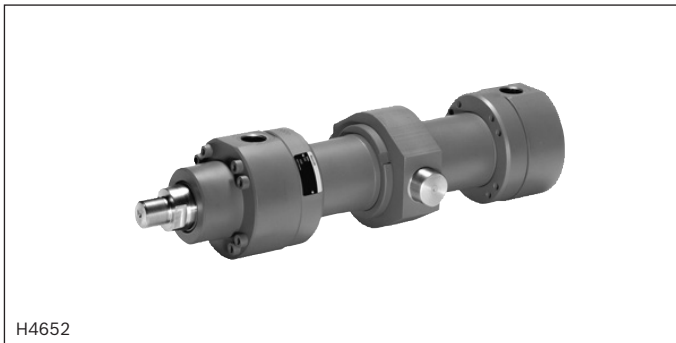


Hydraulic cylinder, mill type

Series CDM1 / CGM1 / CSM1

RE 17329

Edition: 2014-07

 Replaces: 10.07
 09.07
 17328


- ▶ Component series 2X
- ▶ Nominal pressure 160 bar [16 MPa]

Features

- ▶ Installation dimensions according to ISO 6020/1 and VW 39 D 920
- ▶ 9 types of mounting
- ▶ Piston Ø (**ØAL**) 25 to 200 mm
- ▶ Piston rod Ø (**ØMM**) 14 to 140 mm
- ▶ Stroke lengths up to 3,000 mm
- ▶ Self-adjusting or adjustable end position cushioning

Contents

| | |
|---|-----------|
| Features | 1 |
| Ordering code: Series CDM1 | 2, 3 |
| Ordering code: Series CGM1 | 4, 5 |
| Ordering code: Series CSM1 | 6, 7 |
| Technical data | 8, 9 |
| Diameters, areas, forces, flow | 10 |
| Tolerances according to ISO 6020-1 | 10 |
| Overview types of mounting: Series CDM1 | 11 |
| Overview types of mounting: Series CGM1 | 12 |
| Overview types of mounting: Series CSM1 | 13 |
| Dimensions CDM1, CGM1 | 14 ... 29 |
| Dimensions CSM1 | 30 ... 39 |
| Piston rod end E, Enlarged line connections | 40 |
| Flange ports | 41 |
| Subplates for valve mounting | 42 ... 45 |
| Bleeding / measuring coupling, Throttle valve | 46 |
| Proximity switch | 47 ... 49 |
| Position measurement system | 50, 51 |
| Fasteners | 52 ... 61 |
| Kinking, Admissible stroke length | 62, 63 |
| End position cushioning / damping capacity | 64 ... 66 |
| Seal (piston rod / piston) | 67 |
| Spare parts Images | 68 ... 71 |
| Seal kits | 72, 73 |
| Tightening torques | 74 |
| Cylinder weight | 75 |


 Project planning software **Interactive Catalog System**
Online
www.boschrexroth.com/ics

Ordering code: Series CDM1

| | | | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| CD | M1 | / | / | / | A | 2X | / | | | | | | | | | |

| | | |
|----|------------------------|-----------|
| 01 | Differential cylinders | CD |
| 02 | Series | M1 |

Types of mounting

| | | |
|----|------------------------------|--------------------------|
| 03 | No mounting | M00 ²⁾ |
| | Rectangular flange at head | MF1 ³⁾ |
| | Rectangular flange at base | MF2 ³⁾ |
| | Round flange at head | MF3 |
| | Round flange at base | MF4 |
| | Swivel eye at base | MP3 |
| | Self-aligning clevis at base | MP5 |
| | Trunnion | MT4 ⁴⁾ |
| | Foot mounting | MS2 |

| | | |
|----|--|-----|
| 04 | Piston Ø (ØAL) 25 ... 200 mm, see page 10 | ... |
| 05 | Piston rod Ø (ØMM) 14 ... 140 mm, see page 10 | ... |
| 06 | Stroke length in mm | ... |

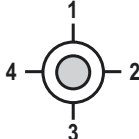
Design principle

| | | |
|----|--|-----------|
| 07 | Head and base flanged | A |
| 08 | Component series 20 ... 29 (20 ... 29: unchanged installation and connection dimensions) | 2X |

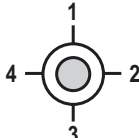
Line connection / version

| | | |
|----|--|---|
| 09 | Pipe thread ISO 1179-1 | B |
| | Metric ISO thread (DIN/ISO 6149-1) | R |
| | Enlarged pipe thread ISO 1179-1, page 40 | S ^{5; 6)} |
| | Rectangular flange connection ISO 6162, page 41 | F ^{6; 7)} |
| | Square flange connection ISO 6164, page 41 | H ^{6; 8)} |
| | For directional and control valves , page 44, 45 | Subplate size 6 P ^{6; 9; 14)} |
| | | Subplate size 10 T ^{6; 10; 14)} |
| | | Subplate size 16 U ^{6; 11; 14)} |
| | For SL and SV valves ¹⁶⁾ , page 42, 43 | Subplate size 6 A ^{6; 9; 14)} |
| | | Subplate size 10 E ^{6; 10; 14)} |
| | | Subplate size 20 L ^{6; 11; 14)} |

Line connection/position at head

| | | | |
|----|-----------------------------------|---|----------|
| 10 | View to piston rod ¹⁸⁾ |  | 1 |
| | | | 2 |
| | | | 3 |
| | | | 4 |

Line connection/position at base

| | | | |
|----|-----------------------------------|---|----------|
| 11 | View to piston rod ¹⁸⁾ |  | 1 |
| | | | 2 |
| | | | 3 |
| | | | 4 |

Ordering code: Series CDM1

| | | | | | | | | | | | | | | | | |
|-----------|-----------|----|----|----|----|----|----|----|----------|-----------|----|----|----|----|----|----|
| 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| CD | M1 | | / | | / | | / | | A | 2X | / | | | | | |

Piston rod design

| | | |
|----|---------------------------------------|-------------------------|
| 12 | Hard chromium-plated | C |
| | Hardened and hard chromium-plated | H ¹²⁾ |
| | Stainless steel, hard chromium-plated | L |

Piston rod end

| | | |
|----|---|-------------------------|
| 13 | Thread (ISO 6020-1) for swivel head CGKD | G |
| | Thread (VW standard) for swivel head CGKD | H ¹⁷⁾ |
| | Internal thread, page 40 | E ¹³⁾ |
| | Piston rod end H with mounted swivel head CGKD | F ¹⁷⁾ |
| | Piston rod end G with mounted swivel head CGKD | K |

End position cushioning

| | | |
|----|--|----------|
| 14 | Without end position cushioning | U |
| | Both sides, self-adjusting | D |
| | Head side, self-adjusting | S |
| | Base side, self-adjusting | K |
| | Both sides, adjustable | E |

Seal design

| | | | |
|----|--|----------------------------------|------------------------|
| 15 | Suitable for mineral oil according to 51524 HL, HLP | Standard seal system | M |
| | | Servo quality / reduced friction | T ⁸⁾ |
| | | Chevron seal kits | A ⁷⁾ |
| | Suitable for phosphoric acid esters HFDR | Standard seal system | V |
| | | Servo quality / reduced friction | S ⁸⁾ |

Option 1

| | | |
|----|---|------------------------|
| 16 | Without option | W |
| | Measuring coupling, on both sides | A |
| | Inductive proximity switch without mating connector, mating connector – separate order see page 48 | E ⁸⁾ |

Option 2

| | | |
|----|---|----------|
| 17 | Without option | W |
| | Specify the piston rod extension LY in the plain text in mm | Y |

Order examples:

CDM1MT4/50/28/550A2X/B11CGDMWW, XV = 175 mm
CDM1MF3/200/140/950A2X/B11CHKAWW

Note:**Replacement cylinder for series 1X**

In the event of an exchange to series 2X, the bearing blocks (trunnions) must also be replaced!

²⁾ Only available on request

³⁾ Piston Ø 25 up to 125 mm

⁴⁾ When ordering, always specify the “XV” dimension in the clear text in mm

⁵⁾ Piston Ø 63 up to 200 mm

⁶⁾ Not for MF2; MF4

⁷⁾ Piston Ø 50 up to 200 mm

⁸⁾ Piston Ø 40 up to 200 mm

⁹⁾ Piston Ø 40 to 80 mm, only position 11

¹⁰⁾ Piston Ø 63 to 200 mm, only position 11

¹¹⁾ Piston Ø 125 to 200 mm, only position 11

¹²⁾ Piston rod Ø 14 up to 110 mm

¹³⁾ Piston rod Ø 22 up to 140 mm

¹⁴⁾ Subplates only possible with pipe thread (ISO 1179-1)

¹⁵⁾ Subplates for SL and SV valves (isolator valves)

Note: Seal design T and S are not designed for the static holding function!

¹⁷⁾ Per piston Ø, only possible with large piston rod Ø

¹⁸⁾ All graphical presentations in the data sheet show position 1

Ordering code: Series CGM1

| | | | | | | | | | | | | | | | | |
|-----------|-----------|----|----|----|----|----------|-----------|----|----|----|----|----|----|----|----|----|
| 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| CG | M1 | / | / | / | | A | 2X | / | | | | | | | | |

| | | |
|----|-------------------------|-------------------------|
| 01 | Double-acting cylinders | CG ¹⁾ |
|----|-------------------------|-------------------------|

| | | |
|----|--------|-----------|
| 02 | Series | M1 |
|----|--------|-----------|

Types of mounting

| | | |
|----|----------------------------|--------------------------|
| 03 | Rectangular flange at head | MF1 ³⁾ |
| | Round flange at head | MF3 |
| | Trunnion | MT4 ⁴⁾ |
| | Foot mounting | MS2 |

| | | |
|----|--|-----|
| 04 | Piston Ø (ØAL) 25 ... 200 mm, see page 10 | ... |
|----|--|-----|

| | | |
|----|--|-----|
| 05 | Piston rod Ø (ØMM) 14 ... 140 mm, see page 10 | ... |
|----|--|-----|

| | | |
|----|---------------------|-----|
| 06 | Stroke length in mm | ... |
|----|---------------------|-----|

Design principle

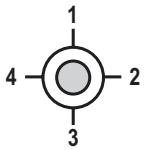
| | | |
|----|-----------------------|----------|
| 07 | Head and base flanged | A |
|----|-----------------------|----------|

| | | |
|----|--|-----------|
| 08 | Component series 20 ... 29 (20 ... 29: unchanged installation and connection dimensions) | 2X |
|----|--|-----------|

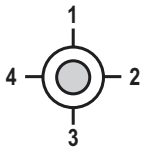
Line connection / version

| | | | |
|------------------|---|------------------------|---------------------|
| 09 | Pipe thread ISO 1179-1 | B | |
| | Metric ISO thread (DIN/ISO 6149-1) | R | |
| | Enlarged pipe thread ISO 1179-1, page 40 | S ⁵⁾ | |
| | Rectangular flange connection ISO 6162, page 41 | F ⁷⁾ | |
| | Square flange connection ISO 6164, page 41 | H ⁸⁾ | |
| | For directional and control valves, page 44, 45 | Subplate size 6 | P 6; 9; 14) |
| | | Subplate size 10 | T 6; 10; 14) |
| | | Subplate size 16 | U 6; 11; 14) |
| | For SL and SV valves ¹⁶⁾ , page 42, 43 | Subplate size 6 | A 6; 9; 14) |
| | | Subplate size 10 | E 6; 10; 14) |
| Subplate size 20 | | L 6; 11; 14) | |

Line connection/position at head

| | | | |
|----|-----------------------------------|---|----------|
| 10 | View to piston rod ¹⁸⁾ |  | 1 |
| | | | 2 |
| | | | 3 |
| | | | 4 |

Line connection/position at base

| | | | |
|----|-----------------------------------|---|----------|
| 11 | View to piston rod ¹⁸⁾ |  | 1 |
| | | | 2 |
| | | | 3 |
| | | | 4 |

Piston rod design

| | | |
|----|---------------------------------------|-------------------------|
| 12 | Hard chromium-plated | C |
| | Hardened and hard chromium-plated | H ¹²⁾ |
| | Stainless steel, hard chromium-plated | L |

Ordering code: Series CGM1

| | | | | | | | | | | | | | | | | |
|-----------|-----------|----|----|----|----|----|----|----|----------|-----------|----|----|----|----|----|----|
| 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| CG | M1 | | / | | / | | / | | A | 2X | / | | | | | |

Piston rod end

| | | |
|----|---|-------------------------|
| 13 | Thread (ISO 6020-1) for swivel head CGKD | G |
| | Thread (VW standard) for swivel head CGKD | H ¹⁷⁾ |
| | Piston rod end H with mounted swivel head CGKD | F ¹⁷⁾ |
| | Piston rod end G with mounted swivel head CGKD | K |

End position cushioning

| | | |
|----|--|----------|
| 14 | Without end position cushioning | U |
| | Both sides, self-adjusting | D |
| | Both sides, adjustable | E |

Seal design

| | | | |
|----|--|----------------------------------|------------------------|
| 15 | Suitable for mineral oil according to 51524 HL, HLP | Standard seal system | M |
| | | Servo quality / reduced friction | T ⁸⁾ |
| | | Chevron seal kits | A ⁷⁾ |
| | Suitable for phosphoric acid esters HFDR | Standard seal system | V |
| | | Servo quality / reduced friction | S ⁸⁾ |

Option 1

| | | |
|----|---|------------------------|
| 16 | Without option | W |
| | Measuring coupling, on both sides | A |
| | Inductive proximity switch without mating connector, mating connector – separate order see page 48 | E ⁸⁾ |

Option 2

| | | |
|----|---|----------|
| 17 | Without option | W |
| | Specify the piston rod extension LY in the plain text in mm | Y |

Order examples:**CGM1MT4/50/28/550A2X/B11CGDMWW, XV = 175 mm****CGM1MF3/200/140/950A2X/B11CHDAWW****Note:****Replacement cylinder for series 1X**

In the event of an exchange to series 2X, the bearing blocks (trunnions) must also be replaced!

¹⁾ Not standardized³⁾ Piston Ø 25 up to 125 mm⁴⁾ When ordering, always specify the “XV” dimension in the clear text in mm⁵⁾ Piston Ø 63 up to 200 mm⁷⁾ Piston Ø 50 up to 200 mm⁸⁾ Piston Ø 40 up to 200 mm⁹⁾ Piston Ø 40 to 80 mm, only position 11¹⁰⁾ Piston Ø 63 to 200 mm, only position 11¹¹⁾ Piston Ø 125 to 200 mm, only position 11¹²⁾ Piston rod Ø 14 up to 110 mm¹⁴⁾ Subplates only possible with pipe thread ISO 1179-1¹⁶⁾ Subplates for SL and SV valves (isolator valves)**Note:** Seal design T and S are not designed for the static holding function!¹⁷⁾ Per piston Ø, only possible with large piston rod Ø¹⁸⁾ All graphical presentations in the data sheet show position 1

Ordering code: Series CSM1

| | | | | | | | | | | | | | | | | |
|-----------|-----------|----|----|----|----|----------|-----------|----|----|----|----|----|----|----|----------|----|
| 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| CS | M1 | / | / | / | / | A | 2X | / | | | | | | | T | |

| | | |
|----|---|-------------------------|
| 01 | Differential cylinder with position measurement system | CS ¹⁾ |
|----|---|-------------------------|

| | | |
|----|--------|-----------|
| 02 | Series | M1 |
|----|--------|-----------|

Types of mounting

| | | |
|----|------------------------------|--------------------------|
| 03 | Rectangular flange at head | MF1 ³⁾ |
| | Round flange at head | MF3 |
| | Swivel eye at base | MP3 |
| | Self-aligning clevis at base | MP5 |
| | Trunnion | MT4 ⁴⁾ |
| | Foot mounting | MS2 |

| | | |
|----|--|-----|
| 04 | Piston Ø (ØAL) 40 ... 200 mm, see page 10 | ... |
|----|--|-----|

| | | |
|----|--|-----|
| 05 | Piston rod Ø (ØMM) 28 ... 140 mm, see page 10 | ... |
|----|--|-----|

| | | |
|----|---------------------|-----|
| 06 | Stroke length in mm | ... |
|----|---------------------|-----|

Design principle

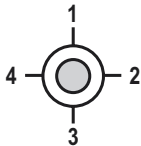
| | | |
|----|-----------------------|----------|
| 07 | Head and base flanged | A |
|----|-----------------------|----------|

| | | |
|----|--|-----------|
| 08 | Component series 20 ... 29 (20 ... 29: unchanged installation and connection dimensions) | 2X |
|----|--|-----------|

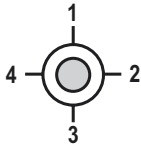
Line connection / version

| | | | |
|------------------|---|--------------------------------|--------------------------------|
| 09 | Pipe thread ISO 1179-1 | B | |
| | Metric ISO thread (DIN/ISO 6149-1) | R | |
| | Enlarged pipe thread ISO 1179-1, page 40 | S ⁵⁾ | |
| | Rectangular flange connection ISO 6162, page 41 | F ⁷⁾ | |
| | Square flange connection ISO 6164, page 41 | H | |
| | For directional and control valves, page 44, 45 | Subplate size 6 | P ^{6; 9; 14)} |
| | | Subplate size 10 | T ^{6; 10; 14)} |
| | | Subplate size 16 | U ^{6; 11; 14)} |
| | For SL and SV valves ¹⁶⁾ , page 42, 43 | Subplate size 6 | A ^{6; 9; 14)} |
| | | Subplate size 10 | E ^{6; 10; 14)} |
| Subplate size 20 | | L ^{6; 11; 14)} | |

Line connection/position at head

| | | | |
|----|-----------------------------------|---|----------|
| 10 | View to piston rod ¹⁸⁾ |  | 1 |
| | | | 2 |
| | | | 3 |
| | | | 4 |

Line connection/position at base

| | | | |
|----|-----------------------------------|---|----------|
| 11 | View to piston rod ¹⁸⁾ |  | 1 |
| | | | 2 |
| | | | 3 |
| | | | 4 |

Piston rod design

| | | |
|----|---------------------------------------|----------|
| 12 | Hard chromium-plated | C |
| | Stainless steel, hard chromium-plated | L |

Ordering code: Series CSM1

| | | | | | | | | | | | | | | | | |
|-----------|-----------|----|----|----|----|----|----|----|----------|-----------|----|----|----|----|----|----------|
| 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| CS | M1 | | / | | / | | / | | A | 2X | / | | | | | T |

Piston rod end

| | | |
|----|---|-------------------------|
| 13 | Thread (ISO 6020-1) for swivel head CGKD | G |
| | Thread (VW standard) for swivel head CGKD | H ¹⁷⁾ |
| | Internal thread, page 40 | E |
| | Piston rod end H with mounted swivel head CGKD | F ¹⁷⁾ |
| | Piston rod end G with mounted swivel head CGKD | K |

End position cushioning

| | | |
|----|--|-------------------------|
| 14 | Without end position cushioning | U |
| | Both sides, adjustable | E ¹⁵⁾ |

Seal design

| | | | |
|----|--|----------------------------------|----------|
| 15 | Suitable for mineral oil according to 51524 HL, HLP | Standard seal system | M |
| | | Servo quality / reduced friction | T |
| | Suitable for phosphoric acid esters HFDR | Servo quality / reduced friction | S |

Option 1

| | | |
|----|--|----------|
| 16 | Position measurement system (magnetostrictive) without mating connector, mating connector – separate order, see page 51 | T |
|----|--|----------|

Option 2

| | | |
|----|---------------------------|----------|
| 17 | Analog output 4 ... 20 mA | C |
| | Analog output 0 ... 10 V | F |
| | Digital output SSI | D |

Order example:**CSM1MT4/50/36/300A2X/B11CHUMTC, XV = 175 mm**

- | | |
|--|--|
| <p>1) Not standardized</p> <p>3) Piston Ø 40 up to 125 mm</p> <p>4) When ordering, always specify the “XV” dimension in the clear text in mm</p> <p>5) Piston Ø 63 up to 200 mm</p> <p>6) Not for MF2; MF4</p> <p>7) Piston Ø 50 up to 200 mm</p> <p>9) Piston Ø 40 to 80 mm, only position 11</p> | <p>10) Piston Ø 63 to 200 mm, only position 11</p> <p>11) Piston Ø 125 to 200 mm, only position 11</p> <p>14) Subplates only possible with pipe thread (ISO 1179-1)</p> <p>15) Piston Ø 80 up to 200 mm</p> <p>16) Subplates for SL and SV valves (isolator valves) Note: Seal design T and S are not designed for the static holding function!</p> <p>17) Per piston Ø, only possible with large piston rod Ø</p> <p>18) All graphical presentations in the data sheet show position 1</p> |
|--|--|

General information on series CSM1

The series CSM1...2X is based on the series CDM1...2X (according to ISO 6020/1).

The same general instructions apply for series CSM1...2X as for series CDM1...2X.

Dimensional differences or deviations in the type code caused by the integrated position measurement system are shown on the pages for the dimensions.

Technical data

(For applications outside these parameters, please consult us!)

| General | | |
|---------------------------|---------|--------------------------|
| Weight | kg | see page 75 |
| Installation position | | any |
| Ambient temperature range | °C [°F] | -20 ... +80 [-4... +176] |
| Primer coat ¹⁾ | µm | min. 40 |

| Hydraulic | | |
|---|--------------------------|--|
| Nominal pressure ²⁾ | bar [MPa] | 160 [16] |
| Minimum operating pressure ³⁾ | (without load) bar [MPa] | 10 [1] |
| Static test pressure | bar [MPa] | 240 [24] |
| Hydraulic fluid | | see table below |
| Hydraulic fluid temperature range | °C [°F] | -20 ... +80 [-4... +176] |
| Viscosity range | mm ² /s | 2.8 ... 380 |
| Maximum permissible degree of contamination of the hydraulic fluid, cleanliness class according to ISO 4406 (c) | | Class 20/18/15 ⁴⁾ |
| Stroke speed ⁵⁾ (depending on line connection) | m/s | up to 0.5 |
| Bleeding | | standard, from piston Ø 40 mm secured against unscrewing |

| Hydraulic fluid ⁶⁾ | Classification | Suitable sealing materials | Standards |
|-------------------------------|----------------|----------------------------|-----------|
| Mineral oils | HL, HLP | NBR, FKM | DIN 51524 |
| Phosphoric acid esters | HFDR | FKM | ISO 12922 |
| Water glycol | HFC | upon request | |

¹⁾ By default, hydraulic cylinders are primed with a coating (color gentian blue RAL 5010). Other colors upon request. With cylinders and attachment parts, the following surfaces are not primed or painted:

- ▶ All fit diameters to the customer side
- ▶ Sealing surfaces for line connection
- ▶ Sealing surfaces for flange connection
- ▶ Position measurement system

The areas that are not painted are protected by means of a solvent-free corrosion protection agent.

²⁾ Higher operating pressures up to 200 bar available on request. With extreme loads, mounting elements and threaded piston rod connections must be designed for durability.

³⁾ Depending on the application, a certain minimum pressure is required in order to guarantee good functioning of the cylinder. Without load, a minimum pressure of 10 bar is recommended for differential cylinders; for lower pressures as well as double-acting cylinders, please contact us.

⁴⁾ The cleanliness classes stated for the components has to be maintained in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

For the selection of the filters see www.boschrexroth.com/filter.

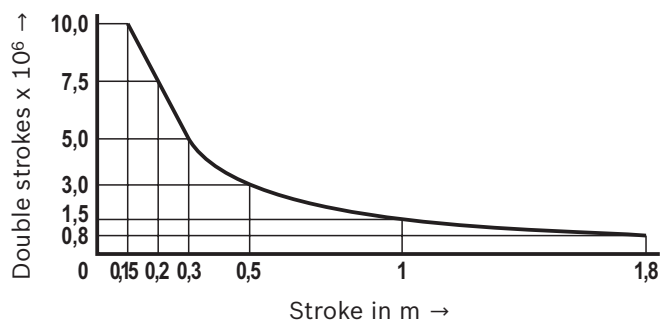
⁵⁾ If the extension velocity is considerably higher than the retraction velocity of the piston rod, drag-out losses of the medium may result. If necessary, please consult us.

⁶⁾ For further information on hydraulic fluids, see data sheet R.90223.

Life cycle:

Rexroth cylinders correspond to the reliability recommendations for industrial applications.

≥ 10,000,000 double strokes in idle continuous operation or 3000 km piston travel at 70% of the maximum operating pressure, without load on the piston rod, with a maximum velocity of 0.5 m/s, with a failure rate of less than 5%.



Technical data

(For applications outside these parameters, please consult us!)

Notices:

Boundary and application conditions:

- ▶ The mechanical alignment of the movement axis and thus the mounting points of hydraulic cylinder and piston rod must be ensured. Lateral forces on the guides of piston rod and piston are to be avoided. It may be necessary to consider the own weight of the hydraulic cylinder (MP3/MP5 or MT4) or the piston rod.
- ▶ The kinking length/kinking load of the piston rod and/or the hydraulic cylinder must be observed (see page topic Kinking).
- ▶ The maximum admissible stroke velocities with regard to the suitability/load of seals must be observed as must their compatibility with the properties of the fluid type (see page topic Seals).
- ▶ The maximum admissible velocities/kinetic energies when moving into the end positions, also considering external loads, must be observed.
Danger: Excess pressure
- ▶ The maximum admissible operating pressure must be complied with in any operating state of the hydraulic cylinder.
Possible pressure intensification resulting from the area ratio of annulus area to piston area and possible throttling points are to be observed.
- ▶ Detrimental environmental influences, like e.g. aggressive finest particles, vapors, high temperatures, etc. as well as contaminations and deterioration of the hydraulic fluid are to be avoided.

Standards:

The installation dimensions and types of mounting of the cylinder comply with the standards ISO 6020/1 and VW 39 D 920.

Acceptance:

Each cylinder is tested according to Bosch Rexroth standard and in compliance with ISO 10100: 2001.

Safety instructions:

For assembly, commissioning and maintenance of hydraulic cylinders, observe the operating instructions 07100-B!

Service and repair works have to be performed by Bosch Rexroth AG or by personnel especially trained for this purpose. No warranty is accepted for damage as a consequence of assembly, maintenance or repair work not performed by Bosch Rexroth AG.

Check lists for hydraulic cylinders:

Cylinders the characteristics and/or application parameters of which deviate from the values specified in the data sheet can only be offered as special version upon request. For offers, the deviations of the characteristics and/or application parameters must be described in the check lists for hydraulic cylinders (07200).

This list does not claim to be complete. In case of questions regarding the compatibility with media or exceedance of the boundary or application conditions, please contact us.

All graphical presentations in the data sheet are an example. The product supplied may therefore differ from the photo shown.

Project planning software ICS (Interactive Catalog System)

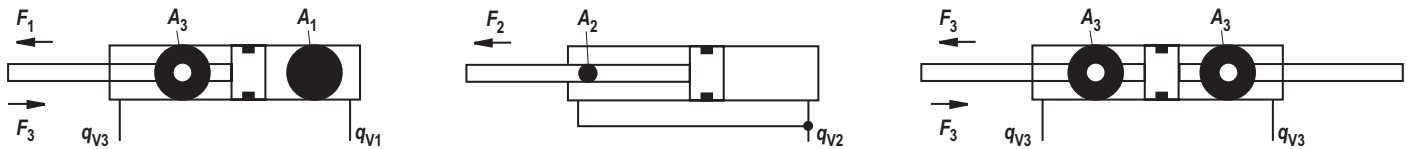
The ICS (Interactive Catalog System) is a selection and project planning help for hydraulic cylinders. The ICS allows designers for machines and systems to quickly and reliably find the perfect hydraulic cylinder solution through logic-guided type key enquiries. This software helps to solve design and project planning tasks more quickly and efficiently. After having been guided through the product

selection, the user quickly and reliably gets the exact technical data of the selected component as well as 2D and 3D CAD data in the correct file format for all common CAD systems.

This allows users to reduce costs while increasing their competitiveness.

Diameters, areas, forces, flow

| Piston | Piston rod | Area ratio | Piston | Areas | | | Force at 160 bar ¹⁾ | | | Flow at 0.1 m/s ²⁾ | | | max. available stroke length |
|------------------------|------------------------|---------------------|--------------------------|--------------------------|--------------------------|-------------|--------------------------------|-------------|-------------------|-------------------------------|-------------------|------|------------------------------|
| | | | | Rod | Ring | | pressure | Diff. | Pulling | From | Diff. | On | |
| \varnothing AL mm | \varnothing MM mm | ϕ A_1/A_3 | A_1 cm ² | A_2 cm ² | A_3 cm ² | F_1 kN | F_2 kN | F_3 kN | q_{V1} l/min | q_{V2} l/min | q_{V3} l/min | mm | |
| 25 | 14 | 1.46 | 4.91 | 1.54 | 3.37 | 7.85 | 2.44 | 5.37 | 2.9 | 0.9 | 2.0 | 600 | |
| | 18 | 2.08 | | 2.54 | 2.36 | | 4.07 | 3.76 | | 1.5 | 1.4 | | |
| 32 | 18 | 1.46 | 8.04 | 2.54 | 5.50 | 12.80 | 4.07 | 8.78 | 4.8 | 1.5 | 3.3 | 800 | |
| | 22 | 1.90 | | 3.80 | 4.24 | | 6.08 | 6.76 | | 2.3 | 2.5 | | |
| 40 | 22 | 1.43 | 12.56 | 3.80 | 8.76 | 20.00 | 6.08 | 14.03 | 7.5 | 2.3 | 5.2 | 1000 | |
| | 28 | 1.96 | | 6.16 | 6.41 | | 9.82 | 10.24 | | 3.7 | 3.8 | | |
| 50 | 28 | 1.46 | 19.63 | 6.16 | 13.47 | 31.30 | 9.82 | 21.55 | 11.8 | 3.7 | 8.1 | 1200 | |
| | 36 | 2.08 | | 10.18 | 9.46 | | 16.29 | 15.10 | | 6.1 | 5.6 | | |
| 63 | 36 | 1.48 | 31.17 | 10.18 | 20.99 | 49.80 | 16.29 | 33.56 | 18.7 | 6.1 | 12.6 | 1400 | |
| | 45 | 2.04 | | 15.90 | 15.27 | | 25.40 | 24.41 | | 9.5 | 9.2 | | |
| 80 | 45 | 1.46 | 50.26 | 15.90 | 34.36 | 80.30 | 25.40 | 54.96 | 30.2 | 9.5 | 20.7 | 1700 | |
| | 56 | 1.96 | | 24.63 | 25.63 | | 39.30 | 40.99 | | 14.8 | 15.4 | | |
| 100 | 56 | 1.46 | 78.54 | 24.63 | 53.91 | 125.00 | 39.30 | 86.22 | 47.1 | 14.8 | 32.3 | 2000 | |
| | 70 | 1.96 | | 38.48 | 40.06 | | 61.50 | 64.04 | | 23.1 | 24.0 | | |
| 125 | 70 | 1.46 | 122.72 | 38.48 | 84.24 | 196.00 | 61.50 | 134.7 | 73.6 | 23.1 | 50.5 | 2300 | |
| | 90 | 2.08 | | 63.62 | 59.10 | | 101.00 | 94.49 | | 38.2 | 35.4 | | |
| 160 | 90 | 1.46 | 201.06 | 63.62 | 137.44 | 321.00 | 101.00 | 219.8 | 120.6 | 38.2 | 82.4 | 2600 | |
| | 110 | 1.90 | | 95.06 | 106.00 | | 151.00 | 169.5 | | 57.0 | 63.6 | | |
| 200 | 110 | 1.43 | 314.16 | 95.06 | 219.09 | 502.60 | 152.00 | 350.6 | 188.5 | 57.0 | 131.5 | 3000 | |
| | 140 | 1.96 | | 153.96 | 160.20 | | 246.30 | 256.3 | | 92.4 | 96.1 | | |



1) Theoretical static cylinder force
(without consideration of the efficiency and admissible load for attachment parts like e.g. swivel heads, plates or valves, etc.)

2) Stroke velocity

Tolerances according to ISO 6020-1

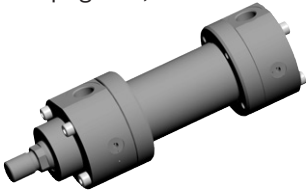
| Installation dimensions | WF | W | WC | XC ¹⁾ | XO ¹⁾ | XS | SS | XV | ZF ¹⁾ | ZP ¹⁾ | Stroke tolerances in mm |
|-------------------------|------------------|-----|-----|------------------|------------------|-----|-------|-----|------------------|------------------|-------------------------|
| Type of mounting | M00 | MF1 | MF3 | MP3 | MP5 | MS2 | MS2 | MT4 | MF2 | MF4 | |
| Stroke length in mm | Tolerances in mm | | | | | | | | | | |
| ≤ 1250 | ± 2 | ± 2 | ± 2 | ± 1.5 | ± 1.5 | ± 2 | ± 1.5 | ± 2 | ± 1.5 | ± 1.5 | + 2 |
| > 1250 to ≤ 3000 | ± 4 | ± 4 | ± 4 | ± 3 | ± 3 | ± 4 | ± 3 | ± 4 | ± 3 | ± 3 | + 5 |

1) Not standardized

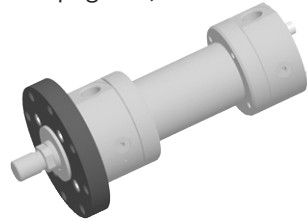
2) Including stroke length

Overview types of mounting: Series CDM1

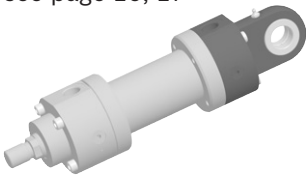
CDM1: M00
see page 14, 15



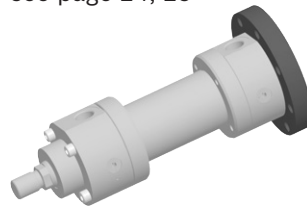
CDM1: MF3
see page 22, 23



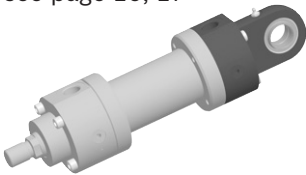
CDM1: MP3
see page 16, 17



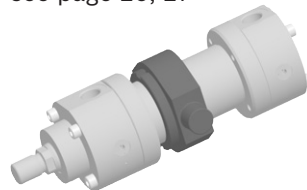
CDM1: MF4
see page 24, 25



CDM1: MP5
see page 16, 17



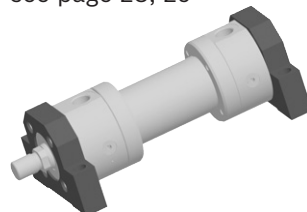
CDM1: MT4
see page 26, 27



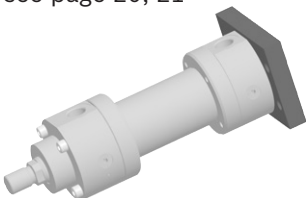
CDM1: MF1
see page 18, 19



CDM1: MS2
see page 28, 29



CDM1: MF2
see page 20, 21



Overview types of mounting: Series CGM1

CGM1: MF1
see page 18, 19



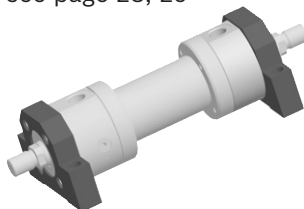
CGM1: MT4
see page 26, 27



CGM1: MF3
see page 22, 23

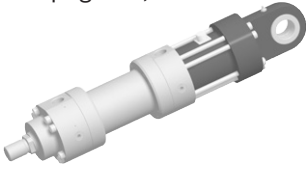


CGM1: MS2
see page 28, 29



Overview types of mounting: Series CSM1

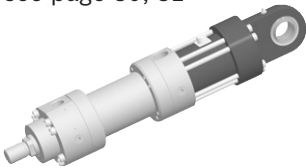
CSM1: MP3
see page 30, 31



CSM1: MF3
see page 34, 35



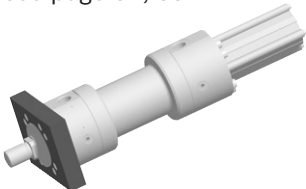
CSM1: MP5
see page 30, 31



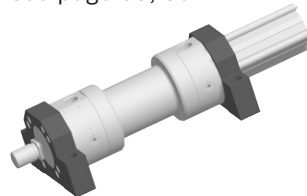
CSM1: MT4
see page 36, 37



CSM1: MF1
see page 32, 33



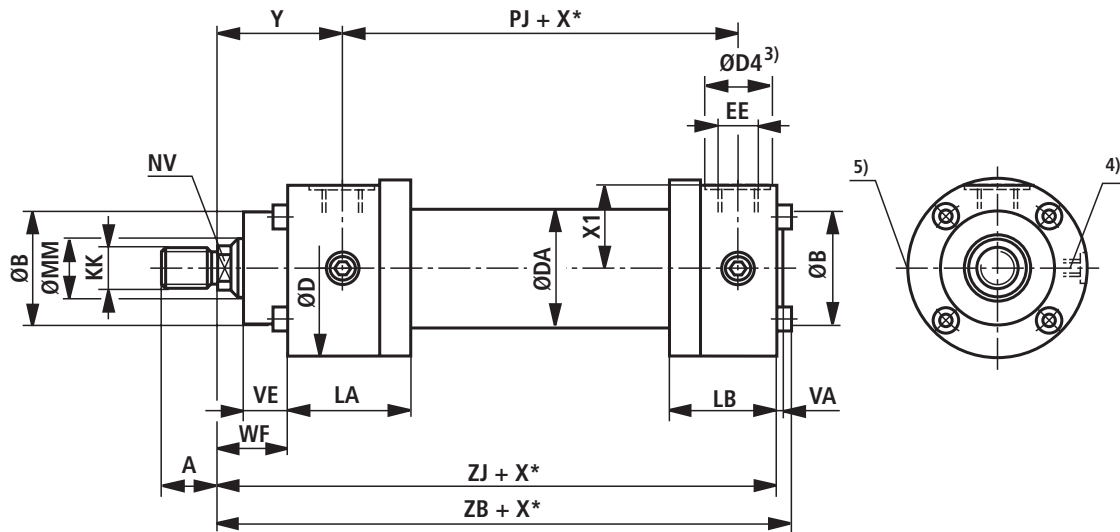
CSM1: MS2
see page 38, 39



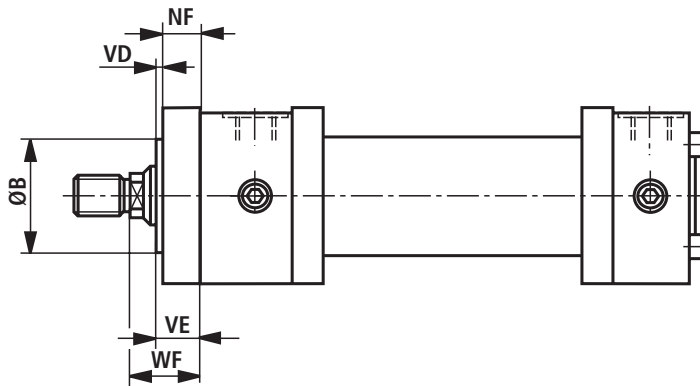
Dimensions CDM1: M00

(dimensions in mm)

