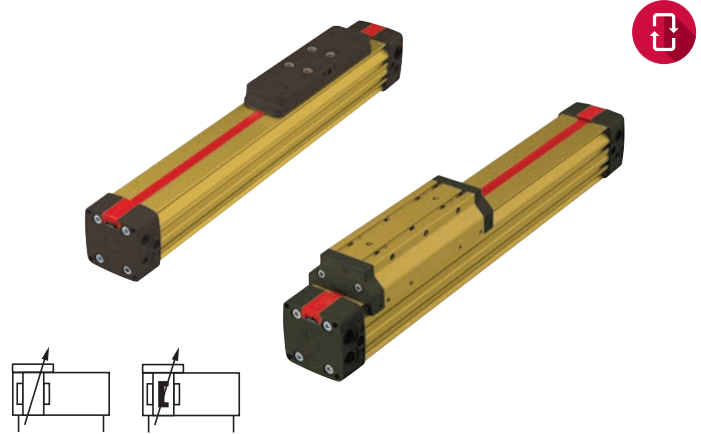


- > Ø 20 ... 80 mm
- > Corrosion-resistant
- > New lightweight design extrusion with universal mounting grooves
- > Proved and patented sealing system
- > Dust protection as standard

- > Up to 10% higher loading values against internal guiding series M/46000
- > Interchangeability with series VM/46000



Technical features

Medium:

Compressed air, filtered, lubricated or non-lubricated

Operation:

VM/146000, VM/146100 Double acting, adjustable cushioning
VM/146000/M, VM/146100/M Double acting, adjustable cushioning and magnetic piston

Models:

VM/146000 with internal guide
VM/146100 with external adjustable guide

Operating pressure:

1 ... 8 bar (14 ... 116 psi)

Cylinder diameters:

20, 25, 32, 40, 50, 63, 80 mm

Maximum strokes:

3500 mm

Operating temperature:

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

Materials:

End covers, closer, carriage and top cover: aluminium diecast hardcoated, aluminium hardcoated (Ø 20 & 80)
Yoke: aluminium, plastics (Ø 20)
Guiding bridge and profile barrel: aluminium hardcoated
Seal strip, wiper and piston seal: PU
Cover strip: polyamide
Other seals: NBR
Mounting screws: stainless steel (A2)
Shim ring: stainless steel (A2)

Technical data

Cylinder Ø (mm)	20	25	32	40	50	63	80
Port size	G 1/8	G 1/8	G 1/4	G 1/4	G 3/8	G 1/2	G 1/2
Cushion length (mm)	26	26	35	50	60	70	75
Theoretical thrusts at 6 bar outstroke (N)	188	294	482	754	1178	1870	3016
Air consumption at 6 bar outstroke (l/cm stroke)	0,022	0,035	0,056	0,088	0,137	0,218	0,35

Cylinder variants

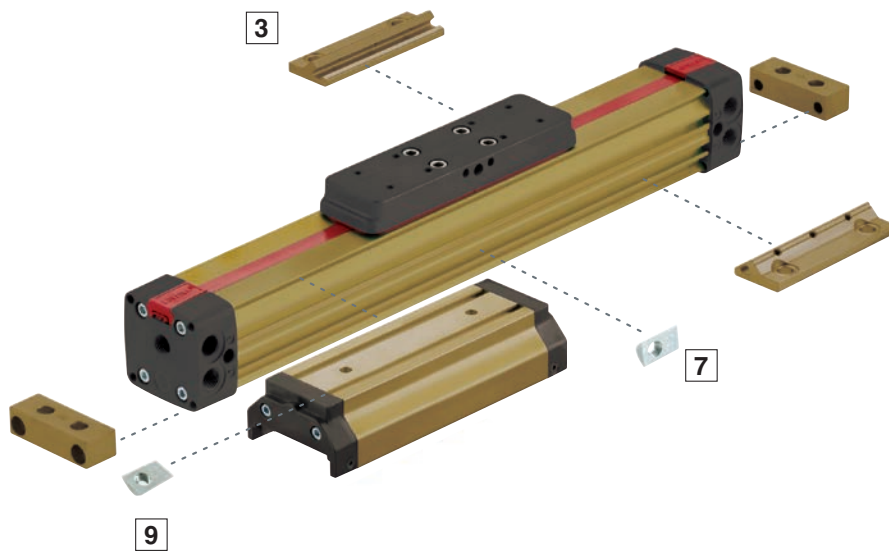
Symbol	Model Non-magnetic piston	Symbol	Model magnetic piston	Description	Dimensions Page
	VM/146000 VM/146100		VM/146000/M VM/146100/M	With internal guide With external adjustable guide	6 ... 9






