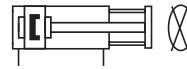


M/61000/M, M/61000/MR Guiding and stopper cylinder

- Ø 32 ... 100 mm
- Guiding accuracy $\pm 0,02$ mm
- Non-rotation accuracy $\pm 0,02^\circ$
- Integrated heavy duty guide rods
- Linear ball bearing option provides precision guiding for higher speeds
- Plain bearing option offers higher side load capacity
- Easy installation
- Magnetic piston as standard
- Buffer pad for noise reduction



Technical features

Medium:

Compressed air, filtered, lubricated or non-lubricated

Operation:

Double acting with magnetic piston and buffer cushioning

Operating pressure:

1 ... 10 bar (14 ... 145 psi)

Cylinder diameters:

32, 40, 50, 63, 80 (plain bearings)
32, 40, 50, 63, 80, 100 (ball bearings)

Standard Strokes:

25, 50, 75, 100 mm
(non-standard strokes <100 mm available.
They have the dimensions of the next longer standard stroke.)

Operating temperature:

-10°C ... +80°C max.
(+14 ... +176°F)
Air supply must be dry enough to avoid ice formation at temperatures below +2°C (+35°F).

Materials:

Profile barrel: anodized aluminium
Piston rod: stainless steel (martensitic)
Guide rod: stainless steel martensitic (plain bearings), hardened steel, hard-chrome plated (ball bearings)
Bearing: solid bronze (plain bearings), steel roller (ball bearings)
Mounting plate: stainless steel (austenitic)
Piston rod seals: PUR
Piston seals: NBR
'O'-ring: NBR

Technical data

Cylinder Ø (mm)	32	40	50	63	80	100
Port size	G1/8	G1/8	G1/4	G1/4	G1/4	G1/4
Theoretical forces at 6 bar outstroke (N)	482	754	1178	1870	3016	4710
Theoretical forces at 6 bar instroke (N)	414	633	990	1680	2722	4416
Air consumption at 6 bar outstroke (l/cm)	0,056	0,088	0,137	0,218	0,35	0,55
Air consumption at 6 bar instroke (l/cm)	0,048	0,074	0,114	0,195	0,32	0,51

Option selector

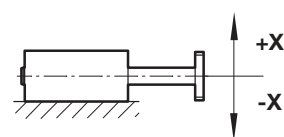
Cylinder Ø (mm)		Strokes (mm)	
32	032	25	25
40	040	50	50
50	050	75	75
63	063	100	100
80	080	Variants (magnetic piston) Substitute Plain bearings (Ø 32 ... 80 mm) M Ball bearings (Ø 32 ... 100 mm) MR Ball bearings, special wipers (Ø 32 ... 100 mm) W2R	
100	100		

Weights (kg)

Ø	Stroke (mm) 25	50	75	100	Model
32	1,50	1,99	2,48	2,97	M/61000/M Cylinder with slide bearing
40	1,70	2,21	2,72	3,23	
50	2,40	3,10	3,80	4,50	
63	3,10	3,91	4,72	5,53	
80	6,45	7,77	9,09	10,40	
32	1,25	1,65	2,05	2,45	M/61000/MR Cylinder with roller bearing
40	1,45	1,87	2,29	2,71	
50	2,10	2,68	3,26	3,84	
63	2,60	3,27	3,94	4,61	
80	5,99	7,14	8,29	9,44	
100	9,16	10,75	12,35	13,95	

Guiding accuracy

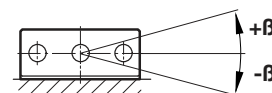
Deflection of the mounting platem at instroke and outstroke position without load.



Cylinder Ø (mm)	32	40	50	63	80	100
Position	Instroke	Outstroke	Instroke	Outstroke	Instroke	Outstroke
Slidebearing	± 0,06	± 0,11	± 0,06	± 0,11	± 0,07	–
Rollerbearing	± 0,02	± 0,04	± 0,02	± 0,04	± 0,03	± 0,05

Non-rotation Accuracy

Deflection of the mounting plate β (°) at instroke position without load.



Cylinder Ø (mm)	32	40	50	63	80	100
Slide bearing	± 0,06	± 0,06	± 0,05	± 0,05	± 0,04	–
Roller bearing	± 0,03	± 0,03	± 0,03	± 0,03	± 0,02	± 0,02

Load data General:

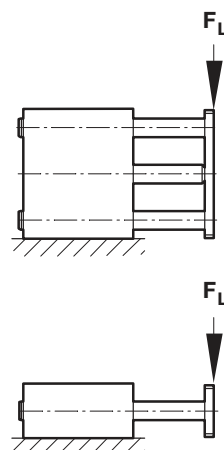
The combination of different load cases (e.g. load plus torque or eccentricity in two directions) will reduce the permissible load accordingly. Keep the guide rods free from any pollution.