CDM1: M00



CDM1: M00...2X/...A: as sleeve design and AL-Ø 50 ... 200 mm



Dimensions CDM1: M00

(dimensions in mm)

| ØAL | ØMM | KK ¹⁾ | | A ¹⁾ | | KK ²⁾ | | A ²⁾ | | NV | ØB | ØD | ØDA | ØD4 3; 8) | EE 8) | ØD4 3; 9) | EE 9) |
|-----|-----|------------------|-----|-----------------|---|------------------|----|-----------------|-----|-----|----|--------|-----|--------------|------------|--------------|----------|
| | | ISO 6020/1 | | VW 39 D 920 | | f8 | | | | | | | | | | | |
| 25 | 14 | M12 x 1.25 | 16 | 16 | – | – | 12 | 32 | 56 | 35 | 25 | G1/4 | 21 | M14x1.5 | | | |
| | 18 | | 18 | | | | | | | | | | | | M12 x 1.25 | 16 | 14 |
| 32 | 18 | M14 x 1.5 | 18 | 18 | – | – | 14 | 40 | 67 | 42 | 28 | G3/8 | 26 | M18x1.5 | | | |
| | 22 | | 22 | | | | | | | | | | | | M14 x 1.5 | 18 | 18 |
| 40 | 22 | M16 x 1.5 | 22 | 22 | – | – | 18 | 50 | 78 | 50 | 34 | G1/2 | 29 | M22x1.5 | | | |
| | 28 | | 28 | | | | | | | | | | | | M16 x 1.5 | 22 | 22 |
| 50 | 28 | M20 x 1.5 | 28 | 28 | – | – | 22 | 60 | 95 | 60 | 34 | G1/2 | 29 | M22x1.5 | | | |
| | 36 | | 36 | | | | | | | | | | | | M20 x 1.5 | 28 | 30 |
| 63 | 36 | M27 x 2 | 36 | 36 | – | – | 30 | 70 | 116 | 78 | 42 | G3/4 | 34 | M27x2 | | | |
| | 45 | | 45 | | | | | | | | | | | | M27 x 2 | 36 | 36 |
| 80 | 45 | M33 x 2 | 45 | 45 | – | – | 36 | 85 | 130 | 95 | 42 | G3/4 | 34 | M27x2 | | | |
| | 56 | | 56 | | | | | | | | | | | | M33 x 2 | 45 | 46 |
| 100 | 56 | M42 x 2 | 56 | 63 | – | – | 46 | 106 | 158 | 120 | 47 | G1 | 43 | M33x2 | | | |
| | 70 | | 63 | | | | | | | | | | | | M42 x 2 | 56 | 60 |
| 125 | 70 | M48 x 2 | 63 | 85 | – | – | 60 | 132 | 192 | 150 | 47 | G1 | 43 | M33x2 | | | |
| | 90 | | 85 | | | | | | | | | | | | M48 x 2 | 63 | 75 |
| 160 | 90 | M64 x 3 | 85 | 95 | – | – | 75 | 160 | 237 | 190 | 58 | G1 1/4 | 52 | M42x2 | | | |
| | 110 | | 95 | | | | | | | | | | | | M64 x 3 | 85 | 95 |
| 200 | 110 | M80 x 3 | 95 | 112 | – | – | 95 | 200 | 285 | 230 | 58 | G1 1/4 | 52 | M42x2 | | | |
| | 140 | | 112 | | | | | | | | | | | | M80 x 3 | 95 | 120 |

| ØAL | ØMM | Y | PJ | X1 | PI | VE | VD | NF | WF | ZB | ZJ | LA | LB |
|-----|-----|-----|-----|-------|----|----|----|----|----|-----|-----|-----|-----|
| 25 | 14 | 58 | 77 | 26 | 3 | 15 | – | – | 28 | 156 | 150 | 58 | 43 |
| | 18 | | | | | | | | | | | | |
| 32 | 18 | 64 | 89 | 30.5 | 3 | 19 | – | – | 32 | 176 | 170 | 62 | 47 |
| | 22 | | | | | | | | | | | | |
| 40 | 22 | 71 | 97 | 35.5 | 3 | 19 | – | – | 32 | 196 | 190 | 73 | 56 |
| | 28 | | | | | | | | | | | | |
| 50 | 28 | 72 | 111 | 44.5 | 4 | 24 | 4 | 20 | 38 | 213 | 205 | 74 | 62 |
| | 36 | | | | | | | | | | | | |
| 63 | 36 | 82 | 117 | 54.5 | 4 | 29 | 4 | 25 | 45 | 234 | 224 | 84 | 72 |
| | 45 | | | | | | | | | | | | |
| 80 | 45 | 91 | 134 | 62.5 | 4 | 36 | 4 | 32 | 54 | 260 | 250 | 93 | 81 |
| | 56 | | | | | | | | | | | | |
| 100 | 56 | 108 | 162 | 75.5 | 5 | 37 | 5 | 32 | 57 | 310 | 300 | 117 | 96 |
| | 70 | | | | | | | | | | | | |
| 125 | 70 | 121 | 174 | 92.5 | 5 | 37 | 5 | 32 | 60 | 335 | 325 | 143 | 112 |
| | 90 | | | | | | | | | | | | |
| 160 | 90 | 143 | 191 | 115.5 | 8 | 41 | 5 | 36 | 66 | 380 | 370 | 171 | 130 |
| | 110 | | | | | | | | | | | | |
| 200 | 110 | 190 | 224 | 138.5 | 15 | 45 | 5 | 40 | 75 | 466 | 450 | 230 | 151 |
| | 140 | | | | | | | | | | | | |

ØAL = Piston Ø

ØMM = Piston rod Ø

X* = Stroke length

1) Thread for piston rod ends "G" and "K"

2) Thread for piston rod ends "H" and "F"

3) ØD4 recess max. 0.5 mm deep

4) Bleeding: With view to the piston rod, the position is offset by 90° in relation to the line connection (clockwise)

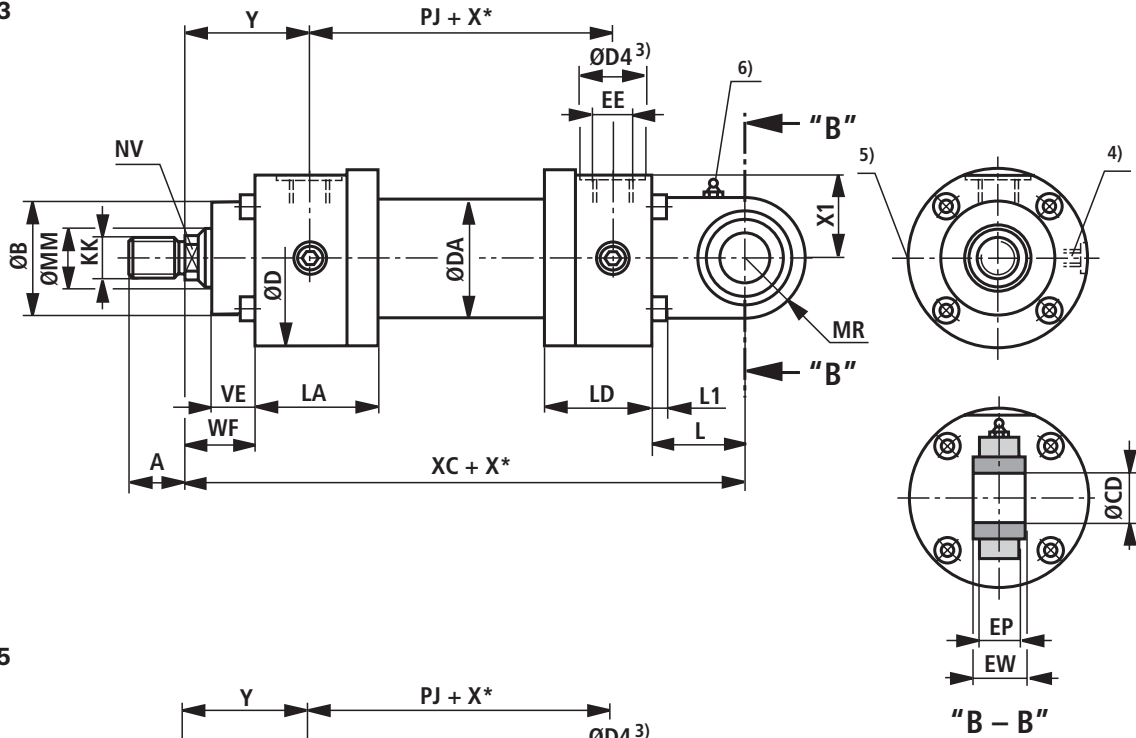
5) Throttle valve only with end position cushioning "E" (180° for bleeding)

8) Line connection "B"

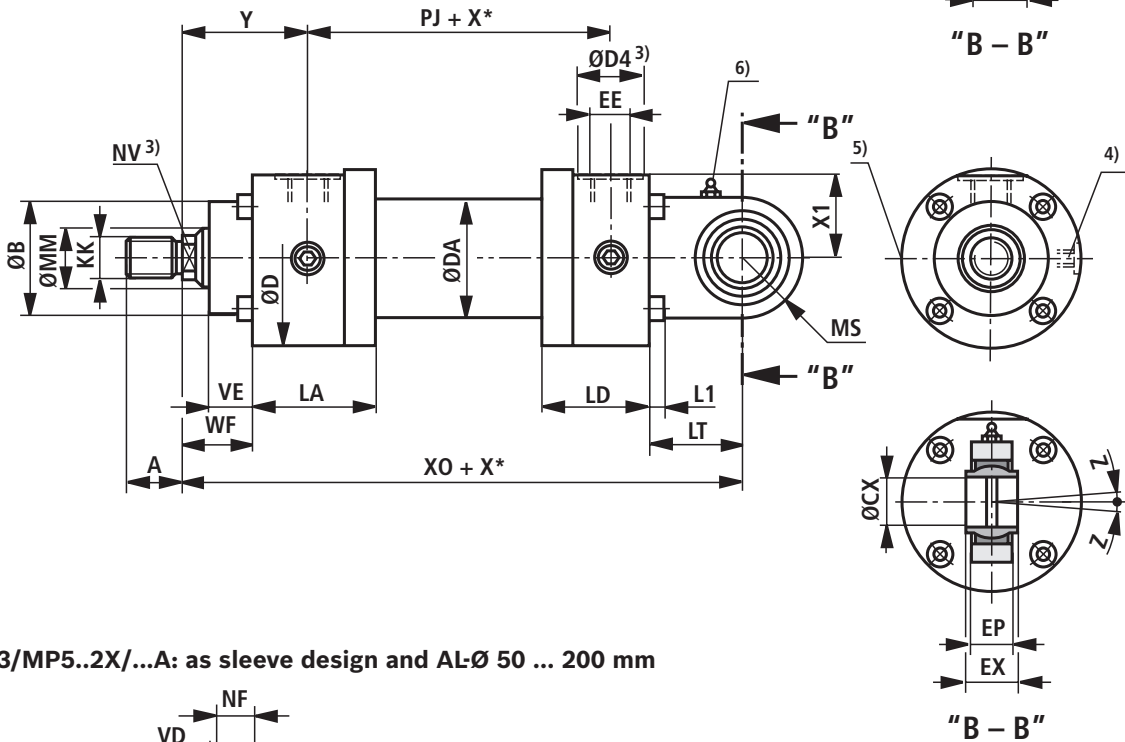
9) Line connection "R"

Dimensions CDM1: MP3 / MP5
(dimensions in mm)

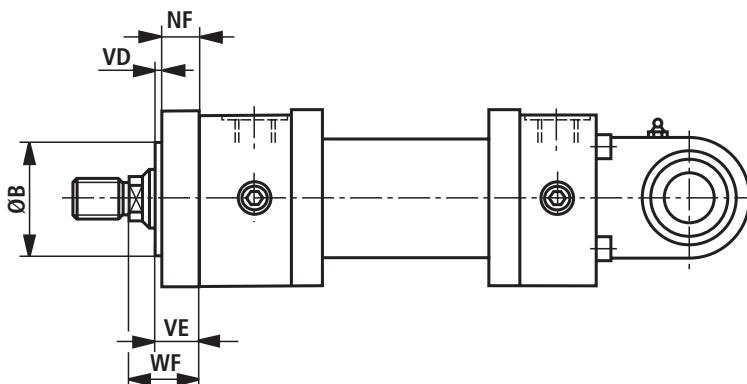
CDM1: MP3



CDM1: MP5



CDM1: MP3/MP5..2X/...A: as sleeve design and AL-Ø 50 ... 200 mm



Dimensions CDM1: MP3 / MP5

(dimensions in mm)

| Ø AL | Ø MM | KK ¹⁾ | | A ¹⁾ | | KK ²⁾ | | A ²⁾ | | NV | ØB f8 | ØD | ØDA | ØD4 3; 8) | EE 8) | ØD4 3; 9) | EE 9) | Y | PJ |
|------|------|------------------|-----|-----------------|----|------------------|---|-----------------|-----|-----|----------|-----|-----|--------------|----------|--------------|----------|-----|----|
| | | ISO 6020/1 | | VW 39 D 920 | | | | | | | | | | | | | | | |
| 25 | 14 | M12 x 1.25 | 16 | – | – | 12 | – | – | 12 | 32 | 56 | 35 | 25 | G1/4 | 21 | M14x1.5 | 58 | 77 | |
| | 18 | M14 x 1.5 | 18 | M12 x 1.25 | 16 | 14 | – | – | 14 | 40 | 67 | 42 | 28 | G3/8 | 26 | M18x1.5 | 64 | 89 | |
| 32 | 18 | M14 x 1.5 | 18 | – | – | 14 | – | – | 14 | 40 | 67 | 42 | 28 | G3/8 | 26 | M18x1.5 | 64 | 89 | |
| | 22 | M16 x 1.5 | 22 | M14 x 1.5 | 18 | 18 | – | – | 18 | 50 | 78 | 50 | 34 | G1/2 | 29 | M22x1.5 | 71 | 97 | |
| 40 | 22 | M16 x 1.5 | 22 | – | – | 18 | – | – | 18 | 50 | 78 | 50 | 34 | G1/2 | 29 | M22x1.5 | 71 | 97 | |
| | 28 | M20 x 1.5 | 28 | M16 x 1.5 | 22 | 22 | – | – | 22 | 60 | 95 | 60 | 34 | G1/2 | 29 | M22x1.5 | 72 | 111 | |
| 50 | 28 | M20 x 1.5 | 28 | – | – | 22 | – | – | 22 | 60 | 95 | 60 | 34 | G1/2 | 29 | M22x1.5 | 72 | 111 | |
| | 36 | M27 x 2 | 36 | M20 x 1.5 | 28 | 30 | – | – | 30 | 70 | 116 | 78 | 42 | G3/4 | 34 | M27x2 | 82 | 117 | |
| 63 | 36 | M27 x 2 | 36 | – | – | 30 | – | – | 30 | 70 | 116 | 78 | 42 | G3/4 | 34 | M27x2 | 82 | 117 | |
| | 45 | M33 x 2 | 45 | M27 x 2 | 36 | 36 | – | – | 36 | 85 | 130 | 95 | 42 | G3/4 | 34 | M27x2 | 91 | 134 | |
| 80 | 45 | M33 x 2 | 45 | – | – | 36 | – | – | 36 | 85 | 130 | 95 | 42 | G3/4 | 34 | M27x2 | 91 | 134 | |
| | 56 | M42 x 2 | 56 | M33 x 2 | 45 | 46 | – | – | 46 | 106 | 158 | 120 | 47 | G1 | 43 | M33x2 | 108 | 162 | |
| 100 | 56 | M42 x 2 | 56 | – | – | 46 | – | – | 46 | 106 | 158 | 120 | 47 | G1 | 43 | M33x2 | 108 | 162 | |
| | 70 | M48 x 2 | 63 | M42 x 2 | 56 | 60 | – | – | 60 | 132 | 192 | 150 | 47 | G1 | 43 | M33x2 | 121 | 174 | |
| 125 | 70 | M48 x 2 | 63 | – | – | 60 | – | – | 60 | 132 | 192 | 150 | 47 | G1 | 43 | M33x2 | 121 | 174 | |
| | 90 | M64 x 3 | 85 | M48 x 2 | 63 | 75 | – | – | 75 | 160 | 237 | 190 | 58 | G1 1/4 | 52 | M42x2 | 143 | 191 | |
| 160 | 90 | M64 x 3 | 85 | – | – | 75 | – | – | 75 | 160 | 237 | 190 | 58 | G1 1/4 | 52 | M42x2 | 143 | 191 | |
| | 110 | M80 x 3 | 95 | M64 x 3 | 85 | 95 | – | – | 95 | 200 | 285 | 230 | 58 | G1 1/4 | 52 | M42x2 | 190 | 224 | |
| 200 | 110 | M80 x 3 | 95 | – | – | 95 | – | – | 95 | 200 | 285 | 230 | 58 | G1 1/4 | 52 | M42x2 | 190 | 224 | |
| | 140 | M100 x 3 | 112 | M80 x 3 | 95 | 120 | – | – | 120 | | | | | | | | | | |

| ØAL | MM | X1 | VE | WF | NF | VD | XC/XO | CD/CX H9/H7 | EP | EW/EX h12 | L/LT | MR/MS | LA | LD | L1 | Z |
|-----|------------|-------|----|----|----|----|-------|----------------|----|--------------|------|-------|-----|-----|----|----|
| 25 | 14 18 | 26 | 15 | 28 | – | – | 178 | 12 | 11 | 12 | 25 | 16 | 58 | 46 | 6 | 2° |
| 32 | 18 22 | 30.5 | 19 | 32 | – | – | 206 | 16 | 13 | 16 | 33 | 20 | 62 | 50 | 6 | 2° |
| 40 | 22 28 | 35.5 | 19 | 32 | – | – | 231 | 20 | 17 | 20 | 38 | 25 | 73 | 59 | 6 | 2° |
| 50 | 28 36 | 44.5 | 24 | 38 | 20 | 4 | 257 | 25 | 22 | 25 | 48 | 32 | 74 | 66 | 8 | 2° |
| 63 | 36 45 | 54.5 | 29 | 45 | 25 | 4 | 289 | 32 | 27 | 32 | 61 | 40 | 84 | 76 | 10 | 4° |
| 80 | 45 56 | 62.5 | 36 | 54 | 32 | 4 | 332 | 40 | 32 | 40 | 78 | 50 | 93 | 85 | 10 | 4° |
| 100 | 56 70 | 75.5 | 37 | 57 | 32 | 5 | 395 | 50 | 40 | 50 | 90 | 63 | 117 | 101 | 10 | 4° |
| 125 | 70 90 | 92.5 | 37 | 60 | 32 | 5 | 428 | 63 | 52 | 63 | 98 | 71 | 143 | 117 | 12 | 4° |
| 160 | 90 110 | 115.5 | 41 | 66 | 36 | 5 | 505 | 80 | 66 | 80 | 127 | 90 | 171 | 138 | 12 | 4° |
| 200 | 110 140 | 138.5 | 45 | 75 | 40 | 5 | 615 | 100 | 84 | 100 | 150 | 112 | 230 | 166 | 16 | 4° |

ØAL = Piston Ø

ØMM = Piston rod Ø

X* = Stroke length

1) Thread for piston rod ends "G" and "K"

2) Thread for piston rod ends "H" and "F"

3) ØD4 recess max. 0.5 mm deep

4) Bleeding: With view to the piston rod, the position is offset by 90° in relation to the line connection (clockwise)

5) Throttle valve only with end position cushioning "E" (180° for bleeding)

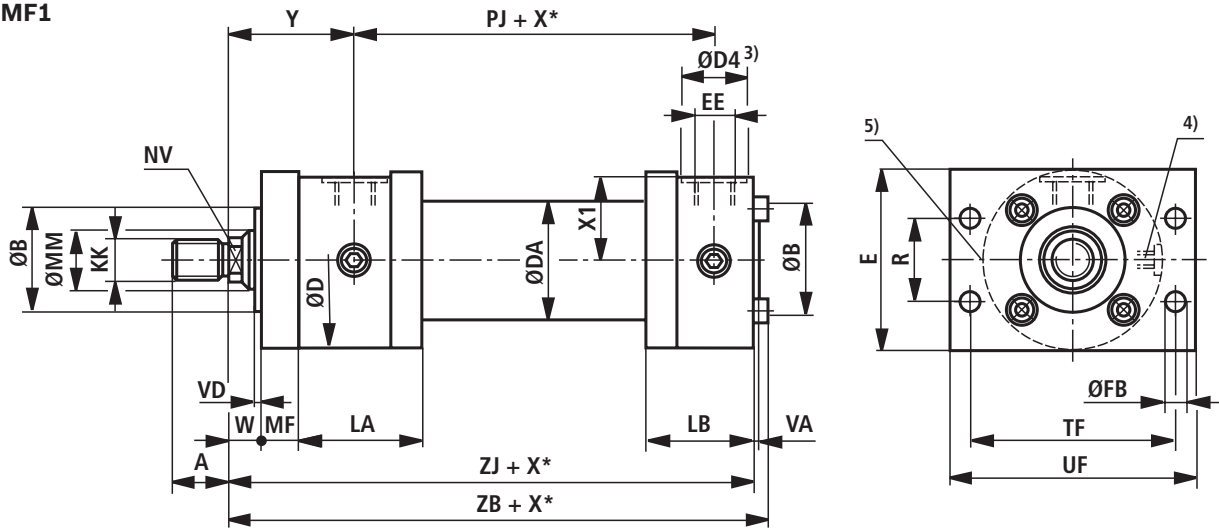
6) Lubricating nipple, cone head form A according to DIN 71412 (with pistons Ø 25 mm bearings cannot be lubricated)

8) Line connection "B"

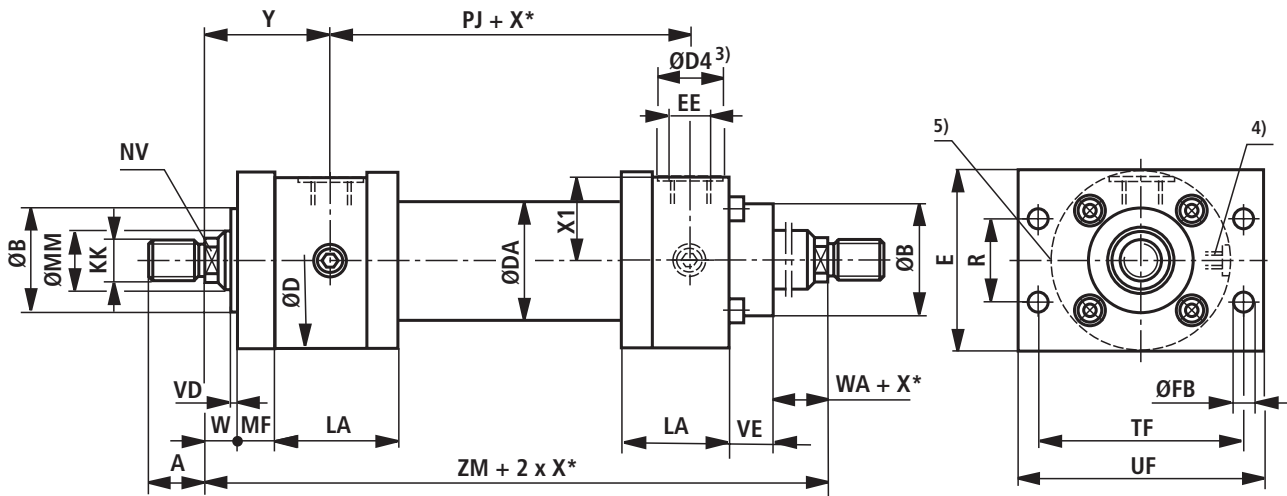
9) Line connection "R"

Dimensions CDM1 / CGM1: MF1
(dimensions in mm)

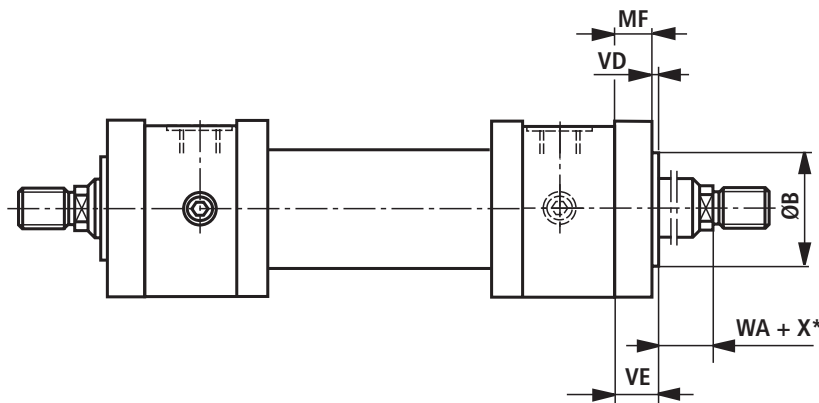
CDM1: MF1



CGM1: MF1



CGM1: MF1..2X/...A: as sleeve design and AL-Ø 50 ... 200 mm



Dimensions CDM1 / CGM1: MF1

(dimensions in mm)

| ØAL | ØMM | KK ¹⁾ ISO 6020/1 | A ¹⁾ | KK ²⁾ VW 39 D 920 | A ²⁾ | NV | ØB | ØD | ØDA | ØD4 3; 8) | EE 8) | ØD4 3; 9) | EE 9) | Y | PJ | X1 |
|-----|-----|--------------------------------|-----------------|---------------------------------|-----------------|----|-----|-----|-----|--------------|----------|--------------|----------|-----|-----|------|
| 25 | 14 | M12x1.25 | 16 | – | – | 12 | 32 | 56 | 35 | 25 | G1/4 | 21 | M14x1.5 | 58 | 77 | 26 |
| | 18 | M14x1.5 | 18 | M12x1.25 | 16 | 14 | | | | | | | | | | |
| 32 | 18 | M14x1.5 | 18 | – | – | 14 | 40 | 67 | 42 | 28 | G3/8 | 26 | M18x1.5 | 64 | 89 | 30.5 |
| | 22 | M16x1.5 | 22 | M14x1.5 | 18 | 18 | | | | | | | | | | |
| 40 | 22 | M16x1.5 | 22 | – | – | 18 | 50 | 78 | 50 | 34 | G1/2 | 29 | M22x1.5 | 71 | 97 | 35.5 |
| | 28 | M20x1.5 | 28 | M16x1.5 | 22 | 22 | | | | | | | | | | |
| 50 | 28 | M20x1.5 | 28 | – | – | 22 | 60 | 95 | 60 | 34 | G1/2 | 29 | M22x1.5 | 72 | 111 | 44.5 |
| | 36 | M27x2 | 36 | M20x1.5 | 28 | 30 | | | | | | | | | | |
| 63 | 36 | M27x2 | 36 | – | – | 30 | 70 | 116 | 78 | 42 | G3/4 | 34 | M27x2 | 82 | 117 | 54.5 |
| | 45 | M33x2 | 45 | M27x2 | 36 | 36 | | | | | | | | | | |
| 80 | 45 | M33x2 | 45 | – | – | 36 | 85 | 130 | 95 | 42 | G3/4 | 34 | M27x2 | 91 | 134 | 62.5 |
| | 56 | M42x2 | 56 | M33x2 | 45 | 46 | | | | | | | | | | |
| 100 | 56 | M42x2 | 56 | – | – | 46 | 106 | 158 | 120 | 47 | G1 | 43 | M33x2 | 108 | 162 | 75.5 |
| | 70 | M48x2 | 63 | M42x2 | 56 | 60 | | | | | | | | | | |
| 125 | 70 | M48x2 | 63 | – | – | 60 | 132 | 192 | 150 | 47 | G1 | 43 | M33x2 | 121 | 174 | 92.5 |
| | 90 | M64x3 | 85 | M48x2 | 63 | 75 | | | | | | | | | | |

| ØAL | ØMM | VE | WA | MF | PI | VD | W | ZJ | ZB | ZM | E | R js13 | TF js13 | UF | ØFB H13 | LA | LB |
|-----|-----|----|----|----|----|----|----|-----|-----|-----|-----|-----------|------------|-----|------------|-----|-----|
| 25 | 14 | 15 | 13 | 12 | 3 | 3 | 16 | 150 | 156 | 193 | 60 | 28.7 | 69.2 | 85 | 6.6 | 58 | 43 |
| | 18 | | | | | | | | | | | | | | | | |
| 32 | 18 | 19 | 13 | 16 | 3 | 3 | 16 | 170 | 176 | 217 | 70 | 35.2 | 85 | 105 | 9 | 62 | 47 |
| | 22 | | | | | | | | | | | | | | | | |
| 40 | 22 | 19 | 13 | 16 | 3 | 3 | 16 | 190 | 196 | 239 | 80 | 40.6 | 98 | 115 | 9 | 73 | 56 |
| | 28 | | | | | | | | | | | | | | | | |
| 50 | 28 | 24 | 14 | 20 | 4 | 4 | 18 | 205 | 213 | 255 | 100 | 48.2 | 116.4 | 140 | 11 | 74 | 62 |
| | 36 | | | | | | | | | | | | | | | | |
| 63 | 36 | 29 | 16 | 25 | 4 | 4 | 20 | 224 | 234 | 281 | 120 | 55.5 | 134 | 160 | 13.5 | 84 | 72 |
| | 45 | | | | | | | | | | | | | | | | |
| 80 | 45 | 36 | 18 | 32 | 4 | 4 | 22 | 250 | 260 | 316 | 135 | 63.1 | 152.5 | 185 | 17.5 | 93 | 81 |
| | 56 | | | | | | | | | | | | | | | | |
| 100 | 56 | 37 | 20 | 32 | 5 | 5 | 25 | 300 | 310 | 378 | 160 | 76.5 | 184.8 | 225 | 22 | 117 | 96 |
| | 70 | | | | | | | | | | | | | | | | |
| 125 | 70 | 37 | 23 | 32 | 5 | 5 | 28 | 325 | 335 | 416 | 195 | 90.2 | 217.1 | 255 | 22 | 143 | 112 |
| | 90 | | | | | | | | | | | | | | | | |

ØAL = Piston Ø

ØMM = Piston rod Ø

X* = Stroke length

1) Thread for piston rod ends "G" and "K"

2) Thread for piston rod ends "H" and "F"

3) ØD4 recess max. 0.5 mm deep

4) Bleeding: With view to the piston rod, the position is offset by 90° in relation to the line connection (clockwise)

5) Throttle valve only with end position cushioning "E" (180° for bleeding)

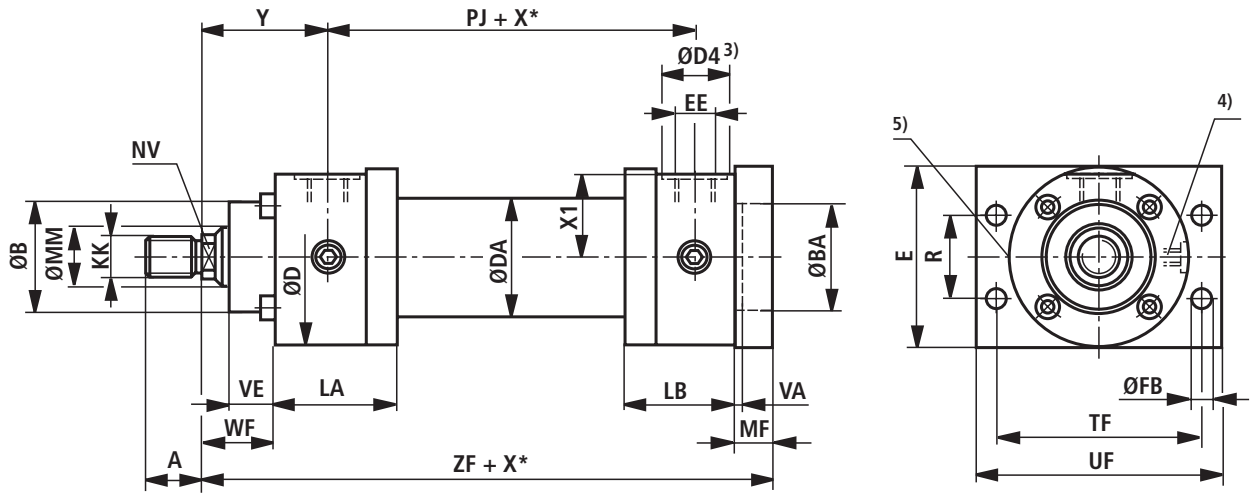
8) Line connection "B"

9) Line connection "R"

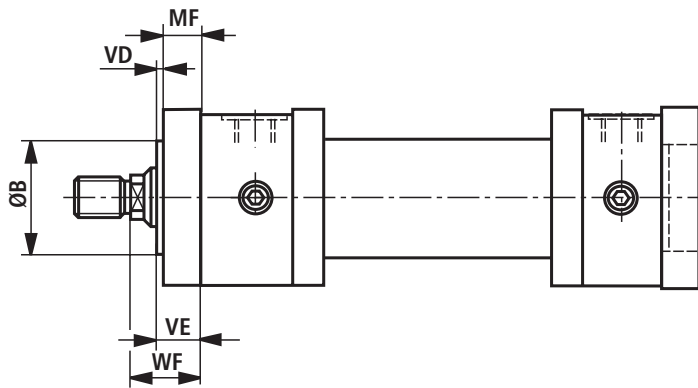
Dimensions CDM1: MF2

(dimensions in mm)

CDM1: MF2



CDM1: MF2..2X/...A: as sleeve design and AL-Ø 50 ... 200 mm



Dimensions CDM1: MF2

(dimensions in mm)

| ØAL | ØMM | KK ¹⁾ ISO 6020/1 | A ¹⁾ | KK ²⁾ VW 39 D 920 | A ²⁾ | NV | ØB f8 | ØD | ØDA | ØD4 3; 8) | EE 8) | ØD4 3; 9) | EE 9) | Y | PJ |
|-----|-----|--------------------------------|-----------------|---------------------------------|-----------------|----|----------|-----|-----|--------------|----------|--------------|----------|-----|-----|
| 25 | 14 | M12 x 1.25 | 16 | – | – | 12 | 32 | 56 | 35 | 25 | G1/4 | 21 | M14x1.5 | 58 | 77 |
| | 18 | M14 x 1.5 | 18 | M12 x 1.25 | 16 | 14 | | | | | | | | | |
| 32 | 18 | M14 x 1.5 | 18 | – | – | 14 | 40 | 67 | 42 | 28 | G3/8 | 26 | M18x1.5 | 64 | 89 |
| | 22 | M16 x 1.5 | 22 | M14 x 1.5 | 18 | 18 | | | | | | | | | |
| 40 | 22 | M16 x 1.5 | 22 | – | – | 18 | 50 | 78 | 50 | 34 | G1/2 | 29 | M22x1.5 | 71 | 97 |
| | 28 | M20 x 1.5 | 28 | M16 x 1.5 | 22 | 22 | | | | | | | | | |
| 50 | 28 | M20 x 1.5 | 28 | – | – | 22 | 60 | 95 | 60 | 34 | G1/2 | 29 | M22x1.5 | 72 | 111 |
| | 36 | M27 x 2 | 36 | M20 x 1.5 | 28 | 30 | | | | | | | | | |
| 63 | 36 | M27 x 2 | 36 | – | – | 30 | 70 | 116 | 78 | 42 | G3/4 | 34 | M27x2 | 82 | 117 |
| | 45 | M33 x 2 | 45 | M27 x 2 | 36 | 36 | | | | | | | | | |
| 80 | 45 | M33 x 2 | 45 | – | – | 36 | 85 | 130 | 95 | 42 | G3/4 | 34 | M27x2 | 91 | 134 |
| | 56 | M42 x 2 | 56 | M33 x 2 | 45 | 46 | | | | | | | | | |
| 100 | 56 | M42 x 2 | 56 | – | – | 46 | 106 | 158 | 120 | 47 | G1 | 43 | M33x2 | 108 | 162 |
| | 70 | M48 x 2 | 63 | M42 x 2 | 56 | 60 | | | | | | | | | |
| 125 | 70 | M48 x 2 | 63 | – | – | 60 | 132 | 192 | 150 | 47 | G1 | 43 | M33x2 | 121 | 174 |
| | 90 | M64 x 3 | 85 | M48 x 2 | 63 | 75 | | | | | | | | | |

| ØAL | ØMM | X1 | WF | MF | PI | VE | VD | ØBA H8 | ZF | E | R js13 | TF js13 | UF | ØFB H13 | LA | LB |
|-----|-----|------|----|----|----|----|----|-----------|-----|-----|-----------|------------|-----|------------|-----|-----|
| 25 | 14 | 26 | 28 | 12 | 3 | 15 | – | 32 | 162 | 60 | 28.7 | 69.2 | 85 | 6.6 | 58 | 43 |
| | 18 | | | | | | | | | | | | | | | |
| 32 | 18 | 30.5 | 32 | 16 | 3 | 19 | – | 40 | 186 | 70 | 35.2 | 85 | 105 | 9 | 62 | 47 |
| | 22 | | | | | | | | | | | | | | | |
| 40 | 22 | 35.5 | 32 | 16 | 3 | 19 | – | 50 | 206 | 80 | 40.6 | 98 | 115 | 9 | 73 | 56 |
| | 28 | | | | | | | | | | | | | | | |
| 50 | 28 | 44.5 | 38 | 20 | 4 | 24 | 4 | 60 | 225 | 100 | 48.2 | 116.4 | 140 | 11 | 74 | 62 |
| | 36 | | | | | | | | | | | | | | | |
| 63 | 36 | 54.5 | 45 | 25 | 4 | 29 | 4 | 70 | 249 | 120 | 55.5 | 134 | 160 | 13.5 | 84 | 72 |
| | 45 | | | | | | | | | | | | | | | |
| 80 | 45 | 62.5 | 54 | 32 | 4 | 36 | 4 | 85 | 282 | 135 | 63.1 | 152.5 | 185 | 17.5 | 93 | 81 |
| | 56 | | | | | | | | | | | | | | | |
| 100 | 56 | 75.5 | 57 | 32 | 5 | 37 | 5 | 106 | 332 | 160 | 76.5 | 184.8 | 225 | 22 | 117 | 96 |
| | 70 | | | | | | | | | | | | | | | |
| 125 | 70 | 92.5 | 60 | 32 | 5 | 37 | 5 | 132 | 357 | 195 | 90.2 | 217.1 | 255 | 22 | 143 | 112 |
| | 90 | | | | | | | | | | | | | | | |

