## GENERAL INFORMATION CLAMPING CYLINDER

| | |
|---|---|
| Force range: | Clamping force up to 160 kN |
| Standard strokes: | Of 20 – 50 mm |
| Installation position: | Fastening by flanging |
| Max. operating pressure: | 500 bar |
| Operating temperature: | Standard: –10 to +60°C \| Viton: on request |
| Piston transverse force: | Should be avoided, in no case > 5% of the cylinder force |
| Medium: | Mineral oil according to DIN 51524 |
| Models: | 12 models with male threads |
| Connections: | Pipe thread connection |
| Designs: | Piston rod ends with female threads or spherical |

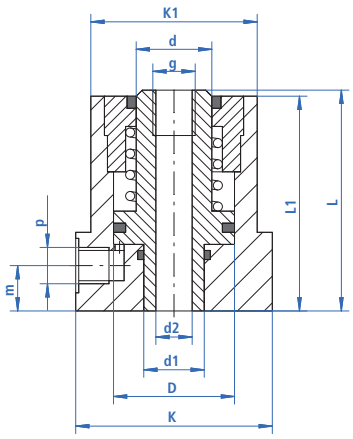
## GENERAL INFORMATION SCREW-IN CYLINDER

| | |
|---|---|
| Force range: | Clamping force up to 160 kN |
| Standard strokes: | Of 15 – 50 mm |
| Installation position: | Fastening by screwing in (cylindrical housing in cartridge design) |
| Max. operating pressure: | 500 bar |
| Operating temperature: | Standard: –10 to +60°C \| Viton: on request |
| Piston transverse force: | Should be avoided, in no case > 5% of the cylinder force |
| Medium: | Mineral oil according to DIN 51524 |
| Models: | 20 models |
| Connections: | Oil supply via oil channels |
| Designs: | Piston rod ends with female threads or spherical |

**M710**

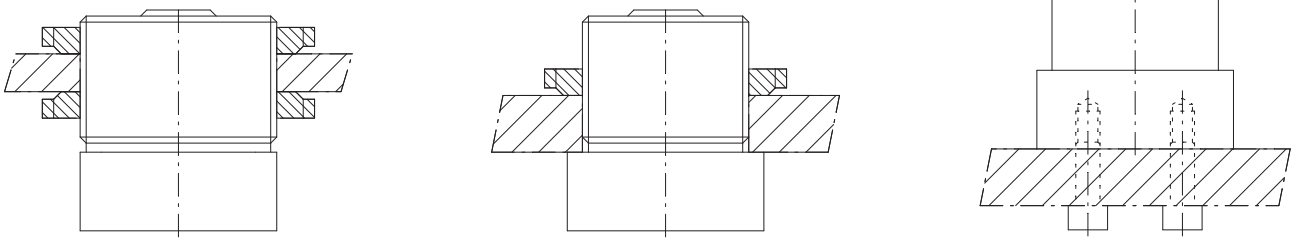



**M711**




*Hollow piston cylinder single-acting*

## FASTENING



# TECHNICAL DATA M710 | M711

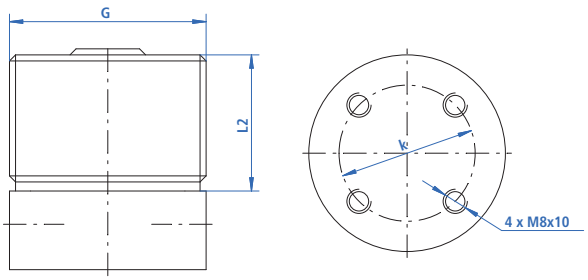
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Pistons Ø D | mm | 25 | 32 | 40 | 50 | 63 | 80 |
| Rods Ø D | mm | 16 | 20 | 25 | 32 | 40 | 50 |
| Lift | mm | 10 | 10 | 12 | 12 | 16 | 16 |
| Effective piston area | cm² | 3.77 | 6.03 | 9.42 | 14.72 | 23.12 | 37.68 |
| Clamping force 100 bar | kN | 3.7 | 6 | 9.4 | 14.7 | 23 | 37.5 |
| 500 bar | kN | 18.5 | 30 | 47 | 73.5 | 115 | 187.5 |
| d1 | mm | 12 | 16 | 20 | 25 | 32 | 40 |
| d2 | mm | 8.2 | 10.2 | 12.2 | 16.2 | 20.2 | 27.2 |
| G | | M40 x 1.5 | M45 x 1.5 | M55 x 1.5 | M65 x 1.5 | M80 x 2 | M100 x 2 |
| g | | HC M8 | HC M10 | HC M12 | HC M16 | HC M20 | HC M27 |
| K | mm | 50 | 55 | 65 | 70 | 80 | 100 |
| K1 | mm | 40 | 45 | 55 | 65 | 80 | 100 |
| k | mm | 35 | 40 | 45 | 50 | 60 | 75 |
| L | mm | 60 | 65 | 72 | 78 | 96 | 110 |
| L1 | mm | 59 | 64 | 71 | 77 | 95 | 109 |
| L2 | mm | 36 | 41 | 45 | 50 | 60 | 65 |
| m | mm | 12 | 12 | 15 | 15 | 21 | 23 |
| p | | G 1/4 | G 1/4 | G 1/4 | G 1/4 | G 1/4 | G 1/4 |

# ORDER NUMBER OVERVIEW

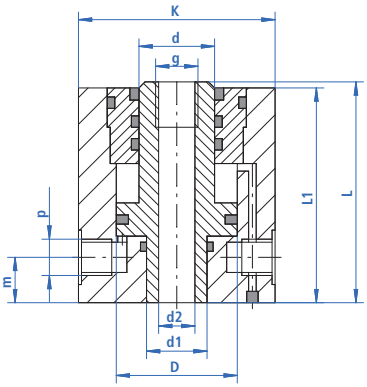
| | | | | | | |
|---|---|---|---|---|---|---|
| Housing with male threads | M710-1-025 | M710-1-032 | M710-1-040 | M710-1-050 | M710-1-063 | M710-1-080 |
| Housing without male threads | M711-1-025 | M711-1-032 | M711-1-040 | M711-1-050 | M711-1-063 | M711-1-080 |