Option selector

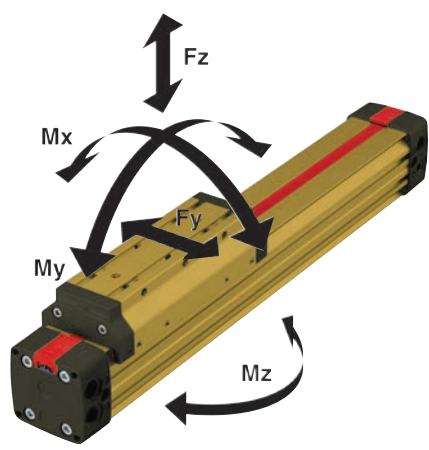
VM/146***/**/*****

Guiding system	Substitute	←	→	Strokes (mm)	On request, 3500 max
Internal	0				
External	1			Variants	
Cylinder Ø (mm)	Substitute	←	→	Non-magnetic piston	None
20, 25, 32, 40, 50, 63, 80				Magnetic piston	M

Mountings



Model	Type C  2 Page 10	Type V  3 Page 10	Groove key for profile barrel  7 Page 9	Groove key  9	Magnetically operated switches  Page 10 & 11
20	VQM/146020/21	VQM/146020/32	-	-	
25	VQM/146025/21	VQM/146025/32	MP74110	MP74110	
32	VQM/146032/21	VQM/146032/32	MP74110	MP74110	
40	VQM/146040/21	VQM/146040/32	MP74110	MP74111	
50	VQM/146050/21	VQM/146050/32	MP74110	MP74112	
63	VQM/146063/21	VQM/146063/32	MP74110	MP74112	
80	VQM/146080/21	VQM/146080/32	-	-	



Loading values for LINTRA® cylinders with double carriages

The values given in the table below show the ingle 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.

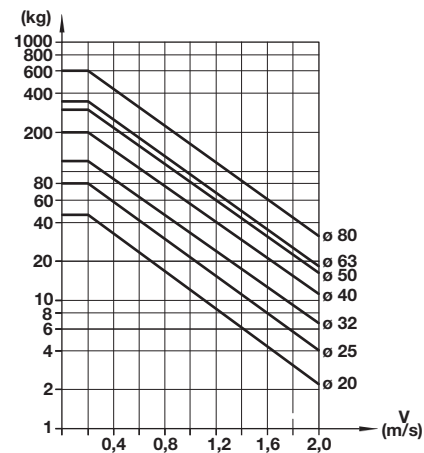
When a LINTRA® cylinder has to take several loads and moments, an additional calculation is necessary using this formula:

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

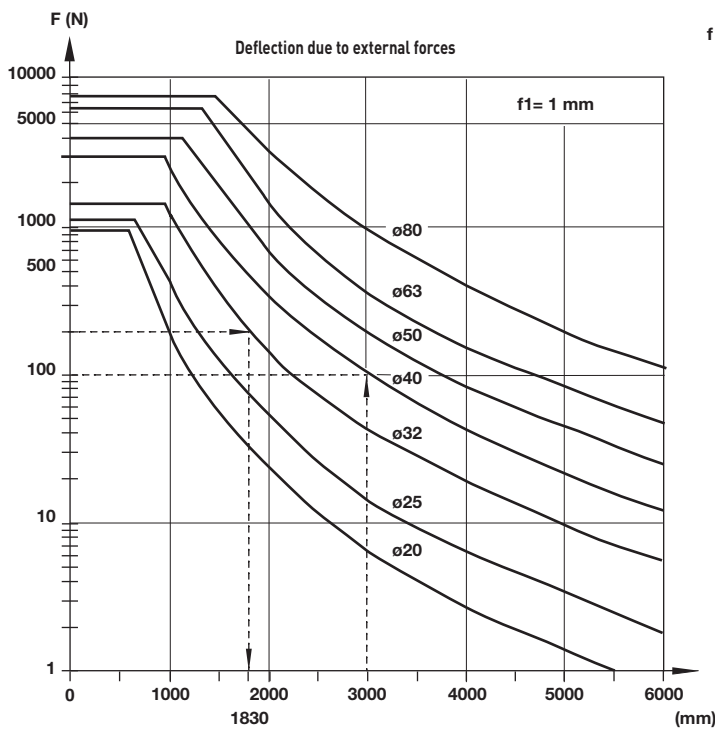
Ø	Internal guide VM/146000			External guide VM/146100				
	Fy (N)	Fz (N)	Mx (Nm)	My (Nm)	Mz (Nm)	Fy, Fz (N)	Mx (Nm)	My, Mz (Nm)
20	90	280	0,9	12	3,6	470	6	18
25	125	385	1,5	19	5,6	590	9	28
32	165	500	3	33	10	780	17	43
40	330	990	6,5	84	24	1600	39	110
50	440	1320	11	120	35	2000	65	160
63	690	2000	20	240	70	3200	120	350
80	780	2300	27	360	100	3900	180	520

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.



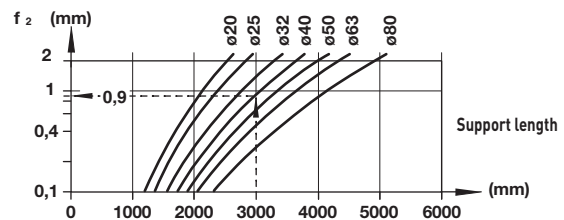
Cylinder deflection



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

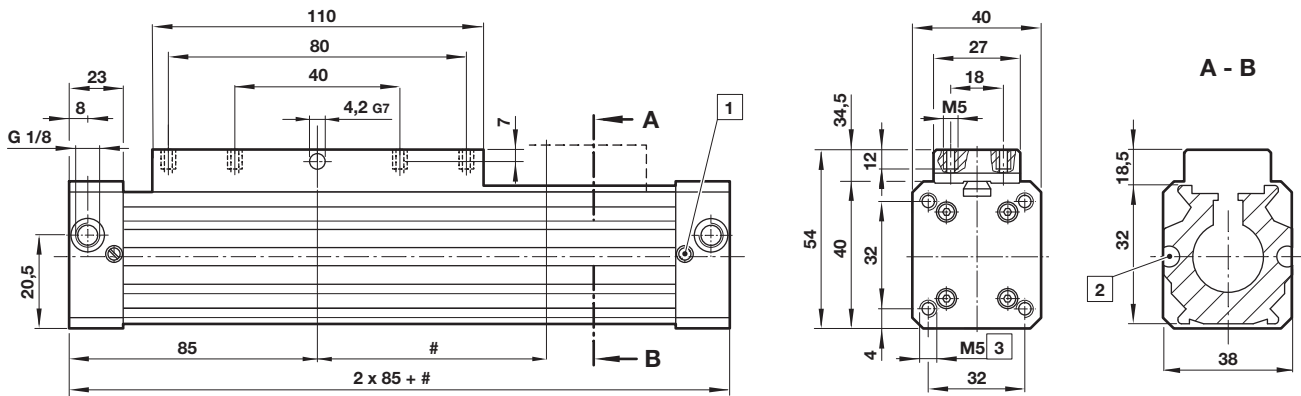
1. Deflection due to external force (f1)
see Diagram 1 (1mm/100 N) · 180 N 1,8 mm
2. Deflection due to cylinder weight diagram 2 + 0,9 mm
- Total deflection: 2,7 mm

Max. permitted deflection (f1 + f2) < 1 mm
1000 mm Hub

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

VM/146000 – cylinder with internal guide (ø 20 mm)