Maximum load FL* (N)

at the front plate

Cylinder Ø (mm)	Stroke (mm) 25	50	75	100	Model
32	212	214	215	216	M/61032/M
32	163	179	187	191	M/61032/MR
40	227	224	223	222	M/61040/M
40	181	191	195	198	M/61040/MR
50	324	331	334	337	M/61050/M
50	223	236	242	246	M/61050/MR
63	343	343	343	344	M/61063/M
63	251	254	256	257	M/61063/MR
80	470	479	484	487	M/61080/M
80	423	459	477	488	M/61080/MR
100	902	761	799	821	M/61100/MR

* Dependent on stroke



Maximum Load FL' (N) at the distance DL

A distance DL between the force and the front plate (e.g. force in the centre of gravity of a load) will reduce the permissible Load as follows:

$$FL' = FL \times (b : b + \Delta l)$$

FL' – Max. load at the distance Δl (N)

FL – Max. load at the front plate (N)

Δl – Distance (mm)

$b = a + 2 \times \text{stroke (mm)}$

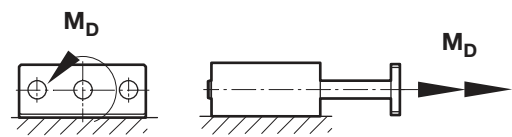
a – Constant (mm)

Cylinder Ø (mm)	32	40	50	63	80	100
a	32	39	41	46	54	59

Maximum torque MD* (Nm)

Cylinder Ø (mm)	Stroke (mm)	25	50	75	100	Model
32	8,5	8,5	8,6	8,6	8,6	M/61032/M
32	6,5	7,1	7,5	7,6	7,6	M/61032/MR
40	10,2	10,1	10	10	10	M/61040/M
40	8,1	8,6	8,7	8,9	8,9	M/61040/MR
50	16,2	16,5	16,7	16,8	16,8	M/61050/M
50	11,1	11,8	12,1	12,3	12,3	M/61050/MR
63	18,8	18,8	18,8	18,9	18,9	M/61063/M
63	13,8	14	14,1	14,1	14,1	M/61063/MR
80	32,9	33,5	33,9	34,1	34,1	M/61080/M
80	29,6	32,1	33,4	34,1	34,1	M/61080/MR
100	76,7	64,7	67,9	69,8	69,8	M/61100/MR

* Dependent on stroke



Calculation of permissible Speed or maximum Load

For a cylinder with guiding used as actuator

ES – Max. kinetic energy (Nm)

mE – Moved weight (kg)

mL – Additional load (kg)

v – Speed (m/s)

$$ES = 0,5 \sqrt{(mE + mL)} \times v^2$$

Maximum permissible speed v max.

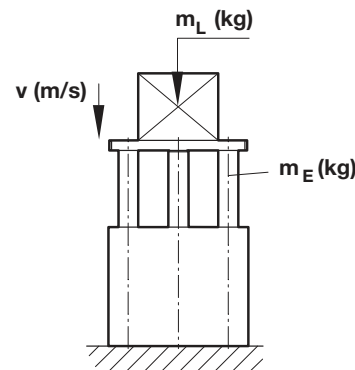
$$v_{max} = \frac{2 ES}{mE + mL}$$

vZyl = 0,6 m/s for cylinder Ø 32 ... 63 mm

vZyl = 0,4 m/s for cylinder Ø 80 ... 100 mm

Maximum additional load mL max.

$$mL_{max} = \frac{2 ES}{v^2} - mE$$



Maximum kinetic energy ES (Nm)

Cylinder Ø (mm)	32	40	50	63	80	100
Es	0,4	0,58	0,67	0,67	1,33	1,33

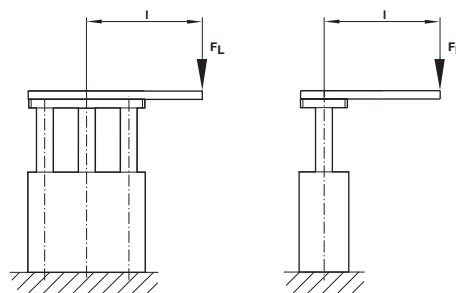
Moved weight mE (kg)