*2D and 3D data is found at: https://micromat.partcommunity.com*

M712

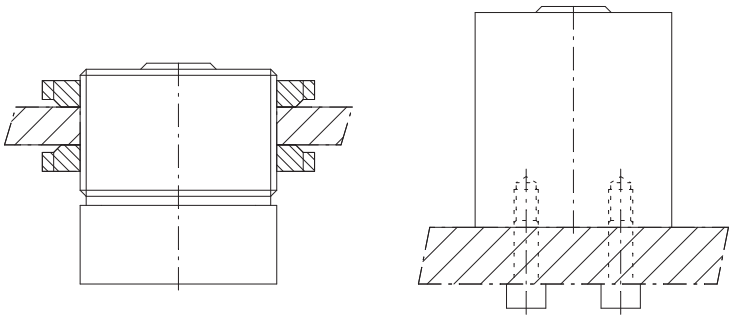



M713




*Hollow piston cylinder double-acting*

## FASTENING



# TECHNICAL DATA M712 | M713

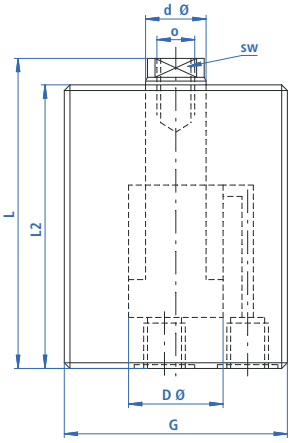
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Pistons Ø D | | mm | 25 | 32 | 40 | 50 | 63 | 80 |
| Rods Ø D | | mm | 16 | 20 | 25 | 32 | 40 | 50 |
| Lift | | mm | 10 | 10 | 16 | 16 | 20 | 25 |
| Effective piston area | Forward stroke | cm² | 3.77 | 6.03 | 9.42 | 14.72 | 23.12 | 37.68 |
| | Return stroke | cm² | 2.89 | 4.9 | 7.65 | 11.59 | 18.6 | 30.63 |
| Clamping force 100 bar | Forward stroke | | 3.77 | 6.03 | 9.42 | 14.72 | 23.12 | 37.68 |
| | Return stroke | | 2.89 | 4.9 | 7.65 | 11.59 | 18.6 | 30.63 |
| Clamping force 500 bar | Forward stroke | kN | 18.85 | 30.15 | 47.1 | 73.6 | 115.6 | 188.4 |
| | Return stroke | kN | 14.45 | 24.5 | 38.25 | 57.95 | 93 | 153.15 |
| d1 | | mm | 12 | 16 | 20 | 25 | 32 | 40 |
| d2 | | mm | 8.2 | 10.2 | 12.2 | 16.2 | 20.2 | 27.2 |
| G | | | M50 x 1.5 | M55 x 1.5 | M65 x 1.5 | M70 x 1.5 | M80 x 2 | M100 x 2 |
| g | | | HC M8 | HC M10 | HC M12 | HC M16 | HC M20 | HC M27 |
| K | | mm | 50 | 55 | 65 | 70 | 80 | 100 |
| k | | mm | 35 | 40 | 45 | 50 | 60 | 75 |
| L | | mm | 60 | 65 | 73 | 79 | 96 | 110 |
| L1 | | mm | 59 | 64 | 72 | 78 | 95 | 109 |
| L2 | | mm | 36 | 41 | 45 | 50 | 60 | 65 |
| m | | mm | 11 | 12 | 14 | 14 | 18 | 22 |
| p | | | G 1/4 | G 1/4 | G 1/4 | G 1/4 | G 1/4 | G 1/4 |

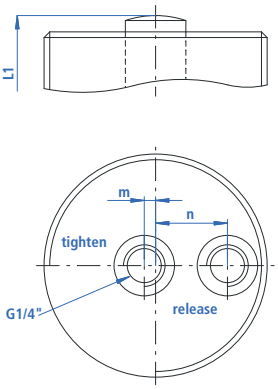
# ORDER NUMBER OVERVIEW

| | | | | | | |
|---|---|---|---|---|---|---|
| Housing with male threads | M712-1-025 | M712-1-032 | M712-1-040 | M712-1-050 | M712-1-063 | M712-1-080 |
| Housing without male threads | M713-1-025 | M713-1-032 | M713-1-040 | M713-1-050 | M713-1-063 | M713-1-080 |

*2D and 3D data is found at: https://micromat.partcommunity.com*

# CLAMPING CYLINDER · M720

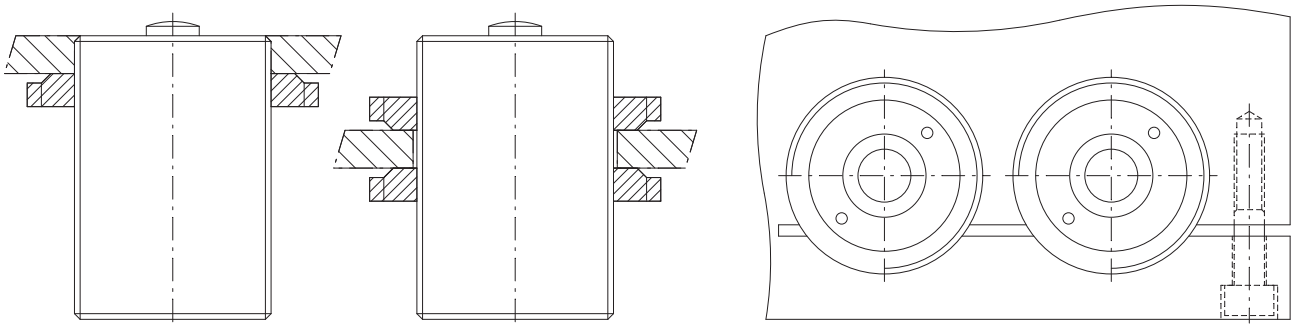



*Clamping cylinder M720*

*Clamping cylinder M720, spherical*

## FASTENING



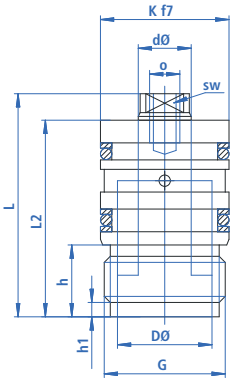
# TECHNICAL DATA M720

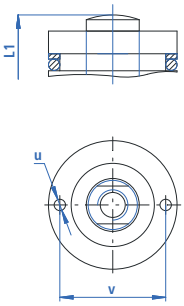
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Pistons Ø D | mm | 20 | 25 | 32 | 40 | 50 | 63 |
| Rods Ø D | mm | 10 | 14 | 16 | 20 | 25 | 32 |
| Lift | mm | 20 | 25 | 25 | 40 | 40 | 50 |
| Effective piston area | cm² | 3.14 | 4.9 | 8.0 | 12.56 | 19.62 | 31.15 |
| Clamping force (100 bar) Compression | kN | 3.14 | 4.9 | 8.0 | 12.56 | 19.62 | 31.15 |
| Tension | kN | 2.3 | 3.4 | 6.2 | 9.6 | 15.1 | 23.8 |
| Clamping force (100 bar) Compression | kN | 16 | 25 | 40 | 64 | 100 | 156 |
| Tension | kN | 11.5 | 17 | 31 | 48 | 75.5 | 119 |
| G | | M45 x 1.5 | M52 x 1.5 | M60 x 1.5 | M70 x 1.5 | M85 x 2 | M105 x 2 |
| L | mm | 74.5 | 81.5 | 87.5 | 108 | 113.5 | 129.5 |
| L1 | mm | 71.5 | 78.5 | 84.5 | 105 | 110.5 | 125.5 |
| L2 | mm | 68 | 75 | 80 | 100 | 103 | 117 |
| m | mm | 9 | 6 | 3 | 0 | 0 | 0 |
| n | mm | 13 | 16 | 20 | 25.5 | 23.5 | 41 |
| o | mm | M6 x 12 | M8 x 12 | M10 x 15 | M12 x 20 | M16 x 22 | M20 x 30 |
| sw | mm | 8 | 11 | 13 | 17 | 19 | 24 |