Dimensions in mm
Projection/First angle

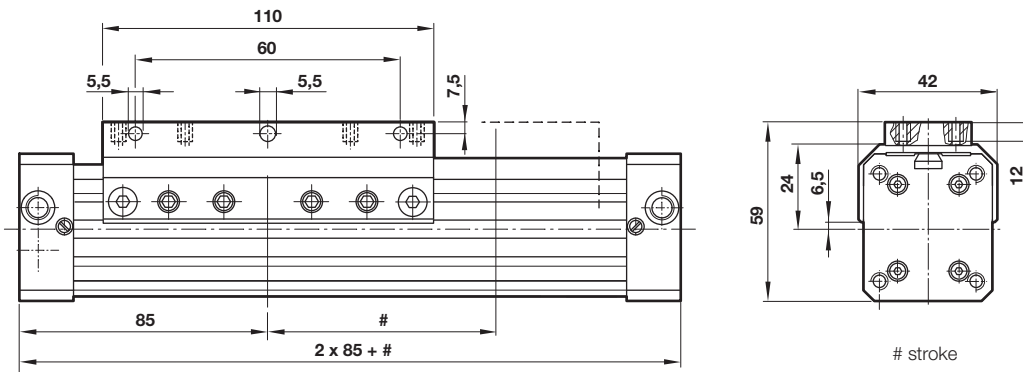


Ø	Weight at 0 mm (kg)	Weight per 100 mm (kg)	Model
20	0,50	0,15	VM/146020/...

stroke

- 1 cushion screw
- 2 M/50 – switches and groove key can be mounted flush with the profile
- 3 12 deep

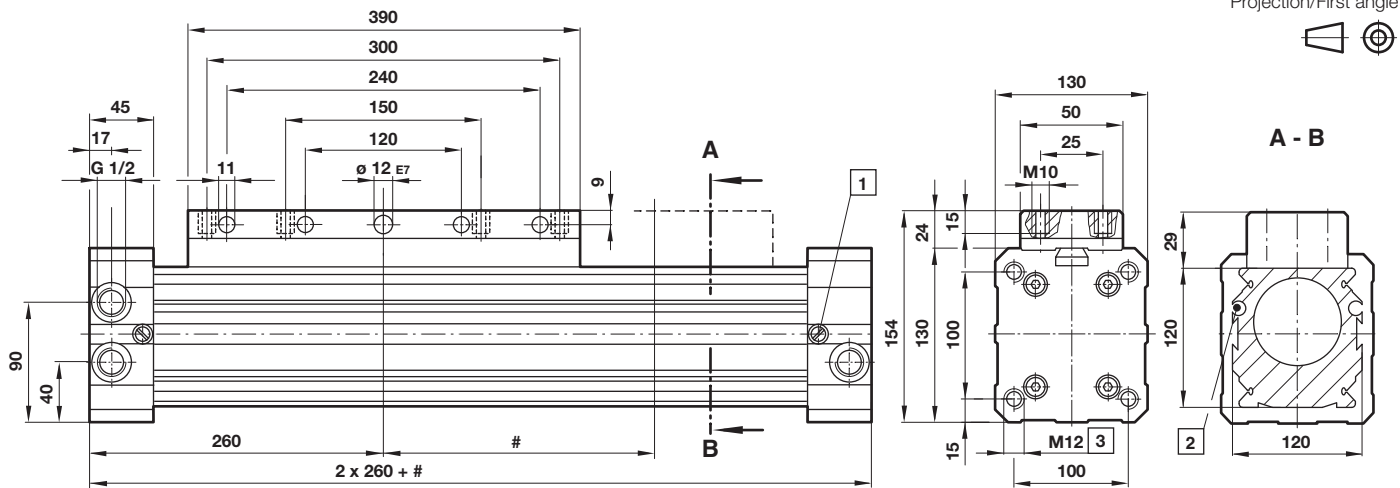
VM/146100 – cylinder with external adjustable guide (ø 20 mm)



Ø	Weight at 0 mm (kg)	Weight per 100 mm (kg)	Model
20	0,60	0,15	VM/146120/...

