

**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 data

Medium:

Compressed air, filtered,
lubricated or non-lubricated

Operation:

VM/146000, VM/146100

Double acting, with adjustable cushioning

VM/146000/M, VM/146100/M

Double acting with adjustable cushioning
and magnetic piston

Models:

VM/146000 with internal guide

VM/146100 with external adjustable guide

Operating pressure:

1 to 8 bar

Operating temperature:

-30°C to +80°C max.

(consult our Technical Service for use below +2°C)

Cylinder diameter:

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

Max strokes:

3500 mm

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: polyurethane

Cover strip: polyamide

Other seals: nitrile rubber

Mounting screws: stainless steel (A2)

Shim ring: stainless steel (A2)

Ordering example

See page 2

Mountings and switches

See page 2 & 3

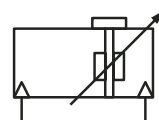
Alternative cylinder

See page 2

LINTRA® rodless cylinders ø20 to 80 mm
see page N/en 1.6.009

ATEX cylinders

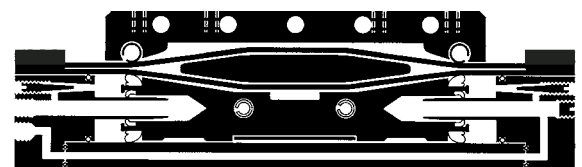
see page ATEX014B_101



Magnetic piston



Non-magnetic piston



Alternative variants

Symbol	Type (non-magnetic piston)	Symbol	Type (magnetic piston)	Description	Page
	VM/146000		VM/146000/M	With internal guide	5 ... 8
	VM/146100		VM/146100/M	With external adjustable guide	5 ... 8

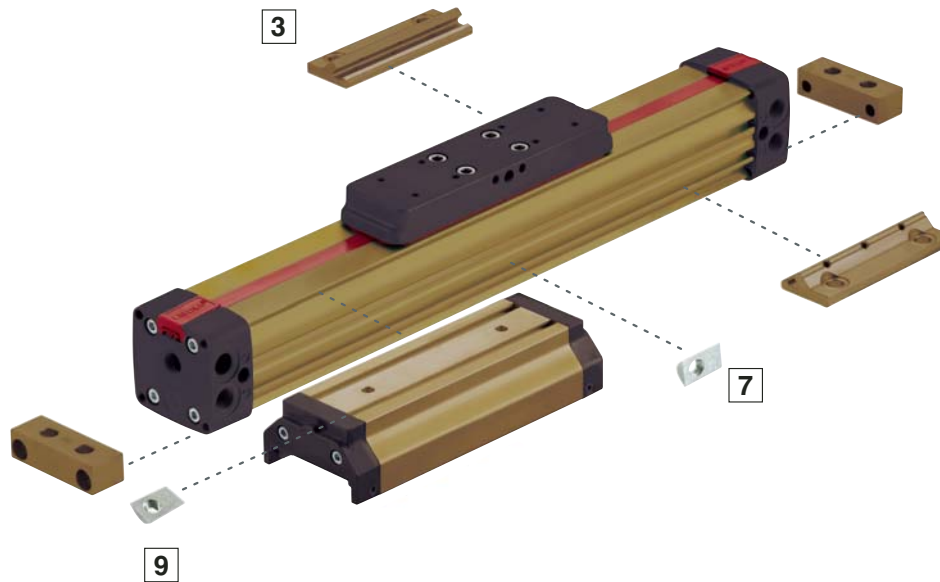
Options selector

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

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

Mountings

	Type C	Type V	Groove key for profile barrel	Groove key for carriage
	2	3	7	9
Ø mm	Page 9	Page 9	Page 9	Page 8
20	VQM/146020/21	VQM/146020/32	-	-
25	VQM/146025/21	VQM/146025/32	M/P74110	M/P74110
32	VQM/146032/21	VQM/146032/32	M/P74110	M/P74110
40	VQM/146040/21	VQM/146040/32	M/P74110	M/P74111
50	VQM/146050/21	VQM/146050/32	M/P74110	M/P74112
63	VQM/146063/21	VQM/146063/32	M/P74110	M/P74112
80	VQM/146080/21	VQM/146080/32	-	-