Ø	Stroke (mm)	25	50	75	100	Model
32	0,92	1,19	1,46	1,73	1,73	M/61000/M Cylinder with slide bearing
40	1,01	1,3	1,59	1,88	1,88	
50	1,49	1,94	2,39	2,84	2,84	
63	1,9	2,35	2,8	3,25	3,25	
80	3,73	4,38	5,03	5,68	5,68	M/61000/MR Cylinder with roller bearing
32	0,74	0,92	1,1	1,28	1,28	
40	0,83	1,03	1,23	1,43	1,43	
50	1,21	1,52	1,83	2,14	2,14	
63	1,61	1,92	2,23	2,54	2,54	
80	3,35	3,83	4,32	4,8	4,8	
100	4,9	5,55	6,2	6,85	6,85	

M/61000/M

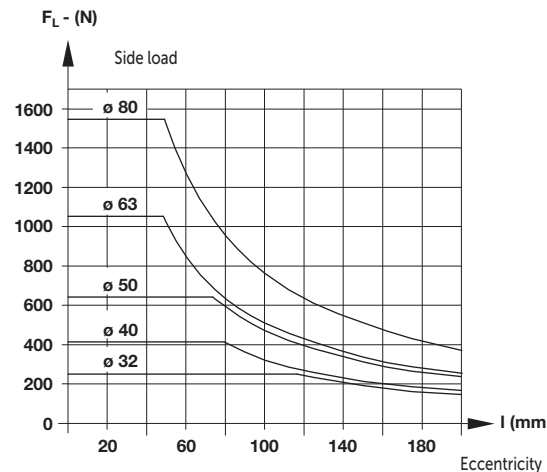
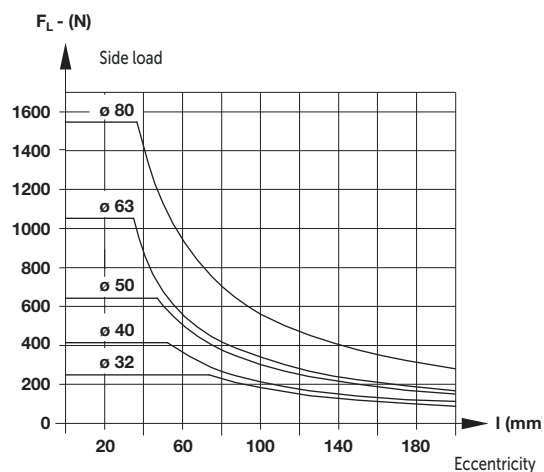
Used as stopper cylinder

Max. side load (F_L) depending on the eccentricity (l), cylinder with slide bearings.



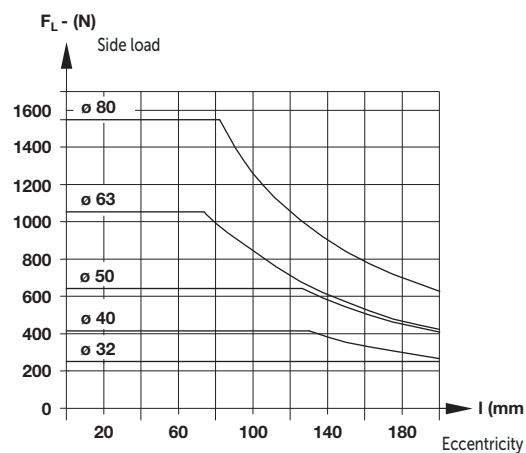
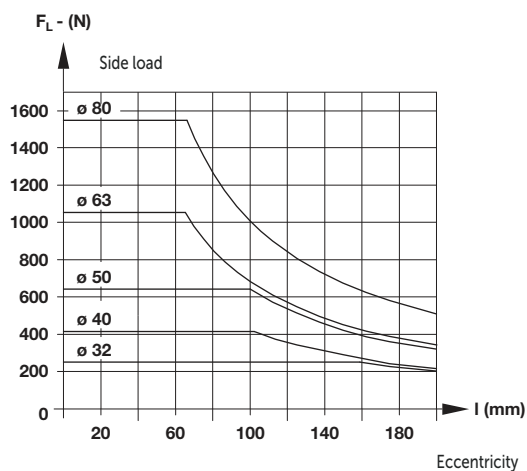
Stroke: 25 mm

