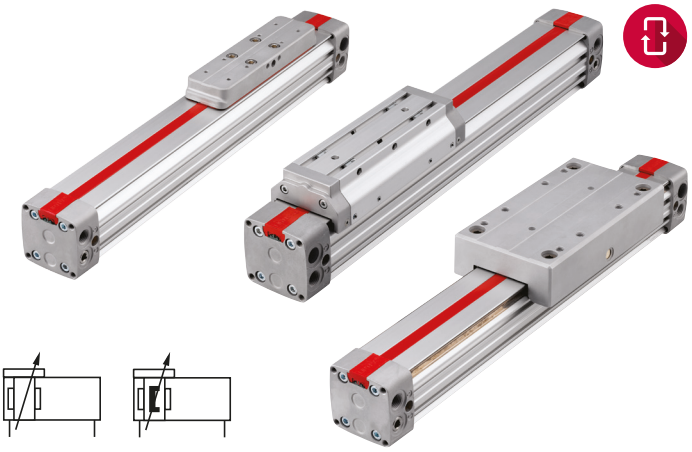
- **ø 16 ... 80 mm**
- **New lightweight design extrusion with universal mounting grooves**
- **Proved and patented sealing system**
- **Dust protection as standard (ø 25 ... 63 mm)**
- **Interchangeability with series M/46000**



## Technical features

**Medium:**
Compressed air, filtered, lubricated or non-lubricated
**Operation:**
M/146000, M/146100, M/146200
Double acting, with adjustable cushioning
M/146000/M, M/146100/M, M/146200/M
Double acting with adjustable cushioning and magnetic piston
**Models:**
M/146000 with internal guide
M/146100 with external adjustable guide
M/146200 with precision roller guide

**Operating pressure:**
1 ... 8 bar (14 ... 116 psi)
**Cylinder diameters:**
16, 20, 25, 32, 40, 50, 63, 80 mm
**Max strokes:**
ø 16 ... 40 mm 8500 mm
ø 50 and 63 mm 8000 mm
ø 80 mm 5500 mm

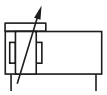
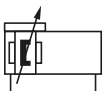
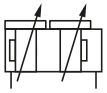
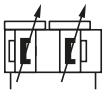
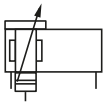
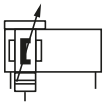
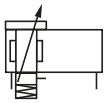
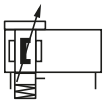
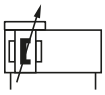
**Operating temperature:**
-30 ... +80°C max.
(-22 ... +176°F)
Air supply must be dry enough to avoid ice formation at temperatures below +2°C (+35°F).

**Materials:**
End covers: aluminium diecast, moulded plastic (ø 16) and anodised aluminium (ø 20 & 80)
Yoke: anodised aluminium, moulded plastic (ø 16 & 20)
Carriage , closer & cover: aluminium diecast
Guiding bridge and profile barrel: anodised aluminium
Seal strip, wiper and piston seal: PUR
Cover strip: PA
Other seals: NBR
Mounting screws: A2E
Shim ring: stainless steel (A2)

## Technical data

| Cylinder Ø (mm) | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 80 |
|---|---|---|---|---|---|---|---|---|
| **Port size** | M5 | G1/8 | G1/8 | G1/4 | G1/4 | G3/8 | G1/2 | G1/2 |
| **Cushion length (mm)** | 12 | 26 | 26 | 35 | 50 | 60 | 70 | 75 |
| **Theoretical thrusts at 6 bar outstroke (N)** | 120 | 188 | 294 | 482 | 754 | 1178 | 1870 | 3016 |
| **Air consumption at 6 bar outstroke (l/cm stroke)** | 0,014 | 0,022 | 0,035 | 0,056 | 0,088 | 0,137 | 0,218 | 0,35 |
| **Holding forces (N) of brake (on dry braking surface)** | | | | | | | | |
| **Activ (L1 + L3) at 6 bar** | — | — | 500 | 900 | 1500 | 2500 | 4000 | — |
| **Passive (L2 + L4)** | — | — | 220 | 375 | 630 | 1000 | 1650 | — |

## Alternative variants

| Symbol | Model (non-magnetic piston) | Symbol | Model (magnetic piston) | Description | Page |
|---|---|---|---|---|---|
|  | M/146000 |  | M/146000/M | With internal guide | 7, 8 & 16 |
| | M/146100 | | M/146100/M | With external adjustable guide | 7, 9 & 16 |
| | M/146200 | | M/146200/M | With precision roller guide (ø 25 ... 63 mm) | 10 |
| | M/146200/P | | M/146200/PM | With added caged ball linear motion guide (ø 25 ... 63 mm) | 11 |
| | M/146000/IC | | M/146000/MC | With alternative ports | 12 |
| | M/146100/IC | | M/146100/MC | With alternative ports | 12 |
| | M/146200/IC | | M/146200/MC | With alternative ports | 12 |
|  | M/146100/ID |  | M/146100/MD | With external adjustable guide (ø 16 ... 80 mm) | 7, 9 & 16 |
| | M/146200/ID | | M/146200/MD | With precision roller guide (ø 25 ... 63 mm) | 10 |
|  | M/146000/L1 |  | M/146000/L3 | Active holding brake (ø 25 ... 63 mm) | 13 |
| | M/146200/L1 | | M/146200/L3 | Applying pressure activates the brake<br>The brake lining is pushed against a stainless steel strip.<br>To release, depressurize. | 14 |
|  | M/146000/L2 |  | M/146000/L4 | Passive holding brake; (ø 25 ... 63 mm) | 13 |
| | M/146200/L2 | | M/146200/L4 | Applying pressure releases the brake. When the pressure is released the brake lining is pushed against the stainless steel strip by a spring loaded plate. | 14 |
| | |  | M/146000/F1 | With internal guide and linear position sensor (ø 32 ... 63 mm)<br>Electrical data of linear position sensor:<br>Operating voltage: 10 ... 30 V d.c., resolution 16 bit,<br>Repeat accuracy 0,006 %, output 4 ... 20 mA,<br>short-circuit protection, linearity 0,05 % of measuring range,<br>protection class IP67 | 15 |
| | | | M/146100/F1 | With external adjustable guide and linear position sensor (ø 32 ... 63 mm) | 15 |
| | | | M/146200/F1 | With precision roller guide and linear position sensor (ø 32 ... 63 mm) | 15 |

Corrosion resistants cylinders see page N/en 1.6.011

## Options selector

**M/146★★★/★★/★★★★**

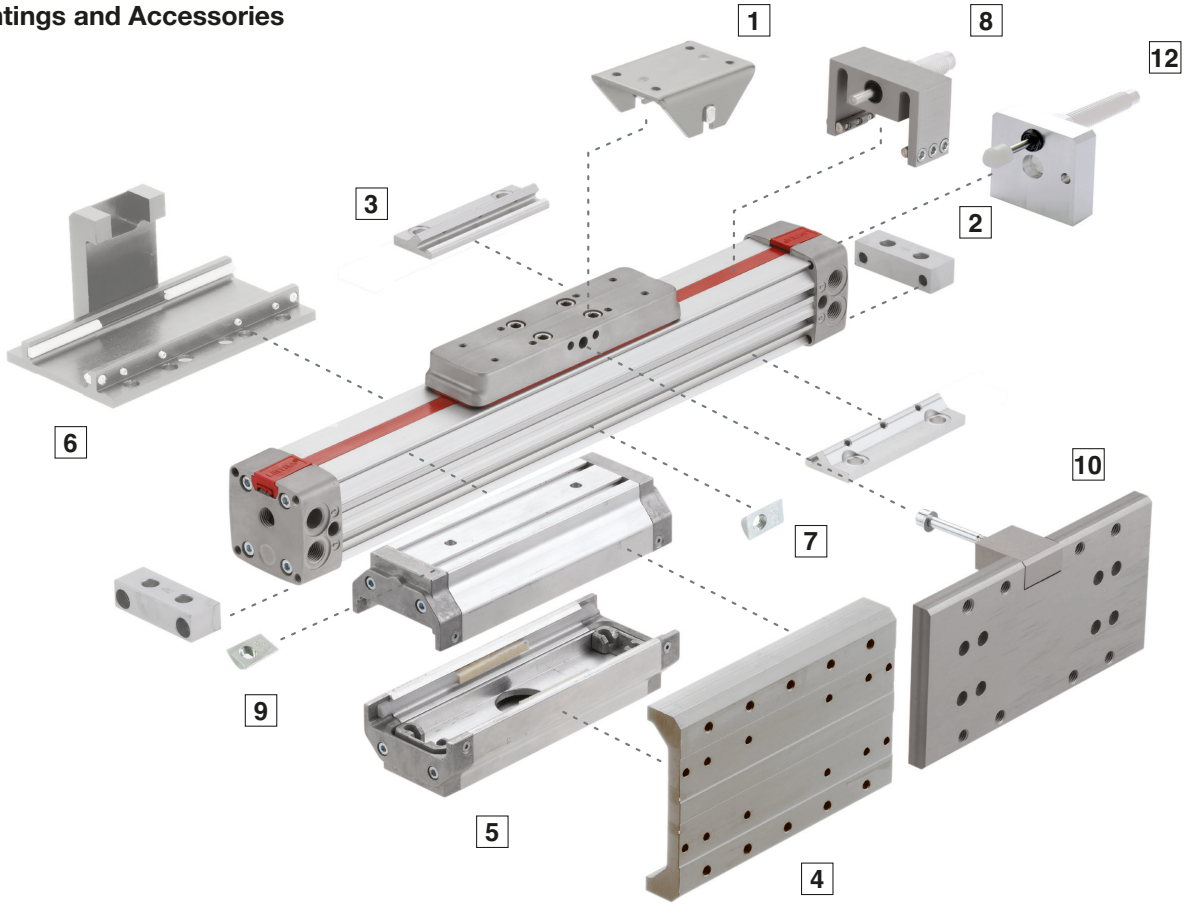
| Guiding system | Substitute |
|---|---|
| Internal | **0** |
| External | **1** |
| Precision roller guide | **2** |
| **Cylinder Ø (mm)** | **Substitute** |
| 16 | **16** |
| 20 | **20** |
| 25 | **25** |
| 32 | **32** |
| 40 | **40** |
| 50 | **50** |
| 63 | **63** |
| 80 | **80** |

Note:
Disregard option positions not used.
For combinations of cylinder variants consult our Technical Service.
This options selector explains only the cylinder variants. Additional variants/options are not possible.

| Strokes (mm) | |
|---|---|
| On request | |
| **Variants (non-magnetic piston)** | **Substitute** |
| Alternative ports | **IC** |
| Active brake | **L1** |
| Passive brake | **L2** |
| With added caged ball linear motion guide | **P** |
| Double carriages *1) | **ID** |
| **M/146***/ID/****/**** → Distance between carriage centres (mm) | |
| **Variants (magnetic piston)** | **Substitute** |
| Alternative ports | **MC** |
| Active brake | **L3** |
| Passive brake | **L4** |
| With added caged ball linear motion guide | **PM** |
| With linear position sensor | **F1** |
| Double carriages *1) | **MD** |
| **M/146***/MD/****/**** → Distance between carriage centres (mm) | |

*1) For M/146100 & M/146200 only

## Mountings and Accessories




| | C | S *1) | UV | UW *2) | V | W *2) |
|---|---|---|---|---|---|---|
| | 2 | 1 | 6 | 4 | 3 | 5 |
| Ø mm | Page 17 | Page 18 | Page 17 | Page 18 | Page 17 | Page 18 |
| 16 | QM/146016/21 | QM/146016/37 | QM/146016/34 | — | QM/146016/32 | QM/146116/35 |
| 20 | QM/146020/21 | QM/146020/37 | QM/146020/34 | QM/146120/36 | QM/146020/32 | QM/146120/35 |
| 25 | QM/146025/21 | QM/146025/37 | QM/146025/34 | QM/146125/36 | QM/146025/32 | QM/146125/35 |
| 32 | QM/146032/21 | QM/146032/37 | QM/146032/34 | QM/146132/36 | QM/146032/32 | QM/146132/35 |
| 40 | QM/146040/21 | QM/146032/37 | QM/146040/34 | QM/146140/36 | QM/146040/32 | QM/146140/35 |
| 50 | QM/146050/21 | QM/146050/37 | QM/146050/34 | QM/146150/36 | QM/146050/32 | QM/146150/35 |
| 63 | QM/146063/21 | QM/146050/37 | QM/146063/34 | QM/146163/36 | QM/146063/32 | QM/146163/35 |
| 80 | QM/146080/21 | QM/146080/37 | QM/146080/34 | — | QM/146080/32 | QM/146180/35 |
| | | | | | | |
| | Assembly kit for caged ball linear motion guide | Adjustable stop | Assembly kit for shock absorbers | Groove key for profile barrel | Groove key for guiding bridge | Magnetically operated switches |
| | 10 | 8 | 12 | 7 | 9 | |
| | Page 11 | Page 18 | Page 19 | Page 17 | Page 17 | Page 20 & 21 |
| 16 | — | — | — | — | — | |
| 20 | — | QM/146120/75 | — | — | — | |
| 25 | QM/146225/P/70 | QM/146125/75 | QM/146125/67 | M/P74065 | M/P74065 | |
| 32 | QM/146232/P/70 | QM/146132/75 | QM/146132/67 | M/P74065 | M/P74065 | |
| 40 | QM/146240/P/70 | QM/146140/75 | QM/146140/67 | M/P74065 | M/P74066 | |
| 50 | QM/146250/P/70 | — | QM/146150/67 | M/P74065 | M/P41858 | |
| 63 | QM/146263/P/70 | — | QM/146163/67 | M/P74065 | M/P41858 | |
| 80 | — | — | — | M/P74065 | — | |

*1) Suitable for internally guided models only (M/146000), *2) Suitable for external guided models only (M/146100)

## Service kit

| Guiding systems | ø 16 | ø 20 | ø 25 | ø 32 | ø 40 | ø 50 | ø 63 | ø 80 | Model |
|---|---|---|---|---|---|---|---|---|---|
| **Internal** | M/146016, .../M | M/146020, .../M | M/146025, .../M | M/146032, .../M | M/146040, .../M | M/146050, .../M | M/146063, .../M | M/146080, .../M | QM/1460**/88/* |
| | - | - | - | M/146032/F1 | M/146040/F1 | M/146050/F1 | M/146063/F1 | - | |
| | - | - | M/146025/L1, .../L2 | M/146032/L1, .../L2 | M/146040/L1, .../L2 | M/146050/L1, .../L2 | M/146063/L1, .../L2 | - | |
| **External** | M/146116, .../M | M/146120, .../M | M/146125, .../M | M/146132, .../M | M/146140, .../M | M/146150, .../M | M/146163, .../M | M/146180, .../M | QM/1461**/88/* |
| | - | - | M/146125/L3, .../L4 | M/146132/L3, .../L4 | M/146140/L3, .../L4 | M/146150/L3, .../L4 | M/146163/L3, .../L4 | - | |
| | - | - | - | M/146132/F1 | M/146140/F1 | M/146150/F1 | M/146163/F1 | - | |
| **Roller ball** | - | - | M/146225/M | M/146232/M | M/146240/M | M/146250/M | M/146263/M | - | QM/1460**/88/* |
| | - | - | - | M/146232/F1 | M/146240/F1 | M/146250/F1 | M/146263/F1 | - | |
| | - | - | M/146225/P, .../PM | M/146232/P, .../PM | M/146240/P, .../PM | M/146250/P, .../PM | M/146263/P, .../PM | - | |

* Insert stroke length in mm
** Insert cylinder diameters for the service kit.