Ordering information

Cylinder

LINTRA® cylinder with internal guiding system, Ø 32 mm cylinder diameter and 3000 mm stroke length with magnetic piston

Quote: **VM/146032/M/3000**

LINTRA® cylinder with external guiding system, Ø 50 mm cylinder diameter and 2000 mm stroke length and non-magnetic piston

Quote: **VM/146150/2000**

Mountings

Foot mounting for cylinder Ø 50 mm
Quote: **VQM/146050/21**

Switches

Reed plug with LED and 2 m cable length
Quote: **M/50/LSU/2V**

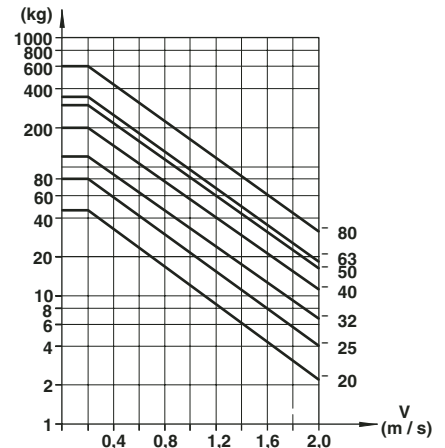
Switches

Type	With cable		With connector (M8x1)		Current max.	Temperature °C	LED	Features	Cable Connector length	Cable type	Cable with connector straight	Datasheet
	Reed	Solid state	Voltage V AC	V DC								
M/50/LSU/*V	-	-	10 to 240	10 to 170	180 mA	-20 to +80	•	-	2, 5, 10 m	PVC 2 x 0,25	-	N/en 4.3.005
M/50/LSU/5U	-	-	10 to 240	10 to 170	180 mA	-20 to +80	•	-	5 m	PUR 2 x 0,25	-	N/en 4.3.005
TM/50/RAU/2S	-	-	10 to 240	10 to 170	180 mA	-20 to +150	-	-	2 m	Silicone 2 x 0,25	-	N/en 4.3.005
M/50/RAC/5V	-	-	10 to 240	10 to 170	180 mA	-20 to +80	-	Changeover	5 m	PVC 3 x 0,25	-	N/en 4.3.005
M/50/LSU/CP	-	-	10 to 60	10 to 75	180 mA	-20 to +80	•	Plug M8x1	5 m	PVC 3 x 0,25	MP73001/5	N/en 4.3.005
-	M/50/EAP/*V	-	-	10 to 30	150 mA	-20 to +80	•	PNP	2, 5, 10 m	PVC 3 x 0,25	-	N/en 4.3.007
-	M/50/EAP/CP	-	-	10 to 30	150 mA	-20 to +80	•	PNP, plug M8x1	5 m	PVC 3 x 0,25	MP73001/5	N/en 4.3.007
-	M/50/EAP/CC	-	-	10 to 30	150 mA	-20 to +80	•	PNP, plug M12x1	5 m	PVC 3 x 0,25	MP34614/5	N/en 4.3.007
-	M/50/EAN/*V	-	-	10 to 30	150 mA	-20 to +80	•	NPN	2, 5, 10 m	PVC 3 x 0,25	-	N/en 4.3.007
-	M/50/EAN/CP	-	-	10 to 30	150 mA	-20 to +80	•	NPN, plug M8x1	5 m	PVC 3 x 0,25	MP73001/5	N/en 4.3.007