# ORDER NUMBER OVERVIEW

| | | | | | | |
|---|---|---|---|---|---|---|
| Piston, female threads | M720-G-020 | M720-G-025 | M720-G-032 | M720-G-040 | M720-G-050 | M720-G-063 |
| Piston, spherical | M720-B-020 | M720-B-025 | M720-B-032 | M720-B-040 | M720-B-050 | M720-B-063 |

*2D and 3D data is found at: https://micromat.partcommunity.com*

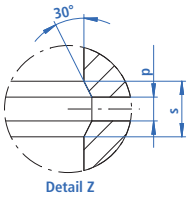


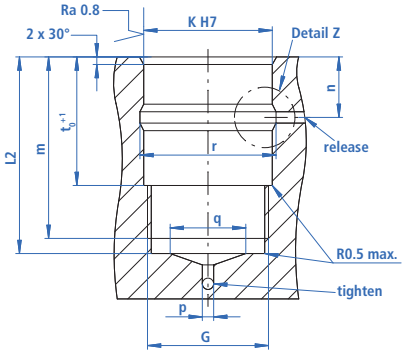




*Screw-in cylinder M730 with female threads*

*Screw-in cylinder M730, spherical*

## INSTALLATION SPACE



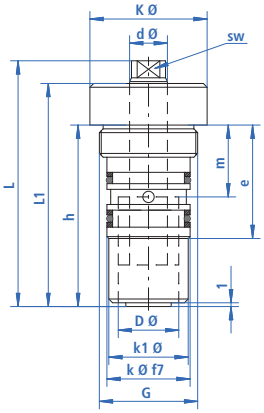

# TECHNICAL DATA M730

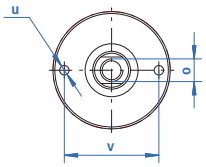
| Pistons Ø D | mm | 10 | 16 | 20 | 25 | 32 | 40 | 50 | 63 |
|---|---|---|---|---|---|---|---|---|---|
| Rods Ø D | mm | 5 | 8 | 10 | 14 | 16 | 20 | 25 | 32 |
| Lift | mm | 15 | 15 | 20 | 25 | 25 | 40 | 40 | 50 |
| Effective piston area | cm² | 0.78 | 2.0 | 3.14 | 4.9 | 8.0 | 12.56 | 19.62 | 31.15 |
| Comp. force (100 bar) | kN | 0.78 | 2.0 | 3.14 | 4.9 | 8.0 | 12.56 | 19.62 | 31.15 |
| Tensile force (100 bar) | kN | 0.6 | 1.5 | 2.3 | 3.4 | 6.2 | 9.6 | 15.1 | 23.8 |
| Comp. force (500 bar) | kN | 4 | 10 | 16 | 25 | 40 | 64 | 100 | 156 |
| Tensile force (500 bar) | kN | 3 | 7.5 | 11.5 | 17 | 31 | 48 | 75.5 | 119 |
| G | | M15 x 1.5 | M22 x 1.5 | M26 x 1.5 | M32 x 1.5 | M40 x 1.5 | M50 x 1.5 | M62 x 1.5 | M78 x 1.5 |
| h | mm | 14 | 15 | 17 | 19 | 22 | 30 | 33 | 40 |
| h1 | mm | 3 | 3 | 3 | 4 | 4 | 5 | 6 | 6 |
| K | mm | 16 | 24 | 28 | 34 | 42 | 52 | 64 | 80 |
| L | mm | 38 | 47 | 51 | 59 | 64 | 85 | 88 | 103 |
| L1 | mm | 35 | 44 | 48 | 56 | 61 | 82 | 85 | 99 |
| L2 | mm | 33 | 41 | 44 | 52 | 56 | 76.5 | 77 | 90 |
| m | mm | 30 | 38 | 41 | 48 | 52 | 71.5 | 71 | 84 |
| n | mm | 11 | 16.5 | 14 | 16 | 19 | 21.5 | 22 | 25 |
| o | mm | M3 x 6 | M5 x 10 | M6 x 12 | M8 x 12 | M10 x 15 | M12 x 20 | M16 x 22 | M20 x 30 |
| p | mm | 2 | 3 | 3 | 3 | 4 | 6 | 6 | 6 |
| q | mm | 5 | 11 | 15 | 20 | 27 | 35 | 45 | 58 |
| r / s | mm | 17 / 4 | 25 / 5 | 29 / 5 | 35 / 5 | 43.6 / 7 | 54 / 10 | 66 / 10 | 82 / 10 |
| t | mm | 20 | 27 | 28 | 34 | 35 | 47 | 45 | 51 |
| u / v | mm | 2 / 12.5 | 3 / 18 | 4 / 22 | 4 / 28 | 5 / 32 | 6 / 40 | 8 / 48 | 10 / 62 |
| sw | mm | - | - | 8 | 11 | 13 | 17 | 19 | 24 |

# ORDER NUMBER OVERVIEW

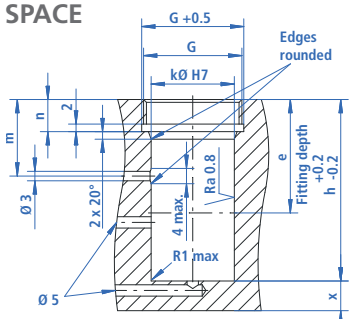
| Piston, female threads | M730 - G - 010 | M730 - G - 016 | M730 - G - 020 | M730 - G - 025 | M730 - G - 032 | M730 - G - 040 | M730 - G - 050 | M730 - G - 063 |
|---|---|---|---|---|---|---|---|---|
| Piston, spherical | M730 - B - 010 | M730 - B - 016 | M730 - B - 020 | M730 - B - 025 | M730 - B - 032 | M730 - B - 040 | M730 - B - 050 | M730 - B - 063 |

*2D and 3D data is found at: https://micromat.partcommunity.com*




**INSTALLATION SPACE**



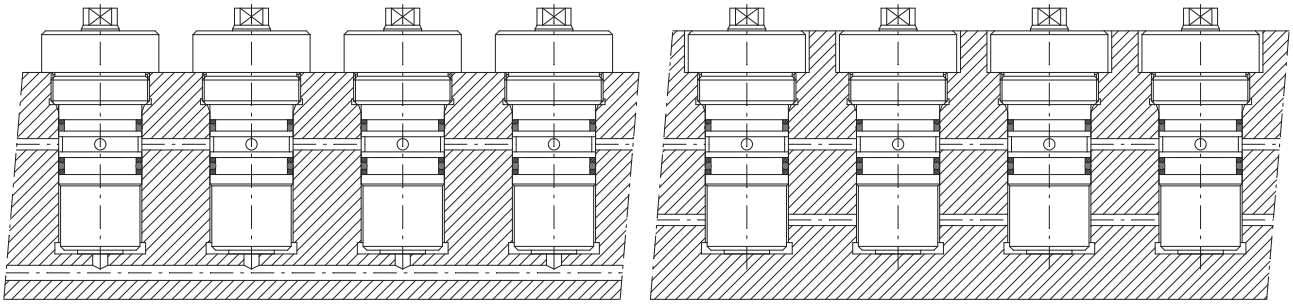

(alternatively: lower oil supply freely selectable outside of the fitting depth)