stroke

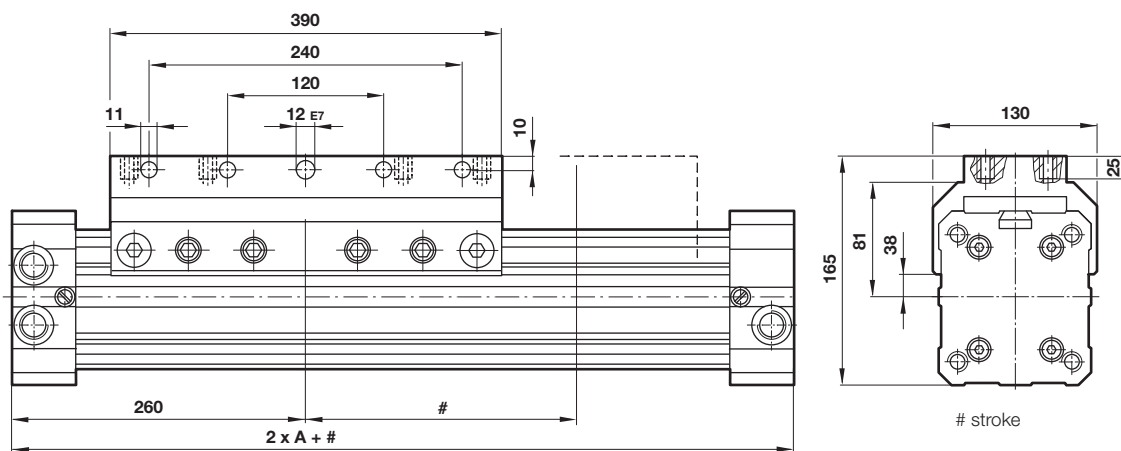
VM/146080 – cylinder with internal guide (ø 80 mm)

 Dimensions in mm
 Projection/First angle


Ø	Weight at 0 mm (kg)	Weight per 100 mm (kg)	Model
80	13,2	1,50	VM/146080/...

stroke

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

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


Ø	Weight at 0 mm (kg)	Weight per 100 mm (kg)	Model
80	13,40	1,50	VM/146180/

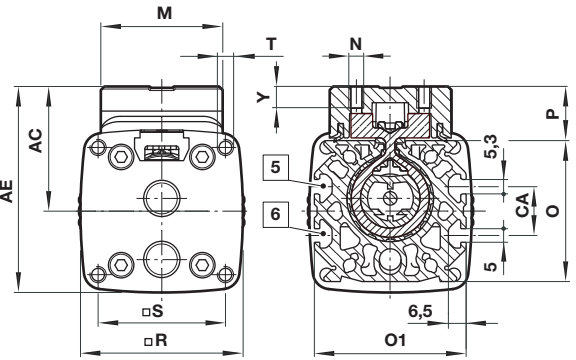
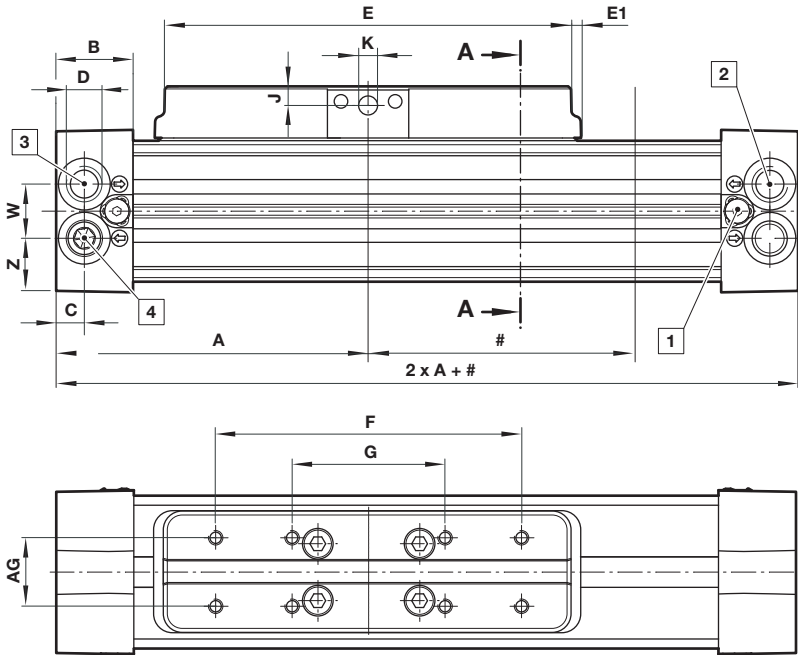
stroke

Basic dimensions

VM/146000 – cylinder with internal guide (∅ 25 ... 63 mm)