ØAL = Piston Ø

ØMM = Piston rod Ø

X* = Stroke length

1) Thread for piston rod ends "G" and "K"

2) Thread for piston rod ends "H" and "F"

3) ØD4 recess max. 0.5 mm deep

4) Bleeding: With view to the piston rod, the position is offset by 90° in relation to the line connection (clockwise)

5) Throttle valve only with end position cushioning "E" (180° for bleeding)

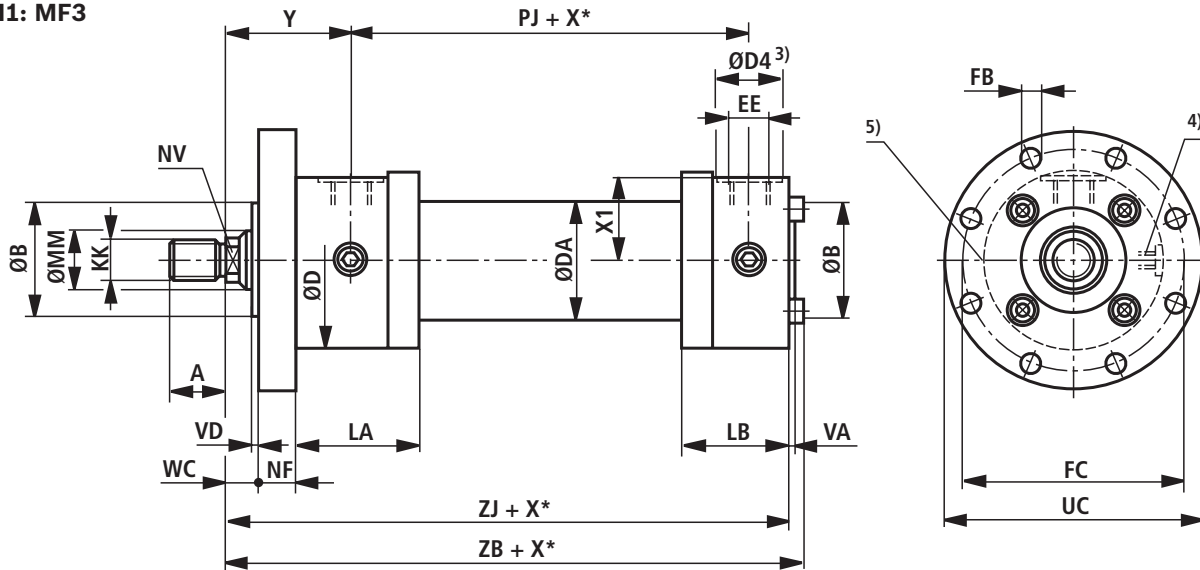
8) Line connection "B"

9) Line connection "R"

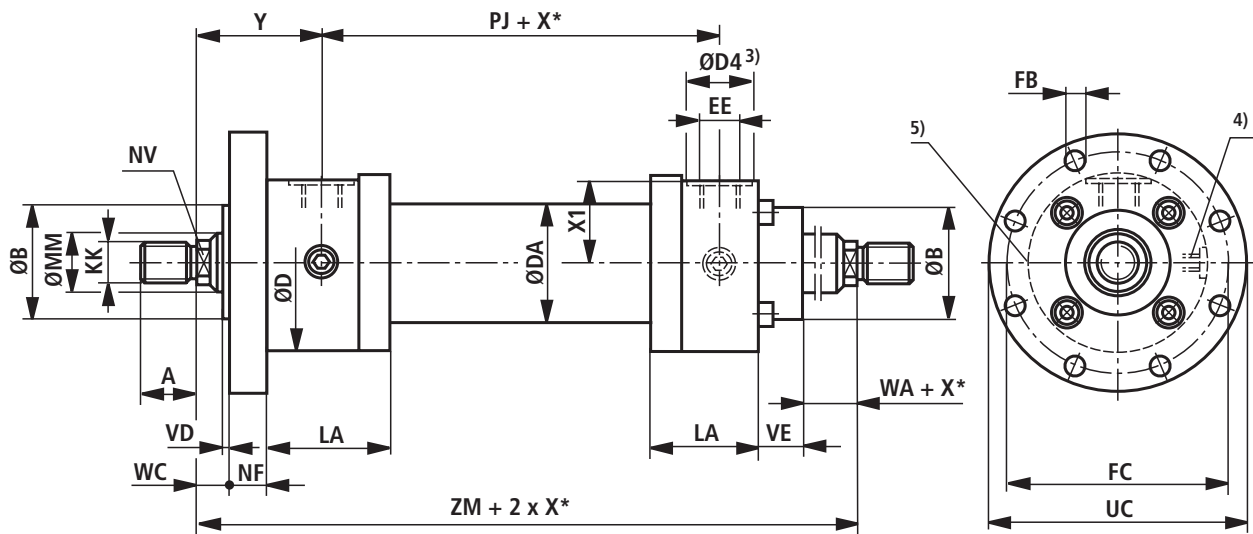
Dimensions CDM1 / CGM1: MF3

(dimensions in mm)

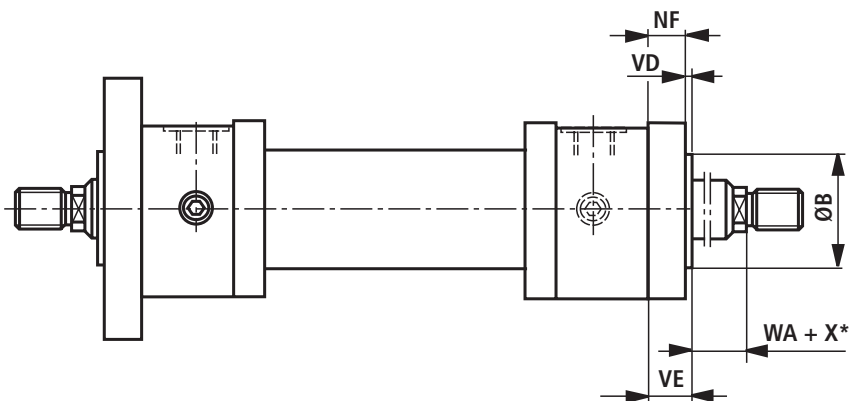
CDM1: MF3



CGM1: MF3



CGM1: MF3..2X/...A: as sleeve design and AL- \varnothing 50 ... 200 mm



Dimensions CDM1 / CGM1: MF3

(dimensions in mm)

| ØAL | ØMM | KK ¹⁾ | | A ¹⁾ | | KK ²⁾ | | A ²⁾ | | NV | ØB | ØD | ØDA | ØD4 3; 8) | EE 8) | ØD4 3; 9) | EE 9) | Y | PJ |
|-----|-----|------------------|-----|-----------------|----|------------------|---|-----------------|---|-----|-----|-----|-----|--------------|----------|--------------|----------|-----|-----|
| | | ISO 6020/1 | | VW 39 D 920 | | | | | | | | | | | | | | | |
| 25 | 14 | M12x1.25 | 16 | – | – | 12 | – | – | – | 12 | 32 | 56 | 35 | 25 | G1/4 | 21 | M14x1.5 | 58 | 77 |
| | 18 | M14x1.5 | 18 | M12x1.25 | 16 | 14 | – | – | – | 14 | 40 | 67 | 42 | 28 | G3/8 | 26 | M18x1.5 | 64 | 89 |
| 32 | 18 | M14x1.5 | 18 | – | – | 14 | – | – | – | 14 | 40 | 67 | 42 | 28 | G3/8 | 26 | M18x1.5 | 64 | 89 |
| | 22 | M16x1.5 | 22 | M14x1.5 | 18 | 18 | – | – | – | 18 | 50 | 78 | 50 | 34 | G1/2 | 29 | M22x1.5 | 71 | 97 |
| 40 | 22 | M16x1.5 | 22 | – | – | 18 | – | – | – | 18 | 50 | 78 | 50 | 34 | G1/2 | 29 | M22x1.5 | 71 | 97 |
| | 28 | M20x1.5 | 28 | M16x1.5 | 22 | 22 | – | – | – | 22 | 60 | 95 | 60 | 34 | G1/2 | 29 | M22x1.5 | 72 | 111 |
| 50 | 28 | M20x1.5 | 28 | – | – | 22 | – | – | – | 22 | 60 | 95 | 60 | 34 | G1/2 | 29 | M22x1.5 | 72 | 111 |
| | 36 | M27x2 | 36 | M20x1.5 | 28 | 30 | – | – | – | 30 | 70 | 116 | 78 | 42 | G3/4 | 34 | M27x2 | 82 | 117 |
| 63 | 36 | M27x2 | 36 | – | – | 30 | – | – | – | 30 | 70 | 116 | 78 | 42 | G3/4 | 34 | M27x2 | 82 | 117 |
| | 45 | M33x2 | 45 | M27x2 | 36 | 36 | – | – | – | 36 | 85 | 130 | 95 | 42 | G3/4 | 34 | M27x2 | 91 | 134 |
| 80 | 45 | M33x2 | 45 | – | – | 36 | – | – | – | 36 | 85 | 130 | 95 | 42 | G3/4 | 34 | M27x2 | 91 | 134 |
| | 56 | M42x2 | 56 | M33x2 | 45 | 46 | – | – | – | 46 | 106 | 158 | 120 | 47 | G1 | 43 | M33x2 | 108 | 162 |
| 100 | 56 | M42x2 | 56 | – | – | 46 | – | – | – | 46 | 106 | 158 | 120 | 47 | G1 | 43 | M33x2 | 108 | 162 |
| | 70 | M48x2 | 63 | M42x2 | 56 | 60 | – | – | – | 60 | 132 | 192 | 150 | 47 | G1 | 43 | M33x2 | 121 | 174 |
| 125 | 70 | M48x2 | 63 | – | – | 60 | – | – | – | 60 | 132 | 192 | 150 | 47 | G1 | 43 | M33x2 | 121 | 174 |
| | 90 | M64x3 | 85 | M48x2 | 63 | 75 | – | – | – | 75 | 160 | 237 | 190 | 58 | G1 1/4 | 52 | M42x2 | 143 | 191 |
| 160 | 90 | M64x3 | 85 | – | – | 75 | – | – | – | 75 | 160 | 237 | 190 | 58 | G1 1/4 | 52 | M42x2 | 143 | 191 |
| | 110 | M80x3 | 95 | M64x3 | 85 | 95 | – | – | – | 95 | 200 | 285 | 230 | 58 | G1 1/4 | 52 | M42x2 | 190 | 224 |
| 200 | 110 | M80x3 | 95 | – | – | 95 | – | – | – | 95 | 200 | 285 | 230 | 58 | G1 1/4 | 52 | M42x2 | 190 | 224 |
| | 140 | M100x3 | 112 | M80x3 | 95 | 120 | – | – | – | 120 | 200 | 285 | 230 | 58 | G1 1/4 | 52 | M42x2 | 190 | 224 |

| ØAL | ØMM | X1 | VE | WA | NF | PI | VD | WC | ZJ | ZB | ZM | ØFC | ØUC | ØFB | LA | LB |
|-----|-----|-------|----|----|----|----|----|----|-----|-----|-----|------|------|------|-----|-----|
| | | | | | | | | | | | | js13 | -1 | H13 | | |
| 25 | 14 | 26 | 15 | 13 | 12 | 3 | 3 | 16 | 150 | 156 | 193 | 75 | 90 | 6.6 | 58 | 43 |
| | 18 | | | | | | | | | | | 90 | 6.6 | | | |
| 32 | 18 | 30.5 | 19 | 13 | 16 | 3 | 3 | 16 | 170 | 176 | 217 | 92 | 110 | 9 | 62 | 47 |
| | 22 | | | | | | | | | | | 110 | 9 | | | |
| 40 | 22 | 35.5 | 19 | 13 | 16 | 3 | 3 | 16 | 190 | 196 | 239 | 106 | 125 | 9 | 73 | 56 |
| | 28 | | | | | | | | | | | 125 | 9 | | | |
| 50 | 28 | 44.5 | 24 | 14 | 20 | 4 | 4 | 18 | 205 | 213 | 255 | 126 | 150 | 11 | 74 | 62 |
| | 36 | | | | | | | | | | | 150 | 11 | | | |
| 63 | 36 | 54.5 | 29 | 16 | 25 | 4 | 4 | 20 | 224 | 234 | 281 | 145 | 170 | 13.5 | 84 | 72 |
| | 45 | | | | | | | | | | | 170 | 13.5 | | | |
| 80 | 45 | 62.5 | 36 | 18 | 32 | 4 | 4 | 22 | 250 | 260 | 316 | 165 | 195 | 17.5 | 93 | 81 |
| | 56 | | | | | | | | | | | 195 | 17.5 | | | |
| 100 | 56 | 75.5 | 37 | 20 | 32 | 5 | 5 | 25 | 300 | 310 | 378 | 200 | 240 | 22 | 117 | 96 |
| | 70 | | | | | | | | | | | 240 | 22 | | | |
| 125 | 70 | 92.5 | 37 | 23 | 32 | 5 | 5 | 28 | 325 | 335 | 416 | 235 | 275 | 22 | 143 | 112 |
| | 90 | | | | | | | | | | | 275 | 22 | | | |
| 160 | 90 | 115.5 | 41 | 25 | 36 | 8 | 5 | 30 | 370 | 380 | 477 | 280 | 320 | 22 | 171 | 130 |
| | 110 | | | | | | | | | | | 320 | 22 | | | |
| 200 | 110 | 138.5 | 45 | 30 | 40 | 15 | 5 | 35 | 450 | 466 | 604 | 340 | 385 | 26 | 230 | 151 |
| | 140 | | | | | | | | | | | 385 | 26 | | | |

ØAL = Piston Ø

ØMM = Piston rod Ø

X* = Stroke length

1) Thread for piston rod ends "G" and "K"

2) Thread for piston rod ends "H" and "F"

3) ØD4 recess max. 0.5 mm deep

4) Bleeding: With view to the piston rod, the position is offset by 90° in relation to the line connection (clockwise)

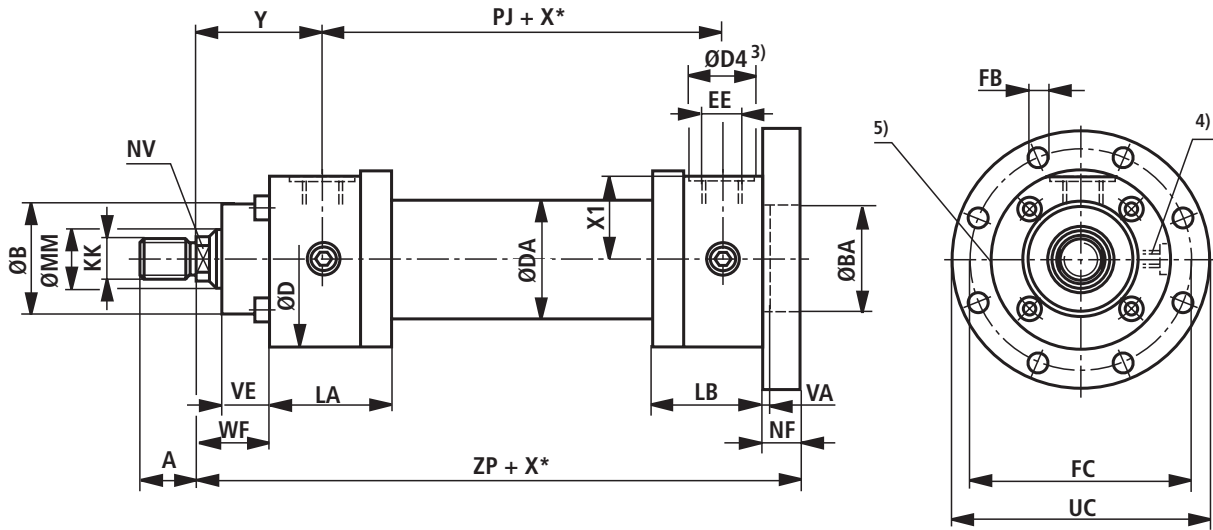
5) Throttle valve only with end position cushioning "E" (180° for bleeding)

8) Line connection "B"

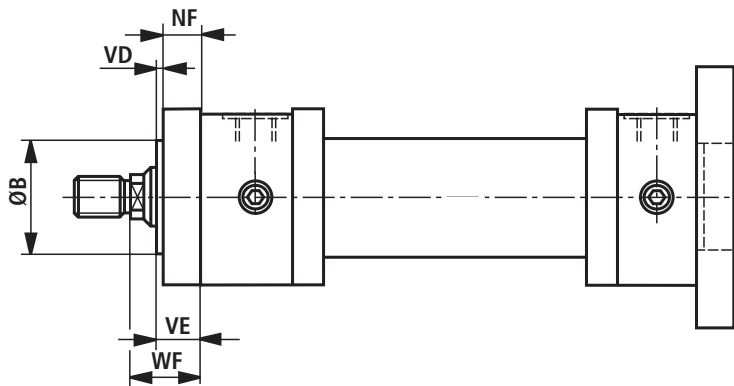
9) Line connection "R"

Dimensions CDM1: MF4
(dimensions in mm)

CDM1: MF4



CDM1: MF4..2X/...A: as sleeve design and AL-Ø 50 ... 200 mm



Dimensions CDM1: MF4

(dimensions in mm)

| AL Ø | MM Ø | KK ¹⁾ ISO 6020/1 | A ¹⁾ | KK ²⁾ VW 39 D 920 | A ²⁾ | NV | ØD | ØDA | ØD4 3; 8) | EE 8) | ØD4 3; 9) | EE 9) | Y | PJ |
|---------|---------|--------------------------------|-----------------|---------------------------------|-----------------|-----|-----|-----|--------------|----------|--------------|----------|-----|-----|
| 25 | 14 | M12x1.25 | 16 | – | – | 12 | 56 | 35 | 25 | G1/4 | 21 | M14x1.5 | 58 | 77 |
| | 18 | M14x1.5 | 18 | M12x1.25 | 16 | 14 | | | | | | | | |
| 32 | 18 | M14x1.5 | 18 | – | – | 14 | 67 | 42 | 28 | G3/8 | 26 | M18x1.5 | 64 | 89 |
| | 22 | M16x1.5 | 22 | M14x1.5 | 18 | 18 | | | | | | | | |
| 40 | 22 | M16x1.5 | 22 | – | – | 18 | 78 | 50 | 34 | G1/2 | 29 | M22x1.5 | 71 | 97 |
| | 28 | M20x1.5 | 28 | M16x1.5 | 22 | 22 | | | | | | | | |
| 50 | 28 | M20x1.5 | 28 | – | – | 22 | 95 | 60 | 34 | G1/2 | 29 | M22x1.5 | 72 | 111 |
| | 36 | M27x2 | 36 | M20x1.5 | 28 | 30 | | | | | | | | |
| 63 | 36 | M27x2 | 36 | – | – | 30 | 116 | 78 | 42 | G3/4 | 34 | M27x2 | 82 | 117 |
| | 45 | M33x2 | 45 | M27x2 | 36 | 36 | | | | | | | | |
| 80 | 45 | M33x2 | 45 | – | – | 36 | 130 | 95 | 42 | G3/4 | 34 | M27x2 | 91 | 134 |
| | 56 | M42x2 | 56 | M33x2 | 45 | 46 | | | | | | | | |
| 100 | 56 | M42x2 | 56 | – | – | 46 | 158 | 120 | 47 | G1 | 43 | M33x2 | 108 | 162 |
| | 70 | M48x2 | 63 | M42x2 | 56 | 60 | | | | | | | | |
| 125 | 70 | M48x2 | 63 | – | – | 60 | 192 | 150 | 47 | G1 | 43 | M33x2 | 121 | 174 |
| | 90 | M64x3 | 85 | M48x2 | 63 | 75 | | | | | | | | |
| 160 | 90 | M64x3 | 85 | – | – | 75 | 237 | 190 | 58 | G1 1/4 | 52 | M42x2 | 143 | 191 |
| | 110 | M80x3 | 95 | M64x3 | 85 | 95 | | | | | | | | |
| 200 | 110 | M80x3 | 95 | – | – | 95 | 285 | 230 | 58 | G1 1/4 | 52 | M42x2 | 190 | 224 |
| | 140 | M100x3 | 112 | M80x3 | 95 | 120 | | | | | | | | |

| ØAL | ØMM | X1 | WF | NF | PI | VE | VD | ØB/BA f8/H8 | ZP | ØFC js13 | ØUC –1 | ØFB H13 | LA | LB |
|-----|-----|-------|----|----|----|----|----|----------------|-----|-------------|-----------|------------|-----|-----|
| 25 | 14 | 26 | 28 | 12 | 3 | 15 | – | 32 | 162 | 75 | 90 | 6.6 | 58 | 43 |
| | 18 | | | | | | | | | | | | | |
| 32 | 18 | 30.5 | 32 | 16 | 3 | 19 | – | 40 | 186 | 92 | 110 | 9 | 62 | 47 |
| | 22 | | | | | | | | | | | | | |
| 40 | 22 | 35.5 | 32 | 16 | 3 | 19 | – | 50 | 206 | 106 | 125 | 9 | 73 | 56 |
| | 28 | | | | | | | | | | | | | |
| 50 | 28 | 44.5 | 38 | 20 | 4 | 24 | 4 | 60 | 225 | 126 | 150 | 11 | 74 | 62 |
| | 36 | | | | | | | | | | | | | |
| 63 | 36 | 54.5 | 45 | 25 | 4 | 29 | 4 | 70 | 249 | 145 | 170 | 13.5 | 84 | 72 |
| | 45 | | | | | | | | | | | | | |
| 80 | 45 | 62.5 | 54 | 32 | 4 | 36 | 4 | 85 | 282 | 165 | 195 | 17.5 | 93 | 81 |
| | 56 | | | | | | | | | | | | | |
| 100 | 56 | 75.5 | 57 | 32 | 5 | 37 | 5 | 106 | 332 | 200 | 240 | 22 | 117 | 96 |
| | 70 | | | | | | | | | | | | | |
| 125 | 70 | 92.5 | 60 | 32 | 5 | 37 | 5 | 132 | 357 | 235 | 275 | 22 | 143 | 112 |
| | 90 | | | | | | | | | | | | | |
| 160 | 90 | 115.5 | 66 | 36 | 8 | 41 | 5 | 160 | 406 | 280 | 320 | 22 | 171 | 130 |
| | 110 | | | | | | | | | | | | | |
| 200 | 110 | 138.5 | 75 | 40 | 15 | 45 | 5 | 200 | 490 | 340 | 385 | 26 | 230 | 151 |
| | 140 | | | | | | | | | | | | | |

ØAL = Piston Ø

ØMM = Piston rod Ø

X* = Stroke length

1) Thread for piston rod ends “G” and “K”

2) Thread for piston rod ends “H” and “F”

3) ØD4 recess max. 0.5 mm deep

4) Bleeding: With view to the piston rod, the position is offset by 90° in relation to the line connection (clockwise)

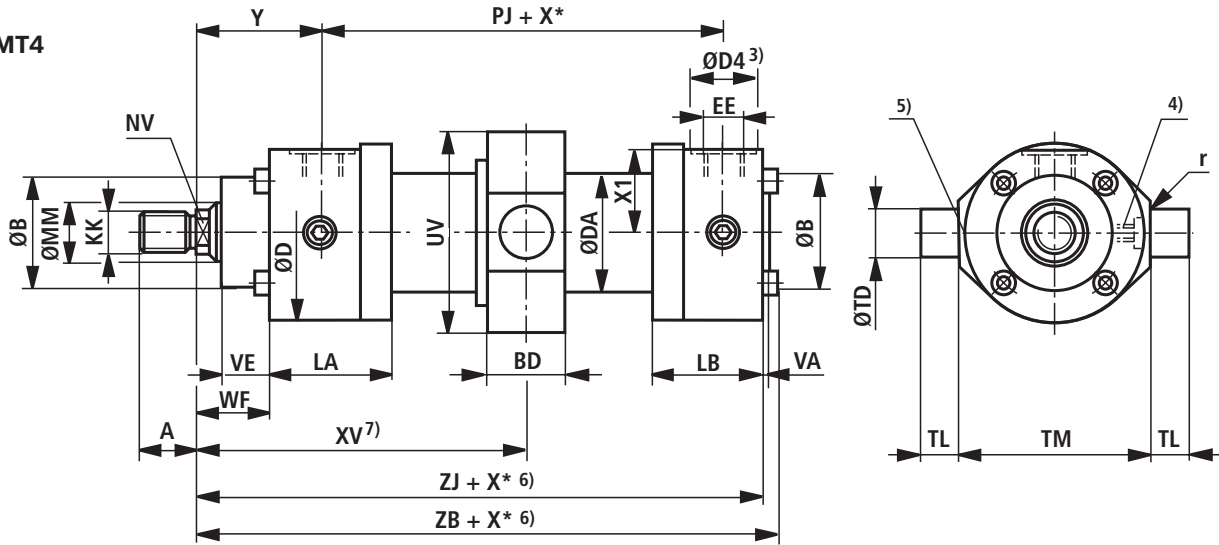
5) Throttle valve only with end position cushioning “E” (180° for bleeding)

8) Line connection “B”

9) Line connection “R”

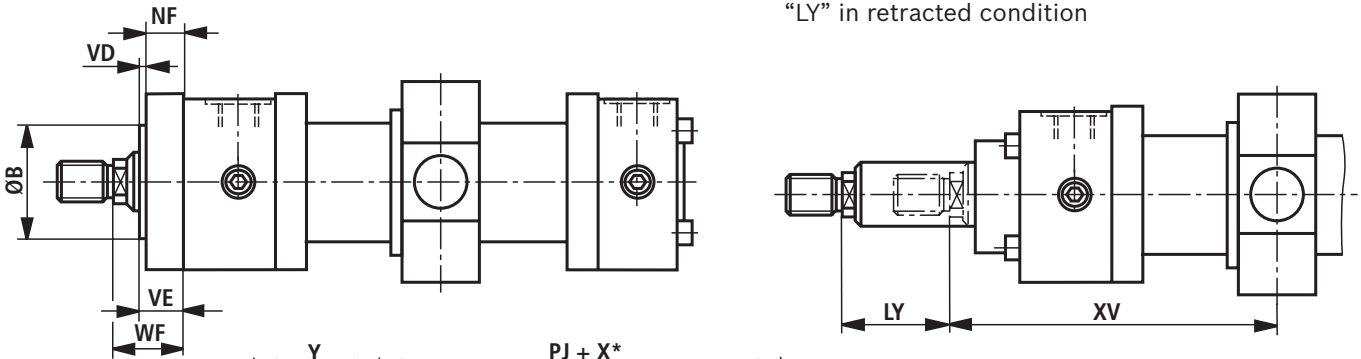
Dimensions CDM1 / CGM1: MT4
(dimensions in mm)

CDM1: MT4

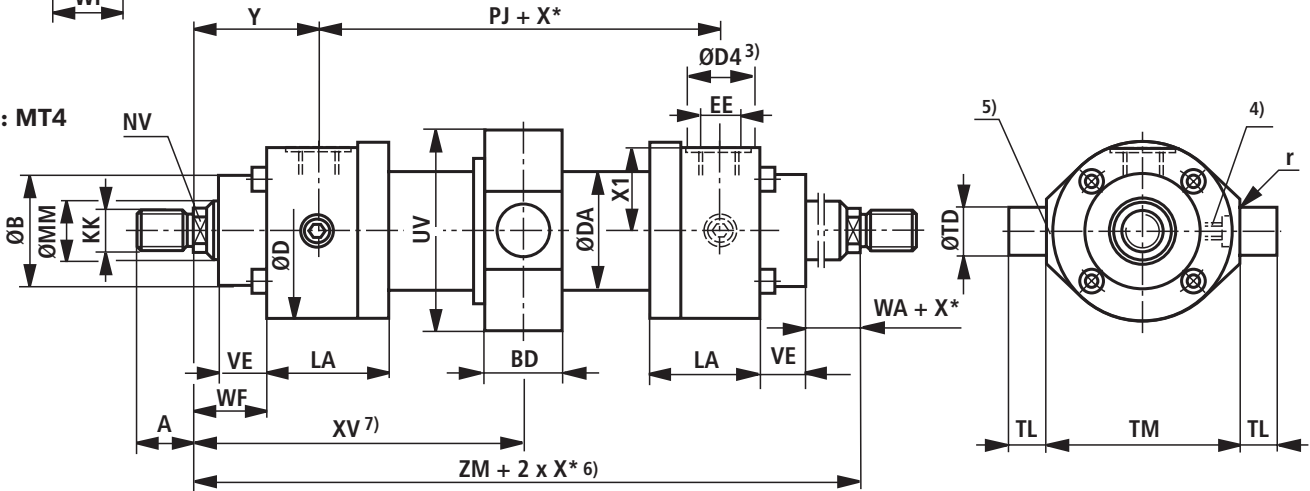


CDM1: MT4..2X/...A: as sleeve design and AL-Ø 50 ... 200 mm

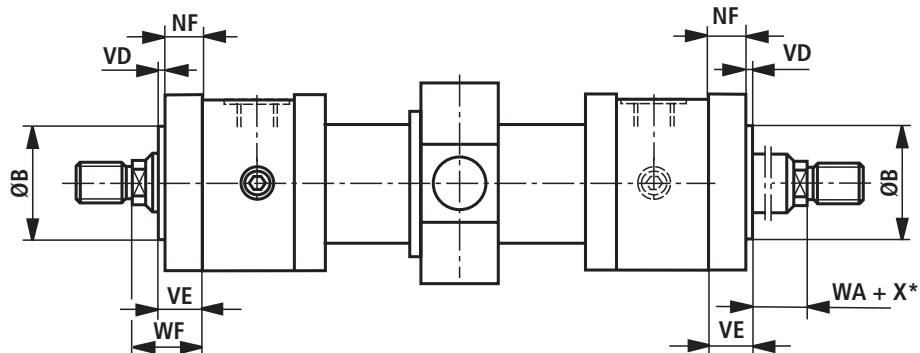
Dimensions for cylinder with piston rod extension "LY" in retracted condition



CGM1: MT4



CGM1: MT4..2X/...A: as sleeve design and AL-Ø 50 ... 200 mm



Dimensions CDM1 / CGM1: MT4

(dimensions in mm)

| AL Ø | MM Ø | KK ¹⁾ ISO 6020/1 | A ¹⁾ | KK ²⁾ VW 39 D 920 | A ²⁾ | NV | ØB f8 | ØD | ØDA | ØD4 3); 8) | EE 8) | ØD4 3); 9) | EE 9) | Y | PJ | X1 | VE |
|---------|------------|--------------------------------|-----------------|---------------------------------|-----------------|-----------|----------|-----|-----|---------------|----------|---------------|----------|-----|-----|-------|----|
| 25 | 14 18 | M12x1.25 M14x1.5 | 16 18 | – M12x1.25 | – 16 | 12 14 | 32 | 56 | 35 | 25 | G1/4 | 21 | M14x1.5 | 58 | 77 | 26 | 15 |
| 32 | 18 22 | M14x1.5 M16x1.5 | 18 22 | – M14x1.5 | – 18 | 14 18 | 40 | 67 | 42 | 28 | G3/8 | 26 | M18x1.5 | 64 | 89 | 30.5 | 19 |
| 40 | 22 28 | M16x1.5 M20x1.5 | 22 28 | – M16x1.5 | – 22 | 18 22 | 50 | 78 | 50 | 34 | G1/2 | 29 | M22x1.5 | 71 | 97 | 35.5 | 19 |
| 50 | 28 36 | M20x1.5 M27x2 | 28 36 | – M20x1.5 | – 28 | 22 30 | 60 | 95 | 60 | 34 | G1/2 | 29 | M22x1.5 | 72 | 111 | 44.5 | 24 |
| 63 | 36 45 | M27x2 M33x2 | 36 45 | – M27x2 | – 36 | 30 36 | 70 | 116 | 78 | 42 | G3/4 | 34 | M27x2 | 82 | 117 | 54.5 | 29 |
| 80 | 45 56 | M33x2 M42x2 | 45 56 | – M33x2 | – 45 | 36 46 | 85 | 130 | 95 | 42 | G3/4 | 34 | M27x2 | 91 | 134 | 62.5 | 36 |
| 100 | 56 70 | M42x2 M48x2 | 56 63 | – M42x2 | – 56 | 46 60 | 106 | 158 | 120 | 47 | G1 | 43 | M33x2 | 108 | 162 | 75.5 | 37 |
| 125 | 70 90 | M48x2 M64x3 | 63 85 | – M48x2 | – 63 | 60 75 | 132 | 192 | 150 | 47 | G1 | 43 | M33x2 | 121 | 174 | 92.5 | 37 |
| 160 | 90 110 | M64x3 M80x3 | 85 95 | – M64x3 | – 85 | 75 95 | 160 | 237 | 190 | 58 | G1 1/4 | 52 | M42x2 | 143 | 191 | 115.5 | 41 |
| 200 | 110 140 | M80x3 M100x3 | 95 112 | – M80x3 | – 95 | 95 120 | 200 | 285 | 230 | 58 | G1 1/4 | 52 | M42x2 | 190 | 224 | 138.5 | 45 |

| AL Ø | MM Ø | WF | WA | NF | PI | VD | ZJ | ZB | ZM | BD | UV 10) | r | ØTD f8 | TL js13 | TM h12 | XV ⁷⁾ min. | XV ⁷⁾ max. | X* ⁶⁾ min. | LA | LB |
|---------|------------|----|----|----|----|----|-----|-----|-----|-----|-----------|-----|-----------|------------|-----------|--------------------------|--------------------------|--------------------------|-----|-----|
| 25 | 14 18 | 28 | 13 | – | 3 | – | 150 | 156 | 193 | 19 | 58 | 0.8 | 12 | 10 | 63 | 107.5 | 93.5+X* | 22 | 58 | 43 |
| 32 | 18 22 | 32 | 13 | – | 3 | – | 170 | 176 | 217 | 24 | 67 | 0.8 | 16 | 12 | 75 | 118 | 107+X* | 19 | 62 | 47 |
| 40 | 22 28 | 32 | 13 | – | 3 | – | 190 | 196 | 239 | 28 | 78 | 1 | 20 | 16 | 90 | 131 | 116+X* | 23 | 73 | 56 |
| 50 | 28 36 | 38 | 14 | 20 | 4 | 4 | 205 | 213 | 255 | 33 | 95 | 1 | 25 | 20 | 105 | 141.5 | 122.5+X* | 28 | 74 | 62 |
| 63 | 36 45 | 45 | 16 | 25 | 4 | 4 | 224 | 234 | 281 | 38 | 116 | 1.5 | 32 | 25 | 120 | 164 | 129+X* | 47 | 84 | 72 |
| 80 | 45 56 | 54 | 18 | 32 | 4 | 4 | 250 | 260 | 316 | 53 | 130 | 2 | 40 | 32 | 135 | 189.5 | 138.5+X* | 63 | 93 | 81 |
| 100 | 56 70 | 57 | 20 | 32 | 5 | 5 | 300 | 310 | 378 | 68 | 158 | 2 | 50 | 40 | 160 | 224 | 166+X* | 70 | 117 | 96 |
| 125 | 70 90 | 60 | 23 | 32 | 5 | 5 | 325 | 335 | 416 | 78 | 210 | 2.5 | 63 | 50 | 195 | 261 | 170+X* | 106 | 143 | 112 |
| 160 | 90 110 | 66 | 25 | 36 | 8 | 5 | 370 | 380 | 477 | 118 | 250 | 3 | 80 | 63 | 240 | 320 | 177+X* | 163 | 171 | 130 |
| 200 | 110 140 | 75 | 30 | 40 | 15 | 5 | 450 | 466 | 604 | 148 | 300 | 3 | 100 | 80 | 295 | 403 | 221+X* | 202 | 230 | 151 |

ØAL = Piston Ø

ØMM = Piston rod Ø

X* = Stroke length

1) Thread for piston rod ends "G" and "K"

2) Thread for piston rod ends "H" and "F"

3) ØD4 recess max. 0.5 mm deep

4) Bleeding: With view to the piston rod, the position is offset by 90° in relation to the line connection (clockwise)

5) Throttle valve only with end position cushioning "E" (180° for bleeding)

6) Observe the min. stroke length "X*_{min.}"7) When ordering, always specify the "XV" dimension in the plain text (XV_{min.} and XV_{max.})

8) Line connection "B"

9) Line connection "R"

10) Tolerance according to EN ISO 9013: Thermal cutting

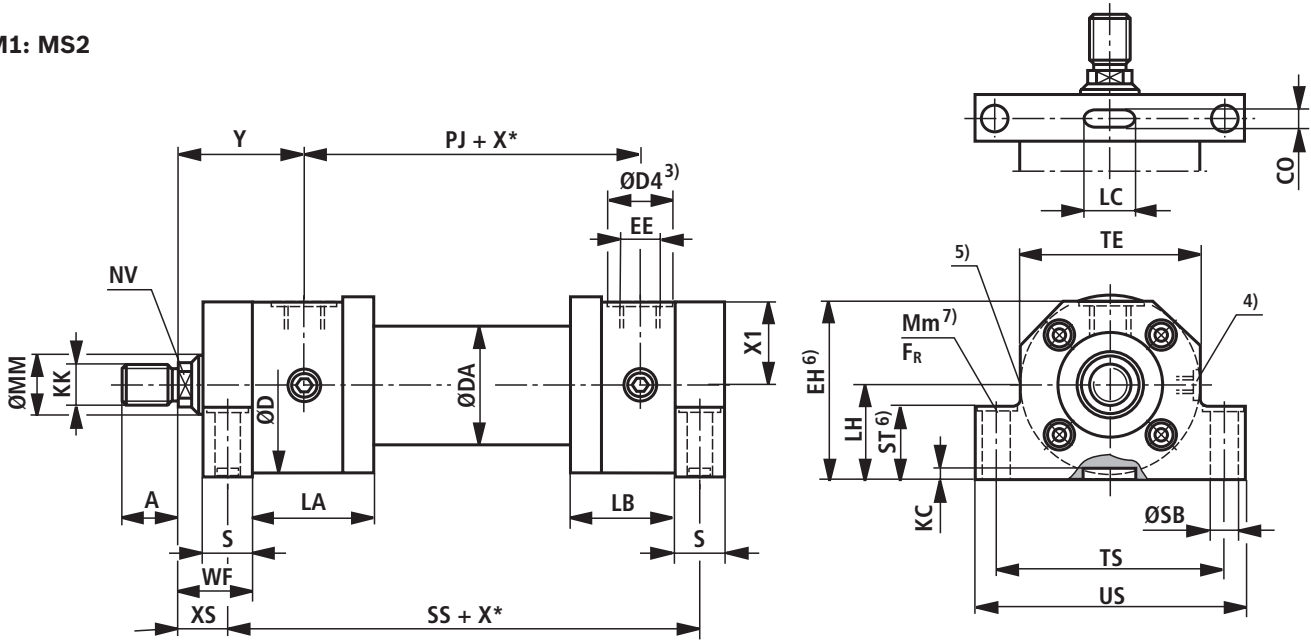
Note: Replacement cylinder for series 1X

In the event of an exchange to series 2X, the bearing blocks (trunnions) must also be replaced!