*Screw-in cylinder M731*

## PLEASE OBSERVE

The location of the lower oil feed can be located anywhere in the area outside of the fitting depth.
The insertion chamfer and the bore of the upper oil infeed must be carefully rounded in order to prevent damage to the seals during assembly.
The base of the fixture hole serves as a stop during return of the piston, therefore the dimension h must absolutely be maintained.
Dimension r applies for an operation pressure of 500 bar and a breaking strength of the material used of 500 N/mm².

## INSTALLATION EXAMPLE



# TECHNICAL DATA M731

| Pistons Ø D | mm | 16 | 20 | 25 | 32 |
|---|---|---|---|---|---|
| Rods Ø D | mm | 10 | 12 | 16 | 20 |
| Lift | mm | 16 | 20 | 25 | 32 |
| Comp. force (100 bar) | kN | 2.0 | 3.1 | 4.9 | 8.0 |
| Tensile force (100 bar) | kN | 1.2 | 2.0 | 2.9 | 4.9 |
| Comp. force (500 bar) | kN | 10 | 15.7 | 24.5 | 40.2 |
| Tensile force (500 bar) | kN | 6.1 | 10.0 | 14.5 | 24.5 |
| e | mm | 30 | 31.0 | 39 | 44 |
| G | mm | M26 x 1.5 | M32 x 1.5 | M40 x 1.5 | M50 x 1.5 |
| h | mm | 48 | 53 | 65 | 72 |
| k | mm | 22 | 28 | 35 | 44 |
| k1 | mm | 21 | 26 | 33 | 42 |
| K | mm | 31 | 37 | 44 | 54 |
| L | mm | 65 | 67 | 82 | 94 |
| L1 | mm | 59 | 60 | 75 | 84 |
| m | mm | 19 | 20 | 25 | 28 |
| n | mm | 8.5 | 10.5 | 13.5 | 15.5 |
| o | mm | M6 x 12 | M8 x 12 | M10 x 15 | M12 x 15 |
| r min. | mm | 8 | 10 | 11 | 13 |
| u / v | mm | 2.5 / 25 | 4 / 30 | 5 / 35 | 5 / 45 |
| sw | mm | 8 | 10 | 13 | 17 |
| Tightening torque | Nm | 50 | 100 | 200 | 400 |

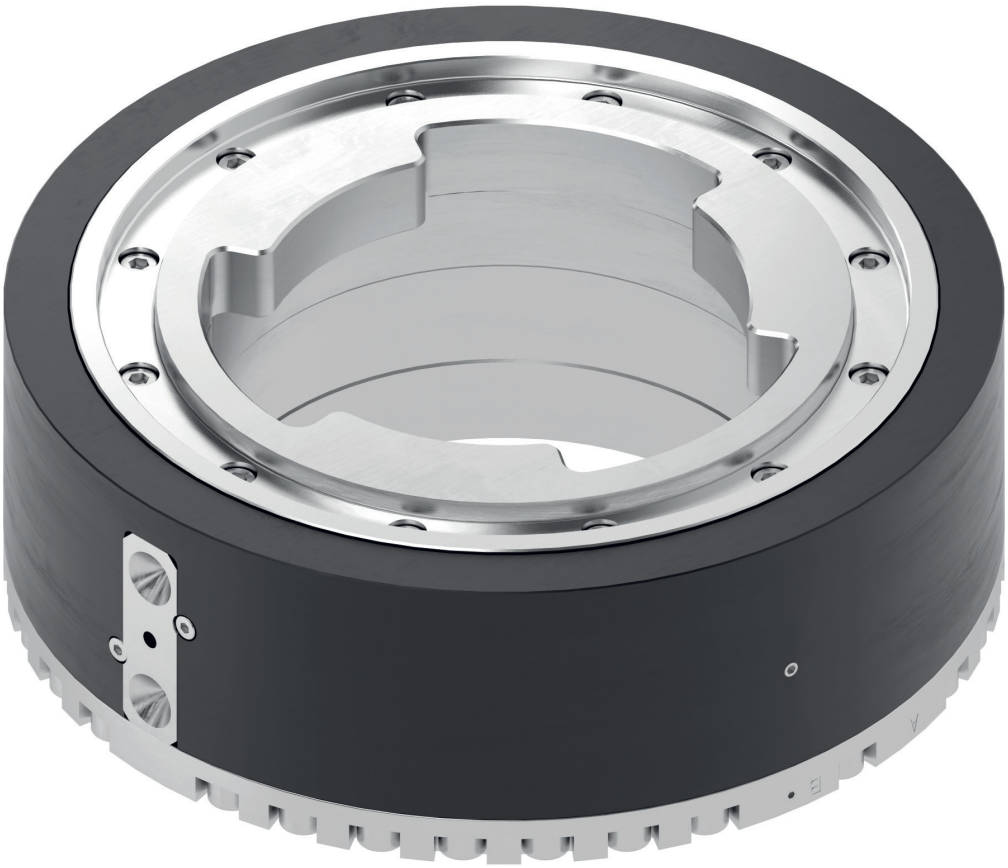
*2D and 3D data is found at: https://micromat.partcommunity.com*

# ORDER NUMBER OVERVIEW

| | M731-1-016 | M731-1-020 | M731-1-025 | M731-1-032 |
|---|---|---|---|---|

micromat

WIR GEBEN HALT!



# CUSTOM DESIGN

## THE RIGHT PRODUCT WASN'T HERE?

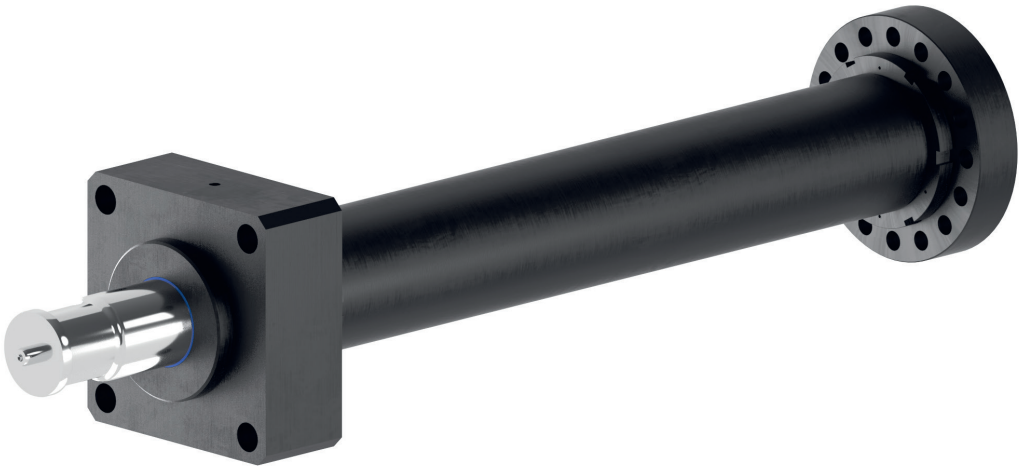
No problem! Our design team will be glad to see your challenge!