Dimensions in mm
Projection/First angle

A-A



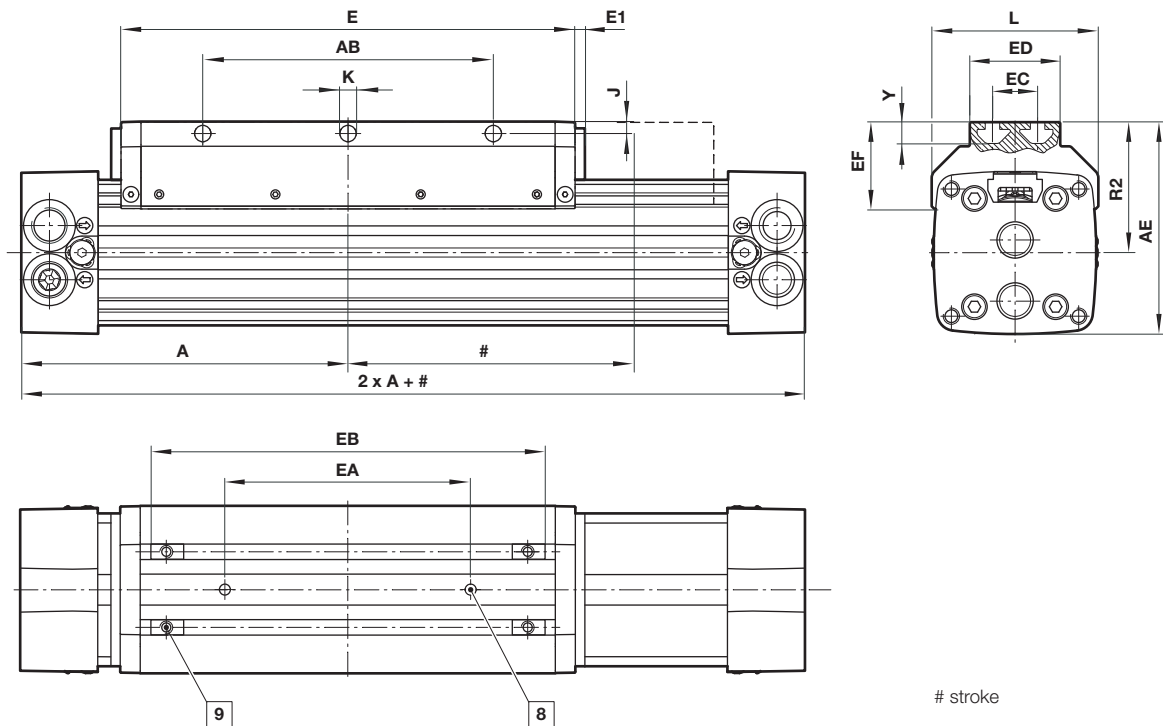
stroke

- 1** cushion screw
- 2** Main port
- 3** Main port
- 4** Alternative port with plug inserted
- 5** M/50 – switches and groove key can be mounted flush with the profile
- 6** For groove key only

∅	A	AC	AE	AG	B	C	CA	D	E	E1	F	G	J	∅ KD7	Model
25	100	36	56	60	23	8,5	–	G1/8	130	–	90	45	4,7	5	VM/146025/...
32	120	46	76	25	28,5	10,5	18	G1/4	160	3,5	120	60	7	7	VM/146032/...
40	150	52,5	90	25	28,5	11,5	18	G1/4	215	–	160	80	7	7	VM/146040/...
50	180	65,5	110	25	38	15	24	G3/8	250	–	190	95	9,5	9	VM/146050/...
63	215	82,5	125	25	38	17	–	G1/2	320	–	240	120	9,5	9	VM/146063/...
∅	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	VM/146025/...	
32	45	M5	52	56	20	60	47	M6-17*1)	20	8	20	1,40 kg	0,30 kg	VM/146032/...	
40	45	M6	65	68	20	74,5	58	M8-20*1)	25	8	25	2,50 kg	0,42 kg	VM/146040/...	
50	50	M8	80	84	25,5	89	70	M8-20*1)	30	11	29,5	4,40 kg	0,62 kg	VM/146050/...	
63	50	M8	95	97	25	105	84	M10-24*1)	35	11	35	6,90 kg	0,9 kg	VM/146063/...	