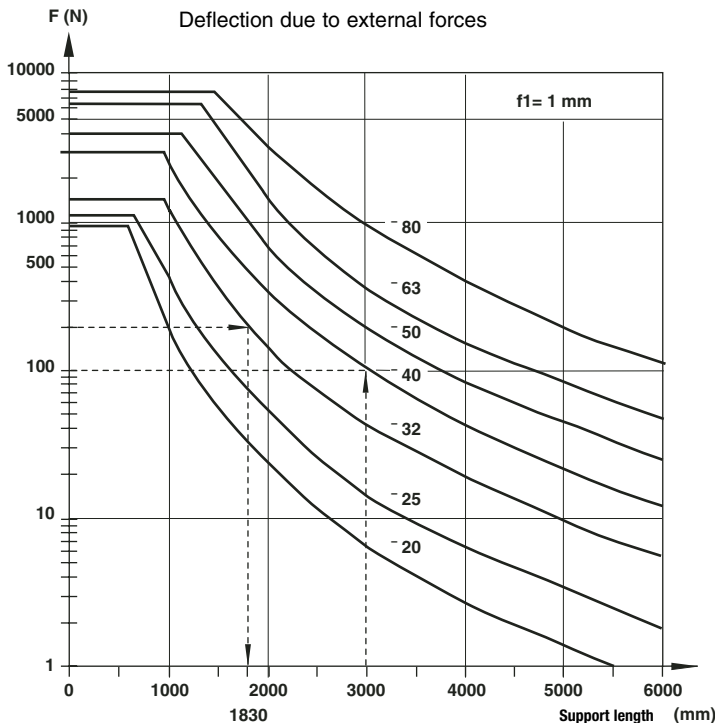
* Please insert cable length
Further information (Technical data, cable material, dimensions) see data sheet

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.

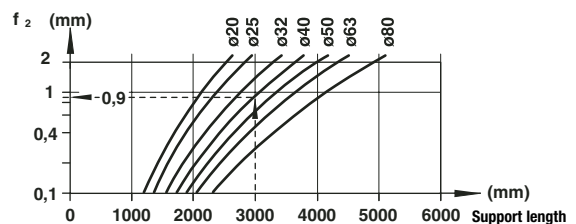


Cylinder deflection



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
2. Deflection due to cylinder weight diagram 2
Total deflection:

$$\frac{1,8 \text{ mm}}{+ 0,9 \text{ mm}} = 2,7 \text{ mm}$$

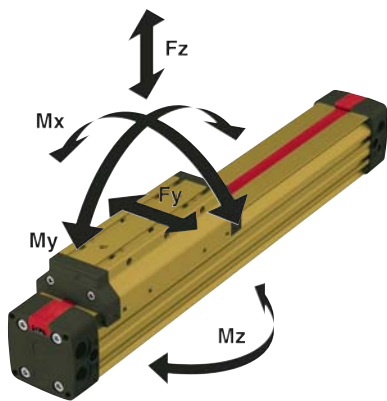
Max. permitted deflection (f1 + f2) < $\frac{1 \text{ mm}}{1000 \text{ mm Hub}}$

A deflection of more than 3 mm is not permitted.

Theoretical forces, air consumption, cushioning length

Cylinder Ø mm	Theoretical forces (N) at 6 bar	Air consumption (l/cm) of stroke at 6 bar	Cushioning length (mm)
20	188	0,022	26
25	294	0,035	26
32	482	0,056	35
40	754	0,088	50
50	1178	0,137	60
63	1870	0,218	70
80	3016	0,350	75

VM/146000, VM/146100



Ø mm	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

Loading values applicable to a speed of ≤ 0,2 m/s. Maximum working life is normally reached below a speed of 1 m/s.