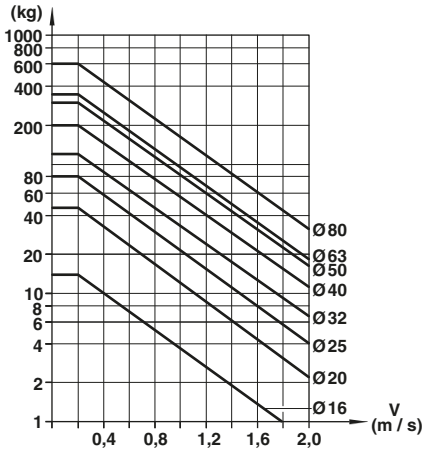
## Seal and cover strip

| Cylinder Ø | Seal strip | Cover strip |
|---|---|---|
| 16 | M/P 40270/* | M/P 74216/* |
| 20 | M/P 40262/* | M/P 74223/* |
| 25 | M/P 40262/* | M/P 74131/* |
| 32 | M/P 40344/* | M/P73936/* |
| 40 | M/P 40263/* | M/P73945/* |
| 50 | M/P 40626/* | M/P73946/* |
| 63 | M/P 40626/* | M/P 73946/* |
| 80 | M/P 40715/* | M/P 74232/* |

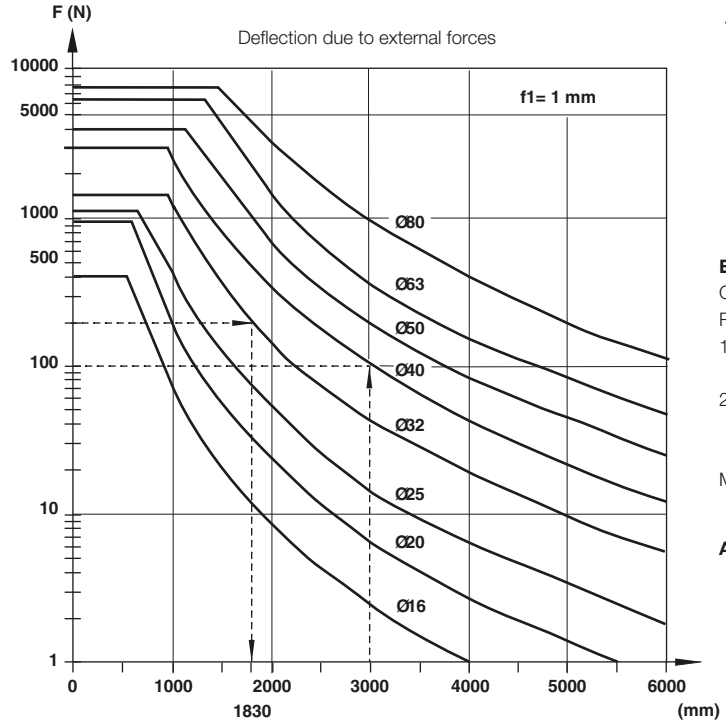
* Insert stroke length in mm

## Cushioning performance

The dynamic energy of a LINTRA® cylinder is caused by direct or partial external loads which must be absorbed by pneumatic cushioning. The cushioning ability depends to a large extent on the pneumatic circuit (e. g. counter pressure, pre-exhaust). The values given in the diagram were tested with an operation pressure of 6 bar using a 5/2 control valve. When installed horizontally, depending upon the speed, dynamic energy can be absorbed by the cylinder. Whenever the values given in the diagram are exceeded, the transported mass must be cushioned by additional shock absorbers. These have to be located at the center of gravity of the mass.

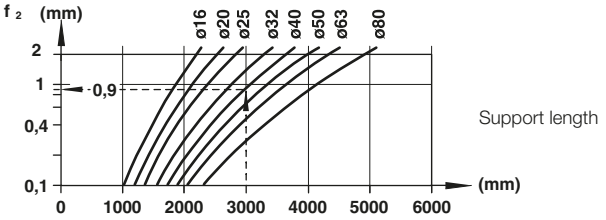



## Cylinder deflection




**Example:**
Cylinder ø 32 mm, stroke length 3500 mm,
external load 200 N and a deflection about 1 mm
Maximum distance between supports = 1830 mm (see diagrams).
Therefore an additional support is required.

## Deflection due to cylinder weight

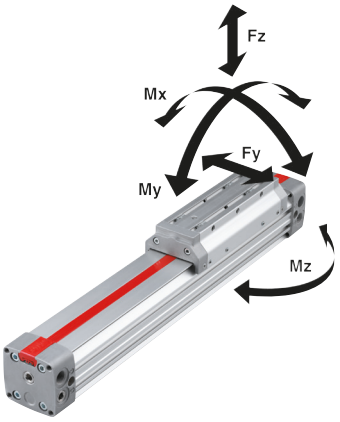



**Example:**
Cylinder ø 40 mm, external force 180 N, distance between supports 3000 mm
Required: total deflection

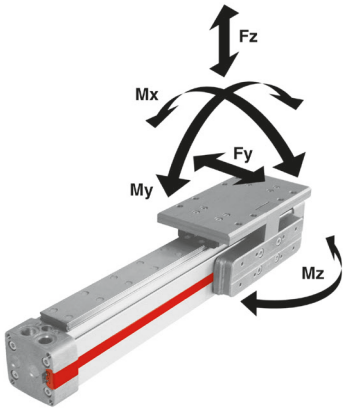
| | |
|---|---|
| 1. Deflection due to external force (f1) | |
| see Diagram 1 (1 mm/100 N) · 180 N | 1,8 mm |
| 2. Deflection due to cylinder weight diagram 2 | + 0,9 mm |
| Total deflection: | 2,7 mm |
| Max. permitted deflection (f1 + f2) | <1 mm |
| | 1000 mm Hub |

**A deflection of more than 3 mm is not permitted.**

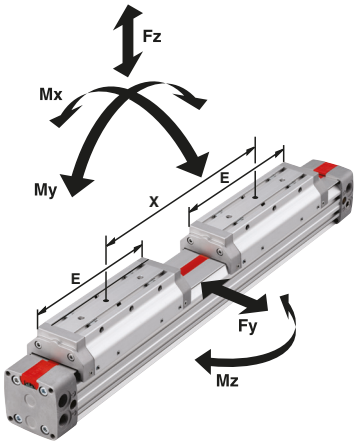
## M/146000, M/146100, M/146200




## M/146200/P




## M/146100/ID, M/146100/MD




| | Internal guide M/146000 | | | | | External adjustable guide M/146100 | | | Precision roller guide M/146200 | | | | Added caged ball linear motion guide M/146200/P | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fy | Fz | Mx | My | Mz | Fy, Fz | Mx | My, Mz | Fy | Fz | Mx | My, Mz | Fy, Fz | Mx | My,Mz |
| Ø mm | (N) | (N) | (Nm) | (Nm) | (Nm) | (N) | (Nm) | (Nm) | (N) | (N) | (Nm) | (Nm) | (N) | (Nm) | (Nm) |
| 16 | 40 | 120 | 0,3 | 3,8 | 1,1 | 200 | 2 | 5,5 | – | – | – | – | – | – | – |
| 20 | 90 | 280 | 0,9 | 12 | 3,6 | 470 | 6 | 18 | – | – | – | – | – | – | – |
| 25 | 125 | 385 | 1,5 | 19 | 5,6 | 590 | 9 | 28 | 590 | 1180 | 13 | 42 | 2000 | 15 | 100 |
| 32 | 165 | 500 | 3 | 33 | 10 | 780 | 17 | 43 | 780 | 1560 | 25 | 64 | 4000 | 64 | 250 |
| 40 | 330 | 990 | 6,5 | 84 | 24 | 1600 | 39 | 110 | 1500 | 3000 | 58 | 160 | 4000 | 64 | 400 |
| 50 | 440 | 1320 | 11 | 120 | 35 | 2000 | 65 | 160 | 2000 | 4000 | 97 | 240 | 8000 | 180 | 800 |
| 63 | 690 | 2000 | 20 | 240 | 70 | 3200 | 120 | 350 | 3200 | 6400 | 180 | 520 | 8000 | 180 | 1000 |
| 80 | 780 | 2300 | 27 | 360 | 100 | 3900 | 180 | 520 | – | – | – | – | – | – | – |

| | External adjustable guide, M/146100/ID and M/146100/MD Fy, Fz | Mx | My, Mz (Nm) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Ø mm** | **(N)** | **(Nm)** | **x min.= E** | **x = 100 mm** | **x = 150 mm** | **x = 200 mm** | **x = 250 mm** | **x = 300 mm** | **x = 350 mm** | **x = 400 mm** | **x = 450 mm** | **x = 500 mm** |
| 16 | 400 | 4 | 14 | 17 | 23 | 29 | 35 | 41 | 48 | 54 | 60 | 66 |
| 20 | 940 | 12 | 64 | – | 80 | 99 | 119 | 139 | 158 | 178 | 197 | 217 |
| 25 | 1180 | 18 | 96 | – | 106 | 131 | 155 | 180 | 205 | 230 | 255 | 279 |
| 32 | 1560 | 34 | 155 | – | – | 181 | 213 | 246 | 278 | 310 | 343 | 375 |
| 40 | 3000 | 78 | 393 | – | – | – | 435 | 496 | 557 | 618 | 679 | 740 |
| 50 | 4000 | 130 | 457 | – | – | – | 457 | 518 | 579 | 639 | 700 | 761 |
| 63 | 6400 | 240 | 1280 | – | – | – | – | – | 1360 | 1500 | 1630 | 1770 |
| 80 | 7800 | 360 | 1910 | – | – | – | – | – | – | 1940 | 2110 | 2270 |
| | **Precision roller guide M/146200/ID and M/146200/MD Fy, Fz** | **Mx** | **My, Mz (Nm)** | | | | | | | | | |
| **Ø mm** | **(N)** | **(Nm)** | **x min. = E** | **x = 100 mm** | **x = 150 mm** | **x = 200 mm** | **x = 250 mm** | **x = 300 mm** | **x = 350 mm** | **x = 400 mm** | **x = 450 mm** | **x = 500 mm** |
| 25 | 1180 | 26 | 125 | – | 138 | 170 | 202 | 234 | 267 | 299 | 332 | 363 |
| 32 | 1560 | 50 | 202 | – | – | 235 | 277 | 320 | 361 | 403 | 446 | 488 |
| 40 | 3000 | 116 | 511 | – | – | – | 566 | 645 | 724 | 803 | 883 | 962 |
| 50 | 4000 | 194 | 594 | – | – | – | 594 | 673 | 753 | 831 | 910 | 989 |
| 63 | 6400 | 360 | 1664 | – | – | – | – | – | 1768 | 1850 | 2119 | 2301 |

## Loading values for LINTRA® cylinders

The values given in the table below show the single forces in the directions Fy and Fz and the maximum moments Mx, My and Mz.
All values are applicable only for speeds of max. 0,2 m/s.
A requirement for using these values is a constant movement (no jerking) of the mass over the whole stroke length of the cylinder.
The reference point from which the moments for all cylinders should be calculated is the centre line of the pistons.

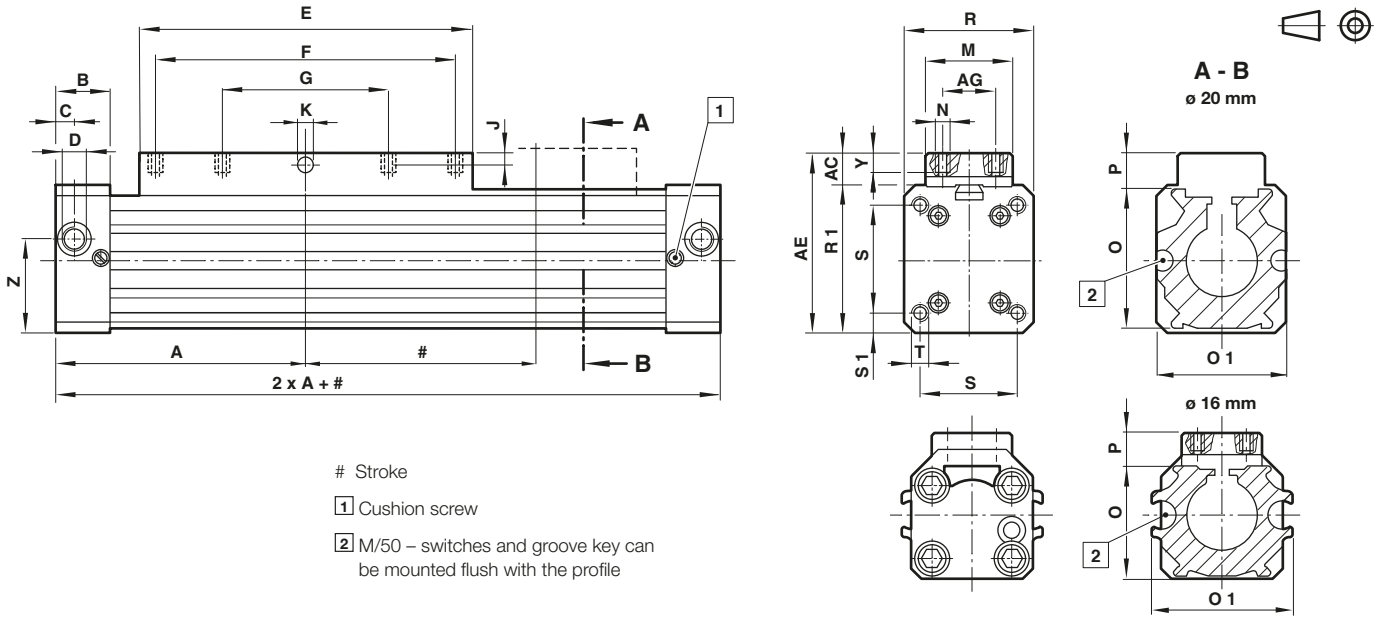
## For speeds up to 2 m/s please use our calculation programme LINTRA® PNEUCALC. It is available upon request.