MICROMAT – Your specialist for custom designs.

## LONGITUDINAL STROKE CUSTOM CYLINDER

**TECHNICAL DATA**

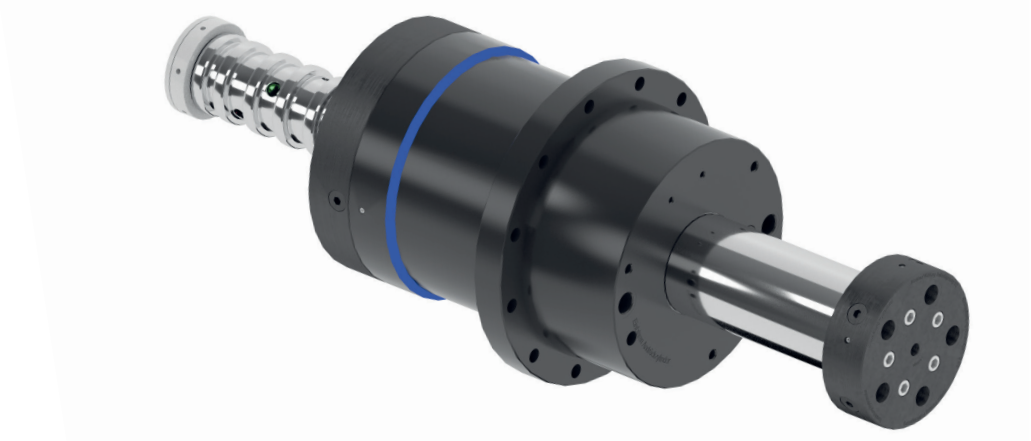
| | | | |
|---|---|---|---|
| Outside dimension (mm): | 1055,4 x 215 x 215 | Stroke length (mm): | 739.5 |
| Maximum pressure (bar): | 260 | Piston diameter (mm): | 95 |
| Maximum operating temperature (°C): | 70 | Rod diameter (mm): | 75 |



## CUSTOM CYLINDER INCL. MEDIA TRANSITION THROUGH PISTON ROD

**TECHNICAL DATA**

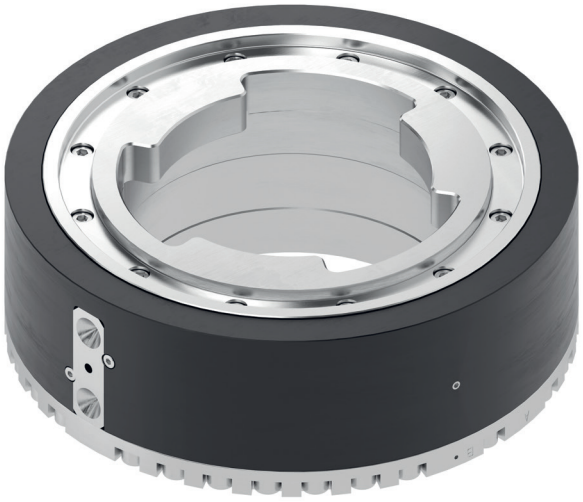
| | | | |
|---|---|---|---|
| Outside dimension (mm): | 1347 x Ø475 | Stroke length (mm): | 290 |
| Maximum pressure (bar): | 280 | Piston diameter (mm): | 280 |
| Maximum operating temperature (°C): | 70 | Rod diameter (mm): | 150 |



## HYDRAULIC NUT TOOL LOCK

**TECHNICAL DATA**

| | |
|---|---|
| Outside dimension (mm): | Ø265 x 104 |
| Maximum pressure (bar): | 150 |
| Maximum operating temperature (°C): | 70 |
| Stroke length (mm): | 6 |
| Piston diameter (mm): | 230 |
| Rod diameter (mm): | 220 |



## CUSTOM BLOCK CYLINDER FOR VERY HIGH TRANSVERSE FORCES

**TECHNICAL DATA**

| | |
|---|---|
| Outside dimension (mm): | 340 x 340 x 546 |
| Maximum pressure (bar): | 150 |
| Maximum operating temperature (°C): | 70 |
| Stroke length (mm): | 50 |
| Piston diameter (mm): | 250 |
| Rod diameter (mm): | 220 |

micromat

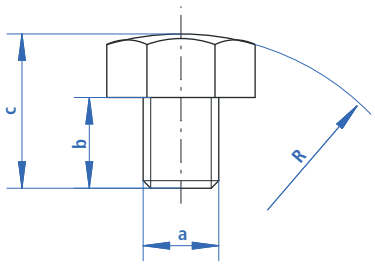
WIR GEBEN HALT!

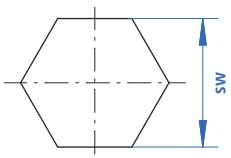
# ACCESSORIES

# PRESSURE SCREWS

## SPHERICAL PRESSURE SCREWS

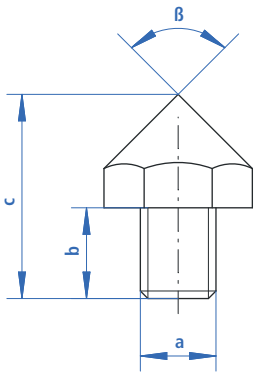
| For pistons with female threads a | b | c | R | sw | Order no. |
|---|---|---|---|---|---|
| **M6** | 10 | 20 | 20 | 10 | 911 - 1 - M06 |
| **M8** | 10 | 20 | 20 | 11 | 911 - 1 - M08 |
| **M10** | 12 | 22 | 35 | 17 | 911 - 1 - M10 |
| **M12** | 12 | 22 | 45 | 19 | 911 - 1 - M12 |
| **M16** | 20 | 30 | 60 | 24 | 911 - 1 - M16 |
| **M20** | 25 | 35 | 60 | 30 | 911 - 1 - M20 |
| **M27** | 30 | 47 | 100 | 41 | 911 - 1 - M27 |
| **M30** | 35 | 54 | 100 | 46 | 911 - 1 - M30 |
| **M42** | 45 | 71 | 140 | 65 | 911 - 1 - M42 |
| **M48** | 60 | 90 | 250 | 75 | 911 - 1 - M48 |