Loading values for LINTRA® cylinders with double carriages

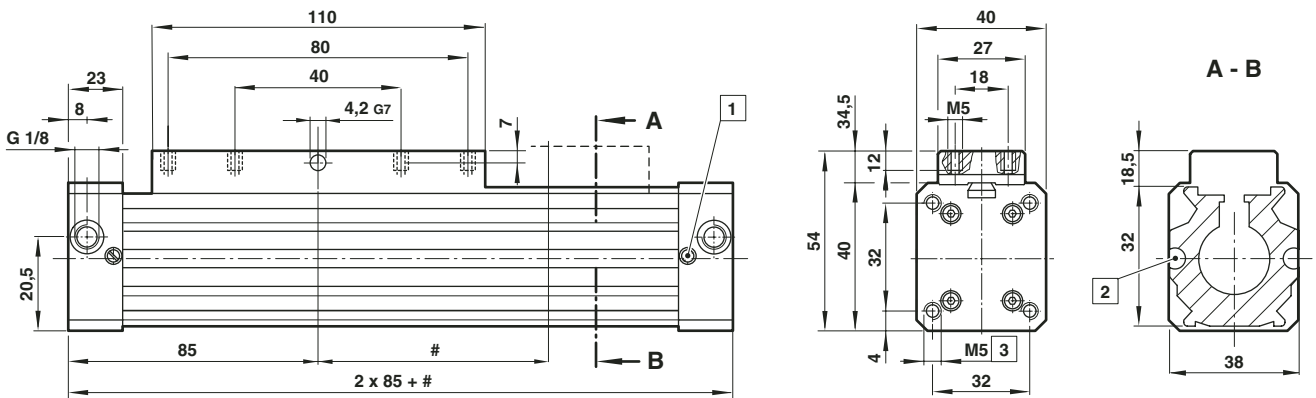
The values given in the table below show the single forces in the directions Fy and Fz and the maximum moments Mx, My and Mz. All values are applicable only for speeds of max. 0,2 m/s. A requirement for using these values is a constant movement (no jerking) of the mass over the whole stroke length of 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:

$$\frac{M_x}{M_{x \max}} + \frac{M_y}{M_{y \max}} + \frac{M_z}{M_{z \max}} + \frac{F_y}{F_{y \max}} + \frac{F_z}{F_{z \max}} \leq 1$$

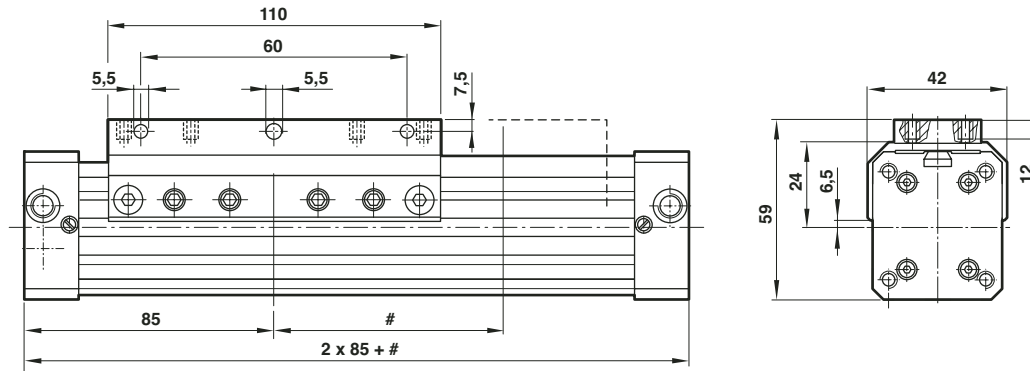
VM/146000 – cylinder with internal guide (ø 20 mm)