When a LINTRA® cylinder has to take several loads and moments, an additional calculation is necessary using this formula:

$$\frac{Mx}{Mx\ max} + \frac{My}{My\ max} + \frac{Mz}{Mz\ max} + \frac{Fy}{Fy\ max} + \frac{Fz}{Fz\ max} \leq 1$$

## M/146000 – cylinder with internal guide, cylinder ø 16 and 20 mm

Dimensions in mm
Projection/First angle




# Stroke

1 Cushion screw

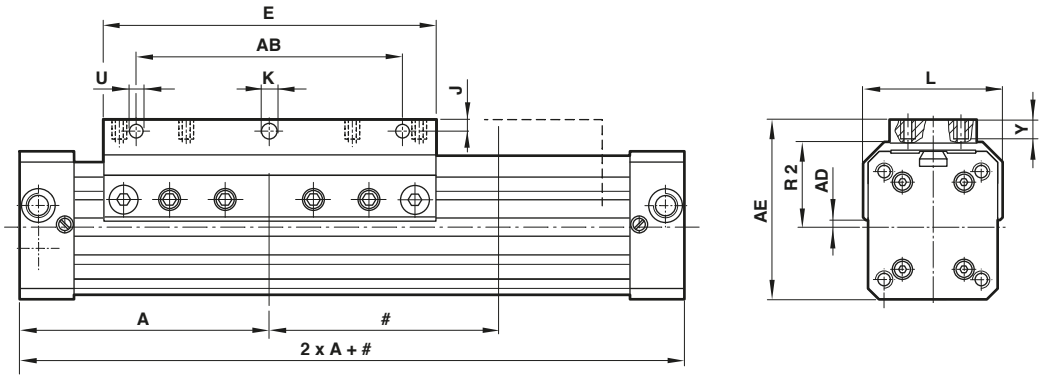
2 M/50 – switches and groove key can be mounted flush with the profile

| Ø | A | AC | AE | AG | B | C | D | E | F | G | J | Ø K D7 | M | N | O |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 62,5 | 24,5 | 38 | 8 | 17,5 | 8 | M5 | 80 | 60 | – | 2,5 | 3 | 18 | M3 | 25 |
| 20 | 85 | 34,5 | 54 | 20 | 23 | 8 | G1/8 | 110 | 80 | 40 | 3,5 | 4,2 | 27 | M5 | 32 |

| Ø | O 1 | P | R | R1 | S | S1 | T | Y | Z | Weight at 0 mm | Weight per 100 mm | Model |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 32 | 12 | 27 | 31 | 16 | 5,5 | M3 - 5 *1) | 4 | 16,5 | 0,16 kg | 0,10 kg | M/146016/... |
| 20 | 38 | 18,5 | 40 | 40 | 32 | 4 | M5 - 12 *) | 12 | 20,5 | 0,50 kg | 0,15 kg | M/146020/... |

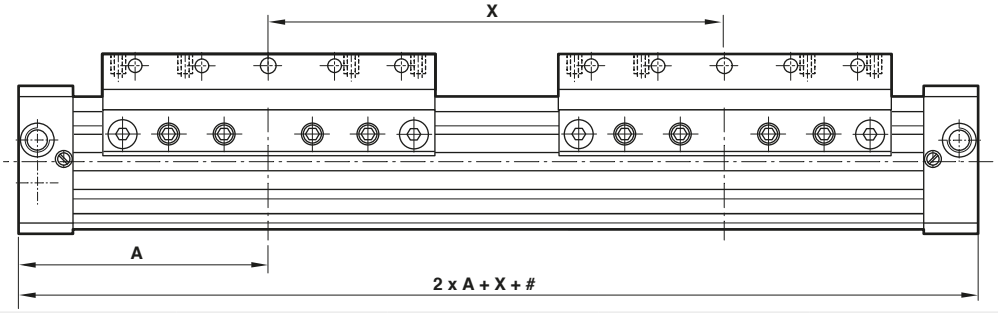
*1) deep

## M/146100 – cylinder with external adjustable guide (ø 16 & 20 mm)




| Ø | A | AB | AE | A0 | E | ED | J | Ø K | L | R2 | U | Y | Weight at 0 mm | Weight per 100 mm | Model |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 62,5 | - | 38 | 7,5 | 80 | 18 | - | - | 31 | 18,5 | - | 5 | 0,18 kg | 0,10 kg | M/146116/... |
| 20 | 85 | 60 | 59 | 6,5 | 110 | 27 | 7,5 | 5,5 | 42 | 24 | 5,5 | 12 | 0,60 kg | 0,15 kg | M/146120/... |

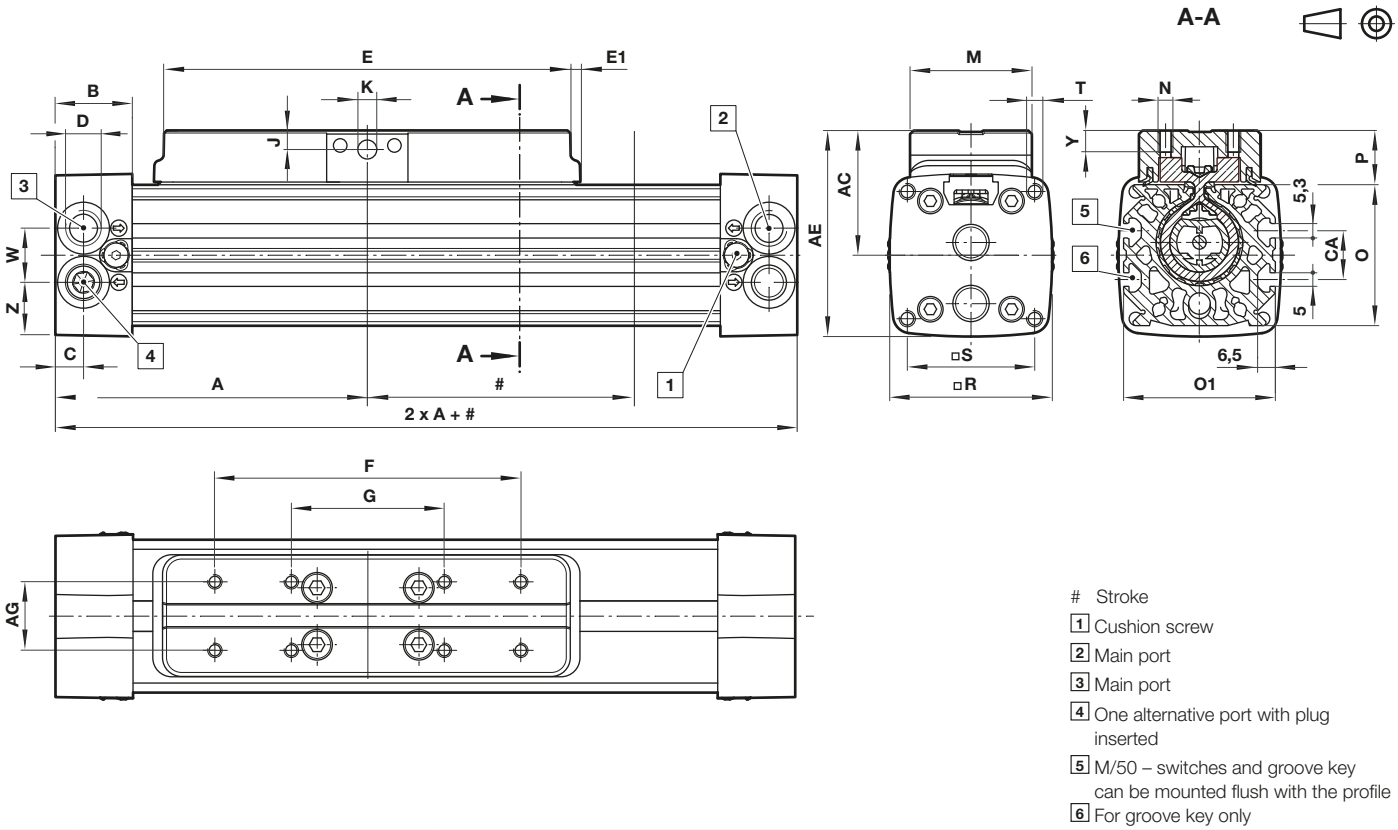
## M/146100/D, .../MD – cylinder with external adjustable guide and double carriages (ø 16 & 20 mm)




| Ø | A | E | X min. | X max. | Weight at 0 mm | Weight per 100 mm | Model |
|---|---|---|---|---|---|---|---|
| 16 | 62,5 | 80 | 80 | 500 | 0,20 kg | 0,10 kg | M/146116/.D/... |
| 20 | 85 | 110 | 110 | 500 | 0,80 kg | 0,15kg | M/146120/.D/... |

## M/146000 – cylinder with internal guide (ø 25 ... 63 mm)

Dimensions in mm
Projection/First angle




# Stroke
1 Cushion screw
2 Main port
3 Main port
4 One alternative port with plug inserted
5 M/50 – switches and groove key can be mounted flush with the profile
6 For groove key only

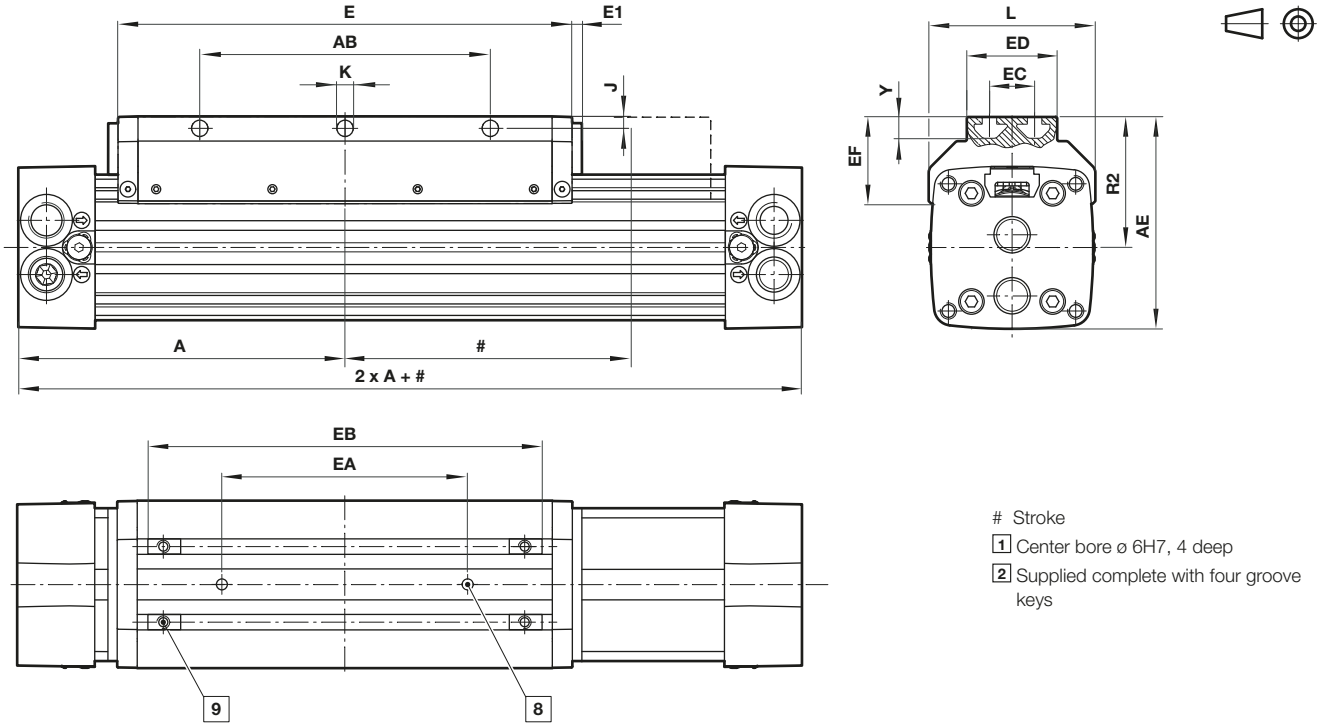
| Ø | A | AC | AE | AG | B | C | CA | D | E | E1 | F | G | J | Ø K D7 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | 100 | 36 | 60 | 20 | 23 | 8,5 | – | G1/8 | 130 | – | 90 | 45 | 4,7 | 5 |
| 32 | 120 | 46 | 76 | 25 | 28,5 | 10,5 | 18 | G1/4 | 160 | 3,5 | 120 | 60 | 7 | 7 |
| 40 | 150 | 52,5 | 90 | 25 | 28,5 | 11,5 | 18 | G1/4 | 215 | – | 160 | 80 | 7 | 7 |
| 50 | 180 | 65,5 | 110 | 25 | 38 | 15 | 24 | G3/8 | 250 | – | 190 | 95 | 9,5 | 9 |
| 63 | 215 | 82,5 | 125 | 25 | 38 | 17 | 24 | G1/2 | 320 | – | 240 | 120 | 9,5 | 9 |

| Ø | M | N | O | O 1 | P | R | S | T | W | Y | Z | Weight at 0 mm | Weight per 100 mm | Model |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | 32 | M5 | 40 | 46 | 16 | 48 | 37 | M5 - 13*1) | 16 | 7 | 16 | 0,7 kg | 0,25 kg | M/146025/... |
| 32 | 45 | M5 | 52 | 56 | 20 | 60 | 47 | M6 - 17*1) | 20 | 8 | 20 | 1,40 kg | 0,30 kg | M/146032/... |
| 40 | 45 | M6 | 65 | 68 | 20 | 74,5 | 58 | M8 - 20*1) | 25 | 8 | 25 | 2,50 kg | 0,42 kg | M/146040/... |
| 50 | 50 | M8 | 80 | 84 | 25,5 | 89 | 70 | M8 - 20*1) | 30 | 11 | 29,5 | 4,40 kg | 0,62 kg | M/146050/... |
| 63 | 50 | M8 | 95 | 97 | 25 | 105 | 84 | M10 - 24*1) | 35 | 11 | 35 | 6,90 kg | 0,9 kg | M/146063/... |

*1) deep

## M/146100 – cylinder with external adjustable guide (Ø 25 ... 63 mm)

Dimensions in mm
Projection/First angle



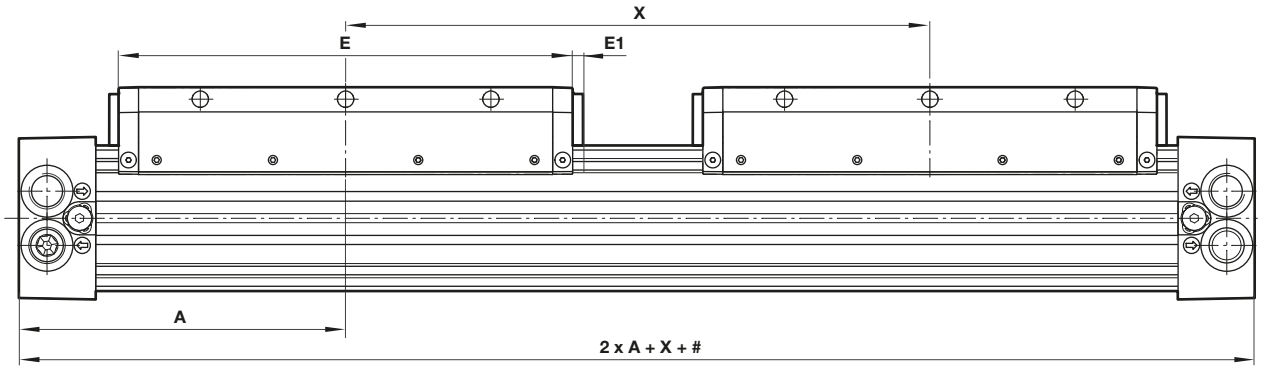

# Stroke
1 Center bore ø 6H7, 4 deep
2 Supplied complete with four groove keys

Missing cylinder dimensions, see previous page 8

| Ø | A | AB | AE | E | E1 | EA ±0,05 | EB | ED | EC | EF | J | ØK | L | R 2 | Y | Weight at 0 mm | Weight per 100 mm | Model |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | 100 | 70 | 67,5 | 130 | - | 50 | 102 | 32 | 20 | 34 | 5 | 5,5 | 52 | – | -9,5 | 0,75kg | 0,20 kg | M/146125/... |
| 32 | 120 | 90 | 82 | 160 | 4 | 70 | 138 | 45 | 25 | 36,5 | 5 | 5,5 | 64 | 52 | 6,5 | 1,50 kg | 0,30 kg | M/146132/... |
| 40 | 150 | 120 | 97,5 | 215 | – | 105 | 193 | 45 | 25 | 43 | 5 | 6,6 | 79 | 60 | 9,5 | 2,60 kg | 0,42 kg | M/146140/... |
| 50 | 180 | 160 | 116,5 | 250 | – | 135 | 228 | 50 | 25 | 47,5 | 6,5 | 9 | 92 | 72 | 11,5 | 4,50 kg | 0,62 kg | M/146150/... |
| 63 | 215 | 190 | 137 | 320 | - | 150 | 292 | 50 | 25 | 59 | 7,5 | 9 | 110 | 84,5 | 11,5 | 7,20kg | 0,90 kg | M/146163/... |