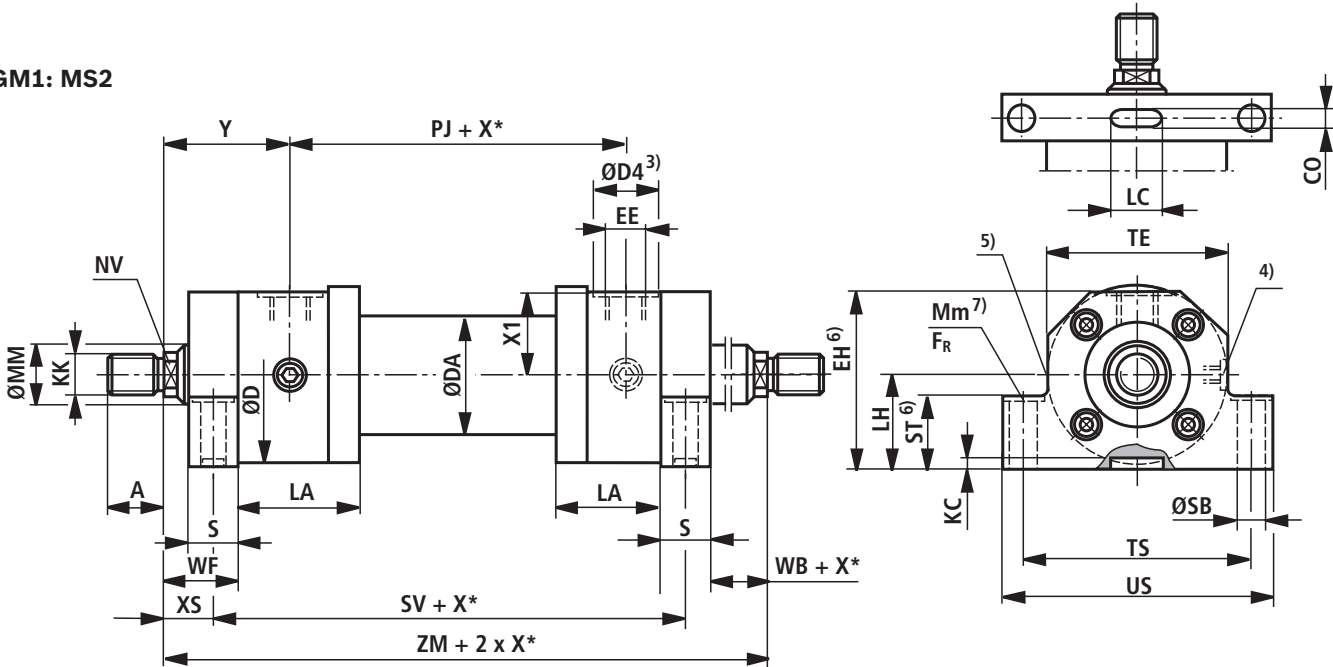
Comply with XV_{min.}, XV_{max.} and X*_{min.}!

Dimensions CDM1 / CGM1: MS2
(dimensions in mm)

CDM1: MS2



CGM1: MS2



$\varnothing AL$ = Piston \varnothing

$\varnothing MM$ = Piston rod \varnothing

X^* = Stroke length

- 1) Thread for piston rod ends "G" and "K"
- 2) Thread for piston rod ends "H" and "F"
- 3) $\varnothing D4$ recess max. 0.5 mm deep
- 4) Bleeding: With view to the piston rod, the position is offset by 90° in relation to the line connection (clockwise)
- 5) Throttle valve only with end position cushioning "E" (180° for bleeding)
- 6) Specified dimensions are smaller than the max. dimensions in ISO 6020/1
- 7) Recess max. 2 mm deep, for hexagon socket head cap screws according to ISO 4762

The mounting screws must not be subjected to shear force. The mounting screws according to ISO 4762 (property class 10.9) must be tightened with the specified torque M_m . If the calculated frictional force F_R is lower than the maximum cylinder force, a key must be used on the head.

Calculation basis:

- ▶ The specified frictional force F_R refers to a friction factor of 0.2 (steel / steel)
- ▶ Foot on the head side as fixed bearing
- ▶ Foot on the base side as floating bearing

8) Line connection "B"

9) Line connection "R"

Dimensions CDM1 / CGM1: MS2

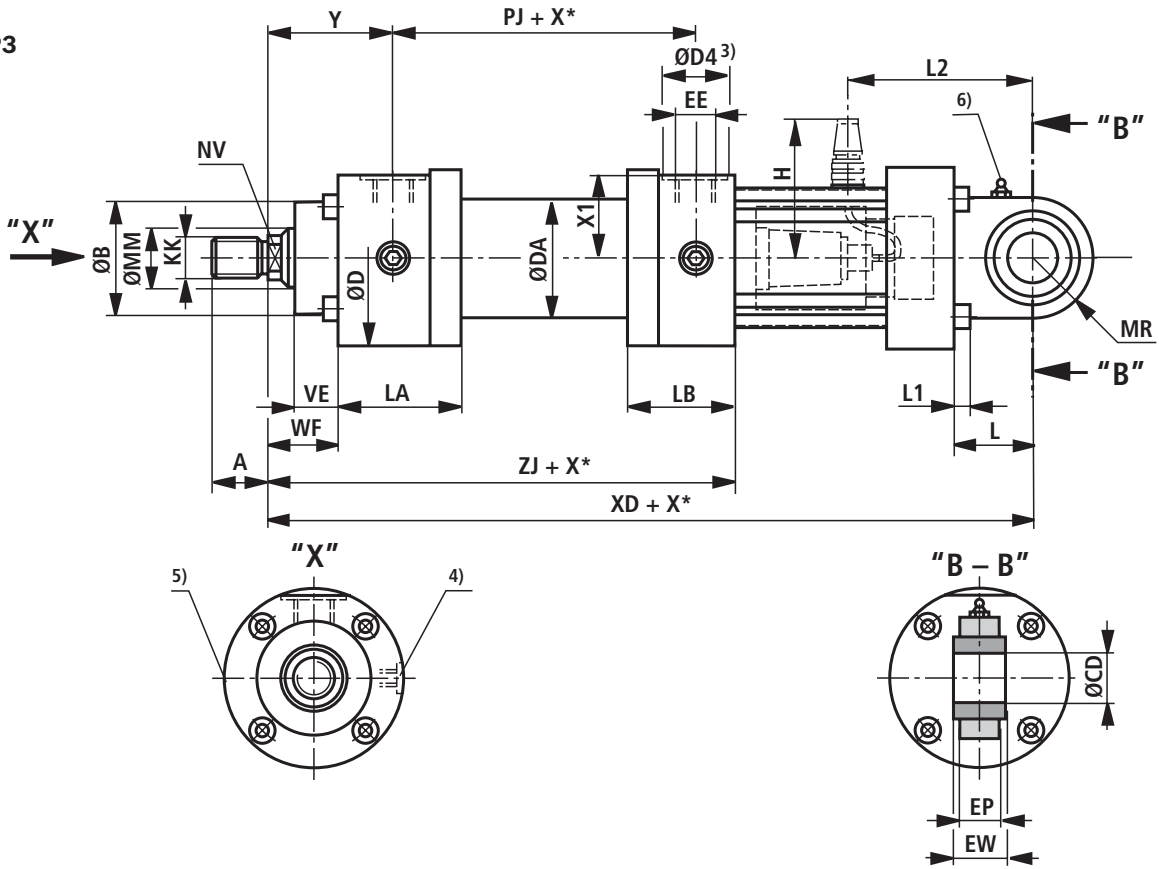
(dimensions in mm)

| AL Ø | MM Ø | KK ¹⁾ ISO 6020/1 | A ¹⁾ | KK ²⁾ VW 39 D 920 | A ²⁾ | NV | ØD | ØDA | ØD4 3; 8) | EE 8) | ØD4 3; 9) | EE 9) | Y | PJ | X1 | WF | WB |
|---------|------------|--------------------------------|-----------------|---------------------------------|-----------------|-----------|-----|-----|--------------|----------|--------------|----------|-----|-----|-------|----|----|
| 25 | 14 18 | M12x1.25 M14x1.5 | 16 18 | – M12x1.25 | – 16 | 12 14 | 56 | 35 | 25 | G1/4 | 21 | M14x1.5 | 58 | 77 | 26 | 28 | 8 |
| 32 | 18 22 | M14x1.5 M16x1.5 | 18 22 | – M14x1.5 | – 18 | 14 18 | 67 | 42 | 28 | G3/8 | 26 | M18x1.5 | 64 | 89 | 30.5 | 32 | 7 |
| 40 | 22 28 | M16x1.5 M20x1.5 | 22 28 | – M16x1.5 | – 22 | 18 22 | 78 | 50 | 34 | G1/2 | 29 | M22x1.5 | 71 | 97 | 35.5 | 32 | 7 |
| 50 | 28 36 | M20x1.5 M27x2 | 28 36 | – M20x1.5 | – 28 | 22 30 | 95 | 60 | 34 | G1/2 | 29 | M22x1.5 | 72 | 111 | 44.5 | 38 | 6 |
| 63 | 36 45 | M27x2 M33x2 | 36 45 | – M27x2 | – 36 | 30 36 | 116 | 78 | 42 | G3/4 | 34 | M27x2 | 82 | 117 | 54.5 | 45 | 13 |
| 80 | 45 56 | M33x2 M42x2 | 45 56 | – M33x2 | – 45 | 36 46 | 130 | 95 | 42 | G3/4 | 34 | M27x2 | 91 | 134 | 62.5 | 54 | 14 |
| 100 | 56 70 | M42x2 M48x2 | 56 63 | – M42x2 | – 56 | 46 60 | 158 | 120 | 47 | G1 | 43 | M33x2 | 108 | 162 | 75.5 | 57 | 7 |
| 125 | 70 90 | M48x2 M64x3 | 63 85 | – M48x2 | – 63 | 60 75 | 192 | 150 | 47 | G1 | 43 | M33x2 | 121 | 174 | 92.5 | 60 | 4 |
| 160 | 90 110 | M64x3 M80x3 | 85 95 | – M64x3 | – 85 | 75 95 | 237 | 190 | 58 | G1 1/4 | 52 | M42x2 | 143 | 191 | 115.5 | 66 | 6 |
| 200 | 110 140 | M80x3 M100x3 | 95 112 | – M80x3 | – 95 | 95 120 | 285 | 230 | 58 | G1 1/4 | 52 | M42x2 | 190 | 224 | 138.5 | 75 | 3 |

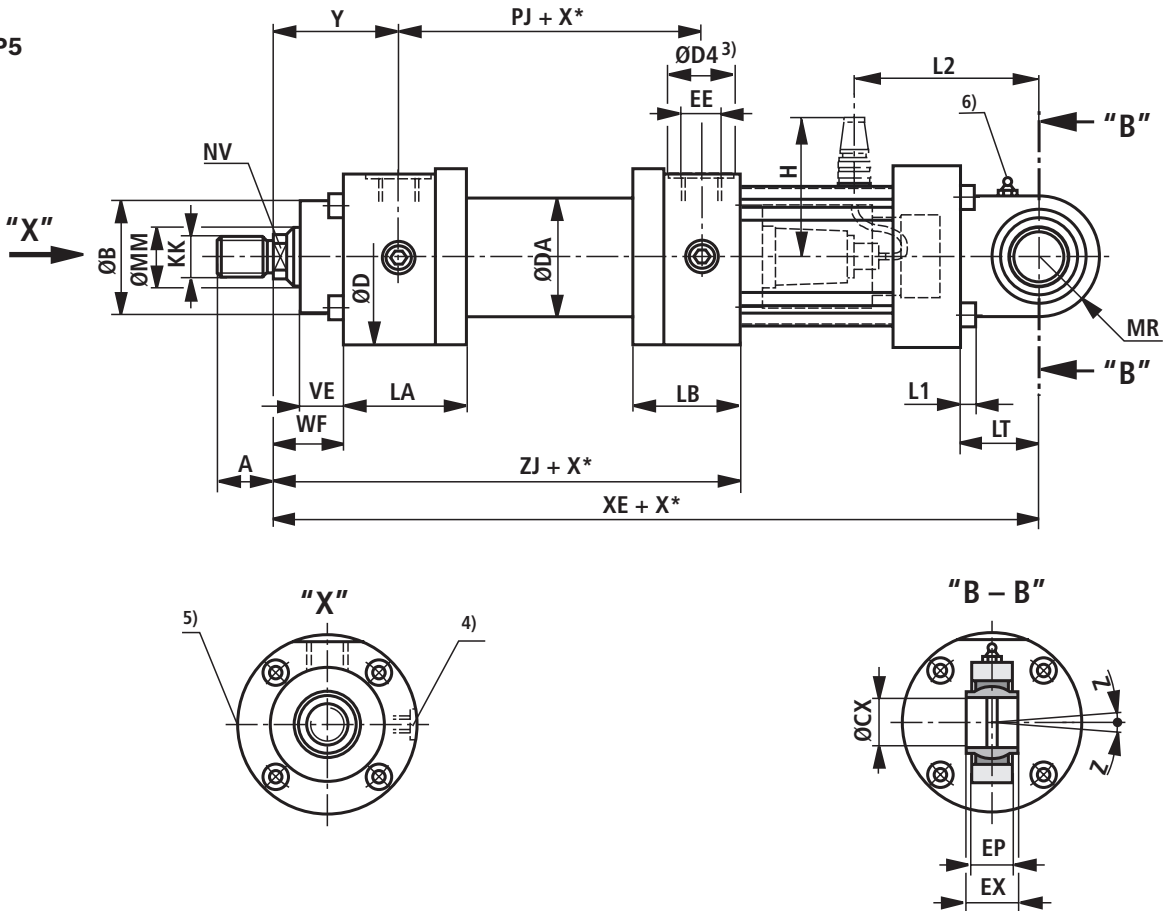
| AL Ø | MM Ø | XS | SS | SV | CO N9 | LC +0.5 | ZM | KC +0.5 | EH ⁶⁾ –1 | LH h10 | S js13 | ØSB H13 | ST 6) | TE | TS js13 | US –1 | LA | LB | FR ⁷⁾ kN | Mm ⁷⁾ Nm |
|---------|------------|------|-----|-----|----------|------------|-----|------------|------------------------|-----------|-----------|------------|----------|-----|------------|----------|-----|-----|------------------------|------------------------|
| 25 | 14 18 | 18 | 142 | 157 | 6 | 25 | 193 | 3.5 | 57 | 32 | 20 | 9 | 24 | 56 | 75 | 92 | 58 | 43 | 4.90 | 30 |
| 32 | 18 22 | 19.5 | 163 | 178 | 8 | 36 | 217 | 4 | 67 | 38 | 25 | 11 | 32 | 67 | 90 | 110 | 62 | 47 | 7.90 | 60 |
| 40 | 22 28 | 19.5 | 183 | 200 | 8 | 36 | 239 | 4 | 77.5 | 43 | 25 | 11 | 32 | 78 | 100 | 120 | 73 | 56 | 7.90 | 60 |
| 50 | 28 36 | 22 | 199 | 211 | 10 | 40 | 255 | 4.5 | 95 | 52 | 32 | 14 | 42 | 95 | 120 | 145 | 74 | 62 | 11.10 | 100 |
| 63 | 36 45 | 29 | 211 | 223 | 10 | 40 | 281 | 4.5 | 113 | 62 | 32 | 18 | 50 | 116 | 150 | 180 | 84 | 72 | 21.15 | 250 |
| 80 | 45 56 | 34 | 236 | 248 | 14 | 63 | 316 | 5 | 129 | 70 | 40 | 22 | 60 | 130 | 170 | 210 | 93 | 81 | 33.35 | 490 |
| 100 | 56 70 | 32 | 293 | 314 | 16 | 70 | 378 | 6 | 153 | 82 | 50 | 26 | 70 | 158 | 205 | 250 | 117 | 96 | 48.30 | 850 |
| 125 | 70 90 | 32 | 321 | 352 | 18 | 80 | 416 | 6 | 190 | 100 | 56 | 33 | 80 | 192 | 245 | 300 | 143 | 112 | 77.80 | 1710 |
| 160 | 90 110 | 36 | 364 | 405 | 22 | 125 | 477 | 8 | 232 | 119 | 60 | 33 | 90 | 238 | 295 | 350 | 171 | 130 | 77.80 | 1710 |
| 200 | 110 140 | 39 | 447 | 526 | 28 | 160 | 604 | 9 | 282 | 145 | 72 | 39 | 110 | 285 | 350 | 415 | 230 | 151 | 113.25 | 2970 |

Dimensions CSM1: MP3 / MP5
(dimensions in mm)

CSM1: MP3



CSM1: MP5



Dimensions CSM1: MP3 / MP5

(dimensions in mm)

| ØAL | ØMM | KK ¹⁾ ISO 6020/1 | A ¹⁾ | KK ²⁾ VW 39 D 920 | A ²⁾ | NV | ØB f8 | ØD | ØDA | ØD4 3; 8) | EE 8) | ØD4 3; 9) | EE 9) | Y | PJ |
|-----|-----|--------------------------------|-----------------|---------------------------------|-----------------|-----|----------|-----|-----|--------------|----------|--------------|----------|-----|-----|
| 40 | 28 | M20x1.5 | 28 | M16x1.5 | 22 | 22 | 50 | 78 | 50 | 34 | G1/2 | 29 | M22x1.5 | 71 | 97 |
| 50 | 28 | M20x1.5 | 28 | – | – | 22 | 60 | 95 | 60 | 34 | G1/2 | 29 | M22x1.5 | 72 | 111 |
| | 36 | M27x2 | 36 | M20x1.5 | 28 | 30 | | | | | | | | | |
| 63 | 36 | M27x2 | 36 | – | – | 30 | 70 | 116 | 78 | 42 | G3/4 | 34 | M27x2 | 82 | 117 |
| | 45 | M33x2 | 45 | M27x2 | 36 | 36 | | | | | | | | | |
| 80 | 45 | M33x2 | 45 | – | – | 36 | 85 | 130 | 95 | 42 | G3/4 | 34 | M27x2 | 91 | 134 |
| | 56 | M42x2 | 56 | M33x2 | 45 | 46 | | | | | | | | | |
| 100 | 56 | M42x2 | 56 | – | – | 46 | 106 | 158 | 120 | 47 | G1 | 43 | M33x2 | 108 | 162 |
| | 70 | M48x2 | 63 | M42x2 | 56 | 60 | | | | | | | | | |
| 125 | 70 | M48x2 | 63 | – | – | 60 | 132 | 192 | 150 | 47 | G1 | 43 | M33x2 | 121 | 174 |
| | 90 | M64x3 | 85 | M48x2 | 63 | 75 | | | | | | | | | |
| 160 | 90 | M64x3 | 85 | – | – | 75 | 160 | 237 | 190 | 58 | G1 1/4 | 52 | M42x2 | 143 | 191 |
| | 110 | M80x3 | 95 | M64x3 | 85 | 95 | | | | | | | | | |
| 200 | 110 | M80x3 | 95 | – | – | 95 | 200 | 285 | 230 | 58 | G1 1/4 | 52 | M42x2 | 190 | 224 |
| | 140 | M100x3 | 112 | M80x3 | 95 | 120 | | | | | | | | | |

| ØAL | ØMM | X1 | VE | WF | ZJ | XD/XE | CD/CX H9/H7 | EP | EW/EX h12 | L/LT | L1 | MR/MS | H | L2 | LA | LB | Z |
|-----|-----|-------|----|----|-----|-------|----------------|----|--------------|------|----|-------|-----|-----|-----|-----|----|
| 40 | 28 | 35.5 | 19 | 32 | 190 | 381 | 20 | 17 | 20 | 38 | 6 | 25 | 110 | 102 | 73 | 56 | 2° |
| 50 | 28 | 44.5 | 24 | 38 | 205 | 407 | 25 | 22 | 25 | 48 | 8 | 32 | 120 | 120 | 74 | 62 | 2° |
| | 36 | | | | | | | | | | | | | | | | |
| 63 | 36 | 54.5 | 29 | 45 | 224 | 439 | 32 | 27 | 32 | 61 | 10 | 40 | 130 | 138 | 84 | 72 | 4° |
| | 45 | | | | | | | | | | | | | | | | |
| 80 | 45 | 62.5 | 36 | 54 | 250 | 482 | 40 | 32 | 40 | 78 | 10 | 50 | 120 | 165 | 93 | 81 | 4° |
| | 56 | | | | | | | | | | | | | | | | |
| 100 | 56 | 75.5 | 37 | 57 | 300 | 545 | 50 | 40 | 50 | 90 | 10 | 63 | 135 | 200 | 117 | 96 | 4° |
| | 70 | | | | | | | | | | | | | | | | |
| 125 | 70 | 92.5 | 37 | 60 | 325 | 578 | 63 | 52 | 63 | 98 | 12 | 71 | 145 | 208 | 143 | 112 | 4° |
| | 90 | | | | | | | | | | | | | | | | |
| 160 | 90 | 115.5 | 41 | 66 | 370 | 655 | 80 | 66 | 80 | 127 | 12 | 90 | 165 | 245 | 171 | 130 | 4° |
| | 110 | | | | | | | | | | | | | | | | |
| 200 | 110 | 138.5 | 45 | 75 | 450 | 765 | 100 | 84 | 100 | 150 | 16 | 112 | 185 | 278 | 230 | 151 | 4° |
| | 140 | | | | | | | | | | | | | | | | |

ØAL = Piston Ø

ØMM = Piston rod Ø

X* = Stroke length

1) Thread for piston rod ends “G” and “K”

2) Thread for piston rod ends “H” and “F”

3) ØD4 recess max. 0.5 mm deep

4) Bleeding: With view to the piston rod, the position is offset by 90° in relation to the line connection (clockwise)

5) Throttle valve only with end position cushioning “E” (180° for bleeding)

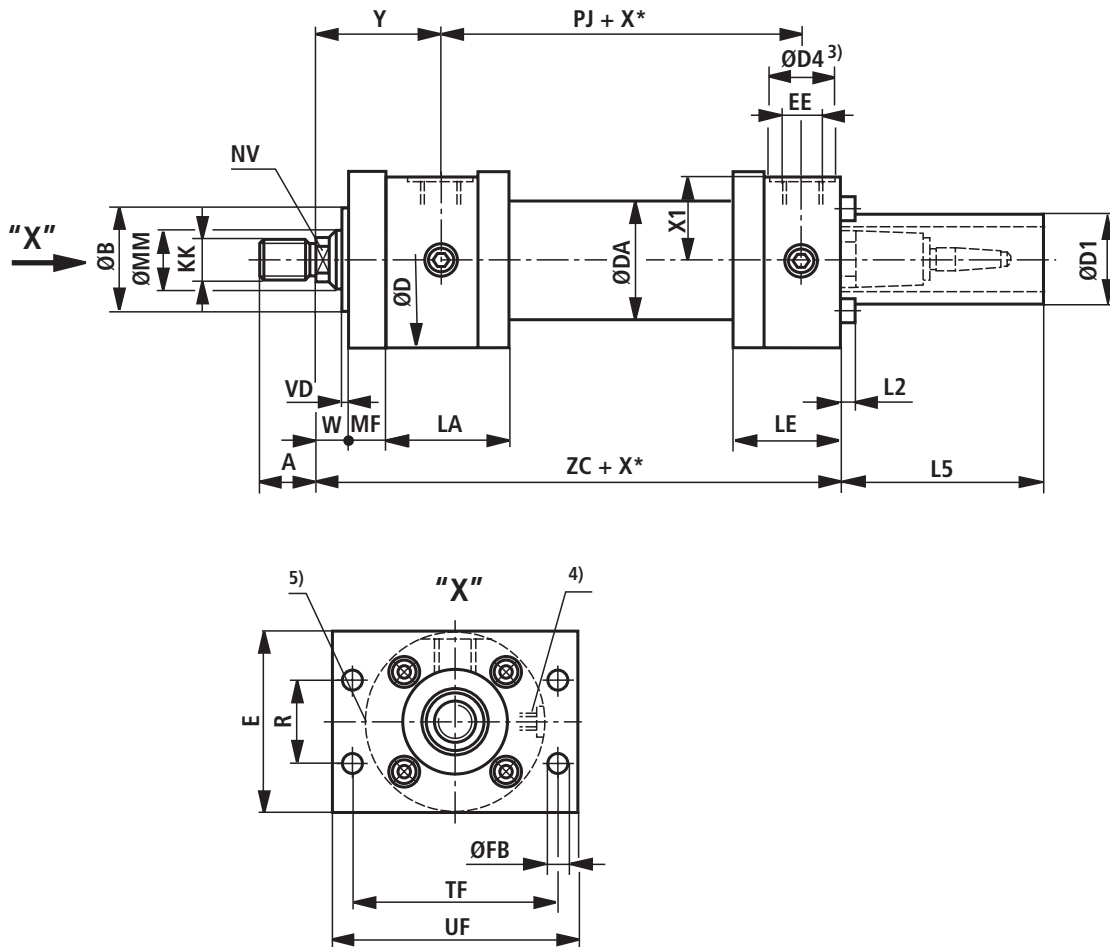
6) Lubricating nipple, cone head form A according to DIN 71412

8) Line connection “B”

9) Line connection “R”

Dimensions CSM1: MF1
(dimensions in mm)

CSM1: MF1



Dimensions CSM1: MF1

(dimensions in mm)

| ØAL | ØMM | KK ¹⁾ ISO 6020/1 | A ¹⁾ | KK ²⁾ VW 39 D 920 | A ²⁾ | NV | ØB f8 | ØD | ØDA | ØD4 3; 8) | EE 8) | ØD4 3; 9) | EE 9) | Y | PJ |
|-----|-----|--------------------------------|-----------------|---------------------------------|-----------------|----|----------|-----|-----|--------------|----------|--------------|----------|-----|-----|
| 40 | 28 | M20x1.5 | 28 | M16x1.5 | 22 | 22 | 50 | 78 | 50 | 34 | G1/2 | 29 | M22x1.5 | 71 | 97 |
| 50 | 28 | M20x1.5 | 28 | – | – | 22 | 60 | 95 | 60 | 34 | G1/2 | 29 | M22x1.5 | 72 | 111 |
| | 36 | M27x2 | 36 | M20x1.5 | 28 | 30 | | | | | | | | | |
| 63 | 36 | M27x2 | 36 | – | – | 30 | 70 | 116 | 78 | 42 | G3/4 | 34 | M27x2 | 82 | 117 |
| | 45 | M33x2 | 45 | M27x2 | 36 | 36 | | | | | | | | | |
| 80 | 45 | M33x2 | 45 | – | – | 36 | 85 | 130 | 95 | 42 | G3/4 | 34 | M27x2 | 91 | 134 |
| | 56 | M42x2 | 56 | M33x2 | 45 | 46 | | | | | | | | | |
| 100 | 56 | M42x2 | 56 | – | – | 46 | 106 | 158 | 120 | 47 | G1 | 43 | M33x2 | 108 | 162 |
| | 70 | M48x2 | 63 | M42x2 | 56 | 60 | | | | | | | | | |
| 125 | 70 | M48x2 | 63 | – | – | 60 | 132 | 192 | 150 | 47 | G1 | 43 | M33x2 | 121 | 174 |
| | 90 | M64x3 | 85 | M48x2 | 63 | 75 | | | | | | | | | |

| ØAL | ØMM | X1 | MF | VD | W | ZC | E | R js13 | TF js13 | UF | ØFB H13 | ØD1 | L5 | LA | LE | L2 |
|-----|-----|------|----|----|----|-----|-----|-----------|------------|-----|------------|-----|-----|-----|-----|----|
| 40 | 28 | 35.5 | 16 | 3 | 16 | 211 | 80 | 40.6 | 98 | 115 | 9 | 80 | 166 | 73 | 77 | 0 |
| 50 | 28 | 44.5 | 20 | 4 | 18 | 224 | 100 | 48.2 | 116.4 | 140 | 11 | 96 | 166 | 74 | 81 | 0 |
| | 36 | | | | | | | | | | | | | | | |
| 63 | 36 | 54.5 | 25 | 4 | 20 | 237 | 120 | 55.5 | 134 | 160 | 13.5 | 96 | 166 | 84 | 85 | 0 |
| | 45 | | | | | | | | | | | | | | | |
| 80 | 45 | 62.5 | 32 | 4 | 22 | 281 | 135 | 63.1 | 152.5 | 185 | 17.5 | 96 | 166 | 93 | 112 | 10 |
| | 56 | | | | | | | | | | | | | | | |
| 100 | 56 | 75.5 | 32 | 5 | 25 | 322 | 160 | 76.5 | 184.8 | 225 | 22 | 96 | 166 | 117 | 118 | 0 |
| | 70 | | | | | | | | | | | | | | | |
| 125 | 70 | 92.5 | 32 | 5 | 28 | 347 | 195 | 90.2 | 217.1 | 255 | 22 | 96 | 166 | 143 | 134 | 0 |
| | 90 | | | | | | | | | | | | | | | |

ØAL = Piston Ø

ØMM = Piston rod Ø

X* = Stroke length

1) Thread for piston rod ends "G" and "K"

2) Thread for piston rod ends "H" and "F"

3) ØD4 recess max. 0.5 mm deep

4) Bleeding: With view to the piston rod, the position is offset by 90° in relation to the line connection (clockwise)

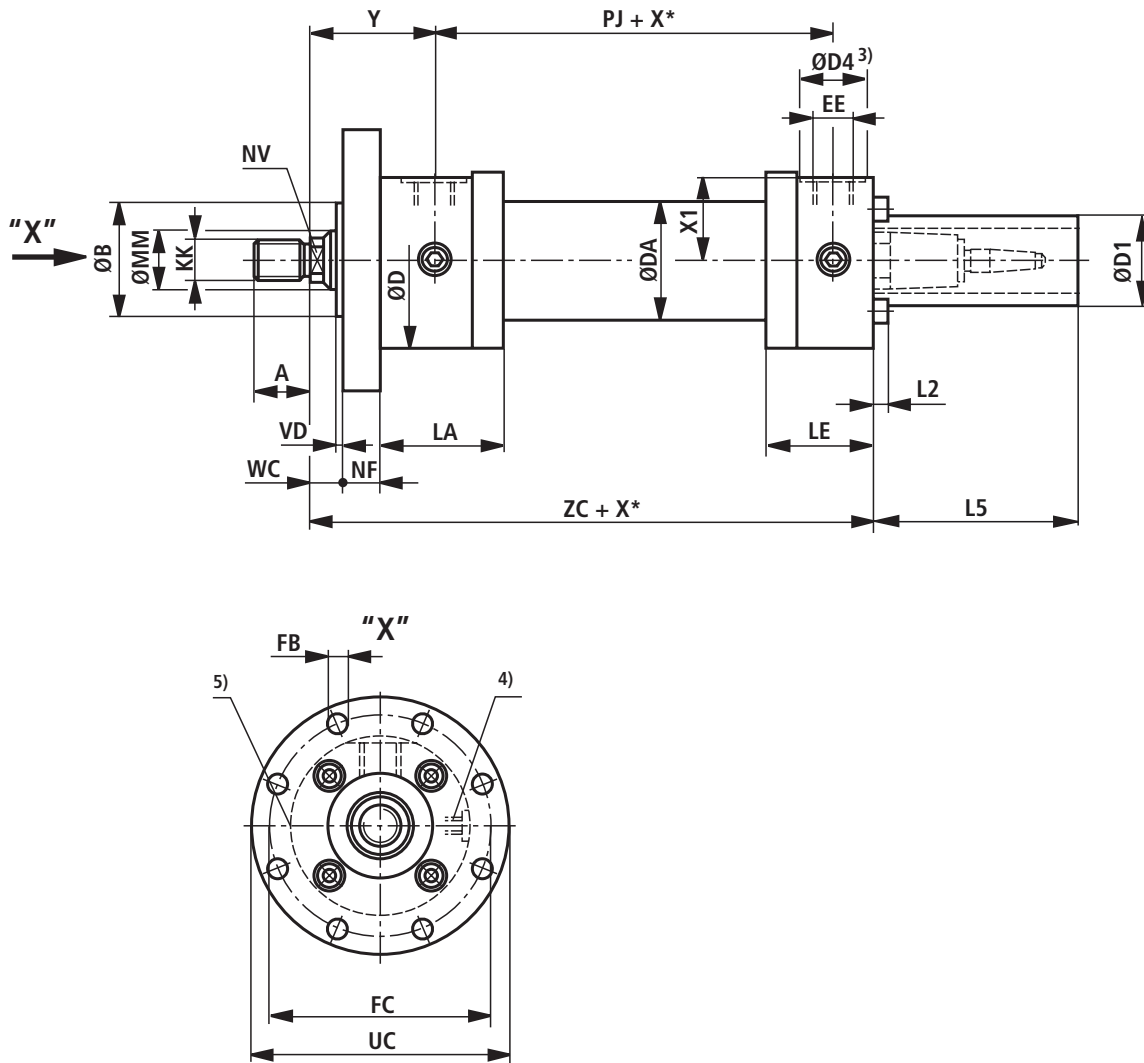
5) Throttle valve only with end position cushioning "E" (180° for bleeding)

8) Line connection "B"

9) Line connection "R"

Dimensions CSM1: MF3
(dimensions in mm)

CSM1: MF3



Dimensions CSM1: MF3

(dimensions in mm)

| ØAL | ØMM | KK ¹⁾ ISO 6020/1 | A ¹⁾ | KK ²⁾ VW 39 D 920 | A ²⁾ | NV | ØB f8 | ØD | ØDA | ØD4 3; 8) | EE 8) | ØD4 3; 9) | EE 9) | Y | PJ |
|-----|------------|--------------------------------|-----------------|---------------------------------|-----------------|-----------|----------|-----|-----|--------------|----------|--------------|----------|-----|-----|
| 40 | 28 | M20x1.5 | 28 | M16x1.5 | 22 | 22 | 50 | 78 | 50 | 34 | G1/2 | 29 | M22x1.5 | 71 | 97 |
| 50 | 28 36 | M20x1.5 M27x2 | 28 36 | – M20x1.5 | – 28 | 22 30 | 60 | 95 | 60 | 34 | G1/2 | 29 | M22x1.5 | 72 | 111 |
| 63 | 36 45 | M27x2 M33x2 | 36 45 | – M27x2 | – 36 | 30 36 | 70 | 116 | 78 | 42 | G3/4 | 34 | M27x2 | 82 | 117 |
| 80 | 45 56 | M33x2 M42x2 | 45 56 | – M33x2 | – 45 | 36 46 | 85 | 130 | 95 | 42 | G3/4 | 34 | M27x2 | 91 | 134 |
| 100 | 56 70 | M42x2 M48x2 | 56 63 | – M42x2 | – 56 | 46 60 | 106 | 158 | 120 | 47 | G1 | 43 | M33x2 | 108 | 162 |
| 125 | 70 90 | M48x2 M64x3 | 63 85 | – M48x2 | – 63 | 60 75 | 132 | 192 | 150 | 47 | G1 | 43 | M33x2 | 121 | 174 |
| 160 | 90 110 | M64x3 M80x3 | 85 95 | – M64x3 | – 85 | 75 95 | 160 | 237 | 190 | 58 | G1 1/4 | 52 | M42x2 | 143 | 191 |
| 200 | 110 140 | M80x3 M100x3 | 95 112 | – M80x3 | – 95 | 95 120 | 200 | 285 | 230 | 58 | G1 1/4 | 52 | M42x2 | 190 | 224 |

| ØAL | ØMM | X1 | NF | VD | WC | ZC | ØFC js13 | ØUC -1 | ØFB H13 | ØD1 | L5 | LA | LE | L2 |
|-----|------------|-------|----|----|----|-----|-------------|-----------|------------|-----|-----|-----|-----|----|
| 40 | 28 | 35.5 | 16 | 3 | 16 | 211 | 106 | 125 | 9 | 80 | 166 | 73 | 77 | 0 |
| 50 | 28 36 | 44.5 | 20 | 4 | 18 | 224 | 126 | 150 | 11 | 96 | 166 | 74 | 81 | 0 |
| 63 | 36 45 | 54.5 | 25 | 4 | 20 | 237 | 145 | 170 | 13.5 | 96 | 166 | 84 | 85 | 0 |
| 80 | 45 56 | 62.5 | 32 | 4 | 22 | 281 | 165 | 195 | 17.5 | 96 | 166 | 93 | 112 | 10 |
| 100 | 56 70 | 75.5 | 32 | 5 | 25 | 322 | 200 | 240 | 22 | 96 | 166 | 117 | 118 | 0 |
| 125 | 70 90 | 92.5 | 32 | 5 | 28 | 347 | 235 | 275 | 22 | 96 | 166 | 143 | 134 | 0 |
| 160 | 90 110 | 115.5 | 36 | 5 | 30 | 390 | 280 | 320 | 22 | 96 | 166 | 171 | 150 | 0 |
| 200 | 110 140 | 138.5 | 40 | 5 | 35 | 472 | 340 | 385 | 26 | 96 | 166 | 230 | 173 | 0 |

ØAL = Piston Ø

ØMM = Piston rod Ø

X* = Stroke length

1) Thread for piston rod ends "G" and "K"

2) Thread for piston rod ends "H" and "F"

3) ØD4 recess max. 0.5 mm deep

4) Bleeding: With view to the piston rod, the position is offset by 90° in relation to the line connection (clockwise)