Stroke: 50 mm



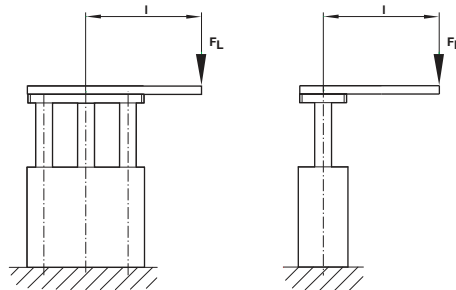
Stroke: 75 mm

Stroke: 100 mm

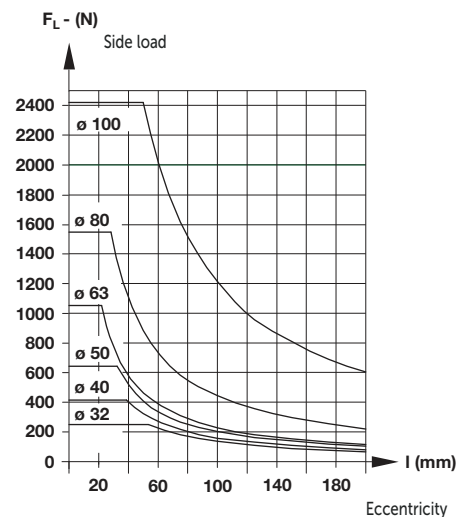


M/61000/MR Used as lifting cylinder

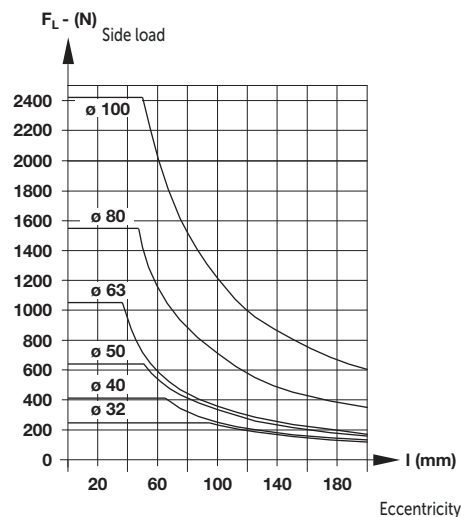
Max. side load (F_L) depending on the eccentricity (l),
cylinder with roller bearings.