*1) deep

## M/146100/ID, .../MD – cylinder with external adjustable guide and double carriages (ø 25 ... 63 mm)



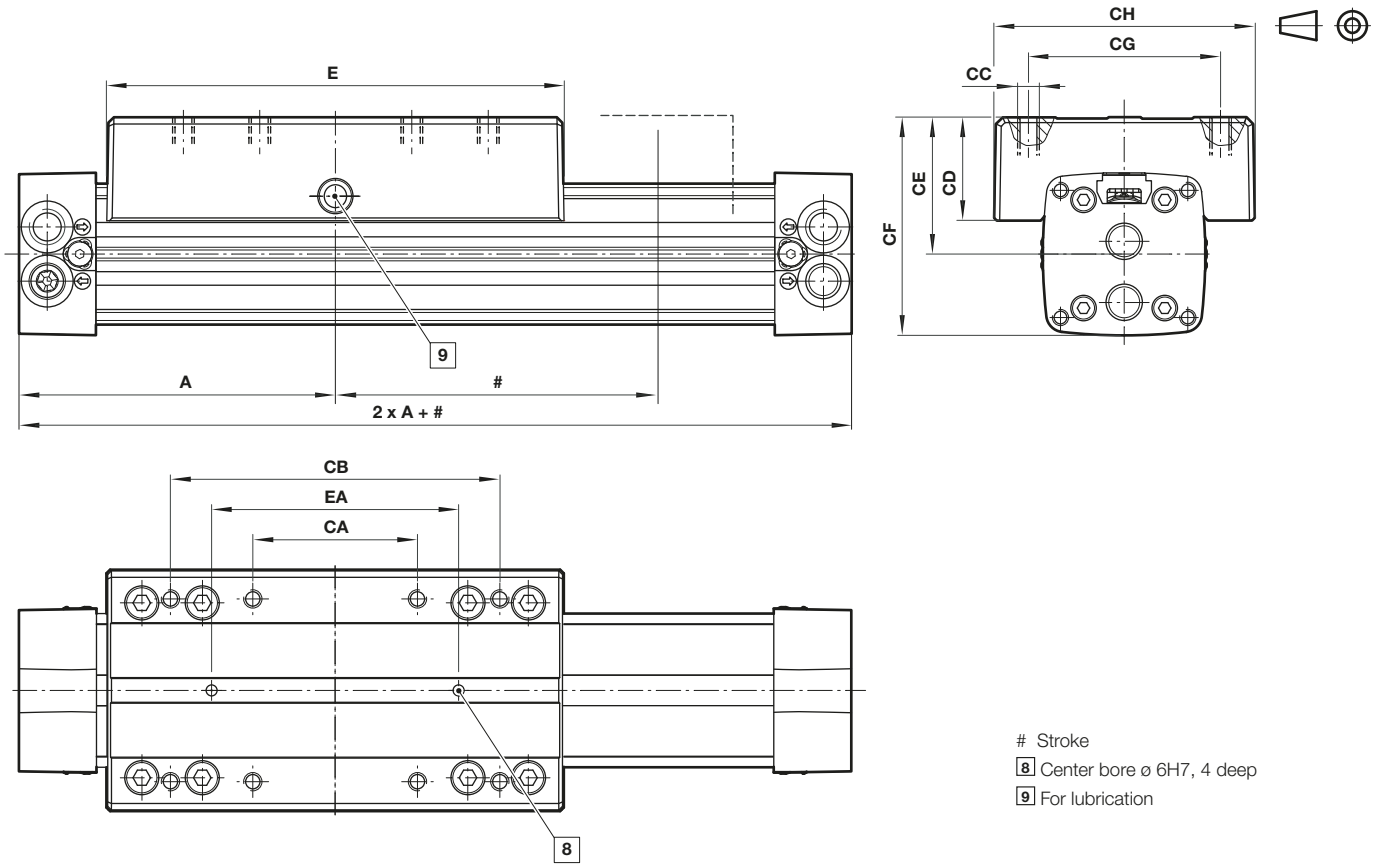

Missing cylinder dimensions, see previous page 8

# Stroke

| Ø | A | E | E1 | X min. | X max. | Weight at 0 mm | Weight per 100 mm | Model |
|---|---|---|---|---|---|---|---|---|
| 25 | 100 | 130 | - | 130 | 500 | 1,50 kg | 0,20 kg | M/146125/.D/... |
| 32 | 120 | 160 | 4 | 168 | 500 | 2,00 kg | 0,30 kg | M/146132/.D/... |
| 40 | 150 | 115 | – | 215 | 500 | 3,20 kg | 0,42 kg | M/146140/.D/... |
| 50 | 180 | 250 | – | 250 | 500 | 5,40 kg | 0,62 kg | M/146150/.D/... |
| 63 | 215 | 320 | - | 320 | 500 | 8,40 kg | 1,00 kg | M/146163/.D/... |

## M/146200, .../M – cylinder with precision roller guide (Ø 25 ... 63 mm)

Dimensions in mm
Projection/First angle



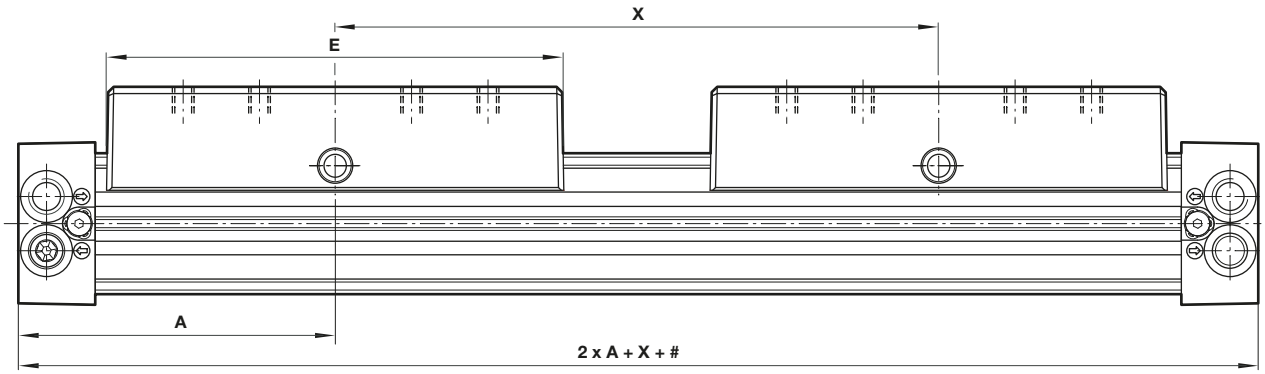

# Stroke
8 Center bore ø 6H7, 4 deep
9 For lubrication

Missing cylinder dimensions, see previous page 8

| Ø | A | CA | CB | CC | CD | CE | CF | CG | CH | E | EA ±0,05 | Weight at 0 mm | Weight per 100 mm | Model |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | 100 | 45 | 90 | M6-14*1) | 36 | 42 | 66 | 60 | 85 | 150 | 70 | 1,50 kg | 0,20 kg | M/146225/... |
| 32 | 120 | 60 | 120 | M8-16*1) | 38 | 50 | 80 | 75 | 98 | 180 | 90 | 2,80 kg | 0,40 kg | M/146232/... |
| 40 | 150 | 80 | 150 | M8-16*1) | 42 | 57,5 | 95 | 92 | 118 | 215 | 115 | 4,50 kg | 0,45 kg | M/146240/... |
| 50 | 180 | 90 | 180 | M10-20*1) | 44 | 67 | 111,5 | 100 | 132 | 250 | 135 | 8,20 kg | 0,90 kg | M/146250/... |
| 63 | 215 | 120 | 240 | M10-20*1) | 47 | 74,5 | 127 | 110 | 140 | 320 | 200 | 12,50 kg | 1,00 kg | M/146263/... |

*1) deep

## M/146200/ID and .../MD – cylinder with precision roller guide and double carriages (Ø 25 ... 63 mm)



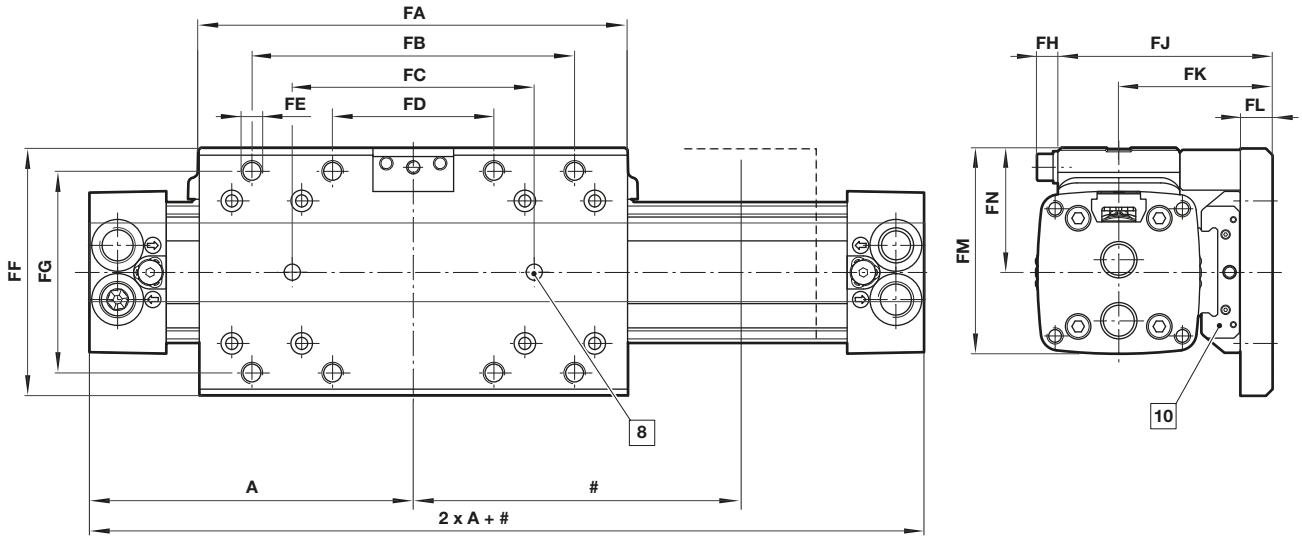

Missing cylinder dimensions, see previous page 8

# Stroke

| Ø | A | E | X min. | X max. | Weight at 0 mm | Weight per 100 mm | Model |
|---|---|---|---|---|---|---|---|
| 25 | 100 | 150 | 150 | 500 | 2,60 kg | 0,20 kg | M/146225/.D/... |
| 32 | 120 | 180 | 180 | 500 | 4,20 kg | 0,40 kg | M/146232/.D/... |
| 40 | 150 | 215 | 215 | 500 | 7,00 kg | 0,45 kg | M/146240/.D/... |
| 50 | 180 | 250 | 250 | 500 | 11,1 kg | 0,90 kg | M/146250/.D/... |
| 63 | 215 | 320 | 320 | 500 | 20,6 kg | 1,00 kg | M/146263/.D/... |

## M/146200/P and M/146200/PM
## cylinder with added caged ball linear motion guide (ø 25 ... 63 mm)

Dimensions in mm
Projection/First angle

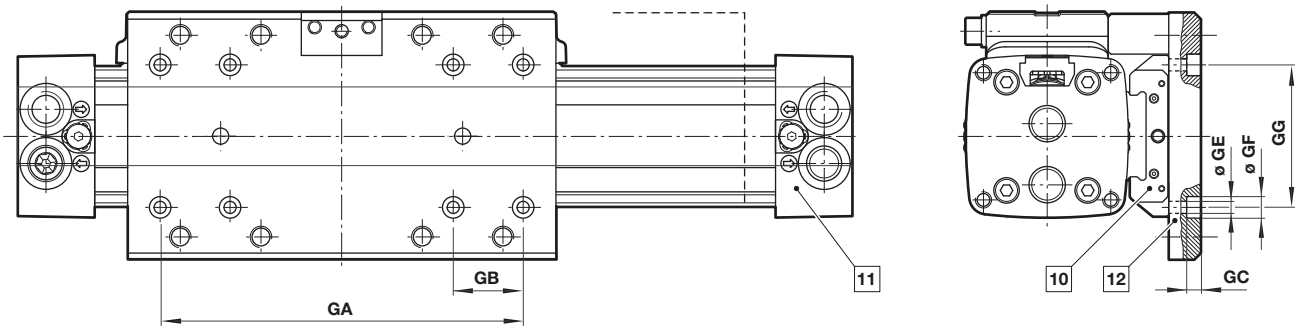



Missing cylinder dimensions, see previous page 8

| Ø | A | FA | FB | FC ±0,05 | FD | FE | FF | FG | FH | FJ | FK | FL | FM | FN | Weight at 0 mm | Weight per 100 mm | Model |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | 100 | 130 | 90 | 70 | 45 | M6 | 72 | 60 | 7 | 61 | 45 | 10 | 60 | 36 | 1,90 kg | 0,40 kg | M/146225/P/.. |
| 32 | 120 | 160 | 120 | 90 | 60 | M8 | 92 | 75 | 7,5 | 79,5 | 57 | 12 | 76 | 46 | 2,90 kg | 0,50 kg | M/146232/P/.. |
| 40 | 150 | 215 | 150 | 115 | 80 | M8 | 105 | 92 | 7,5 | 85,5 | 63 | 12 | 89,5 | 52,5 | 4,70 kg | 0,65 kg | M/146240/P/.. |
| 50 | 180 | 250 | 180 | 135 | 90 | M10 | 131 | 100 | 9,5 | 109 | 84 | 15 | 110 | 65,5 | 8,50 kg | 1,10 kg | M/146250/P/.. |
| 63 | 215 | 320 | 240 | 100 | 120 | M10 | 140 | 110 | 9,5 | 115,5 | 90,5 | 15 | 125 | 75 | 11,0 kg | 1,40 kg | M/146263/P/.. |