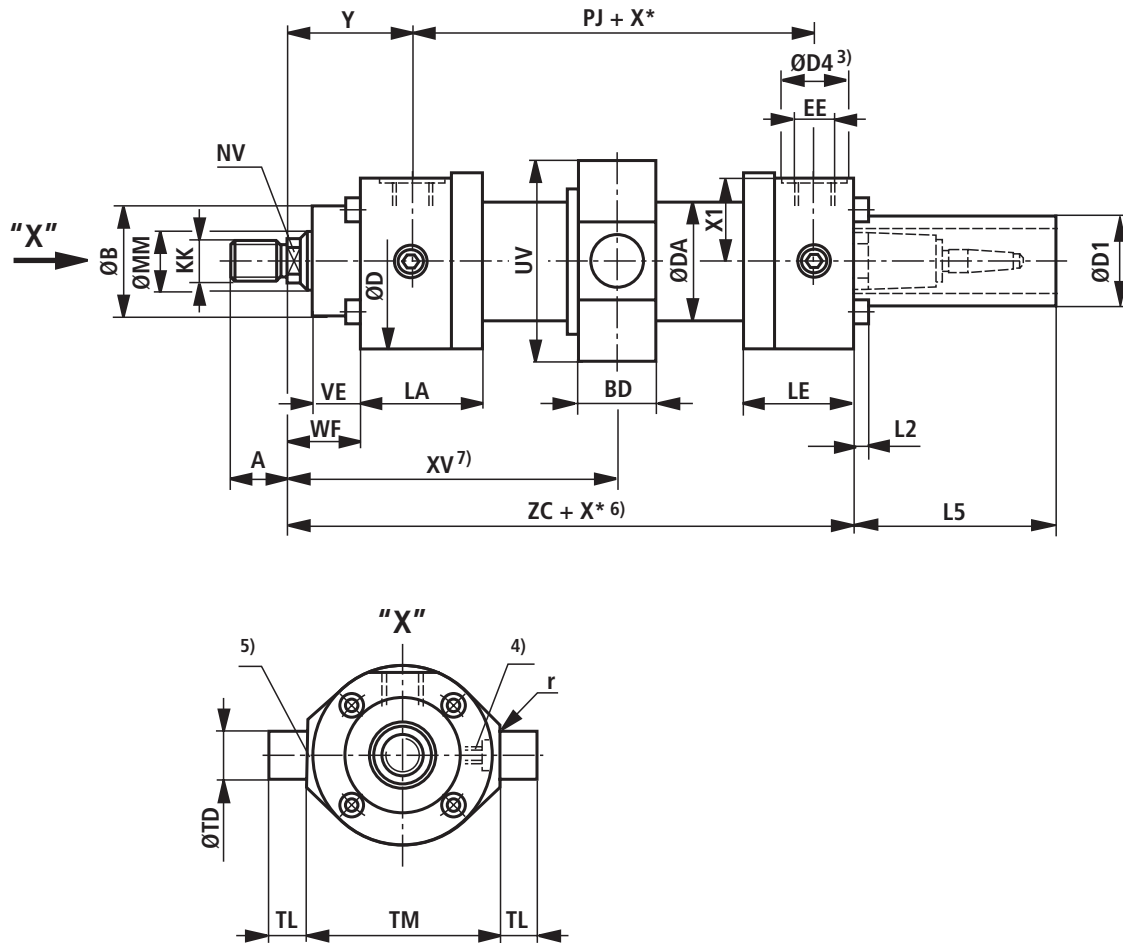
5) Throttle valve only with end position cushioning "E" (180° for bleeding)

8) Line connection "B"

9) Line connection "R"

Dimensions CSM1: MT4
(dimensions in mm)

CSM1: MT4



Dimensions CSM1: MT4

(dimensions in mm)

| ØAL | ØMM | KK ¹⁾ ISO 6020/1 | A ¹⁾ | KK ²⁾ VW 39 D 920 | A ²⁾ | NV | ØB f8 | ØD | ØDA | ØD4 3; 8) | EE 8) | ØD4 3; 9) | EE 9) | Y | PJ | X1 |
|-----|-----|--------------------------------|-----------------|---------------------------------|-----------------|-----|----------|-----|-----|--------------|----------|--------------|----------|-----|-----|-------|
| 40 | 28 | M20x1.5 | 28 | M16x1.5 | 22 | 22 | 50 | 78 | 50 | 34 | G1/2 | 29 | M22x1.5 | 71 | 97 | 35.5 |
| 50 | 28 | M20x1.5 | 28 | – | – | 22 | 60 | 95 | 60 | 34 | G1/2 | 29 | M22x1.5 | 72 | 111 | 44.5 |
| | 36 | M27x2 | 36 | M20x1.5 | 28 | 28 | | | | | | | | | | |
| 63 | 36 | M27x2 | 36 | – | – | 28 | 70 | 116 | 78 | 42 | G3/4 | 34 | M27x2 | 82 | 117 | 54.5 |
| | 45 | M33x2 | 45 | M27x2 | 36 | 36 | | | | | | | | | | |
| 80 | 45 | M33x2 | 45 | – | – | 36 | 85 | 130 | 95 | 42 | G3/4 | 34 | M27x2 | 91 | 134 | 62.5 |
| | 56 | M42x2 | 56 | M33x2 | 45 | 46 | | | | | | | | | | |
| 100 | 56 | M42x2 | 56 | – | – | 46 | 106 | 158 | 120 | 47 | G1 | 43 | M33x2 | 108 | 162 | 75.5 |
| | 70 | M48x2 | 63 | M42x2 | 56 | 60 | | | | | | | | | | |
| 125 | 70 | M48x2 | 63 | – | – | 60 | 132 | 192 | 150 | 47 | G1 | 43 | M33x2 | 121 | 174 | 92.5 |
| | 90 | M64x3 | 85 | M48x2 | 63 | 75 | | | | | | | | | | |
| 160 | 90 | M64x3 | 85 | – | – | 75 | 160 | 238 | 190 | 58 | G1 1/4 | 52 | M42x2 | 143 | 191 | 115.5 |
| | 110 | M80x3 | 95 | M64x3 | 85 | 95 | | | | | | | | | | |
| 200 | 110 | M80x3 | 95 | – | – | 95 | 200 | 285 | 230 | 58 | G1 1/4 | 52 | M42x2 | 190 | 224 | 138.5 |
| | 140 | M100x3 | 112 | M80x3 | 95 | 120 | | | | | | | | | | |

| ØAL | ØMM | VE | WF | ZC | BD | UV 10) | r | ØTD f8 | TL js13 | TM h12 | XV ⁷⁾ min. | XV ⁷⁾ max. | X* ⁶⁾ min. | ØD1 | L5 | LA | LE | L2 |
|-----|-----|----|----|-----|-----|-----------|-----|-----------|------------|-----------|--------------------------|--------------------------|--------------------------|-----|-----|-----|-----|----|
| 40 | 28 | 19 | 32 | 211 | 28 | 78 | 1 | 20 | 16 | 90 | 131 | 116+X* | 23 | 80 | 166 | 73 | 77 | 0 |
| 50 | 28 | 24 | 38 | 224 | 33 | 95 | 1 | 25 | 20 | 105 | 141.5 | 122.5+X* | 28 | 96 | 166 | 74 | 81 | 0 |
| | 36 | | | | | | | | | | | | | | | | | |
| 63 | 36 | 29 | 45 | 237 | 38 | 116 | 1.5 | 32 | 25 | 120 | 164 | 129+X* | 47 | 96 | 166 | 84 | 85 | 0 |
| | 45 | | | | | | | | | | | | | | | | | |
| 80 | 45 | 36 | 54 | 281 | 53 | 130 | 2 | 40 | 32 | 135 | 189.5 | 138.5+X* | 63 | 96 | 166 | 93 | 112 | 10 |
| | 56 | | | | | | | | | | | | | | | | | |
| 100 | 56 | 37 | 57 | 322 | 68 | 158 | 2 | 50 | 40 | 160 | 224 | 166+X* | 70 | 96 | 166 | 117 | 118 | 0 |
| | 70 | | | | | | | | | | | | | | | | | |
| 125 | 70 | 37 | 60 | 347 | 78 | 210 | 2.5 | 63 | 50 | 195 | 261 | 170+X* | 106 | 96 | 166 | 143 | 134 | 0 |
| | 90 | | | | | | | | | | | | | | | | | |
| 160 | 90 | 41 | 66 | 390 | 118 | 250 | 3 | 80 | 63 | 240 | 320 | 177+X* | 163 | 96 | 166 | 171 | 150 | 0 |
| | 110 | | | | | | | | | | | | | | | | | |
| 200 | 110 | 45 | 75 | 472 | 148 | 300 | 3 | 100 | 80 | 295 | 403 | 221+X* | 202 | 96 | 166 | 230 | 173 | 0 |
| | 140 | | | | | | | | | | | | | | | | | |

ØAL = Piston Ø

ØMM = Piston rod Ø

X* = Stroke length

1) Thread for piston rod ends “G” and “K”

2) Thread for piston rod ends “H” and “F”

3) ØD4 recess max. 0.5 mm deep

4) Bleeding: With view to the piston rod, the position is offset by 90° in relation to the line connection (clockwise)

5) Throttle valve only with end position cushioning “E” (180° for bleeding)

6) Observe the min. stroke length “X*_{min.}”

7) When ordering, always specify the “XV” dimension in the plain text (XV_{min.} and XV_{max.})

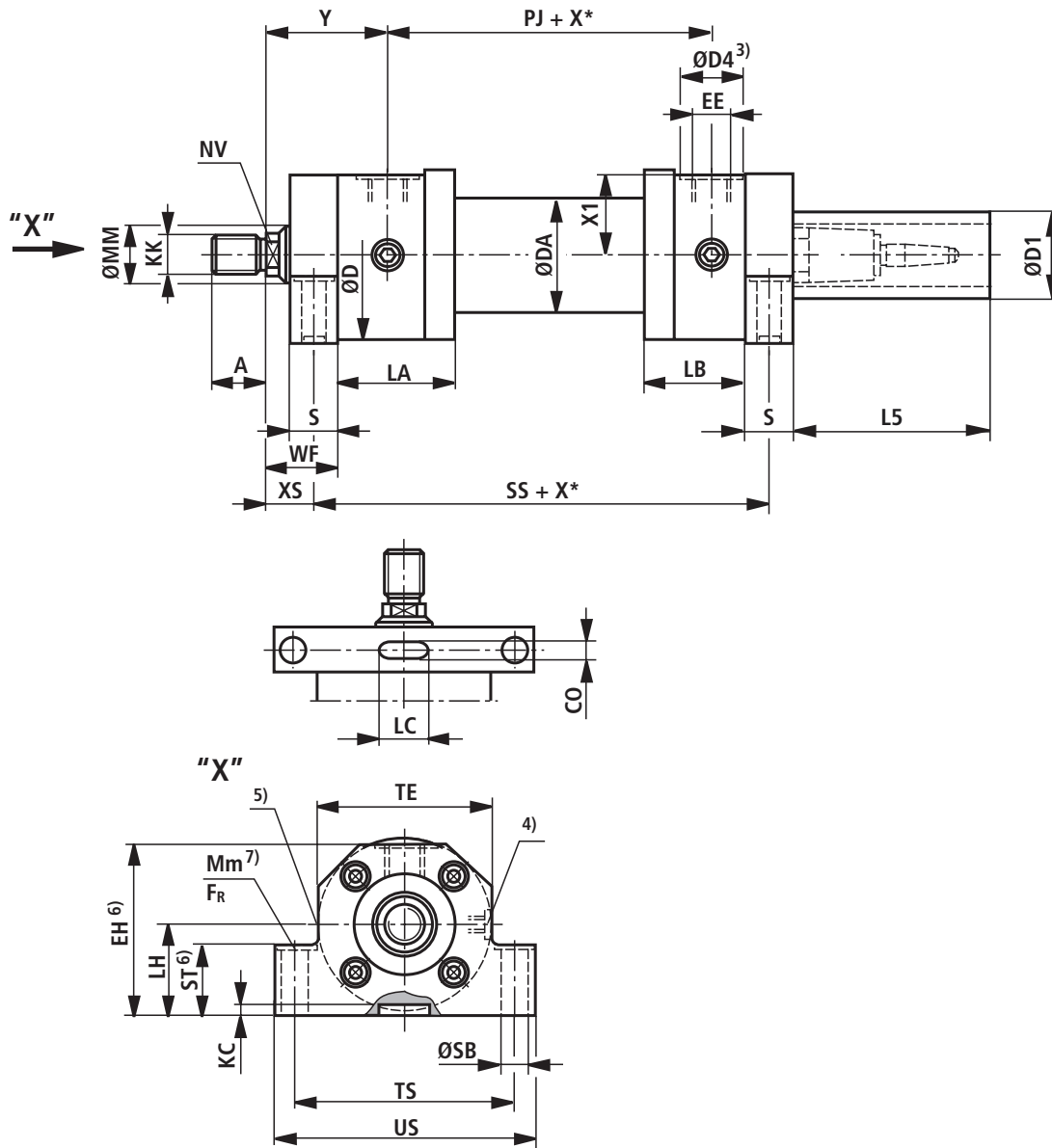
8) Line connection “B”

9) Line connection “R”

10) Tolerance according to EN ISO 9013: Thermal cutting

Dimensions CSM1: MS2
(dimensions in mm)

CSM1: MS2



Dimensions CSM1: MS2

(dimensions in mm)

| AL Ø | MM Ø | KK ¹⁾ ISO 6020/1 | A ¹⁾ | KK ²⁾ VW 39 D 920 | A ²⁾ | NV | ØD | ØDA | ØD4 3; 8) | EE 8) | ØD4 3; 9) | EE 9) | Y | PJ | X1 | WF | XS |
|---------|------------|--------------------------------|-----------------|---------------------------------|-----------------|-----------|-----|-----|--------------|----------|--------------|----------|-----|-----|-------|----|------|
| 40 | 28 | M20x1.5 | 28 | M16x1.5 | 22 | 22 | 78 | 50 | 34 | G1/2 | 29 | M22x1.5 | 71 | 97 | 35.5 | 32 | 19.5 |
| 50 | 28 36 | M20x1.5 M27x2 | 28 36 | – M20x1.5 | – 28 | 22 30 | 95 | 60 | 34 | G1/2 | 29 | M22x1.5 | 72 | 111 | 44.5 | 38 | 22 |
| 63 | 36 45 | M27x2 M33x2 | 36 45 | – M27x2 | – 36 | 30 36 | 116 | 78 | 42 | G3/4 | 34 | M27x2 | 82 | 117 | 54.5 | 45 | 29 |
| 80 | 45 56 | M33x2 M42x2 | 45 56 | – M33x2 | – 45 | 36 46 | 130 | 95 | 42 | G3/4 | 34 | M27x2 | 91 | 134 | 62.5 | 54 | 34 |
| 100 | 56 70 | M42x2 M48x2 | 56 63 | – M42x2 | – 56 | 46 60 | 158 | 120 | 47 | G1 | 43 | M33x2 | 108 | 162 | 75.5 | 57 | 32 |
| 125 | 70 90 | M48x2 M64x3 | 63 85 | – M48x2 | – 63 | 60 75 | 192 | 150 | 47 | G1 | 43 | M33x2 | 121 | 174 | 92.5 | 60 | 32 |
| 160 | 90 110 | M64x3 M80x3 | 85 95 | – M64x3 | – 85 | 75 95 | 237 | 190 | 58 | G1 1/4 | 52 | M42x2 | 143 | 191 | 115.5 | 66 | 36 |
| 200 | 110 140 | M80x3 M100x3 | 95 112 | – M80x3 | – 95 | 95 120 | 285 | 230 | 58 | G1 1/4 | 52 | M42x2 | 190 | 224 | 138.5 | 75 | 39 |

| ØAL | ØMM | SS | CO N9 | LC +0.5 | KC +0.5 | EH ⁶⁾ –1 | LH h10 | S js13 | ØSB H13 | ST 6) | TE | TS js13 | US –1 | ØD1 | L5 | LA | LB | FR ⁷⁾ kN | Mm ⁷⁾ Nm |
|-----|------------|-----|----------|------------|------------|------------------------|-----------|-----------|------------|----------|-----|------------|----------|-----|-----|-----|-----|------------------------|------------------------|
| 40 | 28 | 183 | 8 | 36 | 4 | 77.5 | 43 | 25 | 11 | 32 | 78 | 100 | 120 | 80 | 166 | 73 | 56 | 7.90 | 60 |
| 50 | 28 36 | 199 | 10 | 40 | 4.5 | 95 | 52 | 32 | 14 | 42 | 95 | 120 | 145 | 96 | 166 | 74 | 62 | 11.10 | 100 |
| 63 | 36 45 | 211 | 10 | 40 | 4.5 | 113 | 62 | 32 | 18 | 50 | 116 | 150 | 180 | 96 | 166 | 84 | 72 | 21.15 | 250 |
| 80 | 45 56 | 236 | 14 | 63 | 5 | 129 | 70 | 40 | 22 | 60 | 130 | 170 | 210 | 96 | 166 | 93 | 81 | 33.35 | 490 |
| 100 | 56 70 | 293 | 16 | 70 | 6 | 153 | 82 | 50 | 26 | 70 | 158 | 205 | 250 | 96 | 138 | 117 | 96 | 48.30 | 850 |
| 125 | 70 90 | 321 | 18 | 80 | 6 | 190 | 100 | 56 | 33 | 80 | 192 | 245 | 300 | 96 | 132 | 143 | 112 | 77.80 | 1710 |
| 160 | 90 110 | 364 | 22 | 125 | 8 | 232 | 119 | 60 | 33 | 90 | 238 | 295 | 350 | 96 | 126 | 171 | 130 | 77.80 | 1710 |
| 200 | 110 140 | 447 | 28 | 160 | 9 | 282 | 145 | 72 | 39 | 110 | 285 | 350 | 415 | 96 | 116 | 230 | 151 | 113.25 | 2970 |

ØAL = Piston Ø

ØMM = Piston rod Ø

X* = Stroke length

1) Thread for piston rod ends “G” and “K”

2) Thread for piston rod ends “H” and “F”

3) ØD4 recess max. 0.5 mm deep

4) Bleeding: With view to the piston rod, the position is offset by 90° in relation to the line connection (clockwise)

5) Throttle valve only with end position cushioning “E” (180° for bleeding)

6) Specified dimensions are smaller than the max. dimensions in ISO 6020/1

7) Recess max. 2 mm deep, for hexagon socket head cap screws according to ISO 4762

The mounting screws must not be subjected to shear force. The mounting screws according to ISO 4762 (property class 10.9) must be tightened with the specified torque M_m .

If the calculated frictional force F_R is lower than the maximum cylinder force, a key must be used on the head.

Calculation basis:

► The specified frictional force F_R refers to a friction factor of 0.2 (steel / steel)

► Foot on the head side as fixed bearing

► Foot on the base side as floating bearing

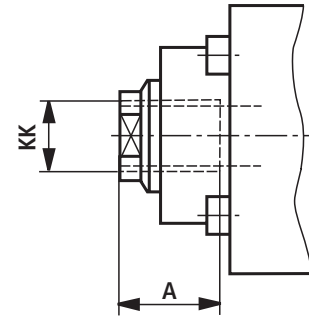
8) Line connection “B”

9) Line connection “R”

Piston rod end E
(dimensions in mm)

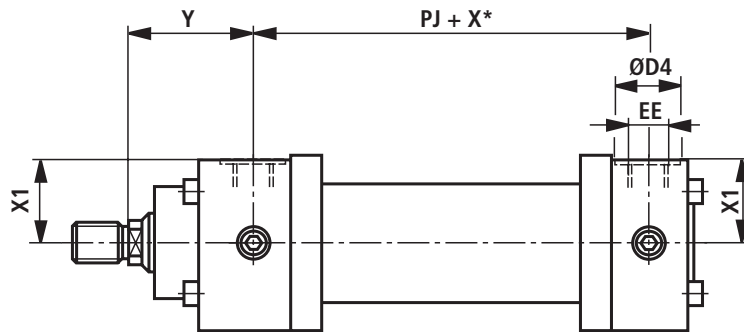
| ØAL | ØMM | KK | A |
|------------|-----|---------|----|
| ISO 6020/1 | | | |
| 32 | 22 | M16x1.5 | 22 |
| 40 | 22 | M16x1.5 | 22 |
| | 28 | M20x1.5 | 28 |
| 50 | 28 | M20x1.5 | 28 |
| | 36 | M27x2 | 36 |
| 63 | 36 | M27x2 | 36 |
| | 45 | M33x2 | 45 |
| 80 | 45 | M33x2 | 45 |
| | 56 | M42x2 | 56 |

| ØAL | ØMM | KK | A |
|------------|-----|--------|-----|
| ISO 6020/1 | | | |
| 100 | 56 | M42x2 | 56 |
| | 70 | M48x2 | 63 |
| 125 | 70 | M48x2 | 63 |
| | 90 | M64x3 | 85 |
| 160 | 90 | M64x3 | 85 |
| | 110 | M80x3 | 95 |
| 200 | 110 | M80x3 | 95 |
| | 140 | M100x3 | 112 |

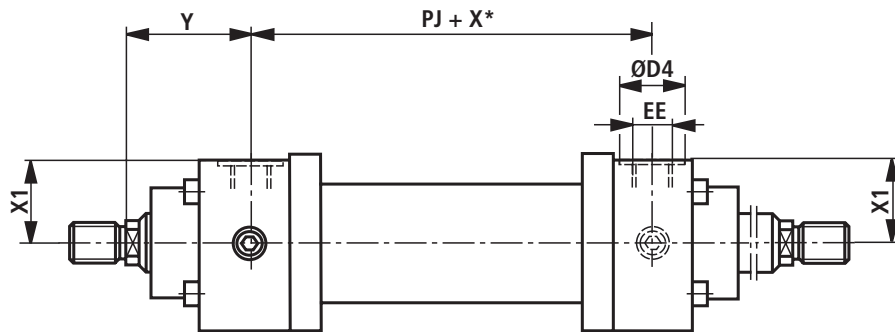


Enlarged line connections
(dimensions in mm)

CDM1



CGM1



| Ø AL | Version "S" ISO 1179-1 | | | | |
|------|---------------------------|-------------------|-----|-----|-------|
| | EE | ØD4 ¹⁾ | Y | PJ | X1 |
| 25 | - | - | - | - | - |
| 32 | - | - | - | - | - |
| 40 | - | - | - | - | - |
| 50 | - | - | - | - | - |
| 63 | G1 | 47 | 80 | 121 | 53.5 |
| 80 | G1 | 47 | 91 | 134 | 60.5 |
| 100 | G1 1/4 | 58 | 108 | 162 | 74 |
| 125 | G1 1/4 | 58 | 121 | 174 | 92 |
| 160 | G1 1/2 | 65 | 143 | 191 | 114.5 |
| 200 | G1 1/2 | 65 | 190 | 224 | 138.5 |

Main dimensions see pages 14 ... 39

ØAL = Piston Ø

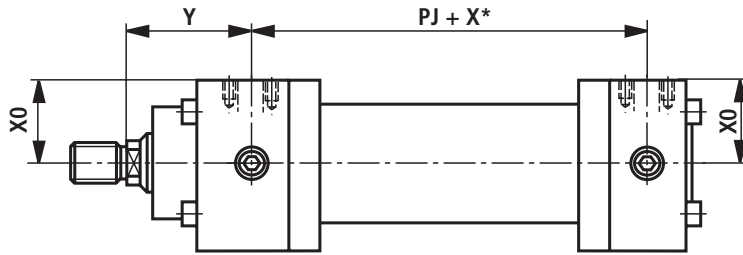
ØMM = Piston rod Ø

X* = Stroke length

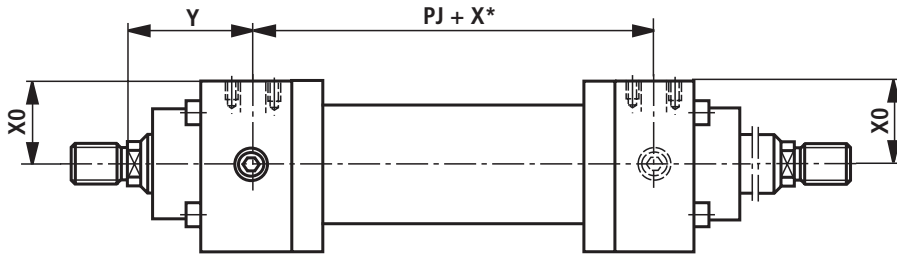
1) ØD4 recess max. 0.5 mm deep

Flange ports
(dimensions in mm)

CDM1

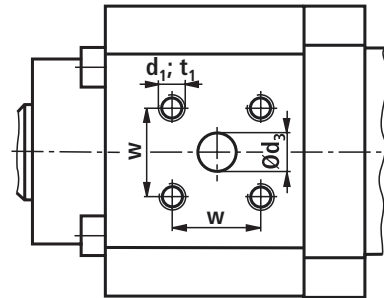
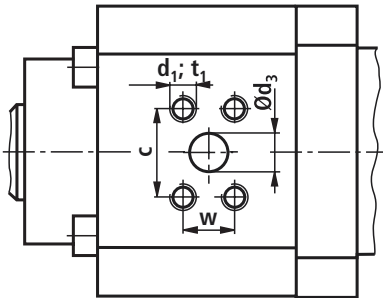


CGM1



Dimensions for rectangular flange
according to ISO 6162-1 ($\hat{=}$ SAE 3000 PSI)

Dimensions for square flange
according to ISO 6164



| ØAL | Version "F" ISO 6162-1 ($\hat{=}$ SAE 3000 PSI) ¹⁾ | | | | | | | | | Version "H" ISO 6164 | | | | | | |
|-----|---|-----|-----|-----------------|-------------------------------|------------|------------|----------------|------------------------------|-------------------------|-----|------|-----------------|------------|----------------|------------------------------|
| | Y | PJ | X0 | Ød ₃ | Ød ₃ ¹⁾ | c ±0.25 | w ±0.25 | d ₁ | t ₁ ²⁾ | Y | PJ | X0 | Ød ₃ | w ±0.25 | d ₁ | t ₁ ²⁾ |
| 25 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 32 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 40 | - | - | - | - | - | - | - | - | - | 69 | 101 | 34.5 | 10 | 24.7 | M6 | 13 |
| 50 | 72 | 111 | 41 | 13 | 1/2" | 38.1 | 17.5 | M8 | 14 | 72 | 111 | 44 | 10 | 24.7 | M6 | 13 |
| 63 | 82 | 117 | 52 | 13 | 1/2" | 38.1 | 17.5 | M8 | 16 | 82 | 117 | 52 | 13 | 29.7 | M8 | 16 |
| 80 | 91 | 134 | 60 | 13 | 1/2" | 38.1 | 17.5 | M8 | 16 | 91 | 134 | 60 | 13 | 29.7 | M8 | 16 |
| 100 | 108 | 162 | 72 | 19 | 3/4" | 47.6 | 22.3 | M10 | 20 | 108 | 162 | 72 | 19 | 35.4 | M8 | 16 |
| 125 | 121 | 174 | 91 | 19 | 3/4" | 47.6 | 22.3 | M10 | 20 | 121 | 174 | 91 | 19 | 35.4 | M8 | 16 |
| 160 | 143 | 191 | 114 | 25 | 1" | 52.4 | 26.2 | M10 | 20 | 143 | 191 | 114 | 25 | 43.8 | M10 | 20 |
| 200 | 190 | 224 | 138 | 25 | 1" | 52.4 | 26.2 | M10 | 20 | 190 | 224 | 138 | 25 | 43.8 | M10 | 20 |

Main dimensions see pages 14 ... 39

ØAL = Piston Ø
X* = Stroke length

¹⁾ Flange connection according to ISO 6162-1 corresponds to flange connection according to SAE 3000 PSI
²⁾ Thread depth

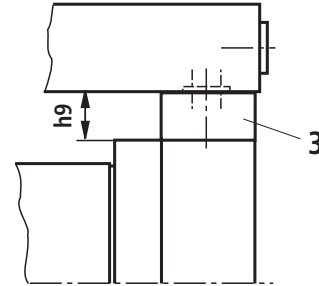
Subplates for valve mounting (SL and SV valve)

Note:

Valves, fittings and piping are **not** included in the scope of delivery!

- 1 Port B to the piston side according to ISO 6164
- 2 Bore for locking pin
- 3 Adapter plate for MT4 type of mounting (part of the scope of delivery for MT4)
- 4 Line connection "B" dimensions, see also page 14 ... 39

Installation situation with MT4

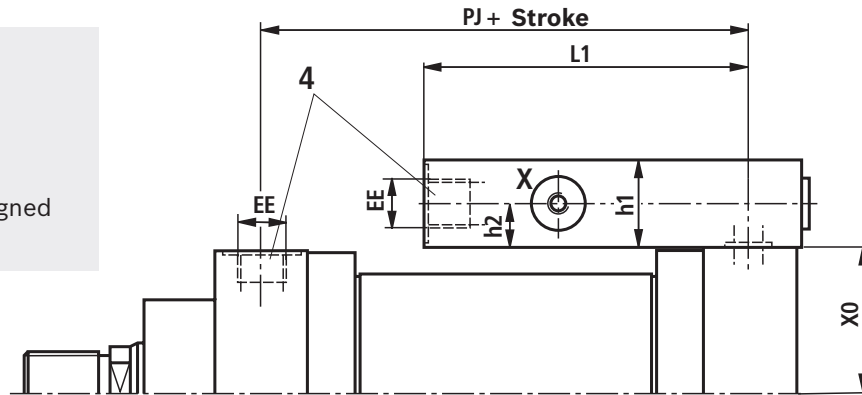


Important note:

Subplates for SL and SV valves (isolator valves)

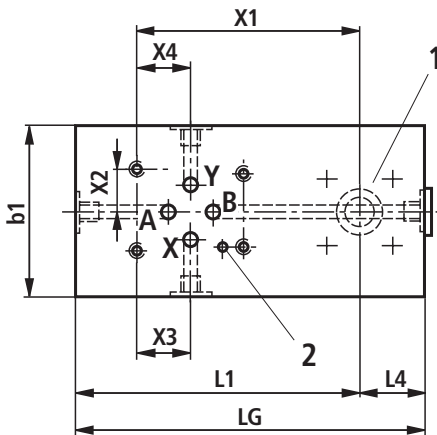
Note:

Seal design T and S are not designed for the static holding function!



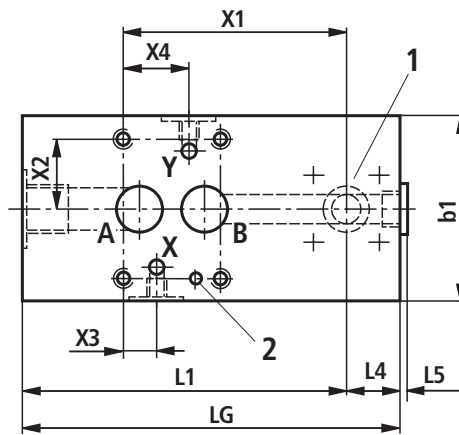
Size 6

Dimensions according to DIN 24340 form A and ISO 4401

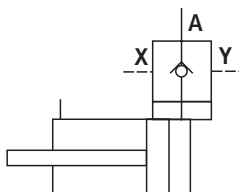


Size 10 and 20

Dimensions according to DIN 24340 form D and ISO 5781



Piping symbol



Subplates for valve mounting

(SL and SV valve – dimensions in mm)

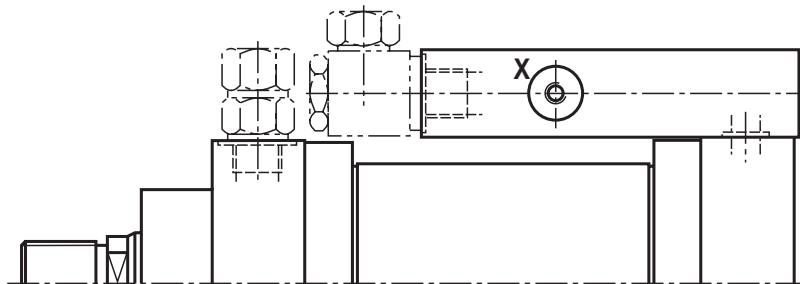
| ØAL | Valve size | PJ | EE | Minimum stroke ¹⁾ | | X0 | Plate dimensions | | | | | | | Port size, Porting pattern | | | | | | Position point Valve | |
|-----|------------|-----|--------|------------------------------|---------------|------|------------------|----|----|-----|-----|----|----|----------------------------|--------|------|------|------|------|----------------------|-------|
| | | | | ²⁾ | ³⁾ | | L1 | L4 | L5 | LG | b1 | h1 | h9 | h2 | A | X | Y | X3 | X4 | X1 | X2 |
| 40 | 6 | 97 | G1/2 | 100 | 100 | 34.5 | 90 | 20 | 4 | 110 | 55 | 40 | 10 | 20 | G1/2 | G1/4 | G1/4 | 21.5 | 21.5 | 65.5 | 15.5 |
| 50 | 6 | 111 | G1/2 | 100 | 100 | 44 | 90 | 20 | 4 | 110 | 55 | 40 | 10 | 20 | G1/2 | G1/4 | G1/4 | 21.5 | 21.5 | 65.5 | 15.5 |
| 63 | 6 | 117 | G3/4 | 100 | 100 | 52 | 100 | 25 | 5 | 125 | 55 | 45 | 10 | 22.5 | G3/4 | G1/4 | G1/4 | 21.5 | 21.5 | 70.5 | 15.5 |
| | 10 | 117 | G3/4 | 100 | 100 | 52 | 105 | 25 | 5 | 130 | 85 | 45 | 10 | 22.5 | G3/4 | G1/4 | G1/4 | 21.5 | 21.5 | 73 | 33.35 |
| 80 | 6 | 134 | G3/4 | 100 | 100 | 60 | 100 | 25 | 5 | 125 | 55 | 45 | 10 | 22.5 | G3/4 | G1/4 | G1/4 | 21.5 | 21.5 | 70.5 | 15.5 |
| | 10 | 134 | G3/4 | 100 | 100 | 60 | 105 | 25 | 5 | 130 | 85 | 45 | 10 | 22.5 | G3/4 | G1/4 | G1/4 | 21.5 | 21.5 | 73 | 33.35 |
| 100 | 10 | 162 | G1 | 100 | 100 | 72 | 102 | 28 | 5 | 130 | 85 | 50 | 10 | 25 | G1 | G1/4 | G1/4 | 21.5 | 21.5 | 70 | 33.35 |
| 125 | 10 | 174 | G1 | 100 | 106 | 91 | 102 | 28 | 5 | 130 | 85 | 50 | 20 | 25 | G1 | G1/4 | G1/4 | 21.5 | 21.5 | 70 | 33.35 |
| | 20 | 174 | G1 | 100 | 106 | 91 | 137 | 28 | 5 | 165 | 100 | 50 | 20 | 25 | G1 | G1/4 | G1/4 | 20.6 | 39.5 | 92 | 39.7 |
| 160 | 10 | 191 | G1 1/4 | 100 | 163 | 114 | 115 | 35 | 5 | 150 | 85 | 60 | 20 | 30 | G1 1/4 | G1/4 | G1/4 | 21.5 | 21.5 | 80 | 33.35 |
| | 20 | 191 | G1 1/4 | 100 | 163 | 114 | 140 | 35 | 5 | 175 | 100 | 60 | 20 | 30 | G1 1/4 | G1/4 | G1/4 | 20.6 | 39.5 | 95 | 39.7 |
| 200 | 10 | 224 | G1 1/4 | 100 | 202 | 138 | 115 | 35 | 5 | 150 | 85 | 60 | 20 | 30 | G1 1/4 | G1/4 | G1/4 | 21.5 | 21.5 | 80 | 33.35 |
| | 20 | 224 | G1 1/4 | 100 | 202 | 138 | 140 | 35 | 5 | 175 | 100 | 60 | 20 | 30 | G1 1/4 | G1/4 | G1/4 | 20.6 | 39.5 | 95 | 39.7 |

ØAL = Piston Ø

²⁾ Not for MT4

³⁾ Not for MT4

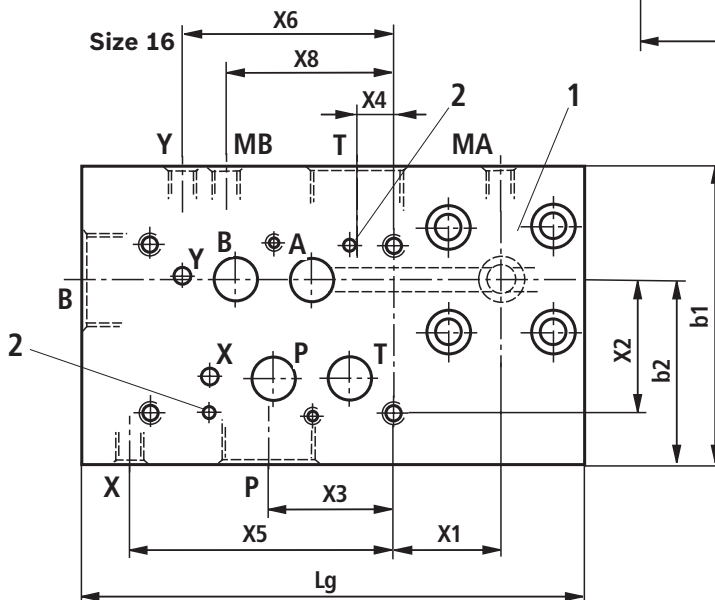
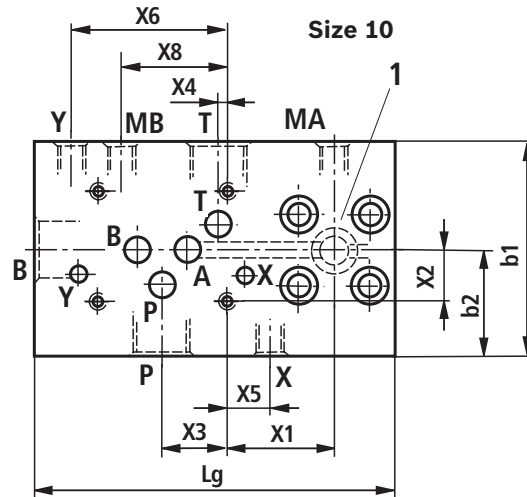
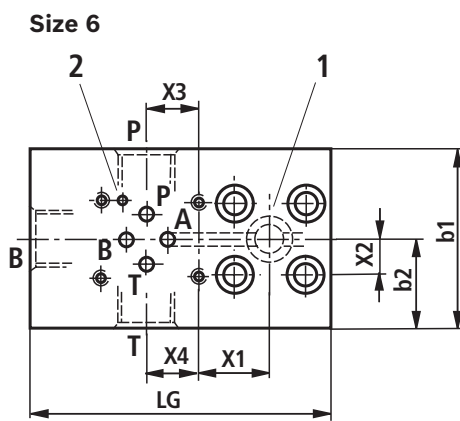
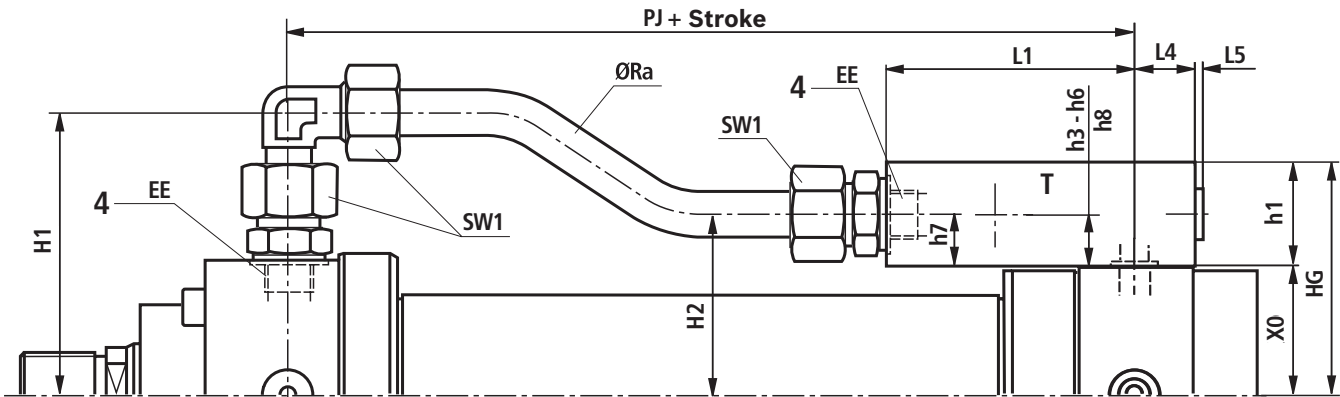
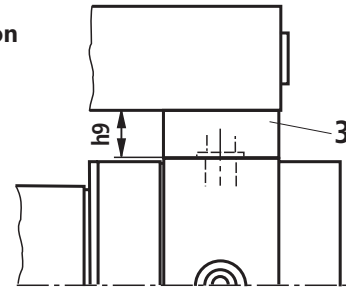
¹⁾ The information only applies to the following connection situation!