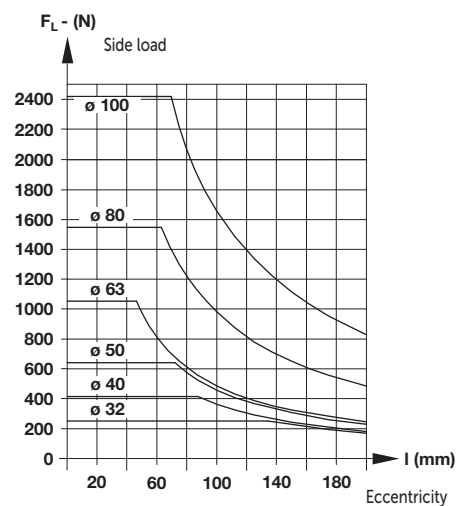
Stroke: 25 mm



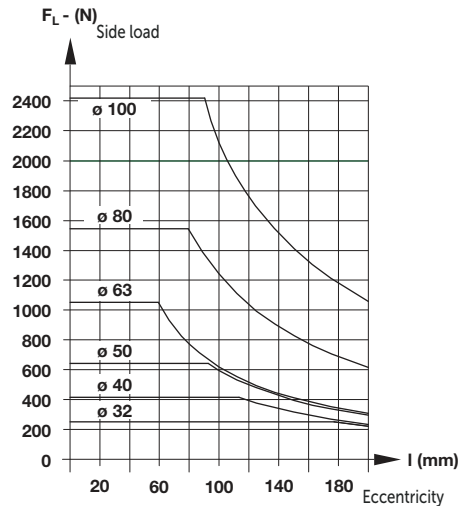
Stroke: 50 mm



Stroke: 75 mm



Stroke: 100 mm



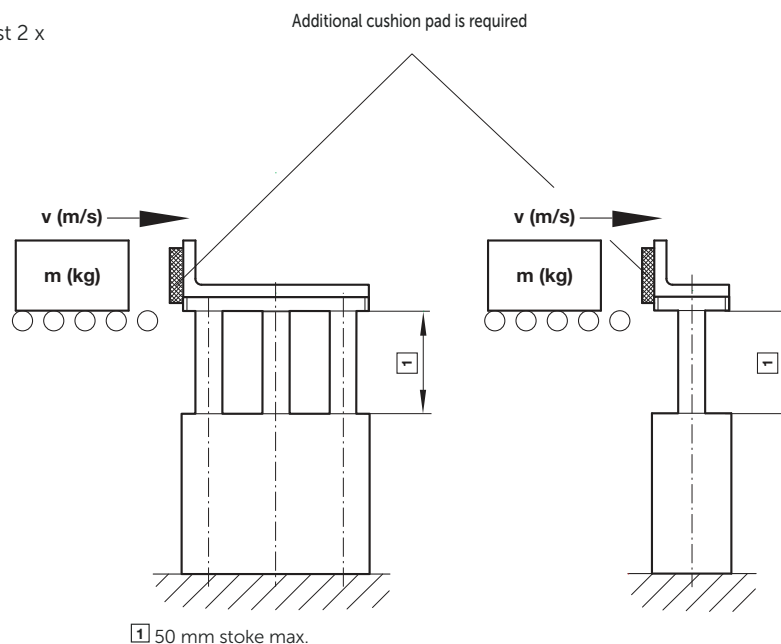
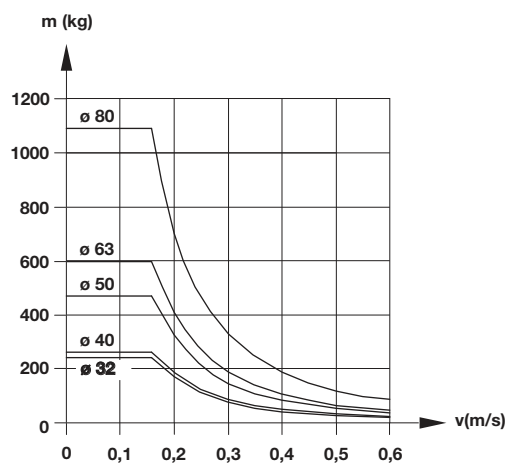
Application: M/61000/M used as Stopper Cylinder

Max. impact energy (Nm)

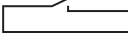
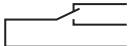
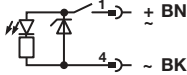
Use only cylinders with plain bearings as stopper The diagram mass vs. speed is based on a cushion stroke of 2,5 mm at the front plate provided e.g. by an additional cushion pad.

Insert mounting screws at the rear side of the cylinder at least 2 x diameter deep.

Dimensions in mm
Projection/First angle



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

Symbol	Voltage		Current maximum (mA)	Function	Operating temperature (°C)	LED	Protection class	Plug	Cable length (m)	Cable type	Weight (g)	Model
	(V a.c.)	(V d.c.)										
	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
	10 ... 240	10 ... 170	180	Closer	-25 ... +150	—	IP66	—	2	Silicon 2 x 0,25	37	TM/50/RAU/2S
	10 ... 240	10 ... 170	180	Changeover	-25 ... +80	—	IP66	—	5	PVC 3 x 0,25	37	M/50/RAC/5V
	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

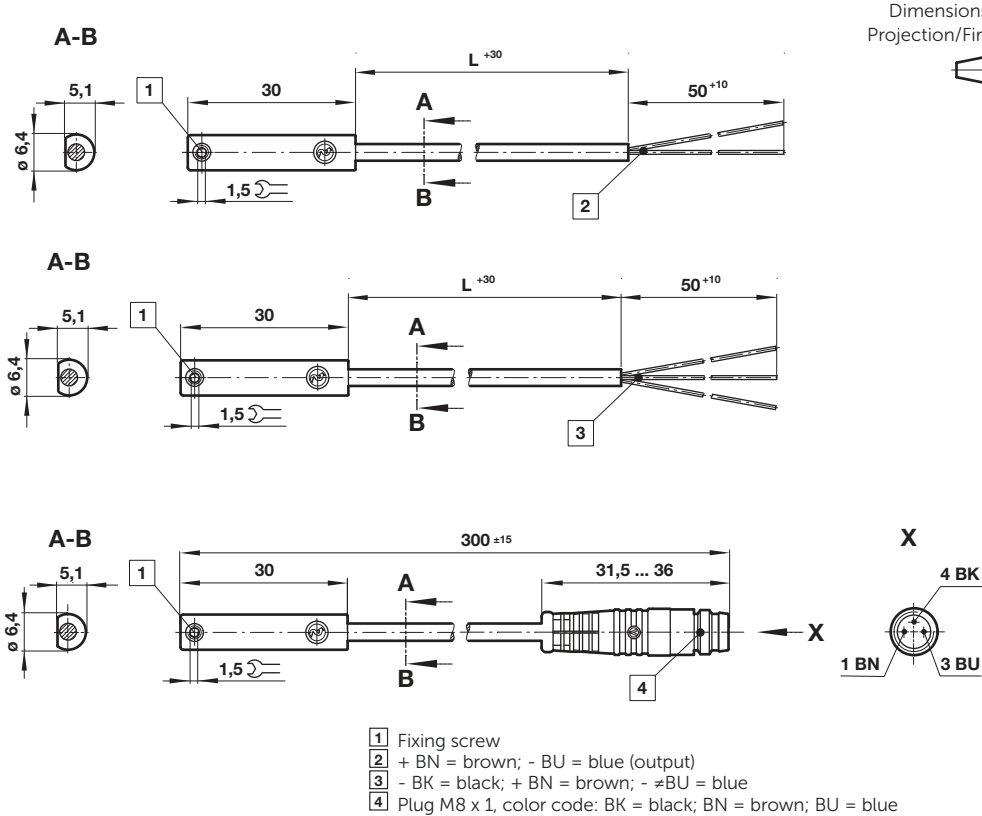
M/50/LSU/*V, M/50/LSU/5U,
TM/50/RAU/2S
Cable length L = 2, 5 or 10 m