Note: Stroke max. ø 25 = 900, ø 32 & 40 = 1500, ø 50 & 63 = 2600

## QM/146200/P/70 – assembly kit for caged ball linear motion guide (Ø 25 ... 63 mm)




Missing cylinder dimensions, see previous page 8

### Recommended supplier/series for caged ball linear motion guide

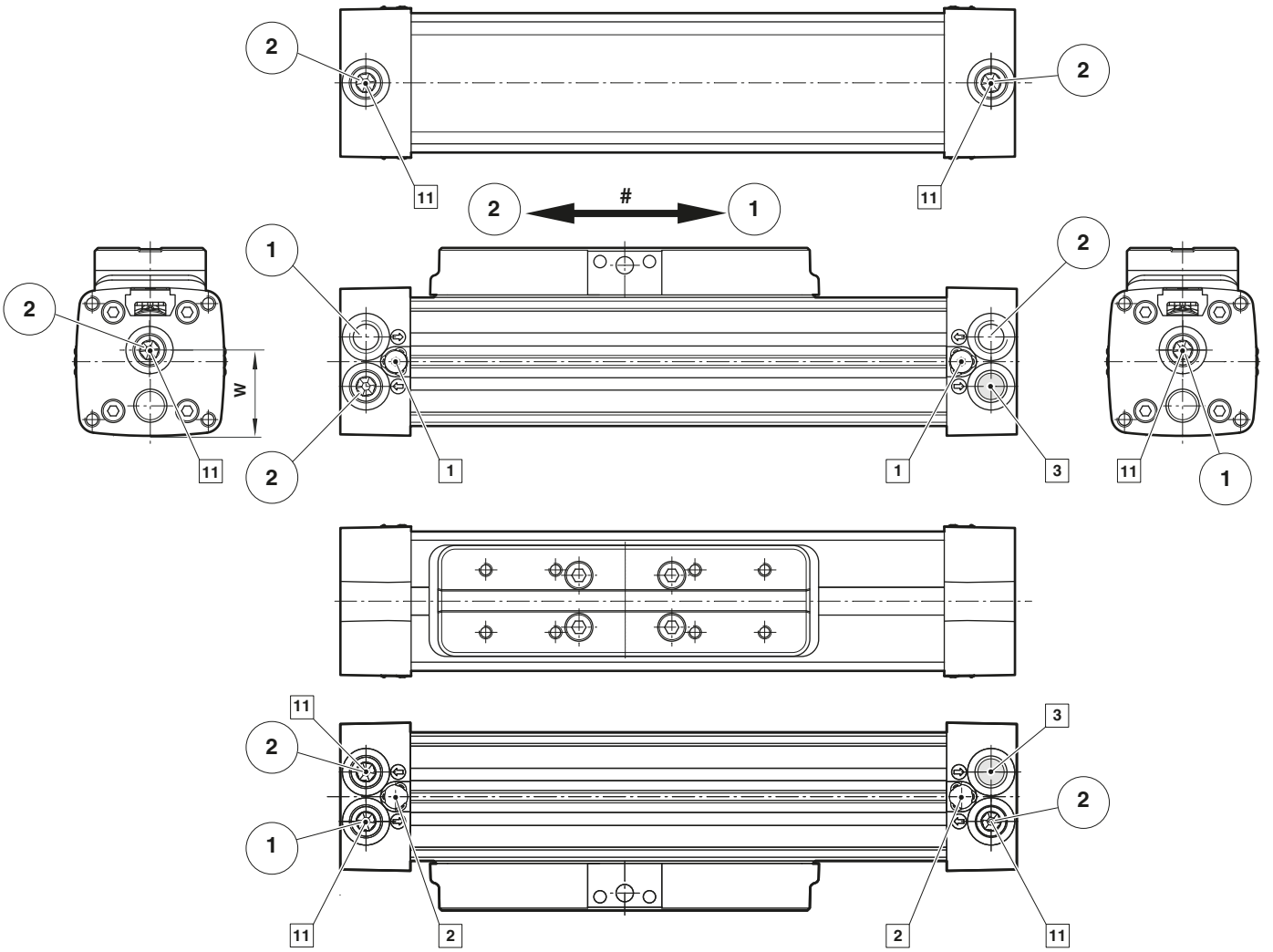
| Cylinder Ø 25 | Cylinder Ø 32 & 40 | Cylinder Ø 50 & 63 |
|---|---|---|
| THK/SHW12CAM | IKO/LWFF33 | IKO/LWFF42 |
| | NSK/LW17ELZ | NSK/LW27ELZ |
| | THK/SHW17CAM | THK/SHW27CA |

\# Stroke
8 Center bore ø 6H7, 4 deep
10 Recommended supplier/series for caged ball linear motion guide
11 Standard cylinder M/146000
12 Assembly kit for caged ball linear motion guide

| Ø | GA | GB | GC | Ø GE | Ø GF | GG | Weight | Model |
|---|---|---|---|---|---|---|---|---|
| 25 | 111 | 18 | 5 | 3,4 | 6,5 | 35 | 0,28 kg | QM/146225/P/70 |
| 32 | 135 | 26 | 4,5 | 4,5 | 8 | 53 | 0,47 kg | QM/146232/P/70 |
| 40 | 177 | 26 | 4,5 | 4,5 | 8 | 53 | 0,47 kg | QM/146240/P/70 |
| 50 | 215 | 40 | 6,5 | 6,6 | 11 | 70 | 1,32 kg | QM/146250/P/70 |
| 63 | 285 | 40 | 6,5 | 6,6 | 11 | 70 | 1,80 kg | QM/146263/P/70 |

## M/146000/IC, .../MC; M/146100/IC, .../MC; M/146200/IC, .../MC cylinder with alternative ports (Ø 25 ... 63 mm)

Dimensions in mm
Projection/First angle



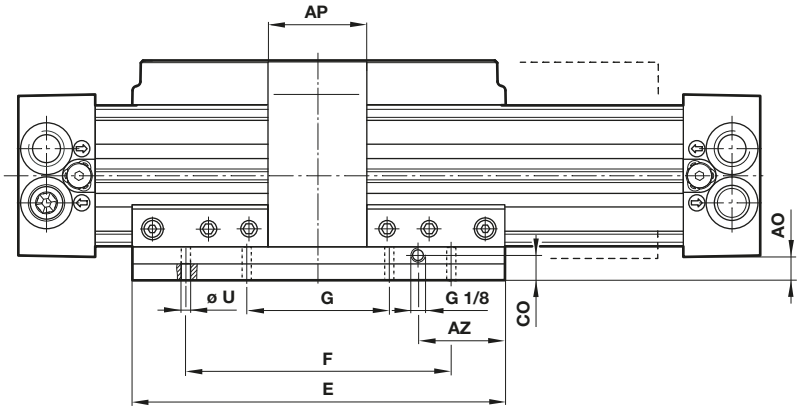

Missing cylinder dimensions and weights, see previous page 8 & 9

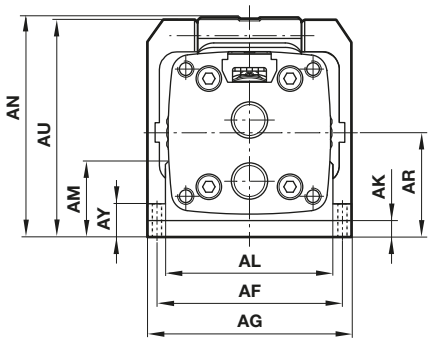
| Ø | W | Model |
|---|---|---|
| 25 | 28 | M/146.25/.. |
| 32 | 34,5 | M/146.32/.. |
| 40 | 43,5 | M/146.40/.. |
| 50 | 53 | M/146.50/.. |
| 63 | 59,5 | M/146.63/.. |

# Moving direction
1 Cushion screw
2 Hole without thread
3 Port without function
11 Alternative ports

## M/146000/L1, M/146000/L3 – cylinder with active brake (ø 25 ... 63 mm)

Dimensions in mm
Projection/First angle

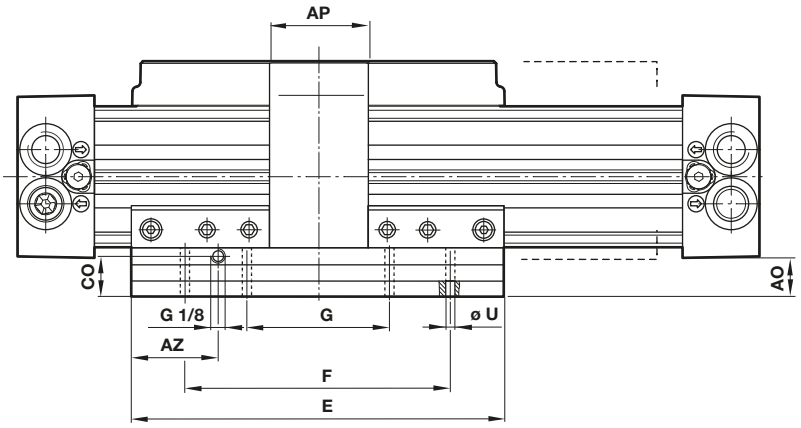


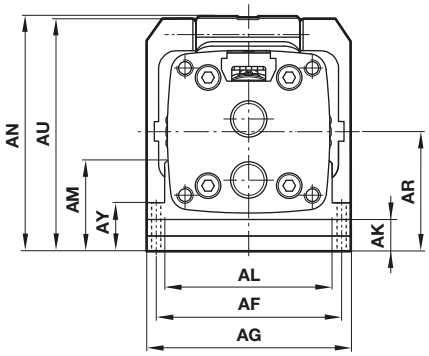




Missing cylinder dimensions, see previous page 8

| Ø | AF | AG | AK | AL | AM | AN | AO | AP | AR | AU | AY | AZ | CO | E | F | G | Ø U | Weight at 0 mm | Weight per 100 mm | Model |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | 62 | 75 | 12 | 52 | 28,5 | 73,5 | 13,5 | 45 | 37,5 | 73 | 16,5 | 30 | 6 | 130 | 90 | 45 | 6,6 | 1,60 kg | 0,2 kg | M/146025/L./... |
| 32 | 78 | 92 | 12 | 64 | 29 | 90 | 14 | 55 | 44 | 89,5 | 17,5 | 32,5 | 6 | 160 | 120 | 60 | 9 | 2,50 kg | 0,35 kg | M/146032/L./... |
| 40 | 94 | 112 | 12 | 81 | 34,5 | 103,5 | 13,5 | 65 | 51 | 103 | 18 | 52,5 | 6 | 215 | 160 | 80 | 9 | 4,20 kg | 0,50 kg | M/146040/L./... |
| 50 | 112 | 132 | 12 | 94 | 35,5 | 124,5 | 14,5 | 75 | 59,5 | 124 | 18,5 | 65 | 6 | 250 | 190 | 95 | 11 | 6,90 kg | 0,75 kg | M/146050/L./... |
| 63 | 113 | 150 | 12 | 112 | 42,5 | 140,5 | 15,5 | 90 | 68 | 140 | 20,5 | 115 | 6 | 320 | 240 | 120 | 13 | 11,5 kg | 1,0 kg | M/146063/L./... |

## M/146000/L2, M/146000/L4 – cylinder with passive brake (ø 25 ... 63 mm)



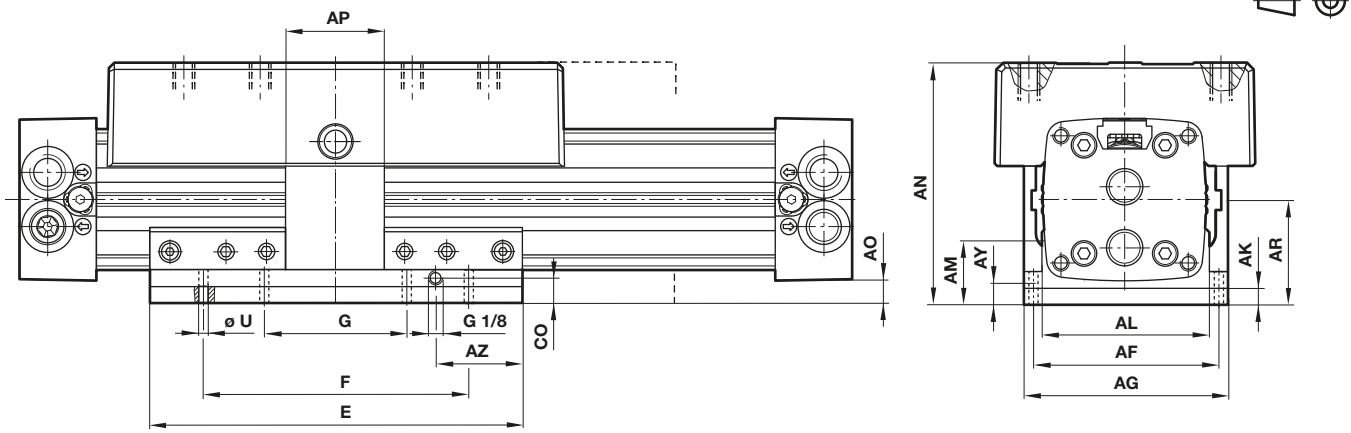




Missing cylinder dimensions, see previous page 8

| Ø | AF | AG | AK | AL | AM | AN | AO | AP | AR | AU | AY | AZ | CO | E | F | G | Ø U | Weight at 0 mm | Weight per 100 mm | Model |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | 62 | 75 | 22 | 52 | 38,5 | 83,5 | 23,5 | 45 | 47,5 | 83 | 26,5 | 30 | 16 | 130 | 90 | 45 | 6,6 | 1,90 kg | 0,2 kg | M/146025/L./... |
| 32 | 78 | 92 | 24 | 64 | 41 | 102 | 26 | 55 | 56 | 101,5 | 29,5 | 32,5 | 18 | 160 | 120 | 60 | 9 | 2,60 kg | 0,35 kg | M/146032/L./... |
| 40 | 94 | 112 | 24 | 81 | 46,5 | 115,5 | 25,5 | 65 | 63 | 115 | 30 | 52,5 | 18 | 215 | 160 | 80 | 9 | 4,70 kg | 0,50 kg | M/146040/L./... |
| 50 | 112 | 132 | 30 | 94 | 53,5 | 142,5 | 32,5 | 75 | 77,5 | 142 | 36,5 | 65 | 24 | 250 | 190 | 95 | 11 | 7,20 kg | 0,75 kg | M/146050/L./... |
| 63 | 132 | 150 | 30 | 112 | 60,5 | 158,5 | 33,5 | 90 | 86 | 158 | 38,5 | 115 | 42 | 320 | 240 | 120 | 13 | 12,40 kg | 1,0 kg | M/146063/L./... |

## M/146200/L1, M/146200/L3 – cylinder with precision roller guide and active brake (Ø 25 ... 63 mm)

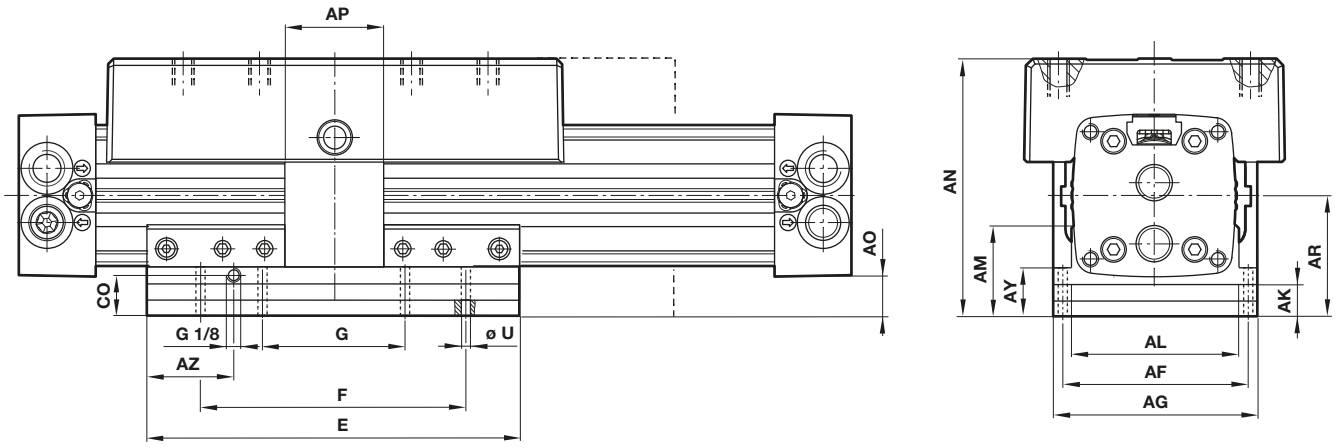
Dimensions in mm
Projection/First angle




Missing cylinder dimensions, see previous page 8 & 10

| Ø | AF | AG | AK | AL | AM | AN | AO | AP | AR | AU | AY | AZ | CO | E | F | G | Ø U | Weight at 0 mm | Weight per 100 mm | Model |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | 62 | 75 | 12 | 52 | 28,5 | 79,5 | 13,5 | 40 | 37,5 | 73 | 16,5 | 30 | 6 | 130 | 90 | 45 | 6,6 | 1,55 kg | 0,2 kg | M/146225/L./... |
| 32 | 78 | 92 | 12 | 64 | 29 | 94 | 14 | 55 | 44 | 89,5 | 17,5 | 32,5 | 6 | 160 | 120 | 60 | 9 | 3,90 kg | 0,35 kg | M/146232/L./... |
| 40 | 94 | 112 | 12 | 81 | 34,5 | 108,5 | 13,5 | 65 | 51 | 103 | 18 | 52,5 | 6 | 215 | 160 | 80 | 9 | 6,20 kg | 0,50 kg | M/146240/L./... |
| 50 | 112 | 132 | 12 | 94 | 35,5 | 126,5 | 14,5 | 75 | 59,5 | 124 | 18,5 | 65 | 6 | 250 | 190 | 95 | 11 | 10,70 kg | 0,75 kg | M/146250/L./... |
| 63 | 132 | 150 | 12 | 112 | 42,5 | 142,5 | 15,5 | 80 | 68 | 140 | 20,5 | 115 | 6 | 320 | 240 | 120 | 13 | 11,50 kg | 1,00 kg | M/146263/L./... |