Subplates for valve mounting (directional and high-response valves)

- 1 Port B to the piston side according to ISO 6164
- 2 Bore for locking pin
- 3 Adapter plate for MT4 type of mounting
(part of the scope of delivery for MT4)
- 4 Line connection "B" dimensions, see also page 14 ... 39

Installation situation
with MT4



Notice:

Dimensions according to DIN 24340 form A and ISO 4401

Subplates for valve mounting

(directional and high-response valves – dimensions in mm)

| ØAL | Valve size | PJ | EE | Minimum stroke | Plate and piping dimensions | | | | | | | | | | | | | | | | |
|-----|------------|-----|--------|----------------|-----------------------------|----|--------------------|-------|------------------|------------------|------------------|------------|-----|-----|-----|------------------|------------------|------|------|------|----|
| | | | | | L1 | L4 | L5 _{max.} | H1 | H2 ¹⁾ | H2 ²⁾ | Wrench size 1 mm | ØRa | b1 | h1 | lg | HG ¹⁾ | HG ²⁾ | b2 | X0 | h7 | h9 |
| 40 | 6 | 101 | G1/2 | 225 | 90 | 20 | 4 | 90 | 54.5 | 64.5 | 30 | 16.0 x 2.5 | 65 | 40 | 110 | 74.5 | 84.5 | 32.5 | 34.5 | 20 | 10 |
| 50 | 6 | 111 | G1/2 | 215 | 90 | 20 | 4 | 99 | 64 | 74 | 30 | 16.0 x 2.5 | 65 | 40 | 110 | 84 | 94 | 32.5 | 44 | 20 | 10 |
| 63 | 6 | 117 | G3/4 | 250 | 100 | 25 | 5 | 119 | 74.5 | 84.5 | 36 | 20.0 x 3.0 | 75 | 45 | 125 | 97 | 107 | 37.5 | 52 | 22.5 | 10 |
| | 10 | 117 | G3/4 | 275 | 125 | 25 | 5 | 119 | 75 | 85 | 36 | 20.0 x 3.0 | 90 | 70 | 150 | 122 | 132 | 45 | 52 | 23 | 10 |
| 80 | 6 | 134 | G3/4 | 235 | 100 | 25 | 5 | 127 | 82.5 | 92.5 | 36 | 20.0 x 3.0 | 75 | 45 | 125 | 105 | 115 | 37.5 | 60 | 22.5 | 10 |
| | 10 | 134 | G3/4 | 260 | 125 | 25 | 5 | 127 | 83 | 93 | 36 | 20.0 x 3.0 | 90 | 70 | 150 | 130 | 140 | 45 | 60 | 23 | 10 |
| 100 | 10 | 162 | G1 | 280 | 132 | 28 | 5 | 148 | 102 | 112 | 46 | 25.0 x 4.0 | 90 | 80 | 160 | 152 | 162 | 45 | 72 | 30 | 10 |
| 125 | 10 | 174 | G1 | 270 | 132 | 28 | 5 | 165 | 121 | 141 | 46 | 25.0 x 4.0 | 90 | 80 | 160 | 171 | 191 | 45 | 91 | 30 | 20 |
| | 16 | 174 | G1 | 300 | 162 | 28 | 5 | 165 | 131 | 151 | 46 | 25.0 x 4.0 | 120 | 90 | 190 | 181 | 201 | 77.5 | 91 | 40 | 20 |
| 160 | 10 | 191 | G1 1/4 | 295 | 135 | 35 | 5 | 193.5 | 149 | 169 | 50 | 30.0 x 5.0 | 105 | 95 | 170 | 209 | 229 | 55 | 114 | 35 | 20 |
| | 16 | 191 | G1 1/4 | 335 | 175 | 35 | 5 | 193.5 | 159 | 179 | 50 | 30.0 x 5.0 | 125 | 100 | 210 | 214 | 234 | 77.5 | 114 | 45 | 20 |
| 200 | 10 | 224 | G1 1/4 | 260 | 135 | 35 | 5 | 216.5 | 173 | 193 | 50 | 30.0 x 5.0 | 105 | 95 | 170 | 233 | 253 | 55 | 138 | 35 | 20 |
| | 16 | 224 | G1 1/4 | 300 | 175 | 35 | 5 | 216.5 | 183 | 203 | 50 | 30.0 x 5.0 | 125 | 100 | 210 | 238 | 258 | 77.5 | 138 | 45 | 20 |

| ØAL | Valve size | Connection size, position of connections | | | | | | | | | | | | | | | |
|-----|------------|--|------|------|--------|------|------|------|-----|----|------|----|----|------|------|----|----|
| | | P | X3 | h3 | T | X4 | h4 | X | X5 | h5 | Y | X6 | h6 | MA | MB | X8 | h8 |
| 40 | 6 | G1/2 | 21.5 | 20 | G1/2 | 21.5 | 20 | - | - | - | - | - | - | - | - | - | - |
| 50 | 6 | G1/2 | 21.5 | 20 | G1/2 | 21.5 | 20 | - | - | - | - | - | - | - | - | - | - |
| 63 | 6 | G3/4 | 21.5 | 22.5 | G3/4 | 21.5 | 22.5 | - | - | - | - | - | - | - | - | - | - |
| | 10 | G3/4 | 27 | 33 | G3/4 | 3.5 | 33 | G1/4 | 18 | 47 | G1/4 | 65 | 47 | G1/4 | G1/4 | 60 | 17 |
| 80 | 6 | G3/4 | 21.5 | 22.5 | G3/4 | 21.5 | 22.5 | - | - | - | - | - | - | - | - | - | - |
| | 10 | G3/4 | 27 | 33 | G3/4 | 3.5 | 33 | G1/4 | 18 | 47 | G1/4 | 65 | 47 | G1/4 | G1/4 | 60 | 17 |
| 100 | 10 | G1 | 27 | 30 | G1 | 3.5 | 40 | G1/4 | 18 | 57 | G1/4 | 65 | 57 | G1/4 | G1/4 | 58 | 20 |
| 125 | 10 | G1 | 27 | 30 | G1 | 3.5 | 40 | G1/4 | 18 | 57 | G1/4 | 65 | 57 | G1/4 | G1/4 | 58 | 20 |
| | 16 | G1 | 50 | 26 | G1 | 17.0 | 25 | G1/4 | 105 | 45 | G1/4 | 88 | 70 | G1/4 | G1/4 | 88 | 35 |
| 160 | 10 | G1 1/4 | 27 | 35 | G1 1/4 | 3.5 | 45 | G1/4 | 20 | 72 | G1/4 | 65 | 72 | G1/4 | G1/4 | 55 | 25 |
| | 16 | G1 1/4 | 52 | 32 | G1 1/4 | 15.0 | 32 | G1/4 | 110 | 55 | G1/4 | 88 | 80 | G1/4 | G1/4 | 88 | 40 |
| 200 | 10 | G1 1/4 | 27 | 35 | G1 1/4 | 3.5 | 45 | G1/4 | 20 | 72 | G1/4 | 65 | 72 | G1/4 | G1/4 | 55 | 25 |
| | 16 | G1 1/4 | 52 | 32 | G1 1/4 | 15.0 | 32 | G1/4 | 110 | 55 | G1/4 | 88 | 80 | G1/4 | G1/4 | 88 | 40 |

| ØAL | Valve size | Position point Valve | |
|-----|------------|----------------------|------|
| | | X1 | X2 |
| 40 | 6 | 25 | 15.5 |
| 50 | 6 | 25 | 15.5 |
| 63 | 6 | 30 | 15.5 |
| | 10 | 45 | 21.4 |
| 80 | 6 | 30 | 15.5 |
| | 10 | 45 | 21.4 |
| 100 | 10 | 52 | 21.4 |
| 125 | 10 | 52 | 21.4 |
| | 16 | 37 | 55.6 |
| 160 | 10 | 55 | 21.4 |
| | 16 | 45 | 55.6 |
| 200 | 10 | 55 | 21.4 |
| | 16 | 45 | 55.6 |

1) Not for MT4

2) Not for MT4

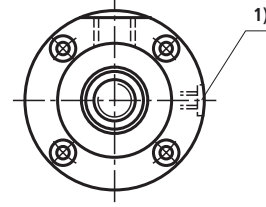
The dimensions h3, h4, h5, h6, h8 and X3, X4, X5, X6, define the position of connections P, T, B, X, Y.

Bleeding / measuring coupling (dimensions in mm)

By default, a patented safety bleeding device against unintended screwing out in head and base is delivered for piston $\varnothing \geq 40$ mm.

For piston $\varnothing 25$ and 32 mm, a bleed screw G1/8 is installed in head and base which is **not** secured against screwing out.

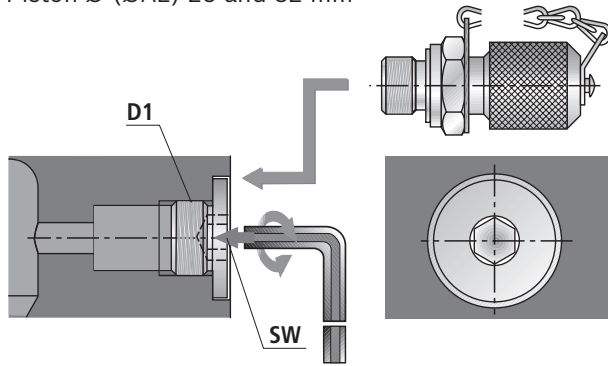
The port allows for the installation of a measuring coupling with check valve for pressure measurement or contamination-free bleeding. Measuring coupling with check valve function, i.e. it can also be connected when the system is pressurized.



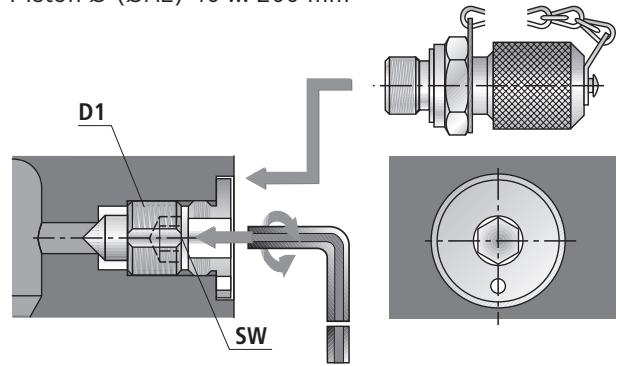
1) Bleeding: With view to the piston rod, the position is offset by 90° in relation to the line connection (clockwise)

Connection possibility for measuring coupling

Piston \varnothing (\varnothing_{AL}) 25 and 32 mm



Piston \varnothing (\varnothing_{AL}) 40 ... 200 mm



| \varnothing_{AL} | Bleed screw | | | Measuring coupling | |
|--------------------|-------------|-------------|----|--------------------|--|
| | D1 | Fuse | SW | D2 | |
| 25 and 32 | G1/8 | not secured | 5 | G1/8 | |
| 40 and 50 | G1/8 | secured | 5 | G1/8 | |
| 63 ... 200 | G1/4 | secured | 6 | G1/4 | |

Scope of delivery: Measuring coupling **G1/8**

MEASURING COUPLING AB 20-11/K3 G1/8 with seal ring made from NBR

Material no. **R900014363**

MEASURING COUPLING AB 20-11/K3V G1/8 with seal ring made from FKM

Material no. **R900024710**

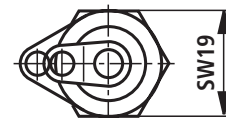
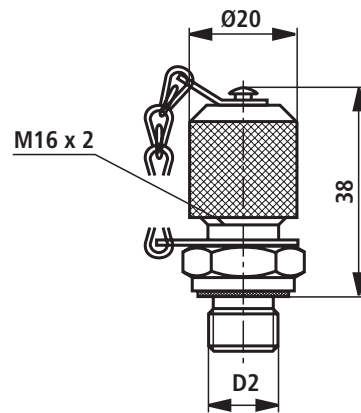
Scope of delivery: Measuring coupling **G1/4**

MEASURING COUPLING AB 20-11/K1 G1/4 with seal ring made from NBR

Material no. **R900009090**

MEASURING COUPLING AB 20-11/K1V G1/4 with seal ring made from FKM

Material no. **R900001264**

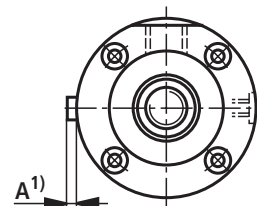


Throttle valve (dimensions in mm)

| \varnothing_{AL} | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 | 200 |
|----------------------------|-----|----|-----|-----|----|----|-----|-----|-----|-----|
| Protrusion A ¹⁾ | 6.5 | 4 | 5.5 | 1.5 | 0 | 0 | 0 | 0 | 0 | 0 |

\varnothing_{AL} = Piston \varnothing

¹⁾ Throttle valve only with end position cushioning "E" (180° for bleeding) Protrusion A in closed condition



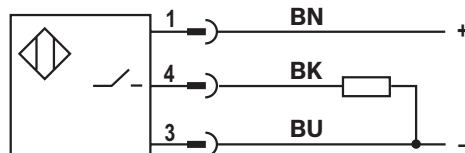
Proximity switch

Inductive proximity switches are used as reliable end position control for hydraulic cylinders. They are an important element for the safe and exact monitoring of safety equipment, locks and/or other machine functions in their end position by means of the output of signals. The proximity switch which is high-pressure resistant up to

500 bar works in a contactless manner. Consequently, it is wear-free. The proximity switch has been set at the factory. The switching distance must not be adjusted. The lock nut of the proximity switch is marked at the factory using sealing wax. On versions with proximity switch, the cylinders are equipped with proximity switches.

| Technical data | |
|---|------------------------------|
| (For applications outside these parameters, please consult us!) | |
| Function type | PNP normally open contact |
| Admissible pressure | bar 500 |
| Operating voltage | V DC 10 ... 30 |
| – including residual ripple | % ≤ 15 |
| Voltage drop | V ≤ 1.5 |
| Rated operating voltage | V DC 24 |
| Rated operating current | mA 200 |
| Idle current | mA ≤ 8 |
| Residual current | µA ≤ 10 |
| Repetition accuracy | % ≤ 5 |
| Hysteresis | % ≤ 15 |
| Ambient temperature range | °C –25 ... +80 |
| Temperature drift | % ≤ 10 |
| Switching frequency | Hz 1000 |
| Protection class | IP 68 according to DIN 40050 |
| – active area | IP 67 according to DIN 40050 |
| – Proximity switch | |
| Housing material | Material no. 1.4104 |

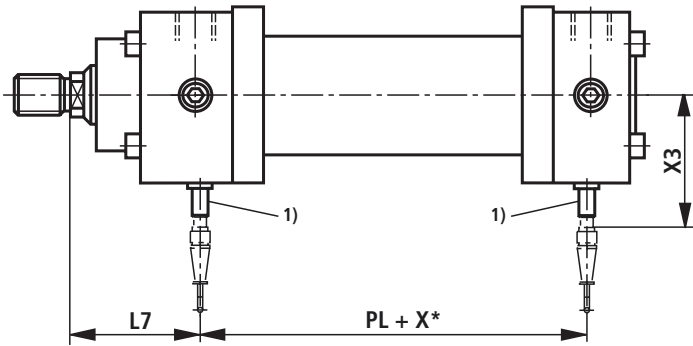
Pin assignment



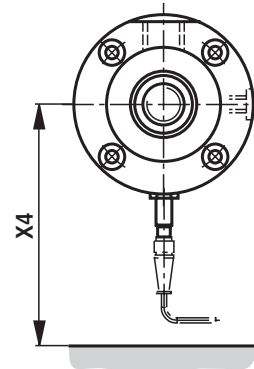
BN brown
BK black
BU blue

Proximity switch
(dimensions in mm)

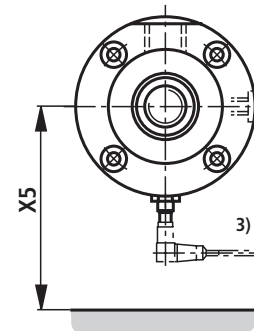
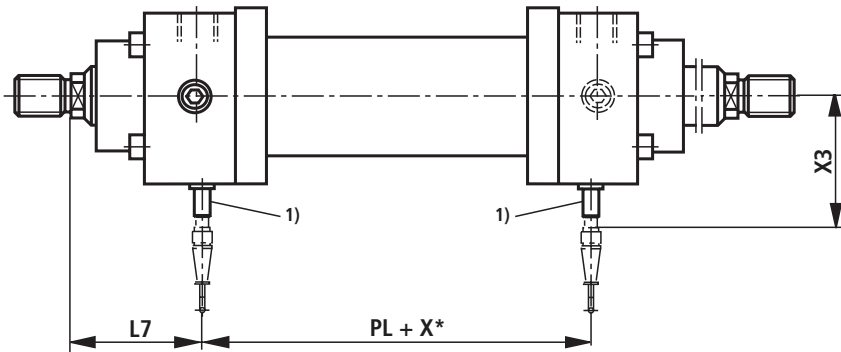
CDM1



Installation space for mating connector



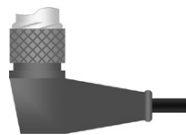
CGM1



Mating connector with 5 m cable

Material no. **R913016852**

(mating connector is **not** included in the scope of delivery, must be ordered separately)



Mating connector, angled with 5 m cable
(position of the cable outlet cannot be defined)

Material no. **R988064311**

(mating connector is **not** included in the scope of delivery, must be ordered separately)

Proximity switch

(dimensions in mm)

| ØAL | ØMM | PL | L7 | X3 | X4 | X5 |
|-------------------------|--------------------------|-----------|-----------|-----------|-----------|-----------|
| 25 ²⁾ | 14 18 | – | – | – | – | – |
| 32 ²⁾ | 18 22 | – | – | – | – | – |
| 40 | 22 28 | 97 | 71 | 94 | 170 | 125 |
| 50 | 28 36 | 103 | 76 | 98 | 175 | 130 |
| 63 | 36 45 | 113 | 84 | 103 | 180 | 135 |
| 80 | 45 56 | 124 | 96 | 109 | 185 | 140 |
| 100 | 56 70 | 150 | 114 | 116 | 195 | 150 |
| 125 | 70 90 | 158 | 129 | 126 | 205 | 160 |
| 160 | 90 110 | 181 | 148 | 136 | 215 | 170 |
| 200 | 110 140 | 214 | 195 | 151 | 230 | 185 |

Main dimensions see pages 14 ... 39

ØAL = Piston Ø

ØMM = Piston rod Ø

X* = Stroke length

- 1) The proximity switch is always located opposite of the line connection
- 2) Piston Ø 25 to 32 mm proximity switch not possible

Position measurement system

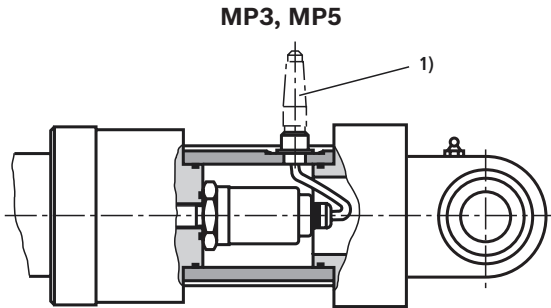
The position measurement system that is pressure-resistant up to 500 bar works in a contactless and absolute manner. The basis of this position measurement system is the magnetostrictive effect. Here, the coincidence of two magnetic fields triggers a torsional impulse.

This impulse runs on the wave guide inside the scale from the measuring point to the sensor head. The running time is constant and almost independent of temperature. It is proportional to the solenoid position and thus a measure for the actual position value and is converted within the sensor into a direct analog or digital output.

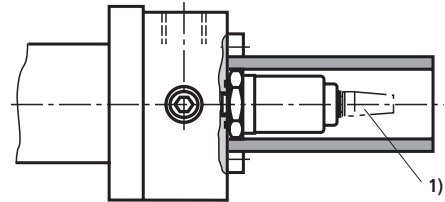
| Technical data | | | |
|---|----------------------------|---|--|
| (For applications outside these parameters, please consult us!) | | | |
| Admissible pressure | | bar | 500 |
| Analog output | | V | 0 ... 10 |
| | - Load resistance | kΩ | ≥ 5 |
| | - Resolution | | unlimited |
| Analog output | | mA | 4 ... 20 |
| | - Load resistance | Ω | 0 ... 500 |
| | - Resolution | | unlimited |
| Digital output | | | SSI 24 bit gray-coded |
| | - Resolution | μm | 5 |
| | - Direction of measurement | | forwards |
| Linearity (absolute accuracy) | - Analog | % | ≤ ±0.02 (referred to measurement length) |
| | | mm | min. ±0.05 |
| | - Digital | % | ≤ ±0.01 (referred to measurement length) |
| | | mm | min. ±0.04 |
| Reproducibility | % | ±0.001 (referred to measurement length) | |
| | mm | min. ±0.0025 | |
| Hysteresis | | mm | ≤ 0.004 |
| Supply voltage | | V DC | 24 (±10% with analog output) |
| | - Current consumption | mA | 100 |
| | - Residual ripple | % s-s | ≤ 1 |
| | | V DC | 24 (+ 20 %/- 15 % with digital output) |
| | - Current consumption | mA | 70 |
| | - Residual ripple | % s-s | ≤ 1 |
| Protection class | - Pipe and flange | IP | 67 |
| | - Sensor electronics | IP | 65 |
| Operating temperature | - Sensor electronics | °C | -40 ... +75 |
| Temperature coefficient | - Voltage | ppm/°C | 70 |
| | - Current | ppm/°C | 90 |

Position measurement system

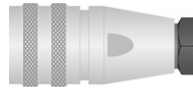
Types of mounting



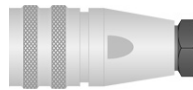
MF3, MF4, MT4, MS2



- 1) For analog output:
 6-pin mating connector
 Material no. **R900072231**
 (mating connector is **not** included in the scope of delivery, must be ordered separately)
 Protection class: IP 67



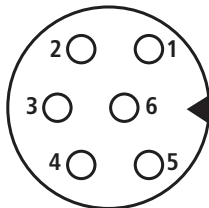
- 1) For digital output:
 7-pin mating connector
 Material no. **R900079551**
 (mating connector is **not** included in the scope of delivery, must be ordered separately)
 Protection class: IP 67



Pin assignment

Position measurement system (analog output)

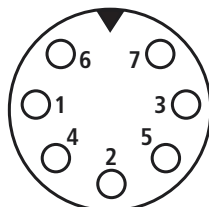
Connector (view to pin side)



| Pin | Cable | Signal / current | Signal / voltage |
|-----|--------|-----------------------------|-----------------------------|
| 1 | gray | 4 ... 20 mA | 0 ... 10 V |
| 2 | pink | DC ground | DC ground |
| 3 | Yellow | not used | not used |
| 4 | Green | DC ground | DC ground |
| 5 | brown | +24 V DC (+20 % / -15 %) | +24 V DC (+20 % / -15 %) |
| 6 | white | DC ground (0 V) | DC ground (0 V) |

Position measurement system (digital output)

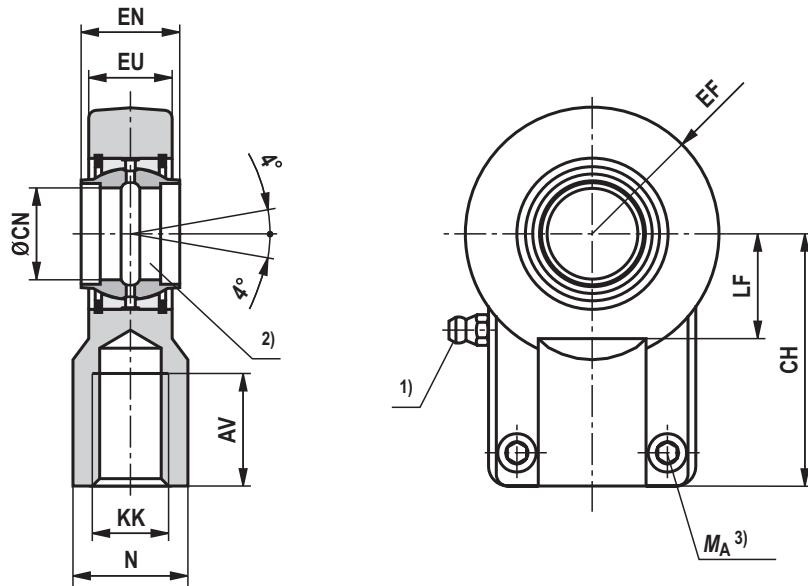
Connector (view to pin side)



| Pin | Cable | Signal / SSI |
|-----|--------|--------------------------|
| 1 | gray | Data (-) |
| 2 | pink | Data (+) |
| 3 | Yellow | Clock (+) |
| 4 | Green | Clock (-) |
| 5 | brown | +24 V DC (+20 % / -15 %) |
| 6 | white | DC ground (0 V) |
| 7 | - | not used |

Dimensions: Swivel head CGKD (clampable) (dimensions in mm)

ISO 8132



| ØAL | ØMM | Type | Material no. | Nominal force kN | AV min. | N max. | CH js13 | EF max. | ØCN H7 ²⁾ | EN h12 | EU max. |
|-----|-----------|-----------------------|--------------|---------------------|------------|-----------|------------|------------|-------------------------|-----------|------------|
| 25 | 14 / 18 | CGKD 12 ⁷⁾ | R900540998 | 8 | 17 | 19 | 38 | 16.5 | 12 | 12 | 11 |
| 25 | 18 | CGKD 16 | R900308559 | 12.5 | 19 | 22 | 44 | 20.5 | 16 | 16 | 14 |
| 32 | 18 / 22 | | | | | | | | | | |
| 32 | 22 | CGKD 20 | R900308576 | 20 | 23 | 28 | 52 | 25 | 20 | 20 | 17.5 |
| 40 | 22 / 28 | | | | | | | | | | |
| 40 | 28 | CGKD 25 | R900323332 | 32 | 29 | 31 | 65 | 32 | 25 | 25 | 22 |
| 50 | 28 / 36 | | | | | | | | | | |
| 50 | 36 | CGKD 32 | R900322049 | 50 | 37 | 38 | 80 | 40 | 32 | 32 | 28 |
| 63 | 36 / 45 | | | | | | | | | | |
| 63 | 45 | CGKD 40 | R900322029 | 80 | 46 | 47 | 97 | 50 | 40 | 40 | 34 |
| 80 | 45 / 56 | | | | | | | | | | |
| 80 | 56 | CGKD 50 | R900322719 | 125 | 57 | 58 | 120 | 63 | 50 | 50 | 42 |
| 100 | 56 / 70 | | | | | | | | | | |
| 100 | 70 | CGKD 63 | R900322028 | 200 | 64 | 70 | 140 | 72.5 | 63 | 63 | 53.5 |
| 125 | 70 / 90 | | | | | | | | | | |
| 125 | 90 | CGKD 80 | R900322700 | 320 | 86 | 91 | 180 | 92 | 80 | 80 | 68 |
| 160 | 90 / 110 | | | | | | | | | | |
| 160 | 110 | CGKD 100 | R900322030 | 500 | 96 | 110 | 210 | 114 | 100 | 100 | 85.5 |
| 200 | 110 / 140 | | | | | | | | | | |
| 200 | 140 | CGKD 125 | R900322026 | 800 | 113 | 135 | 260 | 160 | 125 | 125 | 105 |

Dimensions: Swivel head CGKD(clampable)

(dimensions in mm)

| \varnothing AL | \varnothing MM | Type | KK | LF min. | Clamping screw ISO 4762-10.9 | M_A ³⁾ Nm | m ⁴⁾ kg | C_0 ⁵⁾ kN | F_{adm} ⁶⁾ kN |
|------------------|------------------|-----------------------|----------|------------|---------------------------------|---------------------------|-------------------------|---------------------------|-------------------------------|
| 25 | 14 / 18 | CGKD 12 ⁷⁾ | M12x1.25 | 13 | M5x16 | 6 | 0.1 | 24.5 | 9.0 |
| 25 | 18 | CGKD 16 | M14x1.5 | 16.5 | M6x14 | 10 | 0.2 | 36.5 | 13.5 |
| 32 | 18 / 22 | | | | | | | | |
| 32 | 22 | CGKD 20 | M16x1.5 | 20.5 | M8x20 | 25 | 0.35 | 48 | 17.7 |
| 40 | 22 / 28 | | | | | | | | |
| 40 | 28 | CGKD 25 | M20x1.5 | 25.5 | M8x20 | 30 | 0.65 | 78 | 28.8 |
| 50 | 28 / 36 | | | | | | | | |
| 50 | 36 | CGKD 32 | M27x2 | 30 | M10x25 | 59 | 1.15 | 114 | 42.1 |
| 63 | 36 / 45 | | | | | | | | |
| 63 | 45 | CGKD 40 | M33x2 | 39 | M10x30 | 59 | 2.1 | 204 | 75.3 |
| 80 | 45 / 56 | | | | | | | | |
| 80 | 56 | CGKD 50 | M42x2 | 47 | M12x35 | 100 | 4 | 310 | 114.4 |
| 100 | 56 / 70 | | | | | | | | |
| 100 | 70 | CGKD 63 | M48x2 | 58 | M16x40 | 250 | 7.2 | 430 | 158.7 |
| 125 | 70 / 90 | | | | | | | | |
| 125 | 90 | CGKD 80 | M64x3 | 74 | M20x50 | 490 | 15 | 695 | 265.5 |
| 160 | 90 / 110 | | | | | | | | |
| 160 | 110 | CGKD 100 | M80x3 | 94 | M24x60 | 840 | 25.5 | 1060 | 391.1 |
| 200 | 110 / 140 | | | | | | | | |
| 200 | 140 | CGKD 125 | M100x3 | 116 | M24x70 | 840 | 52.5 | 1430 | 527.7 |

\varnothing AL = Piston \varnothing

\varnothing MM = Piston rod \varnothing

1) Lubricating nipple, cone head form A according to DIN 71412

2) Related bolt \varnothing m6

3) M_A = tightening torque

The swivel head must always be screwed against the shoulder of the piston rod. Afterwards, the clamping screws must be tightened with the specified tightening torque.

4) m = Weight swivel head in kg

5) C_0 = static load rating of the swivel head

6) F_{adm} = max. admissible load of the swivel head with oscillatory or alternating loads

7) Bearings cannot be re-lubricated



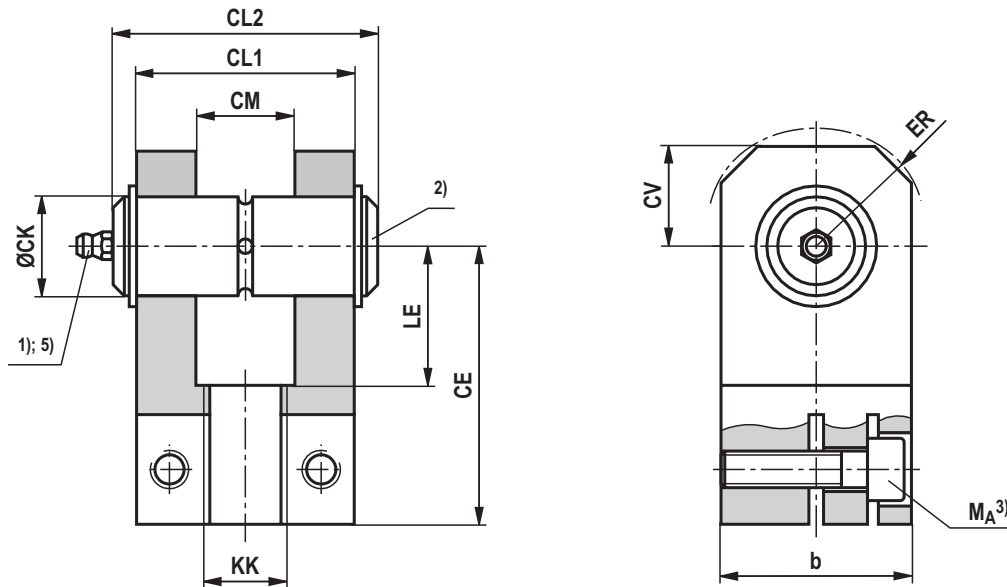
Notice:

Geometry and dimensions may differ depending on the manufacturer. All graphical presentations are examples. In case of combination with other mounting elements, the usability must be checked.

Dimensions: Fork clevis CCKB (clampable)

(dimensions in mm)

ISO 8132



| ØAL | ØMM | Type | Material no. | Nominal force kN | b max. | CE js13 | ØCK H9 2) | CL1 h16 | CL2 max. | CM A13 | ER max. |
|-----|-----------|------------|--------------|---------------------|-----------|------------|--------------|------------|-------------|-----------|------------|
| 25 | 14 / 18 | CCKB 12 5) | R900542842 | 8 | 25 | 38 | 12 | 28 | 49 | 12 | 16 |
| 25 | 18 | CCKB 16 | R900542843 | 12.5 | 30 | 44 | 16 | 36 | 57 | 16 | 20 |
| 32 | 18 / 22 | | | | | | | | | | |
| 32 | 22 | CCKB 20 | R900542844 | 20 | 40 | 52 | 20 | 45 | 72 | 20 | 25 |
| 40 | 22 / 28 | | | | | | | | | | |
| 40 | 28 | CCKB 25 | R900542845 | 32 | 50 | 65 | 25 | 56 | 84 | 25 | 32 |
| 50 | 28 / 36 | | | | | | | | | | |
| 50 | 36 | CCKB 32 | R900542846 | 50 | 65 | 80 | 32 | 70 | 105 | 32 | 40 |
| 63 | 36 / 45 | | | | | | | | | | |
| 63 | 45 | CCKB 40 | R900542847 | 80 | 80 | 97 | 40 | 90 | 133 | 40 | 50 |
| 80 | 45 / 56 | | | | | | | | | | |
| 80 | 56 | CCKB 50 | R900542848 | 125 | 100 | 120 | 50 | 110 | 165 | 50 | 63 |
| 100 | 56 / 70 | | | | | | | | | | |
| 100 | 70 | CCKB 63 | R900542849 | 200 | 140 | 140 | 63 | 140 | 185 | 63 | 71 |
| 125 | 70 / 90 | | | | | | | | | | |
| 125 | 90 | CCKB 80 | R900542850 | 320 | 180 | 180 | 80 | 170 | 225 | 80 | 90 |
| 160 | 90 / 110 | | | | | | | | | | |
| 160 | 110 | CCKB 100 | 6) | 500 | 220 | 210 | 100 | 210 | 6) | 100 | 110 |
| 200 | 110 / 140 | | | | | | | | | | |

Dimensions: Fork clevis CCKB (clampable)

(dimensions in mm)

| ØAL | ØMM | Type | KK | LE min. | CV max. | Clamping screw ISO 4762-10.9 | M_A ³⁾ Nm | m ⁴⁾ kg |
|-----|-----------|-----------------------|----------|------------|------------|---------------------------------|---------------------------|-------------------------|
| 25 | 14 / 18 | CCKB 12 ⁵⁾ | M12x1.25 | 18 | 16 | M4x16 | 2.9 | 0.2 |
| 25 | 18 | CCKB 16 | M14x1.5 | 22 | 20 | M6x20 | 10 | 0.35 |
| 32 | 18 / 22 | | | | | | | |
| 32 | 22 | CCKB 20 | M16x1.5 | 27 | 25 | M8x30 | 25 | 0.7 |
| 40 | 22 / 28 | | | | | | | |
| 40 | 28 | CCKB 25 | M20x1.5 | 34 | 32 | M10x35 | 49 | 1.4 |
| 50 | 28 / 36 | | | | | | | |
| 50 | 36 | CCKB 32 | M27x2 | 41 | 40 | M12x40 | 85 | 2.8 |
| 63 | 36 / 45 | | | | | | | |
| 63 | 45 | CCKB 40 | M33x2 | 51 | 50 | M16x50 | 210 | 5.2 |
| 80 | 45 / 56 | | | | | | | |
| 80 | 56 | CCKB 50 | M42x2 | 63 | 63 | M20x60 | 425 | 9.5 |
| 100 | 56 / 70 | | | | | | | |
| 100 | 70 | CCKB 63 | M48x2 | 75 | 71 | M24x80 | 730 | 21.5 |
| 125 | 70 / 90 | | | | | | | |
| 125 | 90 | CCKB 80 | M64x3 | 94 | 90 | M30x100 | 1450 | 38.2 |
| 160 | 90 / 110 | | | | | | | |
| 160 | 110 | CCKB 100 | M80x3 | 114 | 110 | M36x130 | 2480 | 6) |
| 200 | 110 / 140 | | | | | | | |

ØAL = Piston Ø

ØMM = Piston rod Ø

- 1) Lubricating nipple, cone head form A according to DIN 71412
- 2) Bolt Ø m6 required
(bolt and bolt lock are included in the scope of delivery and are not mounted upon delivery)
- 3) M_A = tightening torque
The fork clevis must always be screwed against the shoulder of the piston rod. Afterwards, the clamping screws must be tightened with the specified tightening torque.
- 4) m = Weight fork clevis in kg
- 5) Without lubrication bore
- 6) On request



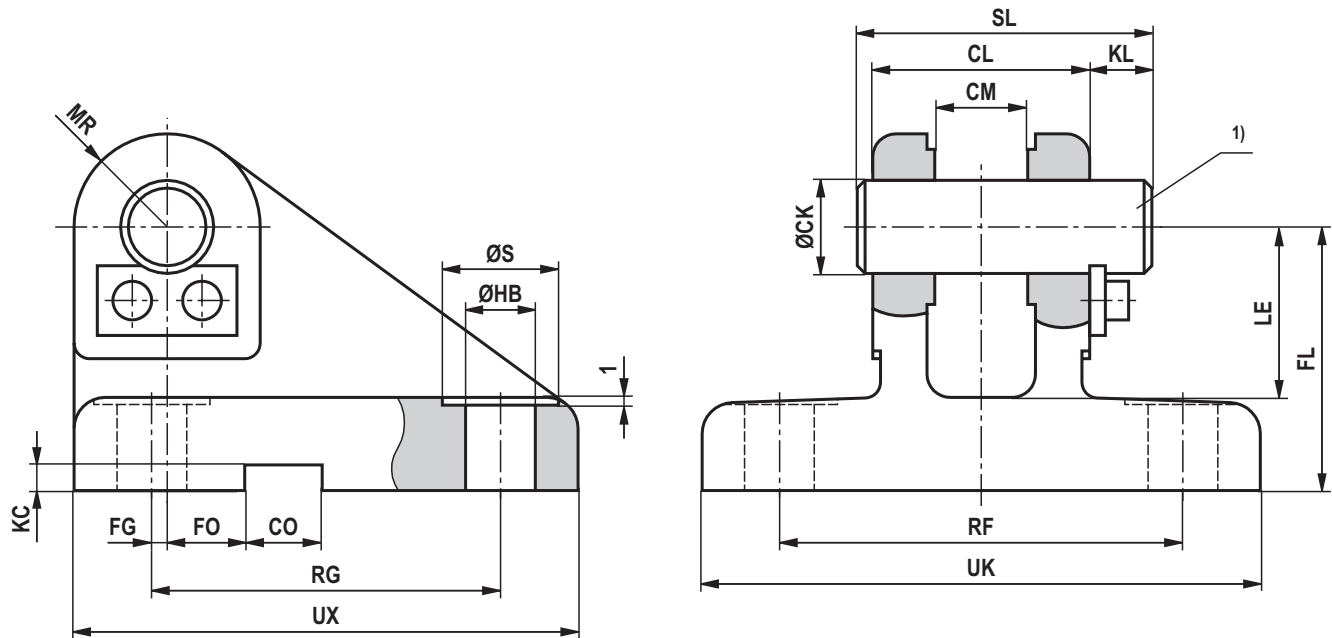
Notice:

Geometry and dimensions may differ depending on the manufacturer. All graphical presentations are examples. In case of combination with other mounting elements, the usability must be checked.