*1) deep

VM/146100 – cylinder with external adjustable guide (ø 25 ... 63 mm)

 Dimensions in mm
 Projection/First angle


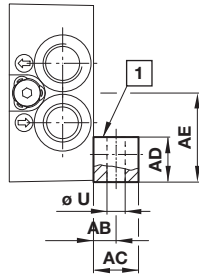
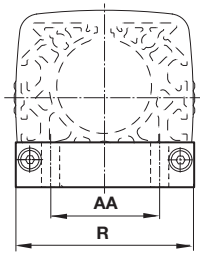
stroke

- 8 Center bore Ø 6H7, 4 deep
- 9 Supplied complete with four groove keys

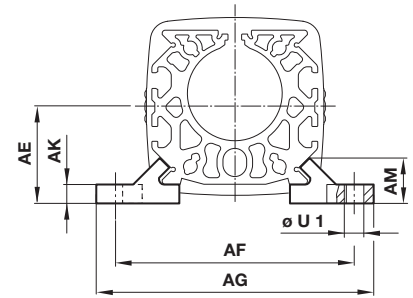
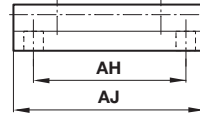
Ø	A	AB	AE	E	E1	EA±0,05	EB	ED	Model
25	100	70	67,5	130	-	50	102	32	VM/146125/..
32	120	90	82	160	4	70	138	45	VM/146132/..
40	150	120	97,5	215	-	105	193	45	VM/146140/..
50	180	160	116,5	250	-	135	228	50	VM/146150/..
63	215	190	137	320	-	150	292	50	VM/146163/..
EC	EF	J	Ø K	L	R 2	Y	Weight at 0 mm	Weight per 100 mm	Model
20	34	5	5,5	52	43,5	9,5	0,75kg	0,20 kg	VM/146125/..
25	36,5	5	5,5	64	52	6,5	1,50 kg	0,30 kg	VM/146132/..
25	43	5	6,6	79	60	9,5	2,60 kg	0,42 kg	VM/146140/..
25	47,5	6,5	9	92	72	11,5	4,50 kg	0,62 kg	VM/146150/..
25	59	7,5	9	110	84,5	16,5	7,20kg	0,90 kg	VM/146163/..

Mountings

Foot mounting C



Centre support V



Dimensions in mm
Projection/First angle



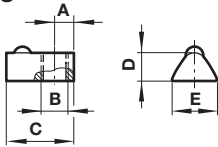
Ø	AA	AB	AC	AD	AE	R	Ø U	kg	Model
20	17	5	10	10	21,5	40	5,5	0,03	VQM/146020/21
25	18	7	15	13,5	24 (26,5)	48	7	0,1	VQM/146025/21
32	26	11	22	16,5	30,5 (33)	60	9	0,1	VQM/146032/21
40	30	11	22	19,5	37,5 (40,5)	75	9	0,2	VQM/146040/21
50	42	12	25	24	45 (49)	90	11	0,3	VQM/146050/21
63	48	13	25	27,5	54 (57,5)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

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

Attention: Foot mounts can be attached to give different distances AE.

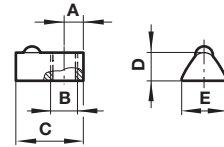
When used together with a centre support mounting the word TOP should be visible on the top face of the mount.

Groove key for carriage



Ø	A	B	C	D	E	Weight (kg)	Model
25 & 32	4	M5	12	9	8	0,01	M/P74110
40	4,5	M6	17	12	10,5	0,02	M/P74111
50 & 63	7,5	M8	23	7,5	13,5	0,03	M/P74112

Groove key for profile barrel



Ø	A	B	C	D	E	(kg)	Model
20 ... 80	4	M5	12	9	8	0,01	M/P74110

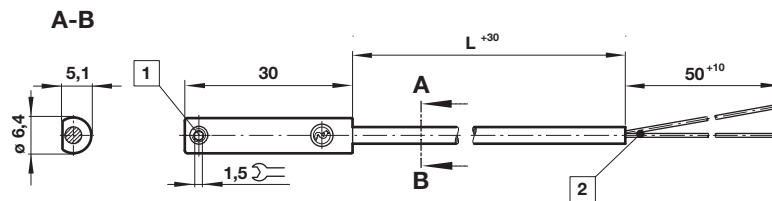
Technical data - Reed switches - additional informations see data sheet N/en 4.3.005