## M/146200/L2, M/146200/L4 – cylinder with precision roller guide and passive brake (Ø 25 ... 63 mm)

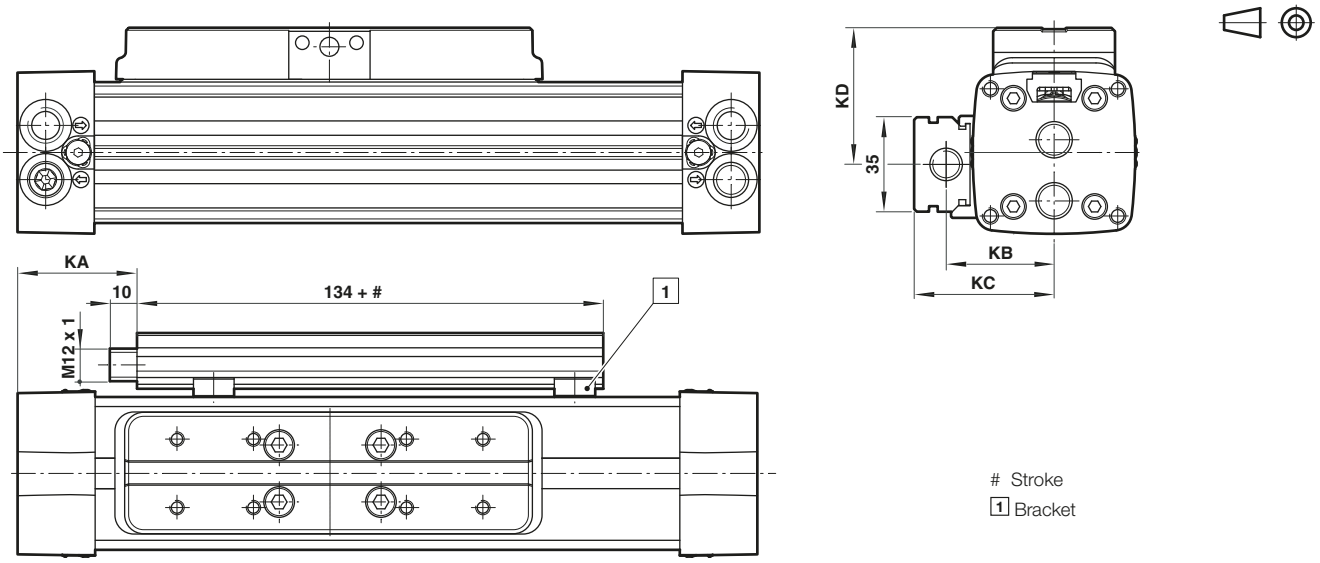



Missing cylinder dimensions, see previous page 8 & 10

| Ø | AF | AG | AK | AL | AM | AN | AO | AP | AR | AU | AY | AZ | CO | E | F | G | Ø U | Weight at 0 mm | Weight per 100 mm | Model |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | 62 | 75 | 22 | 52 | 38,5 | 89,5 | 23,5 | 40 | 47,5 | 83 | 26,5 | 30 | 16 | 130 | 90 | 45 | 6,6 | 1,90 kg | 0,20 kg | M/146225/L/... |
| 32 | 78 | 92 | 24 | 64 | 41 | 106 | 26 | 55 | 56 | 101,5 | 29,5 | 32,5 | 18 | 160 | 120 | 60 | 9 | 4,00 kg | 0,35 kg | M/146232/L/... |
| 40 | 94 | 112 | 24 | 81 | 46,5 | 120,5 | 25,5 | 65 | 63 | 115 | 30 | 52,5 | 18 | 215 | 160 | 80 | 9 | 6,70 kg | 0,50 kg | M/146240/L/... |
| 50 | 112 | 132 | 30 | 94 | 53,5 | 144,5 | 32,5 | 75 | 77,5 | 142 | 36,5 | 65 | 24 | 250 | 190 | 95 | 11 | 11,00 kg | 0,75 kg | M/146250/L/... |
| 63 | 132 | 150 | 30 | 112 | 60,5 | 160,5 | 33,5 | 80 | 86 | 158 | 38,5 | 115 | 24 | 320 | 240 | 120 | 13 | 12,40 kg | 1,00 kg | M/146263/L/... |

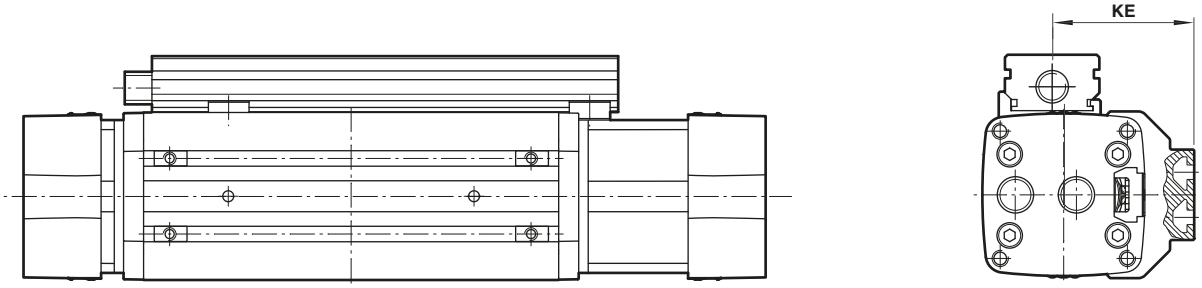
## M/146000/F1 – cylinder with linear sensor and internal guide

Dimensions in mm
Projection/First angle

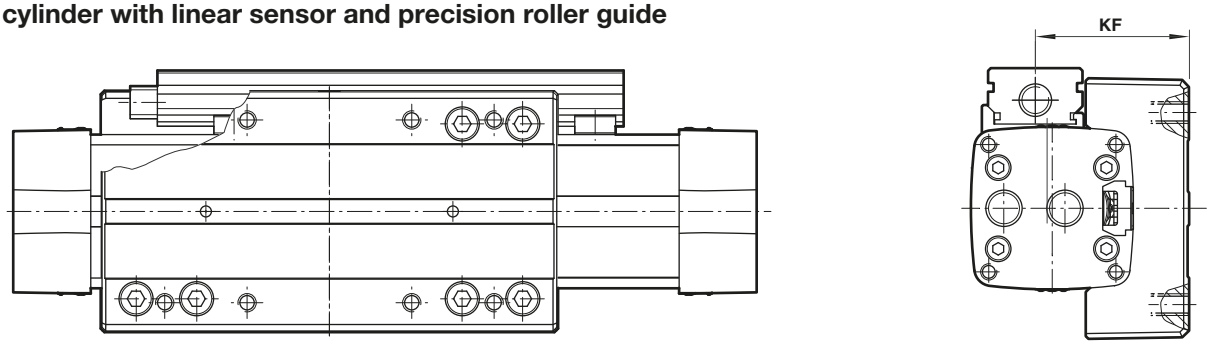



# Stroke
1 Bracket

## M/146100/F1 – cylinder with linear sensor and external adjustable guide



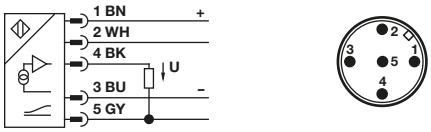

## M/146200/F1 – cylinder with linear sensor and precision roller guide




Missing cylinder dimensions and weights, see previous page 10 & 11
Electrical features see option selector on page 2

| Ø | KA | KB | KC | KD | KE | KF | Model |
|---|---|---|---|---|---|---|---|
| 32 | 44 | 40 | 51,5 | 50,5 | 56 | 56,5 | M/146.32/F1/... |
| 40 | 74 | 46 | 57,5 | 56,5 | 64 | 62,5 | M/146.40/F1/... |
| 50 | 104 | 54 | 65,5 | 68,5 | 75 | 70 | M/146.50/F1/... |
| 63 | 139 | 61 | 72 | 67,5 | 79,5 | 69,5 | M/146.63/F1/... |

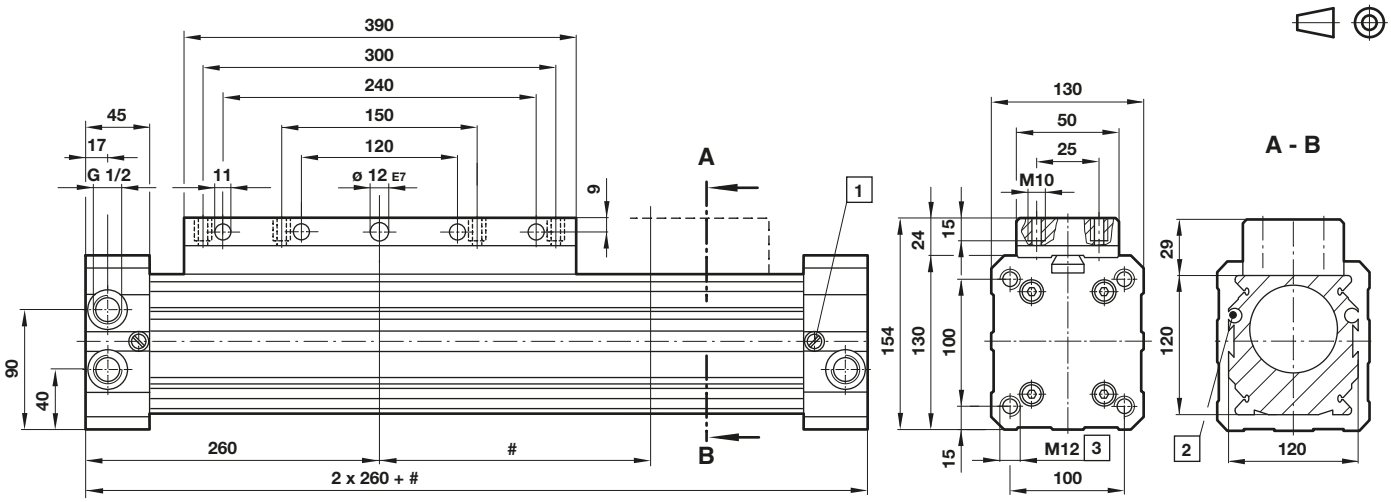
## Connector details




| Pin no. | Color | Function |
|---|---|---|
| 1 | Brown (BN) | + |
| 2 | White (WH) | Program input |
| 3 | Blue (BU) | - |
| 4 | Black (BK) | Output + |
| 5 | Grey (GY) | Output - |

## M/146080 – cylinder with internal guide (ø 80 mm)

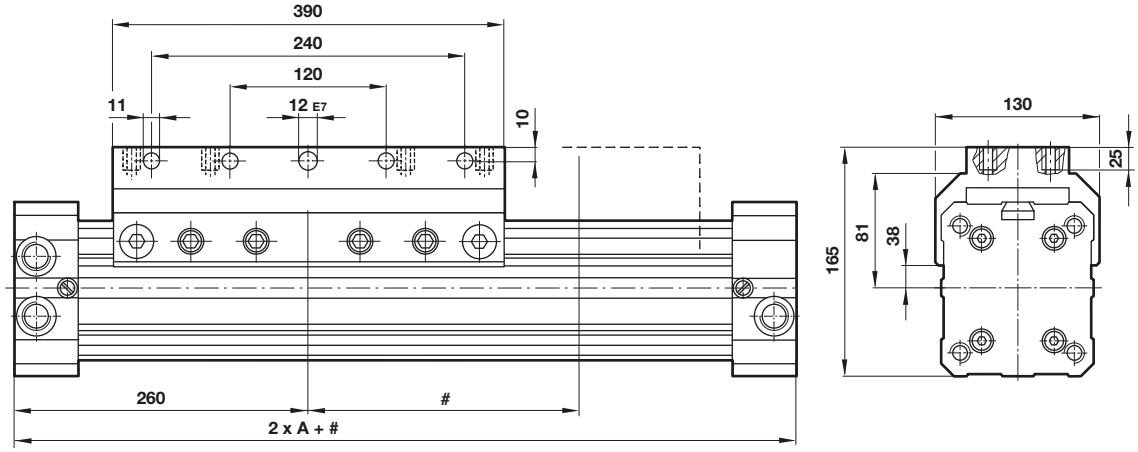
Dimensions in mm
Projection/First angle




| Ø | Weight at 0 mm | Weight per 100 mm | Model |
|---|---|---|---|
| 80 | 13,20 kg | 1,50 kg | M/146080/... |

# Stroke
1 Cushion screw
2 M/50 – switches and groove key can be mounted flush with the profile
3 26 deep

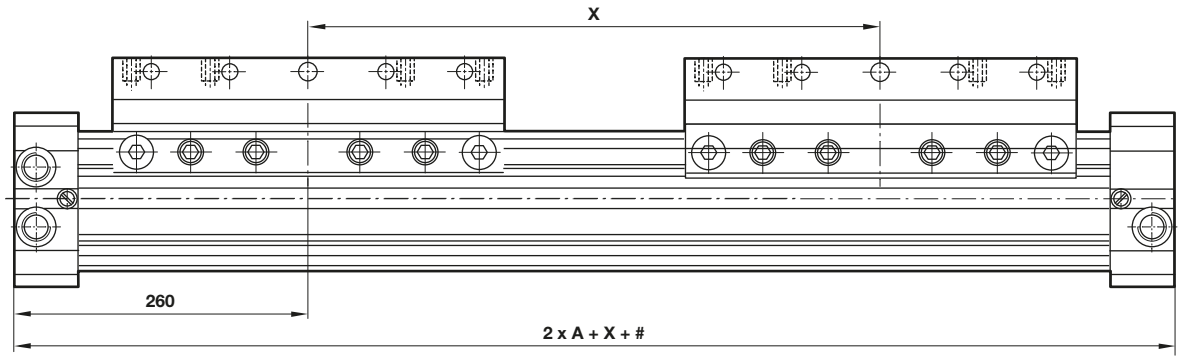
## M/146180 – cylinder with external adjustable guide (ø 80 mm)




| Ø | Weight at 0 mm | Weight per 100 mm | Model |
|---|---|---|---|
| 80 | 13,40 kg | 1,50 kg | M/146180/... |