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



M/50/LSU/CP



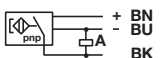
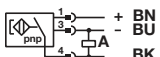
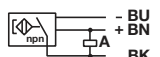
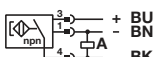
Accessories

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

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

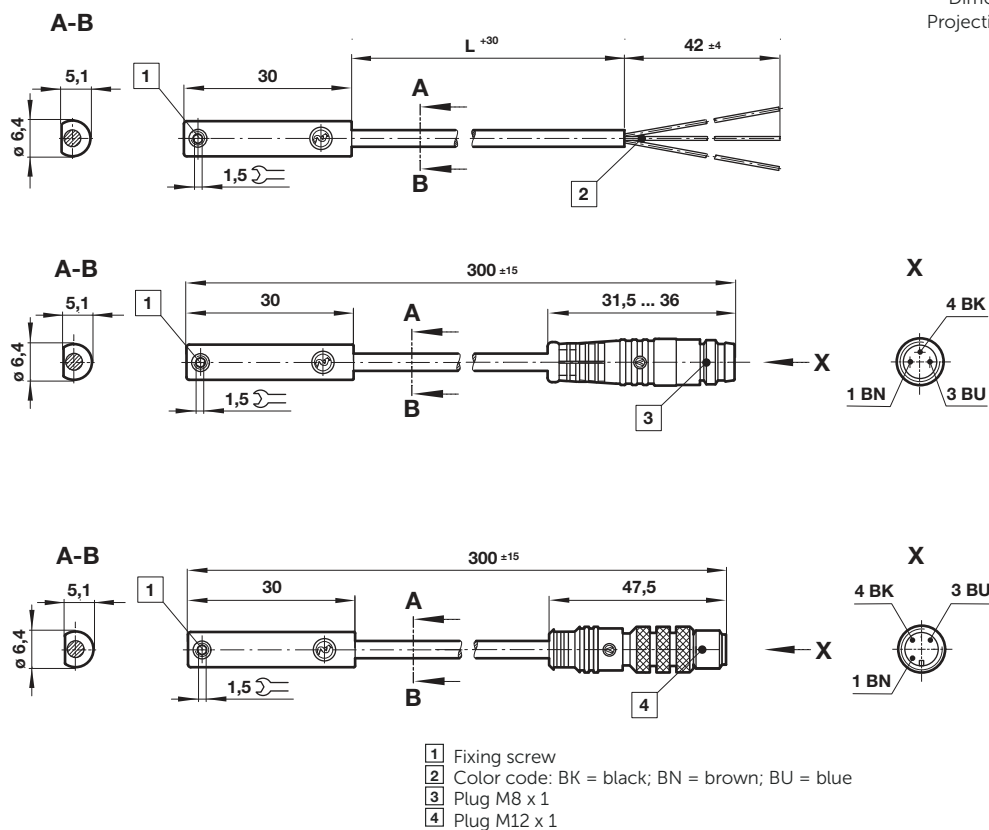
M/50/EAP/*V,
M/50/EAN/*V
Cable length L = 2, 5 or 10 m



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



M/50/EAP/CC



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.