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)

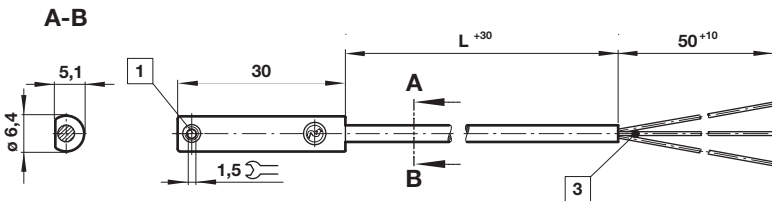
* Insert cable length; *1) Plug-in connector see page 11; Color code: BK = black, BN = brown, BU = blue

Drawings

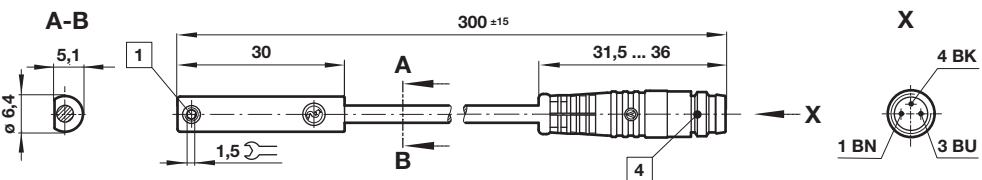
M/50/LSU/*V, M/50/LSU/5U,
TM/50/RAU/2S
Cable length L = 2, 5 or 10 m



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



M/50/LSU/CP



- 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

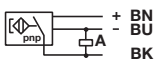
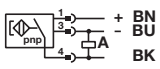
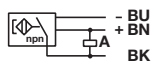
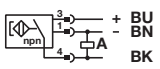
Accessories

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

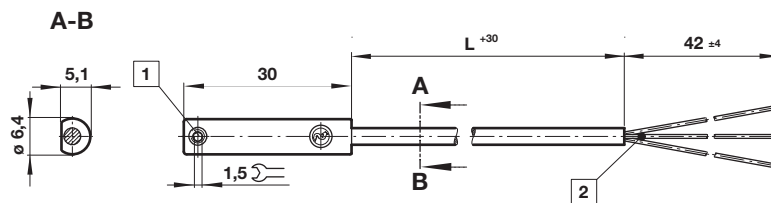
Technical data - Solid state - additional informations see data sheet N/en 4.3.007

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

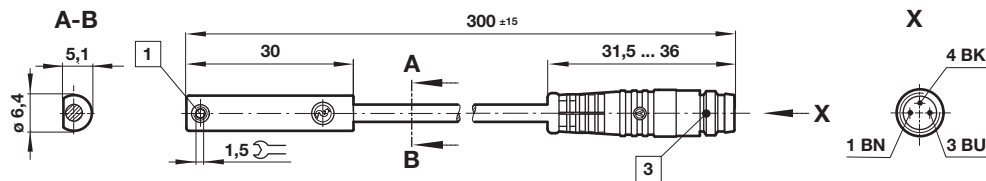
M/50/EAP/*V,
M/50/EAN/*V
Cable length L = 2, 5 or 10 m



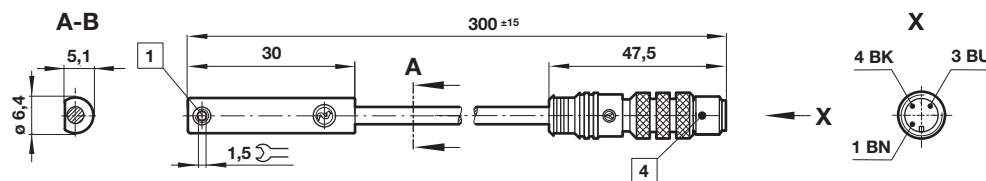
Dimensions in mm
Projection/First angle



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

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 NORGREN.

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.