Dimensions: Clevis bracket CLCA

(dimensions in mm)

ISO 8132, form B



| ØAL | ØAL | ØMM | Type | Material no. | Nominal force kN | ØCK H9 ¹⁾ | CL h16 | CM A12 | CO N9 | FG js14 | FL js12 | FO js14 |
|-----|-----|-----------|----------|--------------|---------------------|-------------------------|-----------|-----------|----------|------------|------------|------------|
| 25 | 25 | 14 / 18 | CLCA 12 | R900542861 | 8 | 12 | 28 | 12 | 10 | 2 | 34 | 10 |
| 32 | 25 | 18 | CLCA 16 | R900542862 | 12.5 | 16 | 36 | 16 | 16 | 3.5 | 40 | 10 |
| | 32 | 18 / 22 | | | | | | | | | | |
| 40 | 32 | 22 | CLCA 20 | R900542863 | 20 | 20 | 45 | 20 | 16 | 7.5 | 45 | 10 |
| | 40 | 22 / 28 | | | | | | | | | | |
| 50 | 40 | 28 | CLCA 25 | R900542864 | 32 | 25 | 56 | 25 | 25 | 10 | 55 | 10 |
| | 50 | 28 / 36 | | | | | | | | | | |
| 63 | 50 | 36 | CLCA 32 | R900542865 | 50 | 32 | 70 | 32 | 25 | 14.5 | 65 | 6 |
| | 63 | 36 / 45 | | | | | | | | | | |
| 80 | 63 | 45 | CLCA 40 | R900542866 | 80 | 40 | 90 | 40 | 36 | 17.5 | 76 | 6 |
| | 80 | 45 / 56 | | | | | | | | | | |
| 100 | 80 | 56 | CLCA 50 | R900542867 | 125 | 50 | 110 | 50 | 36 | 25 | 95 | 0 |
| | 100 | 56 / 70 | | | | | | | | | | |
| 125 | 100 | 70 | CLCA 63 | R900542868 | 200 | 63 | 140 | 63 | 50 | 33 | 112 | 0 |
| | 125 | 70 / 90 | | | | | | | | | | |
| 160 | 125 | 90 | CLCA 80 | R900542869 | 320 | 80 | 170 | 80 | 50 | 45 | 140 | 0 |
| | 160 | 90 / 110 | | | | | | | | | | |
| 200 | 160 | 110 | CLCA 100 | 3) | 500 | 100 | 210 | 100 | 63 | 52.5 | 180 | 0 |
| | 200 | 110 / 140 | | | | | | | | | | |
| — | 200 | 140 | CLCA 125 | 3) | 800 | 125 | 270 | 125 | 80 | 75 | 230 | 0 |

Dimensions: Clevis bracket CLCA

(dimensions in mm)

| ØAL | ØAL | ØMM | Type | ØHB H13 | KC +0.3 | KL | LE min. | MR max. | RF js14 | RG js14 | ØS | SL | UK max. | UX max. | <i>m</i> ²⁾ kg |
|-----|-----|-----------|----------|------------|------------|----|------------|------------|------------|------------|----|-----|------------|------------|------------------------------|
| 25 | 25 | 14 / 18 | CLCA 12 | 9 | 3.3 | 8 | 22 | 12 | 52 | 45 | 15 | 38 | 72 | 65 | 0.45 |
| 32 | 25 | 18 | CLCA 16 | 11 | 4.3 | 8 | 27 | 16 | 65 | 55 | 18 | 46 | 90 | 80 | 1 |
| | 32 | 18 / 22 | | | | | | | | | | | | | |
| 40 | 32 | 22 | CLCA 20 | 11 | 4.3 | 10 | 30 | 20 | 75 | 70 | 18 | 58 | 100 | 95 | 1.5 |
| | 40 | 22 / 28 | | | | | | | | | | | | | |
| 50 | 40 | 28 | CLCA 25 | 13.5 | 5.4 | 10 | 37 | 25 | 90 | 85 | 20 | 69 | 120 | 115 | 3 |
| | 50 | 28 / 36 | | | | | | | | | | | | | |
| 63 | 50 | 36 | CLCA 32 | 17.5 | 5.4 | 13 | 43 | 32 | 110 | 110 | 26 | 87 | 145 | 145 | 5 |
| | 63 | 36 / 45 | | | | | | | | | | | | | |
| 80 | 63 | 45 | CLCA 40 | 22 | 8.4 | 16 | 52 | 40 | 140 | 125 | 33 | 110 | 185 | 170 | 9.6 |
| | 80 | 45 / 56 | | | | | | | | | | | | | |
| 100 | 80 | 56 | CLCA 50 | 26 | 8.4 | 19 | 65 | 50 | 165 | 150 | 40 | 133 | 215 | 200 | 15.5 |
| | 100 | 56 / 70 | | | | | | | | | | | | | |
| 125 | 100 | 70 | CLCA 63 | 33 | 11.4 | 20 | 75 | 63 | 210 | 170 | 48 | 164 | 270 | 230 | 27.5 |
| | 125 | 70 / 90 | | | | | | | | | | | | | |
| 160 | 125 | 90 | CLCA 80 | 39 | 11.4 | 26 | 95 | 80 | 250 | 210 | 57 | 202 | 320 | 280 | 47 |
| | 160 | 90 / 110 | | | | | | | | | | | | | |
| 200 | 160 | 110 | CLCA 100 | 52 | 12.4 | 30 | 120 | 100 | 315 | 250 | 76 | 246 | 405 | 345 | 3) |
| | 200 | 110 / 140 | | | | | | | | | | | | | |
| – | 200 | 140 | CLCA 125 | 52 | 15.4 | 32 | 170 | 125 | 365 | 350 | 76 | 310 | 455 | 450 | 3) |

ØAL = Piston Ø

ØMM = Piston rod Ø

1) Bolt Ø m6 required
(bolt and bolt lock are included in the scope of delivery and are not mounted upon delivery)

2) *m* = weight clevis bracket in kg

3) On request

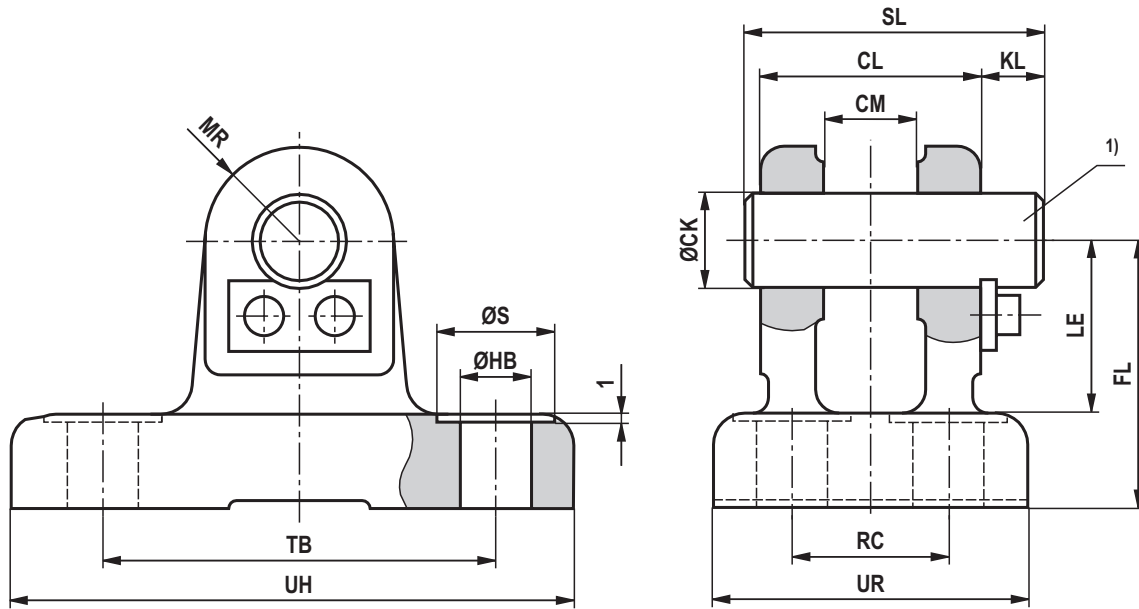
Notice:

Geometry and dimensions may differ depending on the manufacturer. All graphical presentations are examples. In case of combination with other mounting elements, the usability must be checked.

Dimensions: Clevis bracket CLCD

(dimensions in mm)

ISO 8132, form A



| ØAL | ØAL | ØMM | Type | Material no. | Nominal force kN | ØCK H9 1) | CL h16 | CM A13 | FL js12 | ØHB H13 | KL |
|-----|-----|-----------|----------|--------------|---------------------|--------------|-----------|-----------|------------|------------|----|
| 25 | 25 | 14 / 18 | CLCD 12 | R900542879 | 8 | 12 | 28 | 12 | 34 | 9 | 8 |
| 32 | 25 | 18 | CLCD 16 | R900542880 | 12.5 | 16 | 36 | 16 | 40 | 11 | 8 |
| | 32 | 18 / 22 | | | | | | | | | |
| 40 | 32 | 22 | CLCD 20 | R900542881 | 20 | 20 | 45 | 20 | 45 | 11 | 10 |
| | 40 | 22 / 28 | | | | | | | | | |
| 50 | 40 | 28 | CLCD 25 | R900542882 | 32 | 25 | 56 | 25 | 55 | 13.5 | 10 |
| | 50 | 28 / 36 | | | | | | | | | |
| 63 | 50 | 36 | CLCD 32 | R900542883 | 50 | 32 | 70 | 32 | 65 | 17.5 | 13 |
| | 63 | 36 / 45 | | | | | | | | | |
| 80 | 63 | 45 | CLCD 40 | R900542884 | 80 | 40 | 90 | 40 | 76 | 22 | 16 |
| | 80 | 45 / 56 | | | | | | | | | |
| 100 | 80 | 56 | CLCD 50 | R900542885 | 125 | 50 | 110 | 50 | 95 | 26 | 19 |
| | 100 | 56 / 70 | | | | | | | | | |
| 125 | 100 | 70 | CLCD 63 | R900542886 | 200 | 63 | 140 | 63 | 112 | 33 | 20 |
| | 125 | 70 / 90 | | | | | | | | | |
| 160 | 125 | 90 | CLCD 80 | R900542887 | 320 | 80 | 170 | 80 | 140 | 39 | 26 |
| | 160 | 90 / 110 | | | | | | | | | |
| 200 | 160 | 110 | CLCD 100 | 3) | 500 | 100 | 210 | 100 | 180 | 45 | 30 |
| | 200 | 110 / 140 | | | | | | | | | |
| - | 200 | 140 | CLCD 125 | 3) | 800 | 125 | 270 | 125 | 230 | 52 | 32 |

Dimensions: Clevis bracket CLCD

(dimensions in mm)

| \varnothing AL | \varnothing AL | \varnothing MM | Type | LE min. | MR max. | RC js14 | \varnothing S | SL | TB js14 | UR max. | UH max. | m ²⁾ kg |
|------------------|------------------|------------------|----------|------------|------------|------------|-----------------|-----|------------|------------|------------|-------------------------|
| 25 | 25 | 14 / 18 | CLCD 12 | 22 | 12 | 20 | 15 | 38 | 50 | 40 | 70 | 0.35 |
| 32 | 25 | 18 | CLCD 16 | 27 | 16 | 26 | 18 | 46 | 65 | 50 | 90 | 0.7 |
| | 32 | 18 / 22 | | | | | | | | | | |
| 40 | 32 | 22 | CLCD 20 | 30 | 20 | 32 | 18 | 58 | 75 | 58 | 98 | 0.95 |
| | 40 | 22 / 28 | | | | | | | | | | |
| 50 | 40 | 28 | CLCD 25 | 37 | 25 | 40 | 20 | 69 | 85 | 70 | 113 | 1.9 |
| | 50 | 28 / 36 | | | | | | | | | | |
| 63 | 50 | 36 | CLCD 32 | 43 | 32 | 50 | 26 | 87 | 110 | 85 | 143 | 3 |
| | 63 | 36 / 45 | | | | | | | | | | |
| 80 | 63 | 45 | CLCD 40 | 52 | 40 | 65 | 33 | 110 | 130 | 108 | 170 | 5.5 |
| | 80 | 45 / 56 | | | | | | | | | | |
| 100 | 80 | 56 | CLCD 50 | 65 | 50 | 80 | 40 | 133 | 170 | 130 | 220 | 10.6 |
| | 100 | 56 / 70 | | | | | | | | | | |
| 125 | 100 | 70 | CLCD 63 | 75 | 63 | 100 | 48 | 164 | 210 | 160 | 270 | 17 |
| | 125 | 70 / 90 | | | | | | | | | | |
| 160 | 125 | 90 | CLCD 80 | 95 | 80 | 125 | 57 | 202 | 250 | 210 | 320 | 32 |
| | 160 | 90 / 110 | | | | | | | | | | |
| 200 | 160 | 110 | CLCD 100 | 120 | 100 | 160 | 66 | 246 | 315 | 260 | 400 | 3) |
| | 200 | 110 / 140 | | | | | | | | | | |
| – | 200 | 140 | CLCD 125 | 170 | 125 | 200 | 76 | 310 | 385 | 320 | 470 | 3) |

\varnothing AL = Piston \varnothing

\varnothing MM = Piston rod \varnothing

1) Bolt \varnothing m6 required
(bolt and bolt lock are included in the scope of delivery and are not mounted upon delivery)

2) m = weight clevis bracket in kg

3) On request

Notice:

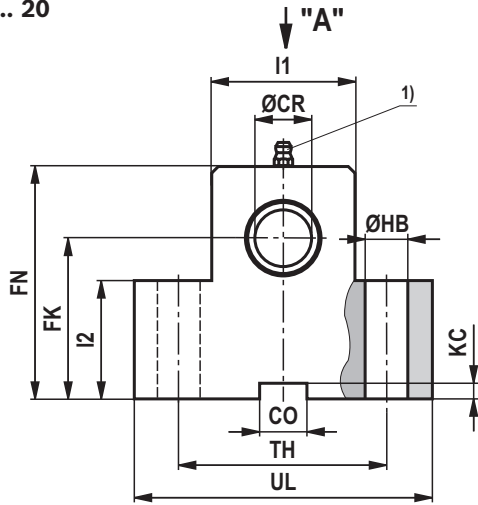
Geometry and dimensions may differ depending on the manufacturer. All graphical presentations are examples. In case of combination with other mounting elements, the usability must be checked.

Dimensions: Trunnion bearing block CLTB

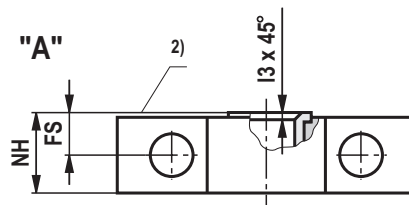
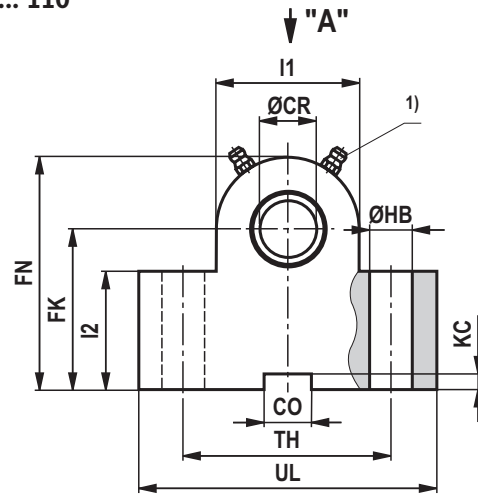
(dimensions in mm)

ISO 8132

CLTB 12 ... 20



CLTB 25 ... 110



| ØAL | Type ³⁾ | Material no. | Nominal force kN ⁴⁾ | ØCR H7 | CO N9 | FK js12 | FN max. | FS js14 | ØHB H13 | KC +0.3 |
|-------------------|--------------------|--------------|-----------------------------------|-----------|----------|------------|------------|------------|------------|------------|
| 25 | CLTB 12 | R900772607 | 8 | 12 | 10 | 34 | 50 | 8 | 9 | 3.3 |
| 32 | CLTB 16 | R900772608 | 12.5 | 16 | 16 | 40 | 60 | 10 | 11 | 4.3 |
| 40 | CLTB 20 | R900772609 | 20 | 20 | 16 | 45 | 70 | 10 | 11 | 4.3 |
| 50 | CLTB 25 | R900772610 | 32 | 25 | 25 | 55 | 80 | 12 | 13.5 | 5.4 |
| 63 | CLTB 32 | R900772611 | 50 | 32 | 25 | 65 | 100 | 15 | 17.5 | 5.4 |
| 80 | CLTB 40 | R900772612 | 80 | 40 | 36 | 76 | 120 | 16 | 22 | 8.4 |
| 100 | CLTB 50 | R900772613 | 125 | 50 | 36 | 95 | 140 | 20 | 26 | 8.4 |
| 125 | CLTB 63 | R900772614 | 200 | 63 | 50 | 112 | 180 | 25 | 33 | 11.4 |
| 160 ⁶⁾ | CLTB 80 | R900772615 | 320 | 80 | 50 | 140 | 220 | 31 | 39 | 11.4 |
| 200 ⁶⁾ | CLTB 100 | R901205929 | 500 | 100 | 63 | 180 | 280 | 45 | 52 | 12.4 |

Dimensions: Trunnion bearing block CLTB

(dimensions in mm)

| ØAL | Type ³⁾ | I1 | I2 | I3 | NH max. | TH js14 | UL max. | m ⁵⁾ kg |
|--------------------------|---------------------------|-----------|-----------|-----------|-------------------|-------------------|-------------------|------------------------------|
| 25 | CLTB 12 | 25 | 25 | 1 | 17 | 40 | 63 | 0.4 |
| 32 | CLTB 16 | 30 | 30 | 1 | 21 | 50 | 80 | 0.85 |
| 40 | CLTB 20 | 40 | 38 | 1.5 | 21 | 60 | 90 | 1.2 |
| 50 | CLTB 25 | 56 | 45 | 1.5 | 26 | 80 | 110 | 2.1 |
| 63 | CLTB 32 | 70 | 52 | 2 | 33 | 110 | 150 | 4.55 |
| 80 | CLTB 40 | 88 | 60 | 2.5 | 41 | 125 | 170 | 7.3 |
| 100 | CLTB 50 | 100 | 75 | 2.5 | 51 | 160 | 210 | 14.5 |
| 125 | CLTB 63 | 130 | 85 | 3 | 61 | 200 | 265 | 23.1 |
| 160 ⁶⁾ | CLTB 80 | 160 | 112 | 3.5 | 81 | 250 | 325 | 52.3 |
| 200 ⁶⁾ | CLTB 100 | 200 | 145 | 4.5 | 102 | 295 | 385 | ⁷⁾ |

ØAL = Piston Ø

- 1) Lubricating nipple, cone head form A according to DIN 71412
- 2) Contact surface trunnion (inside)
- 3) Bearing blocks are always supplied in pairs
- 4) Nominal force applies to applications in pairs
- 5) **m** = weight of trunnion bracket in kg (specified per pair)
- 6) Bearing blocks for piston Ø 160 and 200 mm, dimensions differ for replacement transactions (CDM1 / CGM1 / CSM1 series 1X). Please consult us!
- 7) On request

Notice:

Geometry and dimensions may differ depending on the manufacturer. All graphical presentations are examples. In case of combination with other mounting elements, the usability must be checked. The trunnion brackets are suitable for mounting type MT4.

Kinking

For the admissible stroke length with flexibly guided load and a factor of 3.5 for safety against kinking, please refer to the relevant table. For other installation positions of the cylinder, the admissible stroke length must be interpolated. Admissible stroke length for non-guided load on request. Kinking calculations are carried out according to the following formulas:

1. Calculation according to Euler

$$F = \frac{\pi^2 \cdot E \cdot I}{\nu \cdot L_K^2} \quad \text{if } \lambda > \lambda_g$$

2. Calculation according to Tetmajer

$$F = \frac{d^2 \cdot \pi (335 - 0.62 \cdot \lambda)}{4 \cdot \nu} \quad \text{if } \lambda \leq \lambda_g$$

Explanation:

E = Module of elasticity in N/mm²
= 2.1 x 10⁵ for steel

I = Geometrical moment of inertia in mm⁴

$$\text{for circular cross-section} = \frac{d^4 \cdot \pi}{64} = 0.0491 \cdot d^4$$

ν = 3.5 (safety factor)

L_K = free kinking length in mm (depending on the type of mounting see sketches A, B, C)

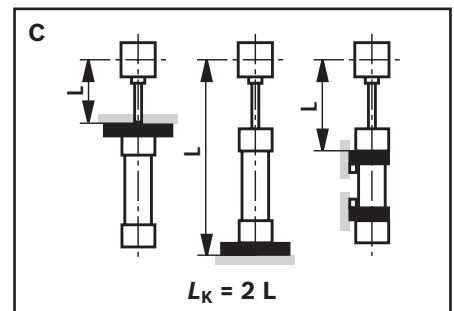
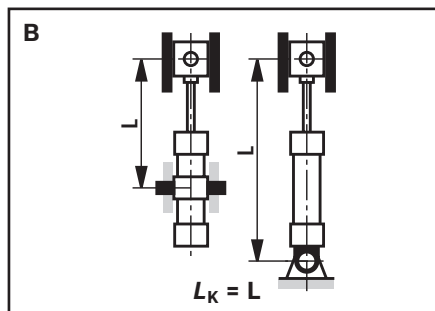
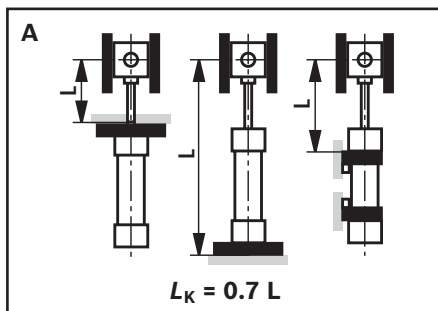
d = Piston rod \varnothing in mm

λ = Slenderness ratio

$$= \frac{4 \cdot L_K}{d} \quad \lambda_g = \pi \sqrt{\frac{E}{0.8 \cdot R_e}}$$

R_e = yield strength of the piston rod material

Influence of the type of mounting on the kinking length:



Admissible stroke length

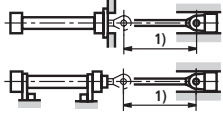
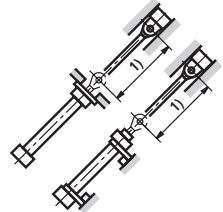
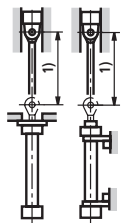
(dimensions in mm)

Type of mounting MF2, MF4, MT4 trunnion (with XV_{max.})

| ØAL | ØMM | admissible stroke length with | | | | | | | | | Installation position |
|-----|-----|-------------------------------|------|------|---------|------|------|---------|------|------|-----------------------|
| | | 70 bar | | | 100 bar | | | 160 bar | | | |
| | | 0° | 45° | 90° | 0° | 45° | 90° | 0° | 45° | 90° | |
| 25 | 14 | 260 | 270 | 305 | 215 | 220 | 240 | 160 | 165 | 170 | |
| | 18 | 435 | 455 | 485 | 385 | 400 | 460 | 310 | 315 | 340 | |
| 32 | 18 | 340 | 355 | 410 | 290 | 295 | 325 | 215 | 220 | 230 | |
| | 22 | 510 | 535 | 665 | 450 | 465 | 535 | 365 | 370 | 400 | |
| 40 | 22 | 405 | 425 | 495 | 345 | 355 | 395 | 265 | 270 | 285 | |
| | 28 | 640 | 680 | 875 | 575 | 600 | 710 | 475 | 490 | 535 | |
| 50 | 28 | 540 | 560 | 665 | 465 | 480 | 535 | 365 | 370 | 390 | |
| | 36 | 845 | 895 | 1180 | 765 | 805 | 970 | 645 | 665 | 735 | |
| 63 | 36 | 705 | 740 | 900 | 620 | 640 | 725 | 500 | 510 | 540 | |
| | 45 | 1030 | 1100 | 1480 | 945 | 990 | 1220 | 805 | 830 | 930 | |
| 80 | 45 | 855 | 900 | 1120 | 760 | 790 | 905 | 615 | 630 | 680 | |
| | 56 | 1230 | 1310 | 1700 | 1130 | 1190 | 1490 | 975 | 1010 | 1140 | |
| 100 | 56 | 1030 | 1090 | 1390 | 925 | 965 | 1130 | 760 | 780 | 850 | |
| | 70 | 1500 | 1590 | 2000 | 1380 | 1460 | 1880 | 1200 | 1250 | 1440 | |
| 125 | 70 | 1280 | 1360 | 1770 | 1160 | 1210 | 1450 | 970 | 995 | 1090 | |
| | 90 | 1900 | 2030 | 2300 | 1770 | 1880 | 2300 | 1570 | 1640 | 1950 | |
| 160 | 90 | 1620 | 1710 | 2320 | 1470 | 1540 | 1900 | 1250 | 1290 | 1440 | |
| | 110 | 2200 | 2350 | 2600 | 2060 | 2180 | 2600 | 1820 | 1900 | 2280 | |
| 200 | 110 | 1890 | 2010 | 2760 | 1730 | 1820 | 2260 | 1470 | 1520 | 1720 | |
| | 140 | 2720 | 2910 | 3000 | 2560 | 2720 | 3000 | 2290 | 2400 | 2980 | |

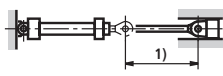
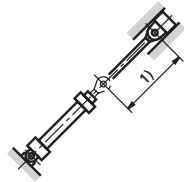
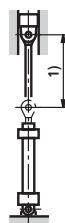
Admissible stroke length (dimensions in mm)

Type of mounting MF1, MF3, MS2

| ØAL | ØMM | admissible stroke length with | | | | | | | | | Installation position |
|-----|-----|-------------------------------|------|------|---------|------|------|---------|------|------|---|
| | | 70 bar | | | 100 bar | | | 160 bar | | | |
| | | 0° | 45° | 90° | 0° | 45° | 90° | 0° | 45° | 90° | |
| 25 | 14 | 350 | 355 | 380 | 300 | 305 | 315 | 235 | 240 | 240 | 0°  45°  90°  |
| | 18 | 530 | 550 | 645 | 470 | 485 | 535 | 390 | 400 | 415 | |
| 32 | 18 | 445 | 455 | 495 | 385 | 390 | 410 | 310 | 315 | 320 | |
| | 22 | 615 | 640 | 660 | 550 | 570 | 625 | 460 | 465 | 490 | |
| 40 | 22 | 530 | 545 | 590 | 460 | 470 | 490 | 370 | 375 | 380 | |
| | 28 | 775 | 810 | 980 | 700 | 725 | 815 | 590 | 600 | 635 | |
| 50 | 28 | 670 | 690 | 770 | 590 | 600 | 640 | 475 | 485 | 495 | |
| | 36 | 975 | 1020 | 1300 | 890 | 925 | 1080 | 765 | 785 | 845 | |
| 63 | 36 | 845 | 880 | 1000 | 750 | 770 | 830 | 615 | 625 | 645 | |
| | 45 | 1170 | 1230 | 1400 | 1070 | 1120 | 1330 | 920 | 950 | 1040 | |
| 80 | 45 | 1020 | 1060 | 1240 | 910 | 935 | 1020 | 750 | 765 | 795 | |
| | 56 | 1390 | 1470 | 1700 | 1280 | 1340 | 1620 | 1110 | 1150 | 1270 | |
| 100 | 56 | 1240 | 1290 | 1540 | 1110 | 1150 | 1280 | 930 | 940 | 990 | |
| | 70 | 1680 | 1780 | 2000 | 1560 | 1640 | 2000 | 1370 | 1410 | 1590 | |
| 125 | 70 | 1510 | 1570 | 1920 | 1360 | 1400 | 1590 | 1140 | 1160 | 1240 | |
| | 90 | 2090 | 2220 | 2300 | 1960 | 2060 | 2300 | 1740 | 1810 | 2110 | |
| 160 | 90 | 1880 | 1980 | 2500 | 1720 | 1780 | 2070 | 1460 | 1500 | 1610 | |
| | 110 | 2430 | 2580 | 2600 | 2280 | 2400 | 2600 | 2600 | 2110 | 2460 | |
| 200 | 110 | 2210 | 2320 | 2980 | 2020 | 2100 | 2470 | 1730 | 1770 | 1920 | |
| | 140 | 2980 | 3000 | 3000 | 2810 | 2980 | 3000 | 2540 | 2650 | 3000 | |

1) adm. stroke

Type of mounting: MP3, MP5

| ØAL | ØMM | admissible stroke length with | | | | | | | | | Installation position |
|-----|-----|-------------------------------|------|------|---------|------|------|---------|------|------|--|
| | | 70 bar | | | 100 bar | | | 160 bar | | | |
| | | 0° | 45° | 90° | 0° | 45° | 90° | 0° | 45° | 90° | |
| 25 | 14 | 155 | 160 | 175 | 120 | 125 | 130 | 75 | 80 | 85 | 0°  45°  90°  |
| | 18 | 300 | 310 | 360 | 250 | 260 | 285 | 190 | 195 | 220 | |
| 32 | 18 | 210 | 220 | 240 | 165 | 170 | 180 | 110 | 115 | 120 | |
| | 22 | 345 | 360 | 420 | 290 | 300 | 330 | 220 | 225 | 235 | |
| 40 | 22 | 255 | 265 | 295 | 205 | 210 | 225 | 140 | 145 | 150 | |
| | 28 | 445 | 465 | 560 | 385 | 395 | 445 | 295 | 305 | 320 | |
| 50 | 28 | 350 | 360 | 405 | 285 | 290 | 315 | 205 | 210 | 215 | |
| | 36 | 600 | 630 | 770 | 525 | 540 | 615 | 415 | 425 | 455 | |
| 63 | 36 | 470 | 490 | 560 | 395 | 405 | 440 | 290 | 292 | 310 | |
| | 45 | 740 | 780 | 970 | 650 | 680 | 780 | 525 | 535 | 580 | |
| 80 | 45 | 575 | 600 | 700 | 490 | 505 | 555 | 370 | 375 | 390 | |
| | 56 | 890 | 935 | 1190 | 790 | 820 | 960 | 640 | 660 | 715 | |
| 100 | 56 | 705 | 735 | 880 | 600 | 620 | 695 | 460 | 470 | 495 | |
| | 70 | 1085 | 1150 | 1500 | 970 | 1015 | 1215 | 800 | 825 | 910 | |
| 125 | 70 | 890 | 935 | 1135 | 770 | 800 | 905 | 605 | 615 | 655 | |
| | 90 | 1400 | 1490 | 2030 | 1270 | 1340 | 1660 | 1070 | 1110 | 1250 | |
| 160 | 90 | 1130 | 1190 | 1490 | 990 | 1030 | 1190 | 790 | 810 | 870 | |
| | 110 | 1620 | 1720 | 2370 | 1470 | 1550 | 1930 | 1240 | 1290 | 1450 | |
| 200 | 110 | 1320 | 1390 | 1770 | 1160 | 1210 | 1420 | 930 | 955 | 1040 | |
| | 140 | 2010 | 2140 | 3000 | 1850 | 1950 | 2520 | 1580 | 1650 | 1910 | |

1) adm. stroke

End position cushioning

End position cushioning:

The objective is to reduce the velocity of a moved mass, whose center of gravity lies on the cylinder axis to a level, at which neither the cylinder nor the machine into which the cylinder is installed is damaged. For velocities above 20 mm/s, we recommend the use of an end position cushioning feature, which absorbs energy without requiring the use of additional equipment. It must, however, always be verified whether end position cushioning is also required for lower velocities with large masses.

Damping capacity:

When decelerating masses via the end position cushioning, the structural-inherent cushioning capacity must not be exceeded. Cylinders with end position cushioning can achieve their full damping capacity only over the entire stroke length.

With the adjustable end position cushioning version “E”, a throttle valve is additionally provided when compared with version “D”. End position cushioning version “E”

allows cycle times to be optimized. The max. damping capacity can only be achieved when the throttle valve is closed.

The calculation depends on the factors weight, velocity, system pressure and installation position. For this reason, mass and velocity are used to determine the characteristic D_m and system pressure and installation position to determine the characteristic D_p . These two characteristics are used for verifying the admissible damping capacity in the “damping capacity” diagram. The intersection point of the characteristics D_m and D_p must always be below the damping capacity curve of the selected cylinder. The values in the diagrams refer to an average oil temperature of +45 to +65 °C with the throttle valve being closed.

For special applications with very short stroke times, high velocities or large masses, cylinders with special end position cushioning versions can be offered on request. When fixed or adjustable stops are used, special measures must be taken!