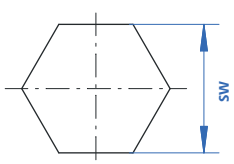



## PRESSURE SCREWS WITH POINTED CONE

| For pistons with female threads a | b | c | ß° | sw | Order no. |
|---|---|---|---|---|---|
| **M6** | 10 | 22 | 90 | 10 | 911 - 2 - M06 |
| **M8** | 8 | 22 | 90 | 13 | 911 - 2 - M08 |
| **M10** | 12 | 27 | 90 | 17 | 911 - 2 - M10 |
| **M12** | 12 | 25 | 120 | 19 | 911 - 2 - M12 |
| **M16** | 20 | 35 | 120 | 24 | 911 - 2 - M16 |
| **M20** | 25 | 40 | 120 | 30 | 911 - 2 - M20 |
| **M27** | 30 | 50 | 120 | 41 | 911 - 2 - M27 |
| **M30** | 35 | 60 | 120 | 46 | 911 - 2 - M30 |
| **M42** | 45 | 77 | 120 | 65 | 911 - 2 - M42 |



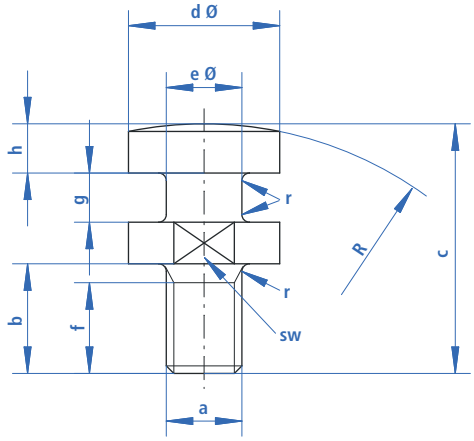




*2D and 3D data is found at: https://micromat.partcommunity.com*

## PRESSURE SCREWS WITH COUPLING JOURNAL

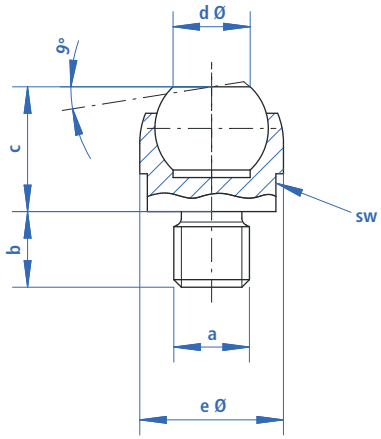
Operating pressure, pulling max 350 bar

| For pistons with female threads a | b | c | d ø | e ø | f | g | h | r | R | sw | Order no. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **M10** | 15 | 32 | 20 | 10 | 12 | 6.5 | 5.5 | 1 | 320 | 17 | 911 - 3 - M10 |
| **M12** | 15 | 32 | 20 | 10 | 12 | 6.5 | 5.5 | 1 | 320 | 17 | 911 - 3 - M12 |
| **M16** | 20 | 40 | 25 | 16 | 14 | 7 | 6 | 1 | 400 | 22 | 911 - 3 - M16 |
| **M20** | 28 | 56 | 32 | 18 | 22 | 10 | 10 | 1 | 500 | 27 | 911 - 3 - M20 |
| **M27** | 39 | 75 | 40 | 24 | 32 | 13 | 12 | 1.5 | 630 | 36 | 911 - 3 - M27 |
| **M30** | 35 | 89 | 52 | 30 | 25 | 19 | 19 | 2 | 800 | 46 | 911 - 3 - M30 |




## PENDULUM PRESSURE SCREW

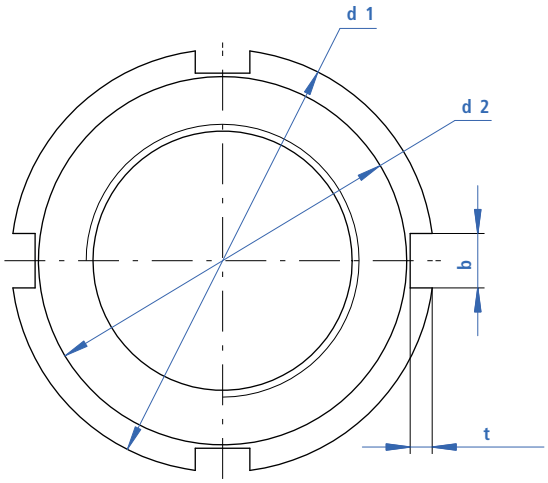
| For pistons with female threads a | Allowable loading (kN) | b | c | d ø | e ø | sw | Order no. |
|---|---|---|---|---|---|---|---|
| **M8** | 10 | 8 | 13 | 7.2 | 13 | 11 | 911 - 4 - M08 |
| **M10** | 25 | 10 | 18 | 10.5 | 20 | 17 | 911 - 4 - M10 |
| **M12** | 25 | 12 | 18 | 10.5 | 20 | 17 | 911 - 4 - M12 |
| **M16** | 90 | 16 | 27 | 20 | 30 | 27 | 911 - 4 - M16 |

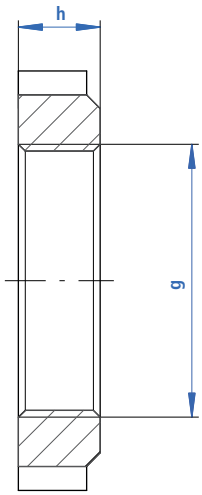



*2D and 3D data is found at: https://micromat.partcommunity.com*

# GROOVED NUTS

| Thread g | d1 | d2 | h | b | t | Order no. |
|---|---|---|---|---|---|---|
| **M22 x 1.5** | 40 | 34 | 9 | 6 | 2.5 | M921 - 1 - 022 |
| **M30 x 1.5** | 50 | 43 | 10 | 7 | 3 | M921 - 1 - 030 |
| **M36 x 1.5** | 58 | 50 | 11 | 8 | 3.5 | M921 - 1 - 036 |
| **M40 x 1.5** | 62 | 54 | 12 | 8 | 3.5 | M921 - 1 - 040 |
| **M42 x 1.5** | 62 | 54 | 12 | 8 | 3.5 | M921 - 1 - 042 |
| **M45 x 1.5** | 68 | 60 | 12 | 8 | 3.5 | M921 - 1 - 045 |
| **M50 x 1.5** | 75 | 67 | 13 | 8 | 3.5 | M921 - 1 - 050 |
| **M52 x 1.5** | 80 | 70 | 13 | 10 | 4 | M921 - 1 - 052 |
| **M55 x 1.5** | 80 | 70 | 13 | 10 | 4 | M921 - 1 - 055 |
| **M60 x 1.5** | 90 | 80 | 13 | 10 | 4 | M921 - 1 - 060 |
| **M65 x 1.5** | 95 | 85 | 14 | 10 | 4 | M921 - 1 - 065 |
| **M70 x 1.5** | 100 | 90 | 14 | 10 | 4 | M921 - 1 - 070 |
| **M72 x 1.5** | 110 | 100 | 14 | 10 | 4 | M921 - 1 - 072 |
| **M75 x 1.5** | 110 | 100 | 14 | 10 | 4 | M921 - 1 - 075 |
| **M80 x 1.5** | 115 | 105 | 16 | 10 | 4 | M921 - 1 - 080 |
| **M85 x 1.5** | 120 | 110 | 16 | 10 | 4 | M921 - 1 - 085 |
| **M95 x 1.5** | 135 | 120 | 16 | 12 | 5 | M921 - 1 - 095 |
| **M100 x 1.5** | 145 | 130 | 16 | 12 | 5 | M921 - 1 - 100 |
| **M105 x 1.5** | 155 | 140 | 16 | 12 | 5 | M921 - 1 - 105 |