# Stroke

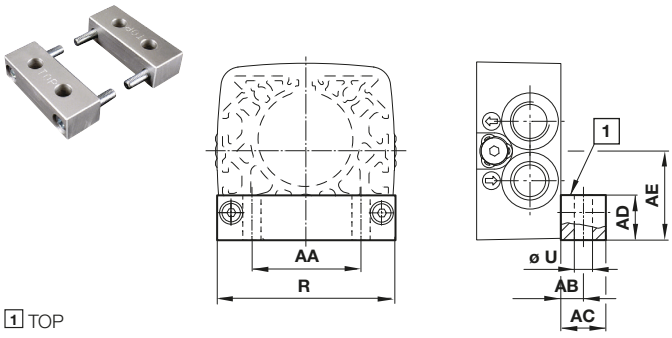
## M/146180/ID, .../MD – cylinder with external adjustable guide and double carriages (ø 80 mm)




| Ø | A | X min. | X max. | Weight at 0 mm | Weight per 100 mm | Model |
|---|---|---|---|---|---|---|
| 80 | 260 | 390 | 500 | 15,90 kg | 1,50 kg | M/146180/.D/... |

# Stroke

## Foot mounting C



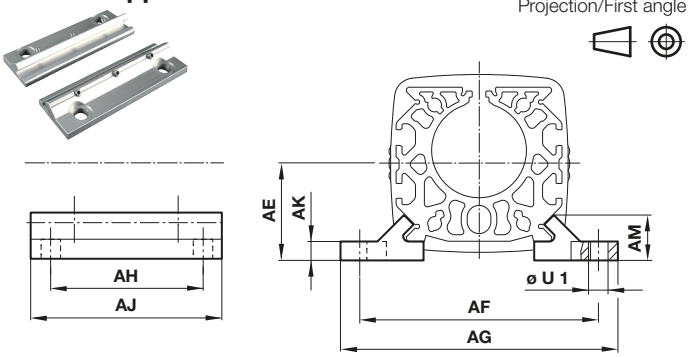

1 TOP

| Ø | AA | AB | AC | AD | AE | R | Ø U | (kg) | Model |
|---|---|---|---|---|---|---|---|---|---|
| 16 | 16 | 10 | 15 | 3 | 16 | 27 | 5,5 | 0,01 | QM/146016/21 |
| 20 | 17 | 5 | 10 | 10 | 21,5 | 40 | 5,5 | 0,03 | QM/146020/21 |
| 25 | 18 | 7 | 15 | 13,5 | 24 (26,5) | 48 | 7 | 0,1 | QM/146025/21 |
| 32 | 26 | 11 | 22 | 16,5 | 30,5 (33) | 60 | 9 | 0,1 | QM/146032/21 |
| 40 | 30 | 11 | 22 | 19,5 | 37,5 (40,5) | 75 | 9 | 0,2 | QM/146040/21 |
| 50 | 42 | 12 | 25 | 24 | 45 (49) | 90 | 11 | 0,3 | QM/146050/21 |
| 63 | 48 | 13 | 25 | 27,5 | 54 (57,5) | 105 | 13 | 0,4 | QM/146063/21 |
| 80 | 64 | 12,5 | 25 | 35 | 70 | 130 | 14 | 0,4 | QM/146080/21 |

Attention: Foot mounts can be attached to give different distances AE.
When used together with a centre support mounting the word TOP should be visible on the top face of the mount.

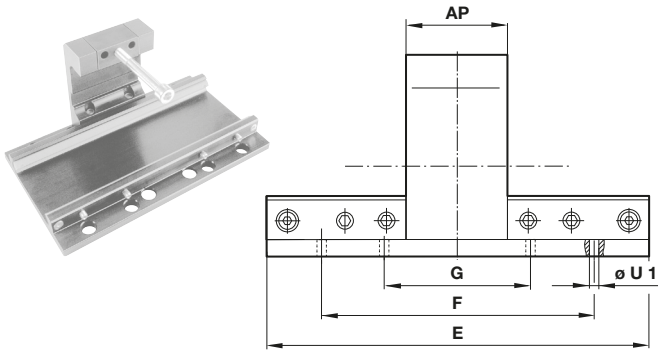
## Centre support V

Dimensions in mm
Projection/First angle



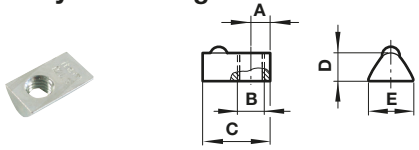

| Ø | AE | AF | AG | AH | AJ | AK | AM | Ø U1 | (kg) | Model |
|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 16 | 40 | 50 | 20 | 30 | 3,5 | 9 | 5,5 | 0,01 | QM/146016/32 |
| 20 | 21,5 | 52 | 62 | 45 | 60 | 4,5 | 12 | 5,5 | 0,03 | QM/146020/32 |
| 25 | 26,5 | 60 | 72 | 60 | 80 | 5,5 | 13 | 6,6 | 0,04 | QM/146025/32 |
| 32 | 30,5 | 76 | 92 | 70 | 100 | 6,5 | 13,5 | 9 | 0,07 | QM/146032/32 |
| 40 | 37,5 | 92 | 108 | 90 | 120 | 7,5 | 18,5 | 9 | 0,2 | QM/146040/32 |
| 50 | 45 | 110 | 128 | 110 | 140 | 7,5 | 18,5 | 11 | 0,2 | QM/146050/32 |
| 63 | 54 | 132 | 154 | 120 | 160 | 9 | 25 | 13 | 0,3 | QM/146063/32 |
| 80 | 70 | 155 | 180 | 140 | 180 | 12 | 28,3 | 14 | 0,4 | QM/146080/32 |

## Carriage plate mounting UV



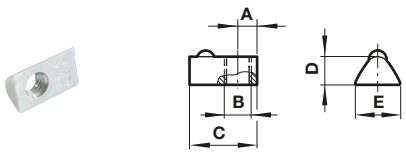

| Ø | AE | AF | AG | AK1 | AL | AM1 | AN | AP | E | F | G | ØU1 | (kg) | Model |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 16 | 40 | 50 | 3,5 | 31 | 8,5 | 40,5 | 30 | 80 | 60 | – | 5,5 | 0,1 | QM/146016/34 |
| 20 | 21,5 | 52 | 62 | 5,5 | 42 | 14,5 | 56 | 36 | 110 | 80 | 40 | 5,5 | 0,2 | QM/146020/34 |
| 25 | 26,5 | 60 | 75 | 5,5 | 52 | 17,5 | 62,5 | 45 | 130 | 90 | 45 | 6,6 | 0,3 | QM/146025/34 |
| 32 | 33 | 78 | 92 | 6,5 | 64 | 18 | 79 | 55 | 160 | 120 | 60 | 9 | 0,4 | QM/146032/34 |
| 40 | 40,5 | 94 | 112 | 7,5 | 81 | 24 | 93 | 65 | 215 | 160 | 80 | 9 | 0,8 | QM/146040/34 |
| 50 | 49 | 112 | 132 | 8 | 94 | 25 | 114 | 75 | 250 | 190 | 95 | 11 | 1,2 | QM/146050/34 |
| 63 | 57,5 | 132 | 150 | 10 | 112 | 32 | 130 | 90 | 320 | 240 | 120 | 13 | 2,0 | QM/146063/34 |
| 80 | 70 | 155 | 180 | 10 | 132 | 32 | 159 | 100 | 390 | 300 | 150 | 14 | 2,9 | QM/146080/34 |

## Groove key for carriage




| Ø | A | B | C | D | E | (kg) | Model |
|---|---|---|---|---|---|---|---|
| 25 | 4 | M5 | 12 | 4,25 | 8 | 0,01 | M/P74065 |
| 32 | 4 | M5 | 12 | 4,25 | 8 | 0,01 | M/P74065 |
| 40 | 4,5 | M6 | 17 | 6,25 | 10,5 | 0,02 | M/P74066 |
| 50 | 7,5 | M8 | 23 | 7,5 | 13,5 | 0,03 | M/P41858 |
| 63 | 7,5 | M8 | 23 | 7,5 | 13,5 | 0,03 | M/P41858 |

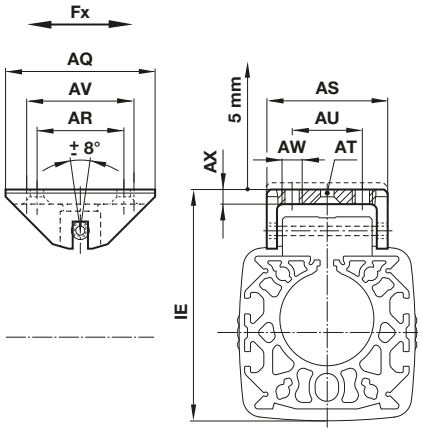
## Groove key for profile barrel




| Ø | A | B | C | D | E | (kg) | Model |
|---|---|---|---|---|---|---|---|
| 16 ... 80 | 4 | M5 | 12 | 4,25 | 8 | 0,01 | M/P74065 |

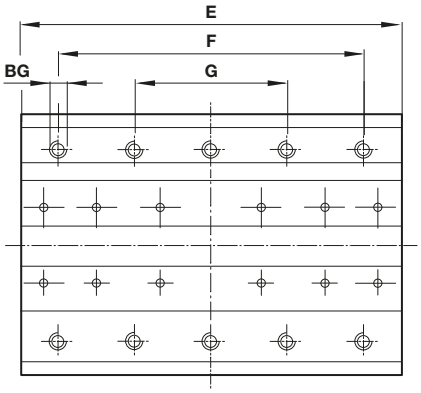
## Swinging bridge S
## For cylinders with internal guiding only

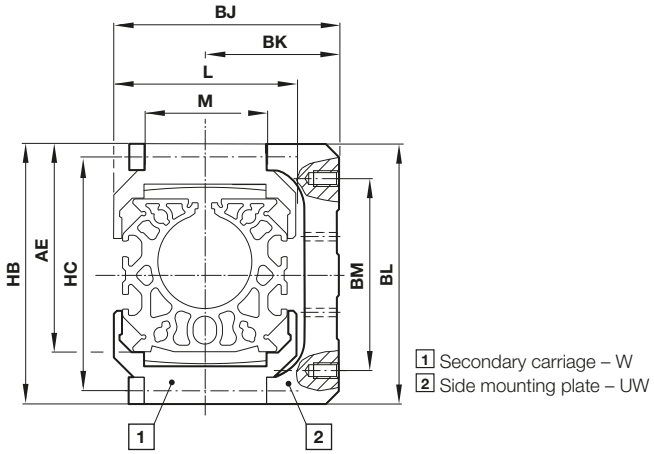
Dimensions in mm
Projection/First angle




| Ø | AQ | AR | AS | AT | AU | AV | AW | AX | IE | Fx (N) | (kg) | Model |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 40 | – | 26 | – | 12 | 30 | M4 | 4 | 48 +4 | 100 | 0,02 | QM/146016/37 |
| 20 | 50 | 35 | 38 | DIN74-Bm5 | 20 | 40 | M5 | 5 | 65,5 +5 | 150 | 0,10 | QM/146020/37 |
| 25 | 60 | 40 | 44 | DIN74-Bm5 | 20 | 45 | M5 | 5 | 70 +5 | 250 | 0,20 | QM/146025/37 |
| 32 | 80 | 50 | 59 | DIN74-Bm6 | 30 | 60 | M6 | 5,5 | 88,5 +5 | 410 | 0,30 | QM/146032/37 |
| 40 | 80 | 50 | 59 | DIN74-Bm6 | 30 | 60 | M6 | 5,5 | 102,5 +5 | 640 | 0,30 | QM/146032/37 |
| 50 | 100 | 60 | 65 | DIN74-Bm8 | 40 | 80 | M8 | 6,5 | 124 +5 | 1000 | 0,50 | QM/146050/37 |
| 63 | 100 | 60 | 65 | DIN74-Bm8 | 40 | 80 | M8 | 6,5 | 139 +5 | 1500 | 0,50 | QM/146050/37 |
| 80 | 100 | 60 | 65 | DIN74-Bm8 | 40 | 80 | M8 | 6,5 | 168,5 +5 | 2400 | 0,50 | QM/146080/37 |

## Secondary carriage W
## Side mounting plate UW



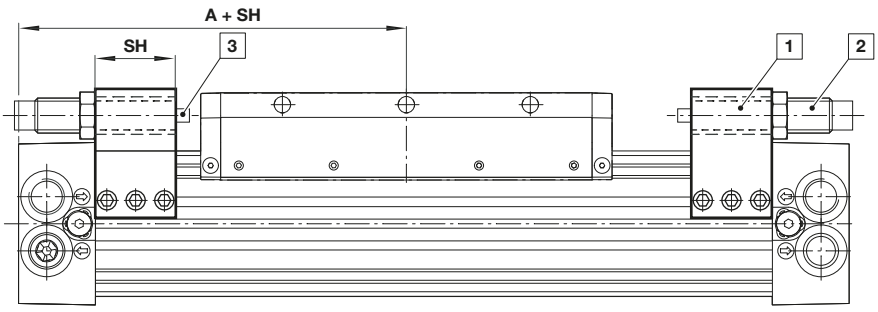



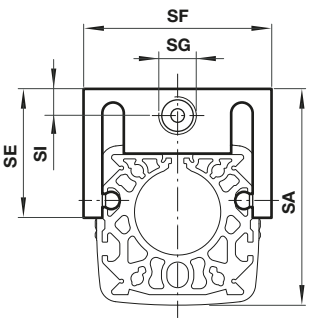

1 Secondary carriage – W
2 Side mounting plate – UW

| Ø | AE | BG | BJ | BK | BL | BM | E | F | G | HB | HC | L | M | W (kg) | UW (kg) | Model (W) | Model (UW) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 38 | – | – | – | – | – | 80 | – | – | 49 | – | – | 18 | 0,04 | – | QM/146116/35 | – |
| 20 | 59 | M 5 x 10*1) | 54 | 33 | 78 | 55 | 110 | 80 | 40 | 79 | 64 | 42 | 27 | 0,19 | 0,25 | QM/146120/35 | QM/146120/36 |
| 25 | 67,5 | M 5 x 10*1) | 63 | 37 | 86 | 65 | 130 | 90 | 45 | 87 | 77 | 52 | 32 | 0,27 | 0,33 | QM/146125/35 | QM/146125/36 |
| 32 | 82 | M 5 x 12*1) | 77 | 45 | 103 | 80 | 160 | 120 | 60 | 104 | 94 | 64 | 45 | 0,50 | 0,50 | QM/146132/35 | QM/146132/36 |
| 40 | 97,5 | M 6 x 12*1) | 77 | 58,5 | 119 | 90 | 215 | 160 | 80 | 120 | 110 | 79 | 45 | 0,65 | 1,08 | QM/146140/35 | QM/146140/36 |
| 50 | 117 | M 6 x 15*1) | 98 | 71,5 | 143 | 120 | 250 | 190 | 95 | 144 | 131 | 92 | 50 | 1,10 | 1,85 | QM/146150/35 | QM/146150/36 |
| 63 | 137 | M 8 x 20*1) | 117,5 | 84,5 | 168 | 140 | 320 | 240 | 120 | 169 | 154 | 110 | 50 | 1,90 | 3,46 | QM/146163/35 | QM/146163/36 |
| 80 | 165 | – | – | – | – | – | 390 | – | – | 200 | – | – | 50 | 2,50 | – | QM/146180/35 | – |