Formulas:

$$D_m = \frac{m}{10^k}; K = kv (0.5-v)$$

m = moved weight in kg
 v = stroke velocity in m/s
 kv = see table page 65

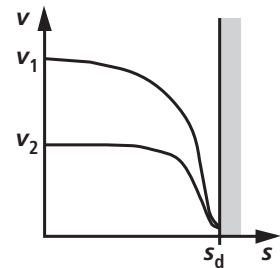
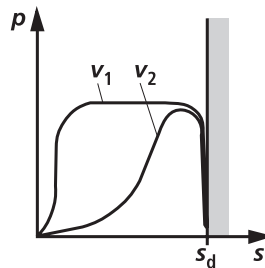
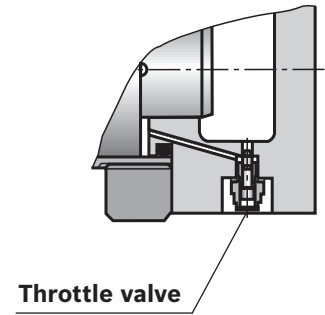
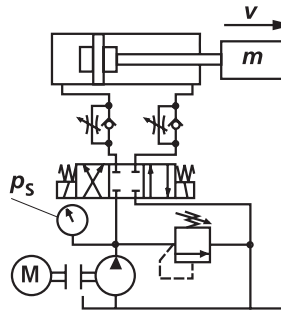
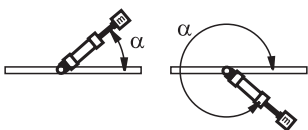
Extension:

$$D_p = p_s - \frac{m \cdot 9.81 \cdot \sin \alpha}{A_1 \cdot 10}$$

Retraction:

$$D_p = p_s + \frac{m \cdot 9.81 \cdot \sin \alpha}{A_3 \cdot 10}$$

p_s = system pressure in bar
 A_1 = piston area in cm² (see page 10)
 A_3 = annulus area in cm² (see page 10)
 α = angle to the horizontal in degree



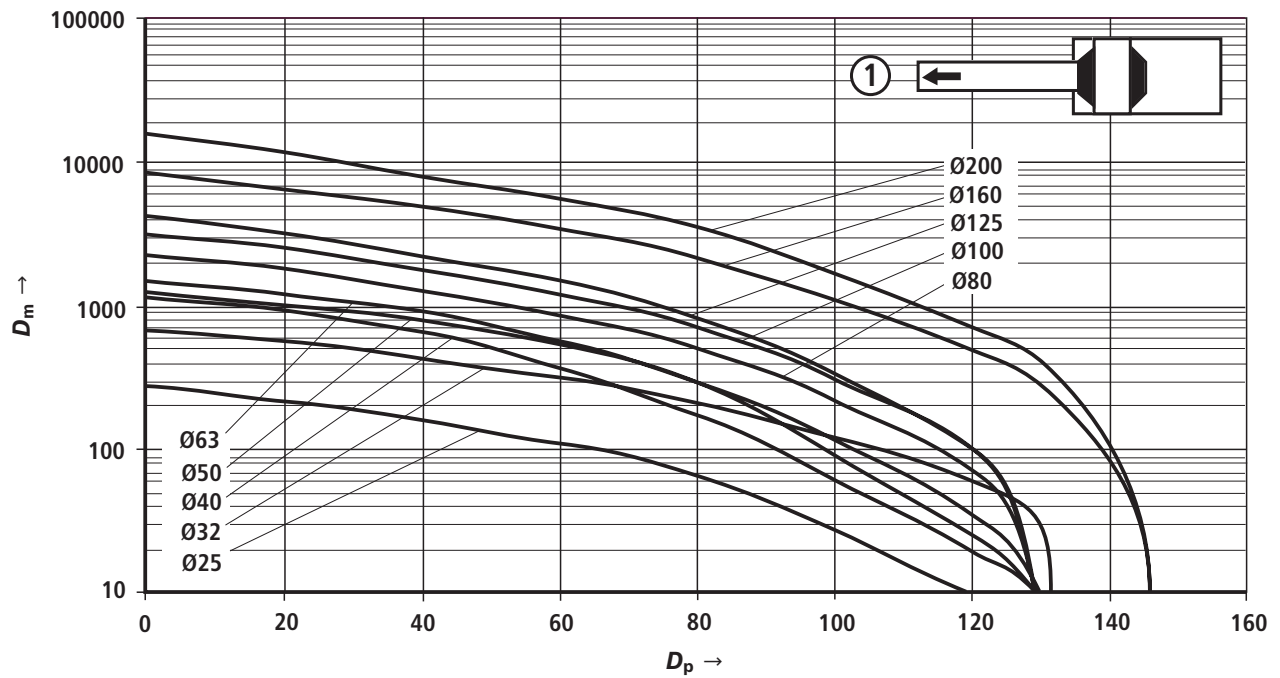
Damping length

| ∅ALmm | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 | 200 |
|-----------|----|----|----|----|----|----|-----|-----|-----|-----|
| Head side | 15 | 19 | 23 | 22 | 27 | 27 | 32 | 33 | 40 | 46 |
| Base side | 15 | 19 | 23 | 22 | 27 | 27 | 32 | 33 | 40 | 46 |

End position cushioning / damping capacity

| AL Ø mm | 25 | 32 | 40 | 50 | 63 | 80 | 100 | 125 | 160 | 200 |
|---------|------|------|------|------|------|------|------|------|------|------|
| kv ① | 2.97 | 2.56 | 2.82 | 3.51 | 3.02 | 2.53 | 2.65 | 2.91 | 2.76 | 2.95 |
| kv ② | 3.15 | 2.93 | 2.95 | 3.45 | 2.95 | 2.53 | 2.93 | 2.95 | 2.95 | 3.1 |
| kv ③ | 3.1 | 2.73 | 3.1 | 3.51 | 2.95 | 2.51 | 2.91 | 2.95 | 2.91 | 2.93 |

Damping capacity:

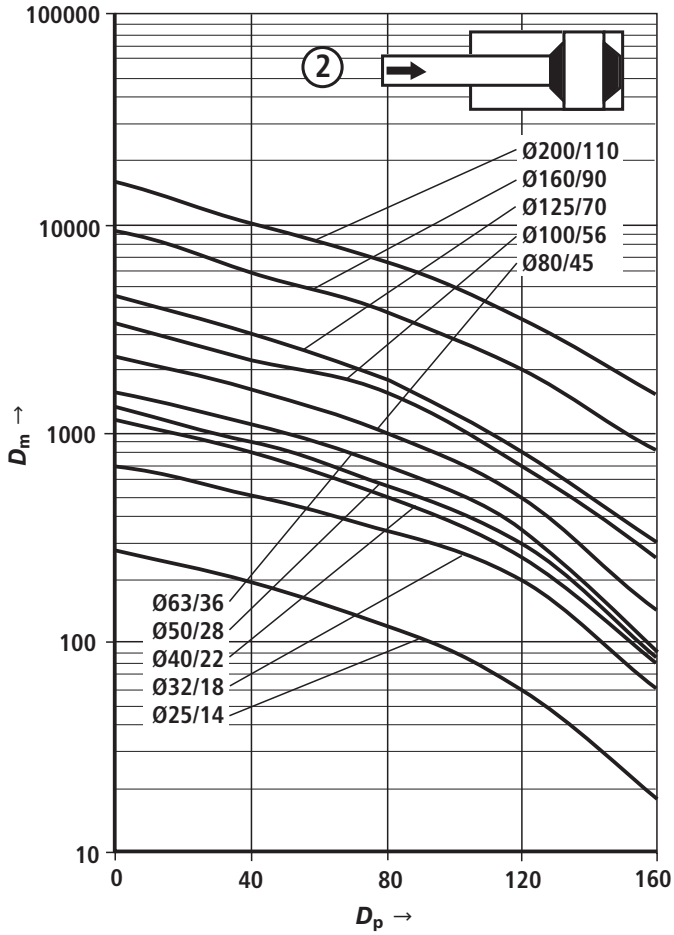
 Extension for CDM1 and CSM1 with kv ①


End position cushioning / damping capacity

Damping capacity:

Retraction for CDM1, CGM1 and CSM1 with k_v ②;

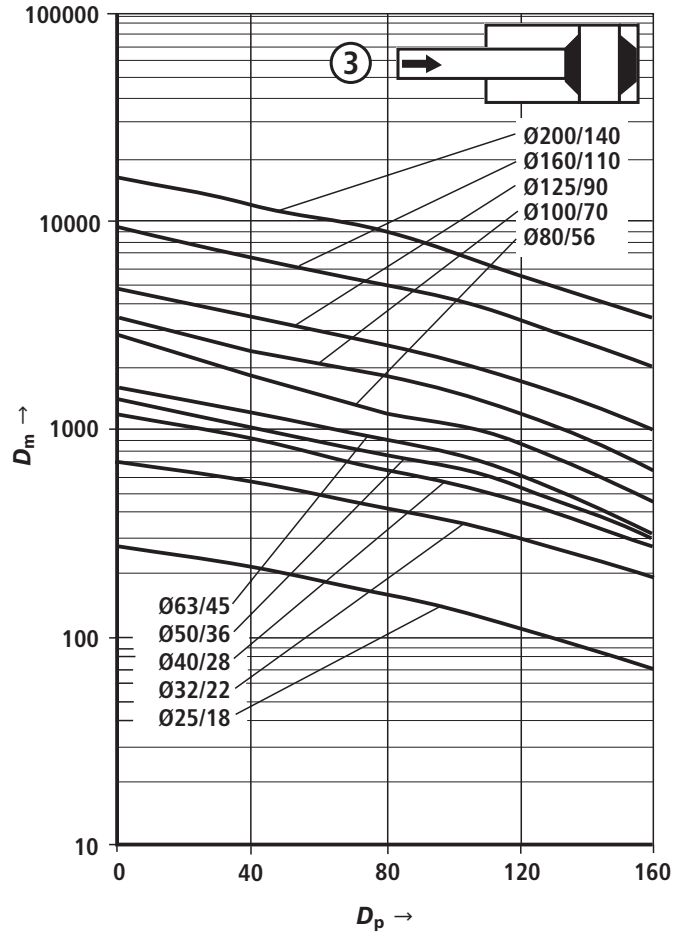
Extension for CGM1 with k_v ②



Damping capacity:

Retraction for CDM1, CGM1 and CSM1 with k_v ③;

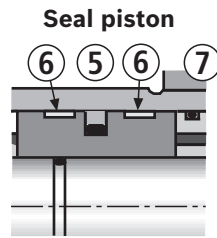
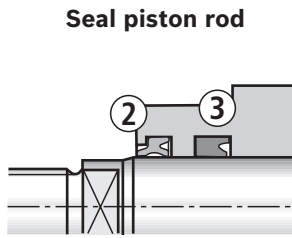
Extension for CGM1 with k_v ③



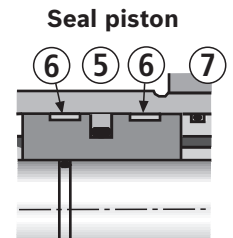
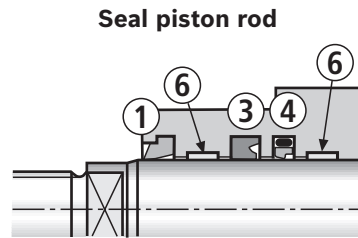
Seal (piston rod / piston)

Version "M and V"

Piston Ø (ØAL) 25 and 32 mm

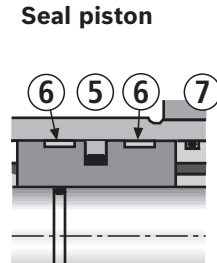
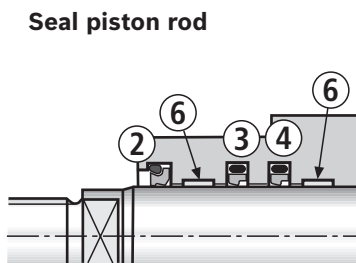


Piston Ø (ØAL) 40 ... 200 mm



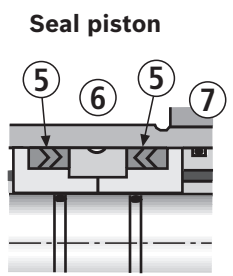
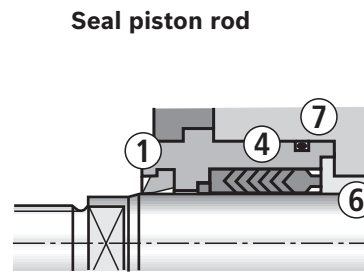
Version "T and S"

Piston Ø (ØAL) 40 ... 200 mm



Version "A"

Piston Ø (ØAL) 50 ... 200 mm



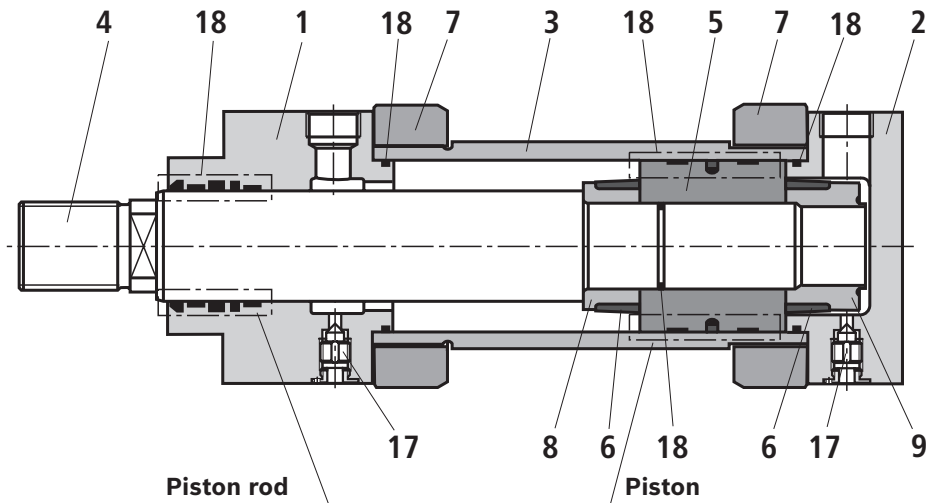
| Medium | Seal version | Compatibility of the medium used / seal materials | | | | | | |
|--------------|--------------|---|-----------------------|------------------------|-----------------------|---------------------------------------|----------------------------|------------------|
| | | ① Wiper | ② Double wiper | | ③ Rod seal | | ④ Rod seal (primary) | ⑤ Piston seal |
| | | | Piston Ø 25 and 32 | Piston Ø 40 ... 200 | Piston Ø 25 and 32 | (secondary) piston Ø 40 ... 200 | | |
| HL, HLP | M | TPE | AU | - | AU | AU | PTFE / NBR | TPE / NBR |
| HL, HLP, HFC | T | - | - | PTFE / NBR | - | PTFE / NBR | PTFE / NBR | PTFE / NBR |
| HFDR | V | TPE | FKM | - | FKM | PTFE / FKM | PTFE / FKM | PTFE / FKM |
| HFDR | S | - | - | PTFE / FKM | - | PTFE / FKM | PTFE / FKM | PTFE / FKM |
| HL, HLP, HFC | A | TPE | - | - | - | - | POM / NBR | POM / NBR |

| Medium | Seal version | ⑥ Guide | ⑦ Seal ring | Features |
|--------------|--------------|------------------|----------------|-----------------------------------|
| HL, HLP | M | Fabric composite | NBR | Holding function on the piston |
| HL, HLP, HFC | T | Fabric composite | NBR | low friction |
| HFDR | V | Fabric composite | FKM | high temperature |
| HFDR | S | Fabric composite | FKM | low friction and high temperature |
| HL, HLP, HFC | A | Red brass | NBR | Holding function |

HL, HLP, HFDR: -20 °C ... +80 °C

HFC: -20 °C ... +60 °C

Spare parts drawing: Series: CDM1

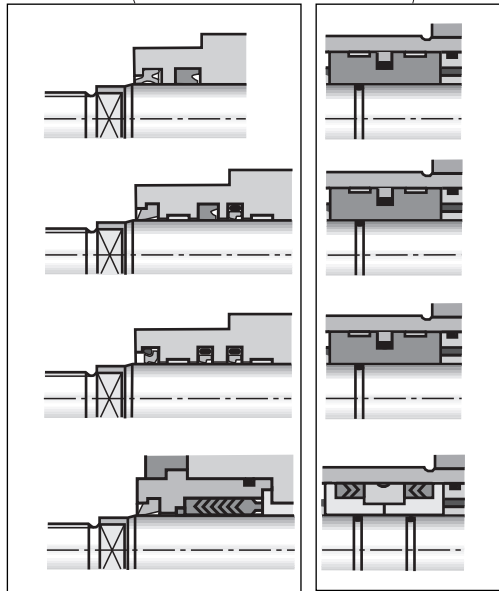


Seal "M and V"
piston Ø (Ø AL) 25 and 32

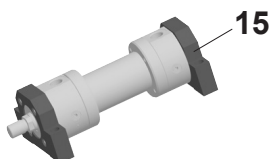
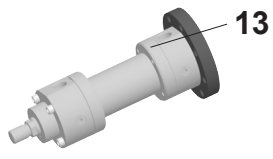
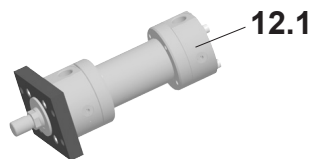
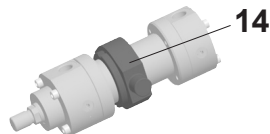
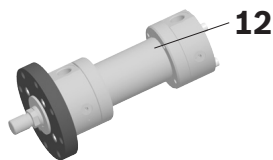
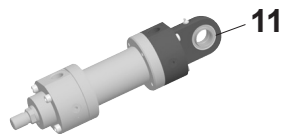
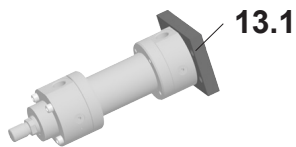
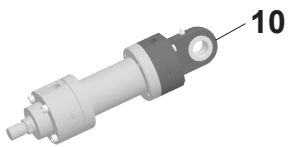
Seal "M and V"
piston Ø (Ø AL) 40 ... 200

Seal "T and S"

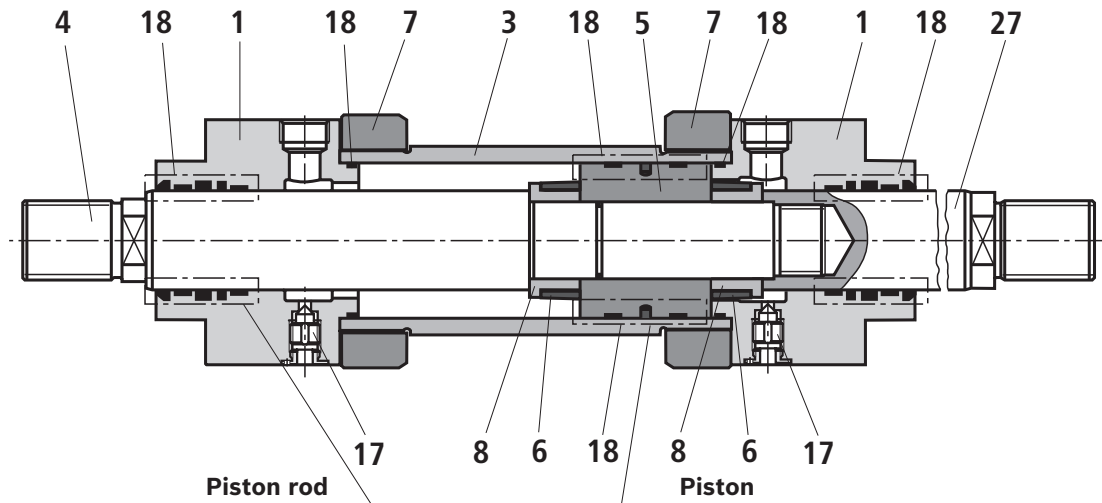
Seal "A"



- 1 Head
- 2 Base
- 3 Pipe
- 4 Piston rod
- 5 Piston
- 6 Damping bush
- 7 Flange
- 8 Bushing
- 9 Bushing
- 10 Base MP3
- 11 Base MP5
- 12 Round flange MF3
- 12.1 Rectangular flange MF1
- 13 Round flange MF4
- 13.1 Rectangular flange MF2
- 14 Trunnion MT4
- 15 Foot MS2
- 17 Bleeding
- 18 Seal kit:
Wiper
Rod seal
Piston seal
Seal ring
Support ring
Guide ring



Spare parts drawing: Series: CGM1

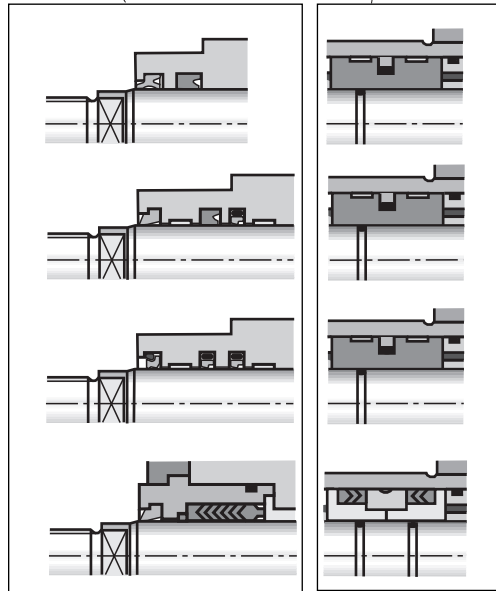


Seal "M and V"
piston Ø (Ø AL) 25 and 32

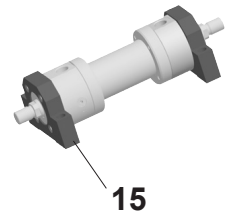
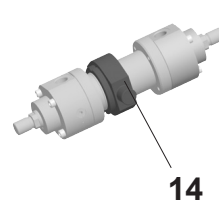
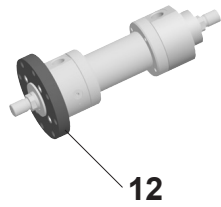
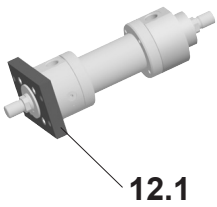
Seal "M and V"
piston Ø (Ø AL) 40 ... 200

Seal "T and S"

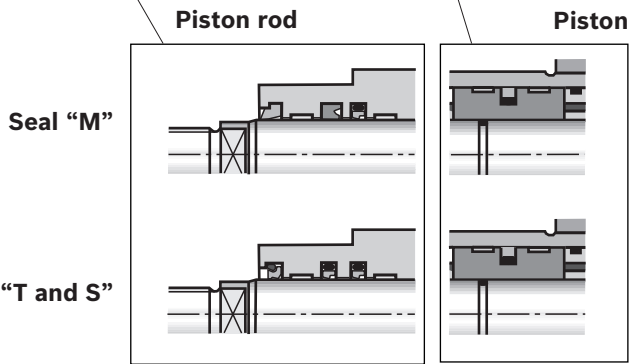
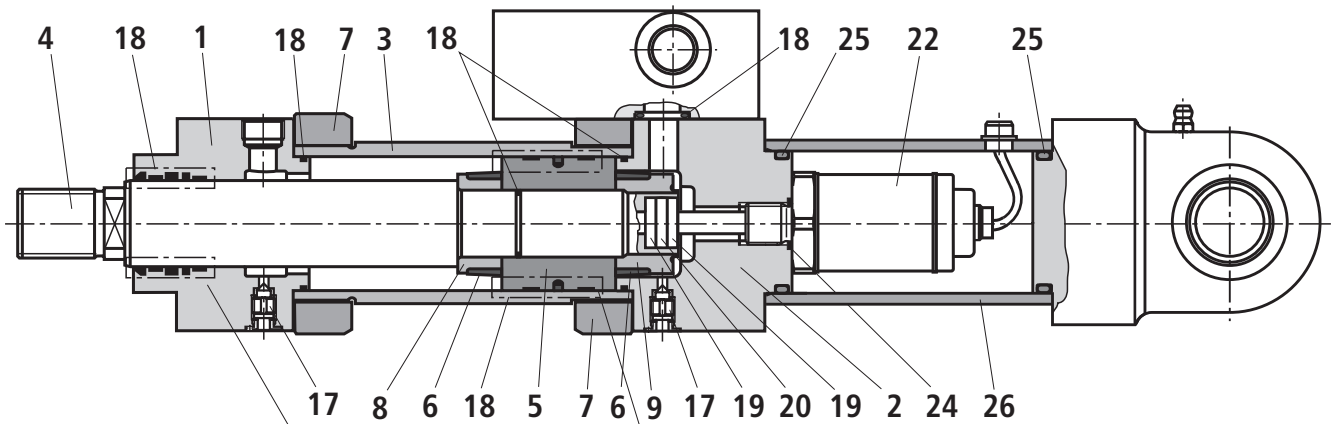
Seal "A"



- 1 Head
- 3 Pipe
- 4 Piston rod
- 5 Piston
- 6 Damping bush
- 7 Flange
- 8 Bushing
- 12 Round flange MF3
- 12.1 Rectangular flange MF1
- 14 Trunnion MT4
- 15 Foot MS2
- 17 Bleeding
- 18 Seal kit:
Wiper
Rod seal
Piston seal
Seal ring
Guide ring
- 27 Piston rod



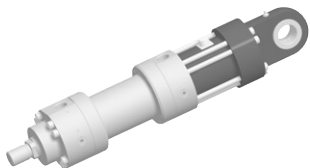
Spare parts drawing: Series CSM1: MP3 and MP5



- 1** Head
- 2** Base
- 3** Pipe
- 4** Piston rod
- 5** Piston
- 6** Damping bush
- 7** Flange
- 8** Bushing
- 9** Bushing
- 17** Bleeding
- 18** Seal kit:
Wiper
Rod seal
Piston seal
Seal ring
Support ring
Guide ring
- 19** Insulating socket
- 20** Solenoid
- 22** Position transducer
- 24** Seal
- 25** Seal
- 26** Protective pipe

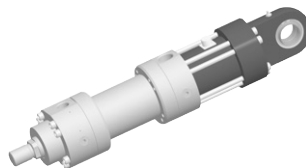
CSM1: MP3

Swivel eye at base

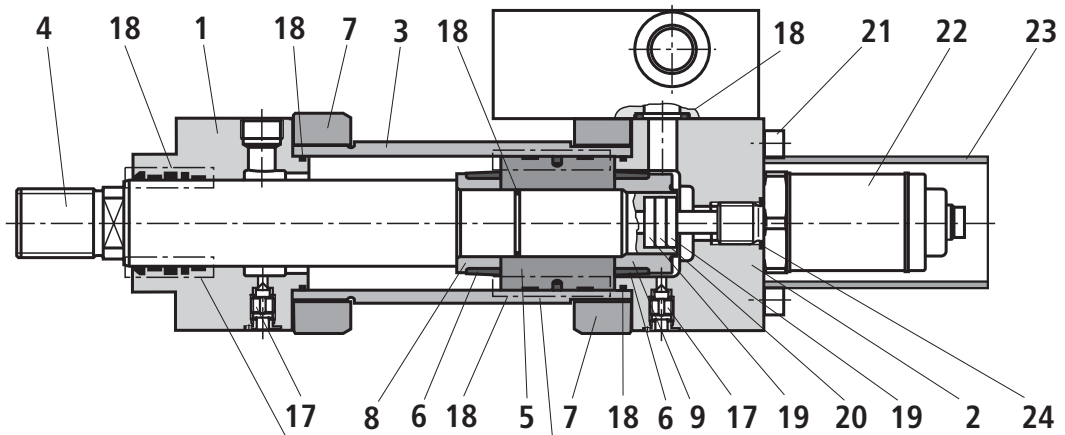


CSM1: MP5

Self-aligning clevis at base



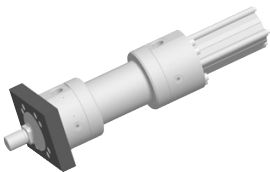
Spare parts drawing: Series CSM1: MF, MT4 and MS2



| | | | | |
|--|-------------------|---------------|-----------|--|
| | Piston rod | Piston | 1 | Head |
| | | | 2 | Base |
| | | | 3 | Pipe |
| | | | 4 | Piston rod |
| | | | 5 | Piston |
| | | | 6 | Damping bush |
| | | | 7 | Flange |
| | | | 8 | Bushing |
| | | | 9 | Bushing |
| | | | 17 | Bleeding |
| | | | 18 | Seal kit: Wiper Rod seal Piston seal Seal ring Support ring Guide ring |
| | | | 19 | Insulating socket |
| | | | 20 | Solenoid |
| | | | 21 | Hex socket head cap screws |
| | | | 22 | Position transducer |
| | | | 23 | Protective pipe |
| | | | 24 | Seal |

| | | |
|-----------------------|--|--|
| Seal "M" | | |
| Seal "T and S" | | |

CSM1: MF1
Rectangular flange at head



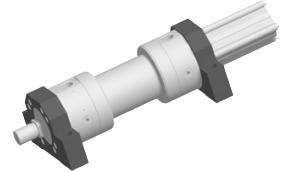
CSM1: MF3
Round flange at head



CSM1: MT4
Trunnion



CSM1: MS2
Foot mounting



Seal kits: Series CDM1 ¹⁾ / CSM1 ²⁾

| ØAL | ØMM | Material no. for seal design | | | | |
|-----|-----|------------------------------|------------|------------|------------|------------|
| | | M | T | V | S | A |
| 25 | 14 | R407026468 | - | R407026567 | - | - |
| | 18 | R407026529 | - | R407026568 | - | - |
| 32 | 18 | R407026530 | - | R407026569 | - | - |
| | 22 | R407026531 | R407026548 | R407026570 | R407026587 | - |
| 40 | 22 | R407026532 | R407026549 | R407026571 | R407026588 | - |
| | 28 | R407026533 | R407026550 | R407026572 | R407026589 | - |
| 50 | 28 | R407026534 | R407026551 | R407026573 | R407026590 | R407026604 |
| | 36 | R407026535 | R407026552 | R407026574 | R407026591 | R407026605 |
| 63 | 36 | R407026536 | R407026553 | R407026575 | R407026592 | R407026606 |
| | 45 | R407026537 | R407026554 | R407026576 | R407026593 | R407026607 |
| 80 | 45 | R407026538 | R407026555 | R407026577 | R407026594 | R407026608 |
| | 56 | R407026539 | R407026556 | R407026578 | R407026595 | R407026609 |
| 100 | 56 | R407026540 | R407026557 | R407026579 | R407026596 | R407026610 |
| | 70 | R407026541 | R407026558 | R407026580 | R407026597 | R407026611 |
| 125 | 70 | R407026542 | R407026559 | R407026581 | R407026598 | R407026612 |
| | 90 | R407026543 | R407026560 | R407026582 | R407026599 | R407026613 |
| 160 | 90 | R407026544 | R407026561 | R407026583 | R407026600 | R407026614 |
| | 110 | R407026545 | R407026562 | R407026584 | R407026601 | R407026615 |
| 200 | 110 | R407026546 | R407026563 | R407026585 | R407026602 | R407026616 |
| | 140 | R407026547 | R407026564 | R407026586 | R407026603 | R407026617 |

ØAL = Piston Ø

ØMM = Piston rod Ø

1) Seal kits for proximity switches separate material no. see page 73

2) Seal kits for position transducers separate material no. see page 73

Seal kits: Series CGM1 ³⁾

| ØAL | ØMM | Material no. for seal design | | | | |
|-----|-----|------------------------------|------------|------------|------------|------------|
| | | M | T | V | S | A |
| 25 | 14 | R407026792 | - | R407026829 | - | - |
| | 18 | R407026793 | - | R407026830 | - | - |
| 32 | 18 | R407026794 | - | R407026831 | - | - |
| | 22 | R407026795 | R407026812 | R407026832 | R407026849 | - |
| 40 | 22 | R407026796 | R407026813 | R407026833 | R407026850 | - |
| | 28 | R407026797 | R407026814 | R407026834 | R407026851 | - |
| 50 | 28 | R407026798 | R407026815 | R407026835 | R407026852 | R407026866 |
| | 36 | R407026799 | R407026816 | R407026836 | R407026853 | R407026867 |
| 63 | 36 | R407026800 | R407026817 | R407026837 | R407026854 | R407026868 |
| | 45 | R407026801 | R407026818 | R407026838 | R407026855 | R407026869 |
| 80 | 45 | R407026802 | R407026819 | R407026839 | R407026856 | R407026870 |
| | 56 | R407026803 | R407026820 | R407026840 | R407026857 | R407026871 |
| 100 | 56 | R407026804 | R407026821 | R407026841 | R407026858 | R407026872 |
| | 70 | R407026805 | R407026822 | R407026842 | R407026859 | R407026873 |
| 125 | 70 | R407026806 | R407026823 | R407026843 | R407026860 | R407026874 |
| | 90 | R407026807 | R407026824 | R407026844 | R407026861 | R407026875 |
| 160 | 90 | R407026808 | R407026825 | R407026845 | R407026862 | R407026876 |
| | 110 | R407026809 | R407026826 | R407026846 | R407026863 | R407026877 |
| 200 | 110 | R407026810 | R407026827 | R407026847 | R407026864 | R407026878 |
| | 140 | R407026811 | R407026828 | R407026848 | R407026865 | R407026879 |

³⁾ Seal kits for proximity switches separate material no. see below

Only for proximity switches

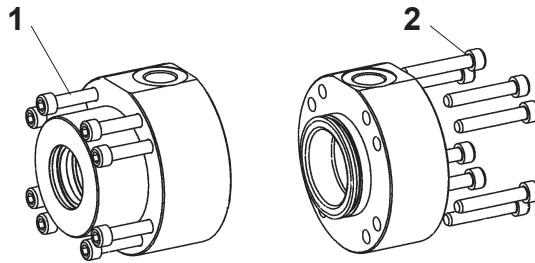
| ØAL | Material no. for seal design | |
|------------|------------------------------|------------|
| | M, T, A | V, S |
| 25 and 32 | - | - |
| 40 ... 200 | R900885938 | R900885939 |

Only for position transducers

| ØAL | Material no. for seal design | |
|-----|------------------------------|------------|
| | M, T | S |
| 40 | R407026769 | R407026777 |
| 50 | R407026770 | R407026778 |
| 63 | R407026771 | R407026779 |
| 80 | R407026772 | R407026780 |
| 100 | R407026773 | R407026781 |
| 125 | R407026774 | R407026782 |
| 160 | R407026775 | R407026783 |
| 200 | R407026776 | R407026784 |

ØAL = Piston Ø

ØMM = Piston rod Ø

Tightening torques**Screws: Head and base
(Pos. 1 and 2)**

| Series | ØAL | Screw | Quantity | Quality class | Tightening torque Nm |
|--------------------|------------|-------|----------|---------------|-------------------------|
| CDM1 / CGM1 / CSM1 | 25 | M6 | 4 | 10.9 | 13 |
| CDM1 / CGM1 / CSM1 | 32 | M6 | 4 | 10.9 | 13 |
| CDM1 / CGM1 / CSM1 | 40 | M6 | 4 | 10.9 | 13 |
| CDM1 / CGM1 / CSM1 | 50 | M8 | 4 | 10.9 | 30 |
| CDM1 / CGM1 / CSM1 | 63 | M10 | 4 | 10.9 | 60 |
| CDM1 / CGM1 / CSM1 | 80 | M10 | 8 | 10.9 | 50 |
| CDM1 / CGM1 / CSM1 | 100 | M10 | 8 | 10.9 | 60 |
| CDM1 / CGM1 / CSM1 | 125 | M12 | 12 | 10.9 | 100 |
| CDM1 / CGM1 / CSM1 | 160 | M12 | 16 | 10.9 | 100 |
| CDM1 / CGM1 / CSM1 | 200 | M16 | 16 | 10.9 | 200 |

Cylinder weight

| Piston ØAL mm | Piston rod ØMM mm | CD/CS cylinder with 0 mm stroke length | | | | | | | per 100 mm stroke length kg | CG cylinder with 0 mm stroke length | | | | per 100 mm stroke length kg |
|----------------------------|-----------------------------------|---|--|--|--------------------------------|--------------------------------|------------------|------------------|---|--|------------------|------------------|------------------|---|
| | | M00 kg | MP3 ¹⁾ MP5 ¹⁾ kg | MP3 ²⁾ MP5 ²⁾ kg | MF1 MF2 kg | MF3 MF4 kg | MT4 kg | MS2 kg | | MF1 kg | MF3 kg | MT4 kg | MS2 kg | |
| 25 | 14 | 2.2 | 2.3 | – | 2.6 | 2.7 | 2.6 | 3.2 | 0.5 | 3.0 | 3.1 | 3.0 | 3.6 | 0.6 |
| | 18 | 2.2 | 2.3 | – | 2.6 | 2.7 | 2.6 | 3.2 | 0.6 | 3.0 | 3.1 | 3.0 | 3.6 | 0.8 |
| 32 | 18 | 3.1 | 3.3 | – | 3.8 | 4.0 | 3.7 | 4.7 | 0.7 | 4.3 | 4.5 | 4.2 | 5.2 | 0.9 |
| | 22 | 3.1 | 3.3 | – | 3.8 | 4.0 | 3.7 | 4.7 | 0.8 | 4.3 | 4.5 | 4.2 | 5.2 | 1.1 |
| 40 | 22 | 5.5 | 5.9 | – | 6.4 | 6.7 | 6.5 | 7.6 | 0.9 | 7.1 | 7.5 | 7.3 | 8.4 | 1.2 |
| | 28 | 5.6 | 6.0 | 10.2 | 6.5 | 6.8 | 6.6 | 7.7 | 1.1 | 7.1 | 7.5 | 7.3 | 8.4 | 1.5 |
| 50 | 28 | 8.1 | 8.9 | 14.4 | 9.7 | 10.2 | 9.8 | 12.0 | 1.2 | 11.0 | 11.5 | 11.1 | 13.3 | 1.7 |
| | 36 | 8.3 | 9.1 | 14.6 | 9.9 | 10.4 | 10.0 | 12.2 | 1.5 | 11.0 | 11.5 | 11.1 | 13.3 | 2.3 |
| 63 | 36 | 14.0 | 15.5 | 25.0 | 17.0 | 17.5 | 17.0 | 20.0 | 2.1 | 18.5 | 19.0 | 18.5 | 22.0 | 2.9 |
| | 45 | 14.0 | 15.5 | 25.0 | 17.0 | 17.5 | 17.0 | 20.0 | 2.6 | 18.5 | 19.0 | 18.5 | 22.0 | 3.8 |
| 80 | 45 | 20.0 | 22.5 | 30.5 | 24.0 | 25.0 | 24.0 | 29.0 | 2.9 | 27.0 | 28.0 | 27.0 | 32.0 | 4.1 |
| | 56 | 20.0 | 22.5 | 30.5 | 24.0 | 25.0 | 24.0 | 29.0 | 3.6 | 27.0 | 28.0 | 27.0 | 32.0 | 5.5 |
| 100 | 56 | 36.0 | 41.0 | 53.0 | 42.5 | 44.5 | 43.5 | 52.0 | 5.4 | 48.0 | 50.0 | 49.0 | 57.5 | 7.4 |
| | 70 | 37.0 | 42.0 | 54.0 | 43.5 | 45.5 | 44.5 | 53.0 | 6.5 | 50.0 | 52.0 | 51.0 | 59.5 | 9.5 |
| 125 | 70 | 60.0 | 66.0 | 84.0 | 68.0 | 70.0 | 73.5 | 86.0 | 7.3 | 78.0 | 80.0 | 83.0 | 96.0 | 10.3 |
| | 90 | 61.0 | 67.0 | 85.0 | 69.0 | 71.0 | 74.5 | 87.0 | 9.3 | 81.0 | 83.0 | 86.0 | 99.0 | 14.2 |
| 160 | 90 | 107.0 | 122.0 | 150.0 | – | 121.0 | 136.0 | 148.0 | 11.5 | – | 143.0 | 158.0 | 170.0 | 16.5 |
| | 110 | 108.0 | 123.0 | 151.0 | – | 122.0 | 137.0 | 149.0 | 14.0 | – | 145.0 | 160.0 | 172.0 | 21.4 |
| 200 | 110 | 193.0 | 222.0 | 262.0 | – | 217.0 | 245.0 | 259.0 | 15.4 | – | 267.0 | 295.0 | 309.0 | 22.9 |
| | 140 | 196.0 | 225.0 | 265.0 | – | 220.0 | 248.0 | 262.0 | 20.1 | – | 273.0 | 301.0 | 315.0 | 32.1 |

1) Mass for CD cylinder

2) Mass for CS cylinder

Notes

Bosch Rexroth AG
Hydraulics
Zum Eisengießer 1
97816 Lohr am Main, Germany
Phone +49 (0) 93 52/18-0
documentation@boschrexroth.de
www.boschrexroth.de

© This document, as well as the data, specifications and other information set forth in it, are the exclusive property of Bosch Rexroth AG. It may not be reproduced or given to third parties without the consent of Bosch Rexroth AG. The data specified above only serve to describe the product. No statements concerning a certain condition or suitability for a certain application can be derived from our information. The information given does not release the user from the obligation of own judgment and verification. It must be remembered that our products are subject to a natural process of wear and aging.