*2D and 3D data is found at: https://micromat.partcommunity.com*

# POSITION MONITOR M930

The position monitor is fastened on the cylinder floor, an actuating cam attached to the through piston rod triggers the function of the proximity switch. By moving the proximity switch in a longitudinal groove of the piston rod, the desired switch positions for messaging of released or clamped position are set.

On request other designs of switches are available in addition to the ones given below.

When using a position monitor the appropriate conditions of use and protective measures must be taken into account and ensured.

## NOTICE

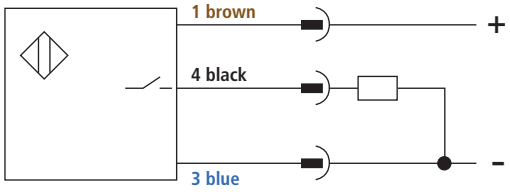
The position monitor is not suitable for use in the coolant area, in case of chips suitable covers must be provided.

## TECHNICAL DATA

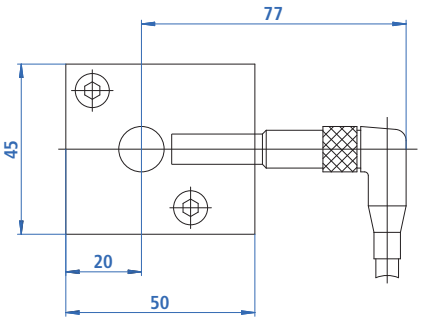
| | |
|---|---|
| Switching function: | Closing |
| Output technology: | PNP |
| Minimum spacing of the switching positions: | 13 mm |
| Ambient temperature: | -25° C to +70° C |
| Operating voltage: | 10 to 30 V DC |
| Residual ripple: | Max. 15 % |
| Continuous current: | Max. 200 mA |
| Nominal switching distance: | 1.5 mm |
| Short circuit test: | Yes |
| Housing material: | Steel, rust-free |
| Type of connection: | Plug |
| Protection class according to DIN 40050: | IP 67 |

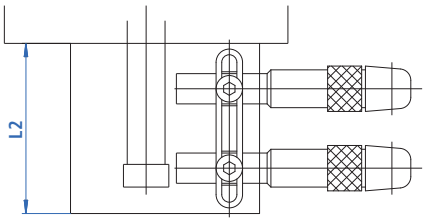
## PROXIMITY SWITCH

Connection circuit diagram




*Other proximity switches on request*

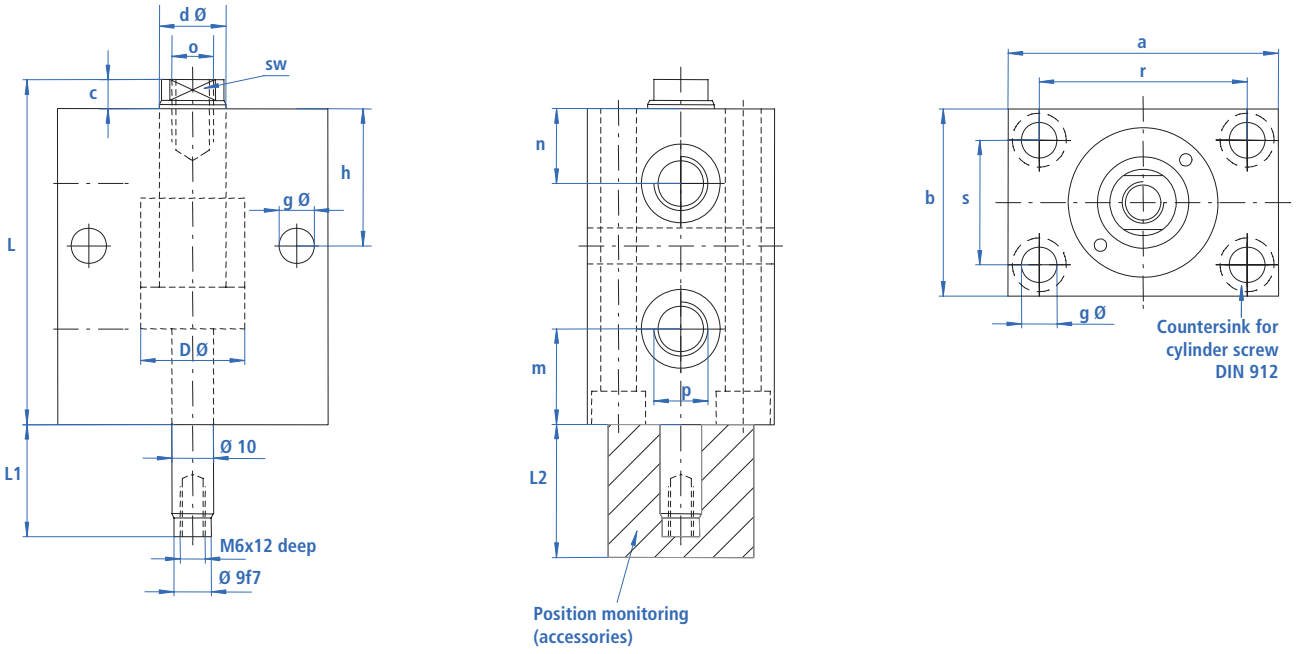



| | Order no. |
|---|---|
| Proximity switch | M935-1-000 |
| Plug with cable | M935-2-000 |
| Position monitor complete up to 30 mm stroke ( L2 = 45 mm ) | M930-1-001 |
| Position monitor complete up to 50 mm stroke ( L2 = 65 mm ) | M930-1-002 |