*1) deep

## Adjustable stop - for M/146100, /.., ../M, M/146200/..., .../M



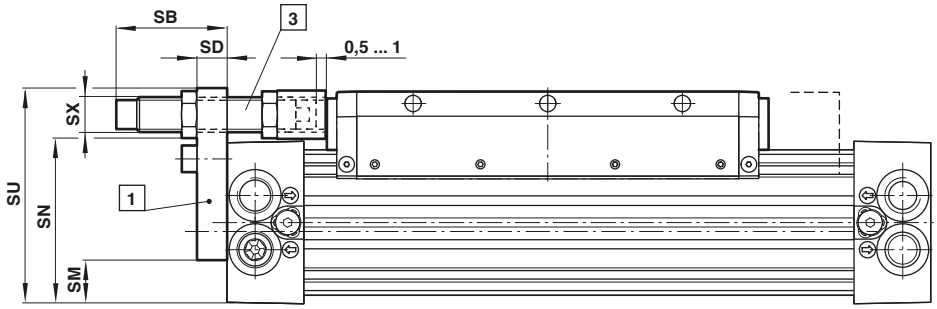

Missing cylinder dimensions and weights see pages 9 & 10

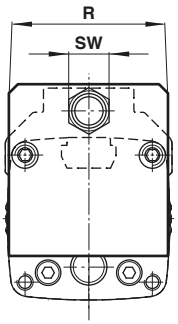
| Ø | A | SA | SE | SF | SG | SH | SI | Weight | Model |
|---|---|---|---|---|---|---|---|---|---|
| 25 | 100 | 67 | 48 | 63 | M14x1,5 | 30 | 10,5 | 0,12 kg | QM/146125/75 |
| 32 | 120 | 80 | 48 | 70 | M14x1,5 | 30 | 10,5 | 0,17 kg | QM/146132/75 |
| 40 | 150 | 102 | 62 | 83 | M20x1,5 | 30 | 15 | 0,22 kg | QM/146140/75 |

1 Assembly kit
2 Please order shock absorber separately, see ACE program
3 Reaction forces (Q max)
ø 25 = 1200 N,
ø 32 = 1500 N,
ø 40 = 1850 N

## Assembly kit for shock absorber - for cylinder series M/146100, M/146100/M

Dimensions in mm
Projection/First angle



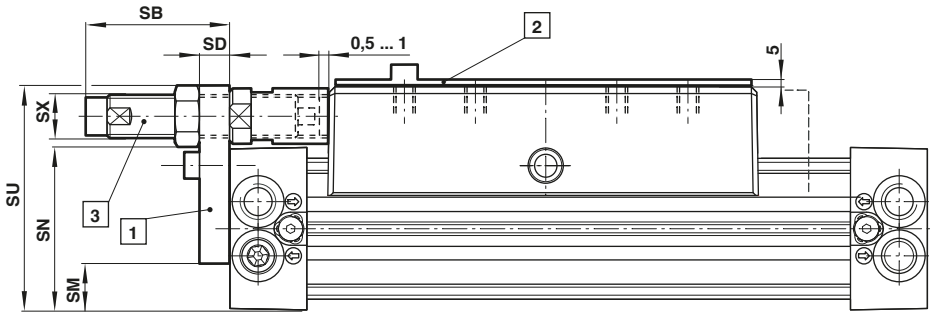



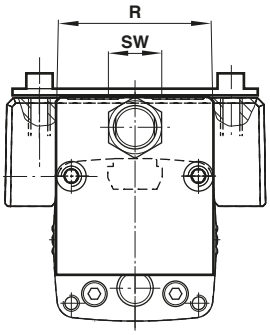

Missing cylinder dimensions, see on page 8 & 9

| Ø | Cylinder | R | SB | SD | SC | SM | SN | SU | SW | SX | Assembly kit for shock absorber Position 1 | Plate Position 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | M/146125 | 48 | 45,5 | 12 | – | 19 | 49 | 69,5 | 17 | M14x1,5 | QM/146125/67 | – |
| 32 | M/146132 | 60 | 40,5 | 12 | – | 24 | 61 | 81,5 | 17 | M14x1,5 | QM/146132/67 | – |
| 40 | M/146140 | 75 | 81,5 | 15 | – | 29 | 74 | 109,5 | 30 | M25x1,5 | QM/146140/67 | – |
| 50 | M/146150 | 90 | 69 | 15 | – | 33 | 91 | 127,5 | 30 | M25x1,5 | QM/146150/67 | – |
| 63 | M/146163 | 105 | 69 | 15 | – | 41 | 105,5 | 141,5 | 30 | M25x1,5 | QM/146163/67 | – |
| 80 | M/146180 | 130 | 85 | 20 | – | 53 | 130,5 | 173,5 | Ø 40 | M33x1,5 | QM/146180/67 | – |

Please order shock absorber and plate separately.

## For cylinder series M/146200, M/146200/M




Missing cylinder dimensions, see on page 8 & 10

| Ø | Cylinder | R | SB | SD | SC | SM | SN | SU | SW | SX | Assembly kit for shock absorber Position 1 | Plate Position 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | M/146225 | 48 | 45,5 | 12 | – | 19 | 49 | 69,5 | 17 | M14x1,5 | QM/146125/67 | – |
| 32 | M/146232 | 60 | 40,5 | 12 | – | 24 | 61 | 81,5 | 17 | M14x1,5 | QM/146132/67 | – |
| 40 | M/146240 | 75 | 81,5 | 15 | 31 | 29 | 74 | 109,5 | 30 | M25x1,5 | QM/146140/67 | M/P41434 |
| 50 | M/146250 | 105 | 69 | 15 | 36 | 33 | 91 | 127,5 | 30 | M25x1,5 | QM/146150/67 | M/P41435 |
| 63 | M/146263 | 130 | 69 | 15 | 35 | 41 | 105,5 | 141,5 | 30 | M25x1,5 | QM/146163/67 | M/P41436 |

Please order shock absorber and plate separately.
Attention: When using M/146200 cylinders (ø 40 to 63 mm) an extra top plate must be mounted onto the carriage as the centre line of the shock absorbers has to be within the surface of the carriage.

## Technical data - Reed switches - additional informations see data sheet N/en 4.3.005

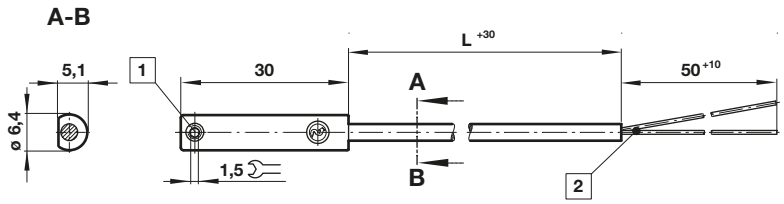
| Symbol | Voltage (V a.c.) | Voltage (V d.c.) | Current maximum (mA) | Function | Operating temperature (°C) | LED | Protection class | Plug | Cable length (m) | Cable type | Weight (g) | Model |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ± BN ~ BU | 10 ... 240 | 10 ... 170 | 180 | Closer | -25 ... +80 | • | IP66 | — | 2, 5 or 10 | PVC 2 x 0,25 | 37 | M/50/LSU/*V |
| | 10 ... 240 | 10 ... 170 | 180 | Closer | -25 ... +80 | • | IP66 | — | 5 | PUR 2 x 0,25 | 37 | M/50/LSU/5U |
| BN BU | 10 ... 240 | 10 ... 170 | 180 | Closer | -25 ... +150 | — | IP66 | — | 2 | Silicon 2 x 0,25 | 37 | TM/50/RAU/2S |
| BK BU BN | 10 ... 240 | 10 ... 170 | 180 | Changeover | -25 ... +80 | — | IP66 | — | 5 | PVC 3 x 0,25 | 37 | M/50/RAC/5V |
| 1 ± BN ~ 4 ~ BK | 10 ... 60 | 10 ... 60 | 180 | Closer | -25 ... +80 | • | IP66 | M8 x 1 | 0,3 | PVC 3 x 0,25 | 16 | M/50/LSU/CP *1) |

* Insert cable length; *1) Plug-in connector see page 11; Color code: BK = black, BN = brown, BU = blue

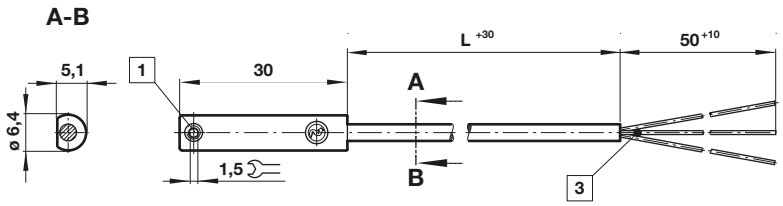
## Drawings

Dimensions in mm
Projection/First angle

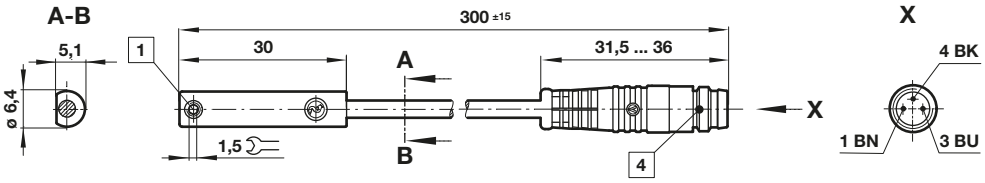
**M/50/LSU/*V, M/50/LSU/5U, TM/50/RAU/2S**
**Cable length L = 2, 5 or 10 m**




**M/50/RAC/5V**
**Cable length L = 5 m**




**M/50/LSU/CP**




1 Fixing screw
2 + BN = brown; - BU = blue (output)
3 - BK = black; + BN = brown; - ≠BU = blue
4 Plug M8 x 1, color code: BK = black; BN = brown; BU = blue

## Switch mounting brackets - Brackets > 15 mm stroke

1 Magnetically operated switch
2 Switch mounting bracket

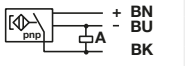
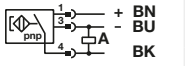
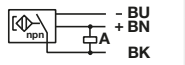
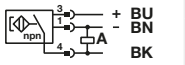
| Ø | B | R max. | kg | Model |
|---|---|---|---|---|
| 10 | 8 | 16 | 0,01 | QM/33/010/22 |
| 12 | 8 | 18 | 0,01 | QM/33/012/22 |
| 16 | 10 | 20 | 0,01 | QM/33/016/22 |
| 20 | 10 | 22 | 0,01 | QM/33/020/22 |
| 25 | 10 | 24 | 0,01 | QM/33/025/22 |

## Switch mounting brackets - Brackets < 15 mm stroke

1 Magnetically operated switch
2 Switch mounting bracket

| Ø | S | T | kg | Model |
|---|---|---|---|---|
| 10 | 27,5 | 19,5 | 0,01 | QM/33/010/23 |
| 12 | 28,5 | 21,5 | 0,01 | QM/33/016/23 |
| 16 | 29,5 | 23,5 | 0,01 | QM/33/016/23 |
| 20 | 29,5 | 26 | 0,01 | QM/33/020/23 |
| 25 | 31,5 | 28,5 | 0,01 | QM/33/025/23 |

## Technical data - Solid state - additional informations see data sheet N/en 4.3.007

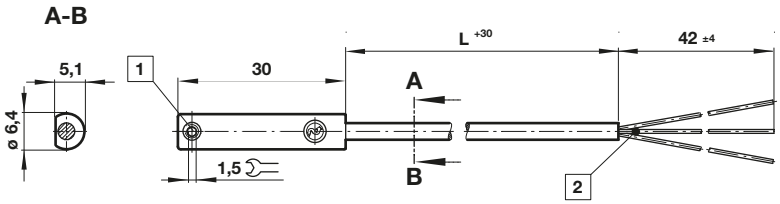
| Symbol | Voltage (V d.c.) | Current maximum (mA) | Function | Operating temperature (°C) | LED | Protection class | Plug | Cable length (m) | Cable type | Weight (g) | Model |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  | 10 ... 30 | 150 | PNP | -40 ... +80 | • | IP67 | — | 2, 5 or 10 | PVC 3 x 0,12 | 37 | M/50/EAP/*V |
| | 10 ... 30 | 150 | PNP | -40 ... +80 | • | IP68 | — | 5 | PUR 3 x 0,14 | 37 | M/50/EAP/5U |
|  | 10 ... 30 | 150 | PNP | -40 ... +80 | • | IP67 | M8 x 1 | 0,3 | PVC 3 x 0,14 | 16 | M/50/EAP/CP *1) |
| | 10 ... 30 | 150 | PNP | -40 ... +80 | • | IP67 | M12 x 1 | 0,3 | PVC 3 x 0,14 | 16 | M/50/EAP/CC *1) |
|  | 10 ... 30 | 150 | NPN | -40 ... +80 | • | IP67 | — | 2, 5 or 10 | PVC 3 x 0,12 | 37 | M/50/EAN/*V |
|  | 10 ... 30 | 150 | Closer | -40 ... +80 | • | IP67 | M8 x 1 | 0,3 | PVC 3 x 0,14 | 16 | M/50/EAN/CP *1) |

* Insert cable length; *1) Plug-in connector below; Color code: BK = black, BN = brown, BU = blue

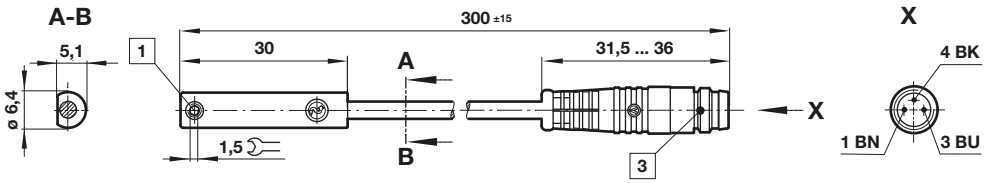
## Drawings

Dimensions in mm
Projection/First angle

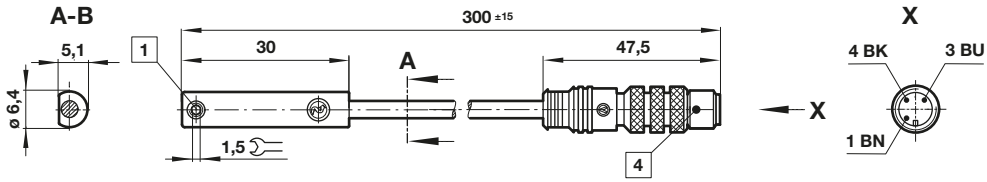
**M/50/EAP/*V,**
**M/50/EAN/*V**
**Cable length L = 2, 5 or 10 m**




**M/50/EAP/CP,**
**M/50/EAN/CP**




**M/50/EAP/CC**




1 Fixing screw
2 Color code:
BK = black;
BN = brown;
BU = blue
3 Plug M8 x 1
4 Plug M12 x 1

## Accessories

**Plug-in connector cable with nut**

| Outer cover | Cable length (m) | Weight (kg) | Connector | Connector |
|---|---|---|---|---|
| PVC 3 x 0,25 | 5 m | 0,18 | M8 x 1 | M/P73001/5 |
| PUR 3 x 0,25 | 5 m | 0,18 | M8 x 1 | M/P73002/5 |
| PUR 3 x 0,34 | 5 m | 0,21 | M12 x 1 | M/P34594/5 |

**Warning**

These products are intended for use in industrial compressed air systems only. Do not use these products where pressures and temperatures can exceed those listed under »**Technical features/data**«.
Before using these products with fluids other than those specified, for non-industrial applications, life-support systems or other applications not within published specifications, consult
IMI Precision Engineering, Norgren GmbH.

Through misuse, age, or malfunction, components used in fluid power systems can fail in various modes. The system designer is warned to consider the failure modes of all component parts used in fluid power systems and to provide adequate safeguards to prevent personal injury or damage to equipment in the event of such failure.
System designers must provide a warning to end users in the system instructional manual if protection against a failure mode cannot be adequately provided.
System designers and end users are cautioned to review specific warnings found in instruction sheets packed and shipped with these products.