*2D and 3D data is found at: https://micromat.partcommunity.com*

# POSITION MONITOR M520




## TECHNICAL DATA M520

| Pistons Ø D | mm | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 |
|---|---|---|---|---|---|---|---|---|---|
| Rods Ø D | mm | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 |
| Lift | mm | 20 | 25 | 25 | 25 | 30 | 32 | 40 | 40 |
| Compression force (100 bar) | kN | 4.1 | 7.2 | 11.8 | 18.9 | 30.4 | 49.5 | 77.8 | 122 |
| Tensile force (100 bar) | kN | 2.9 | 4.9 | 7.7 | 11.6 | 18.6 | 30.6 | 47.4 | 72.4 |
| a | mm | 65 | 75 | 85 | 100 | 125 | 160 | 200 | 230 |
| b | mm | 45 | 55 | 63 | 75 | 95 | 120 | 150 | 180 |
| c | mm | 7 | 10 | 10 | 10 | 14 | 14 | 15 | 16 |
| Ø g | mm | 8.5 | 10.5 | 10.5 | 13 | 17 | 21 | 25 | 32 |
| h | mm | 33 | 38 | 40 | 44 | 50 | 60 | 64 | 82 |
| L | mm | 83 | 96 | 100 | 110 | 124 | 134 | 145 | 166 |
| L1 | mm | 27 | 32 | 32 | 32 | 37 | 47 | 47 | 47 |
| L2 | mm | 45 | 45 | 45 | 45 | 45 | 65 | 65 | 65 |
| m | mm | 23 | 22 | 22 | 23 | 25 | 24 | 25 | 31 |
| n | mm | 18 | 22 | 24 | 27 | 26 | 34 | 35 | 47 |
| o x thread depth | | M10 x 15 | M12 x 15 | M16 x 25 | M20 x 30 | M27 x 40 | M30 x 40 | M42 x 60 | M48 x 70 |
| p | | G 1/4 | G 1/4 | G 1/4 | G 1/4 | G 1/4 | G 1/4 | G 1/4 | G 1/4 |
| r | mm | 50 | 55 | 63 | 76 | 95 | 120 | 158 | 180 |
| s | mm | 30 | 35 | 40 | 45 | 65 | 80 | 108 | 130 |
| sw | mm | 13 | 17 | 22 | 27 | 36 | 46 | 55 | 70 |

## ORDER NUMBER OVERVIEW

| | M520-1-025 | M520-1-032 | M520-1-040 | M520-1-050 | M520-1-063 | M520-1-080 | M520-1-100 | M520-1-125 |
|---|---|---|---|---|---|---|---|---|

*2D and 3D data is found at: https://micromat.partcommunity.com*

# CLAMPING ARM

## CLAMPING ARM CONE 1:10 STANDARD

| Rods Ø D | Clamping arm length cylinder axis to axis pressure point | | | Mounting thread pressure piece | | | Long cylinder axis to outside edge | | |
|---|---|---|---|---|---|---|---|---|---|
| | short | medium | long | short | medium | long | short | medium | long |
| mm | o | o | o | p | p | p | q | q | q |
| **018** | – | 32 | 45 | – | M8 | M8 | 25 | – | – |
| **020** | – | 45 | 64 | – | M8 | M8 | 32 | – | – |
| **025** | – | 50 | 75 | – | M12 | M12 | 35 | – | – |
| **028** | – | 57 | 82 | – | M12 | M12 | 45 | – | – |
| **036** | – | 65 | 90 | – | M16 | M16 | 44.5 | – | – |
| **042** | – | 70 | 100 | – | M20 | M20 | 50 | – | – |
| | **1** | **2** | **3** | **1** | **2** | **3** | **1** | **2** | **3** |

ORDER NUMBER: M901 - **Y** - **XXX** - **X**

## CLAMPING ARM CONE 1:10 BLANK

| Rods Ø D | Total length | | | Width | | | Height | | | Long cylinder axis to outside edge | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | short | medium | long | short | medium | long | short | medium | long | short | medium | long |
| mm | a | a | a | b | b | b | c | c | c | q | q | q |
| **018** | 40 | 55 | 68 | 30 | 30 | 30 | 17 | 17 | 17 | 25 | 40 | 53 |
| **020** | 49 | 72 | 91 | 34 | 34 | 34 | 19 | 19 | 19 | 32 | 55 | 74 |
| **025** | 55 | 85 | 110 | 40 | 40 | 40 | 23 | 23 | 23 | 35 | 65 | 90 |
| **028** | 66 | 100 | 122 | 47 | 47 | 47 | 26 | 26 | 26 | 45 | 79 | 101 |
| **036** | 72 | 108 | 134 | 55 | 55 | 55 | 30 | 30 | 30 | 44.5 | 80.5 | 106.5 |
| **042** | 85 | 125 | 155 | 70 | 70 | 70 | 33 | 33 | 33 | 50 | 90 | 120 |
| | **1** | **2** | **3** | **1** | **2** | **3** | **1** | **2** | **3** | **1** | **2** | **3** |

ORDER NUMBER: M522 - **Y** - **XXX** - **X**

*2D and 3D data is found at: https://micromat.partcommunity.com*

## CLAMPING ARM CONE 15° STANDARD

| Rods Ø D | Clamping arm length cylinder axis to axis pressure point | | | Mounting thread pressure piece | | | Long cylinder axis to outside edge | | |
|---|---|---|---|---|---|---|---|---|---|
| | short | medium | long | short | medium | long | short | medium | long |
| mm | o | o | o | p | p | p | q | q | q |
| **018** | – | 32 | 45 | – | M8 | M8 | 25 | – | – |
| **020** | – | 45 | 64 | – | M8 | M8 | 32 | – | – |
| **025** | – | 50 | 75 | – | M12 | M12 | 35 | – | – |
| **028** | – | 57 | 82 | – | M12 | M12 | 45 | – | – |
| **036** | – | 65 | 90 | – | M16 | M16 | 44.5 | – | – |
| **042** | – | 70 | 100 | – | M20 | M20 | 50 | – | – |
| | **1** | **2** | **3** | **1** | **2** | **3** | **1** | **2** | **3** |

ORDER NUMBER: M906 - **Y** - **XXX** - **X**

## CLAMPING ARM CONE 15° BLANK

| Rods Ø D | Total length | | | Width | | | Height | | | Long cylinder axis to outside edge | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | short | medium | long | short | medium | long | short | medium | long | short | medium | long |
| mm | a | a | a | b | b | b | c | c | c | q | q | q |
| **018** | 40 | 55 | 68 | 30 | 30 | 30 | 17 | 17 | 17 | 25 | 40 | 53 |
| **020** | 49 | 72 | 91 | 34 | 34 | 34 | 19 | 19 | 19 | 32 | 55 | 74 |
| **025** | 55 | 85 | 110 | 40 | 40 | 40 | 23 | 23 | 23 | 35 | 65 | 90 |
| **028** | 66 | 100 | 122 | 47 | 47 | 47 | 26 | 26 | 26 | 45 | 79 | 101 |
| **036** | 72 | 108 | 134 | 55 | 55 | 55 | 30 | 30 | 30 | 44.5 | 80.5 | 106.5 |
| **042** | 85 | 125 | 155 | 70 | 70 | 70 | 33 | 33 | 33 | 50 | 90 | 120 |
| | **1** | **2** | **3** | **1** | **2** | **3** | **1** | **2** | **3** | **1** | **2** | **3** |

ORDER NUMBER: M906 - **Y** - **XXX** - **X**

*2D and 3D data is found at: https://micromat.partcommunity.com*