Typ	Ø	Gewicht bei 0 mm	Gewicht je 100 mm
VM/146020/...	20	0,50 kg	0,15 kg

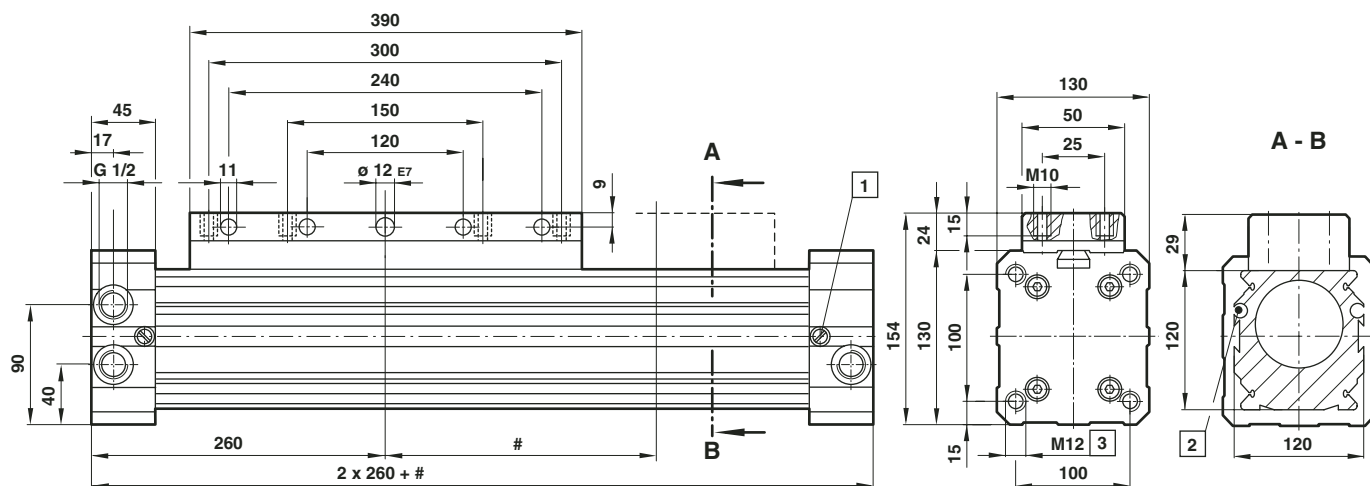
- # Stroke
- 1 Cushion screw
- 2 M/50 – switches and groove key can be mounted flush with the profile
- 3 12 deep

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



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

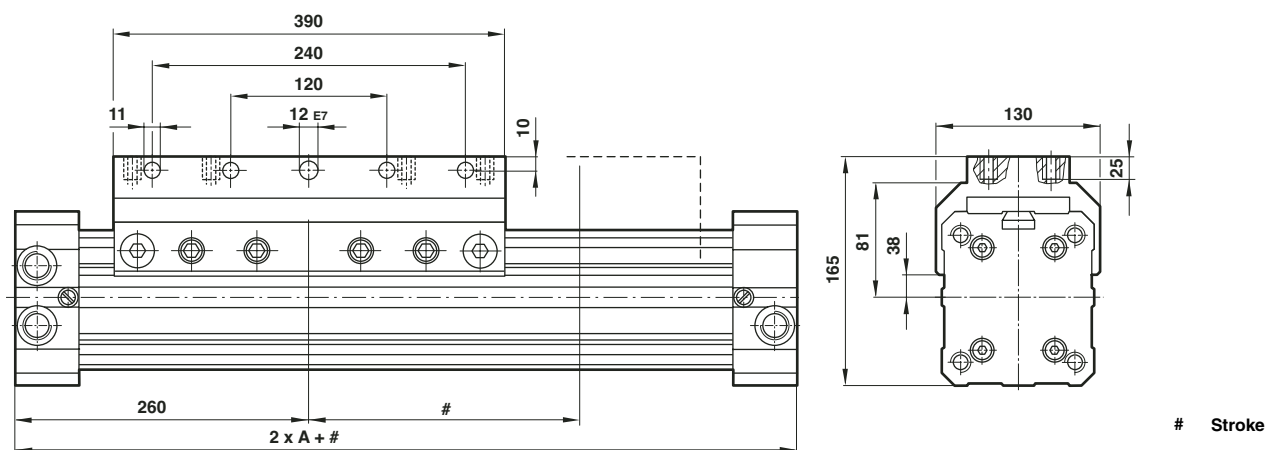
VM/146080 – cylinder with internal guide (ø 80 mm)



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

Type	Ø	Weight at 0 mm	Weight per 100 mm
VM/146080/	80	13,20 kg	1,50 kg

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

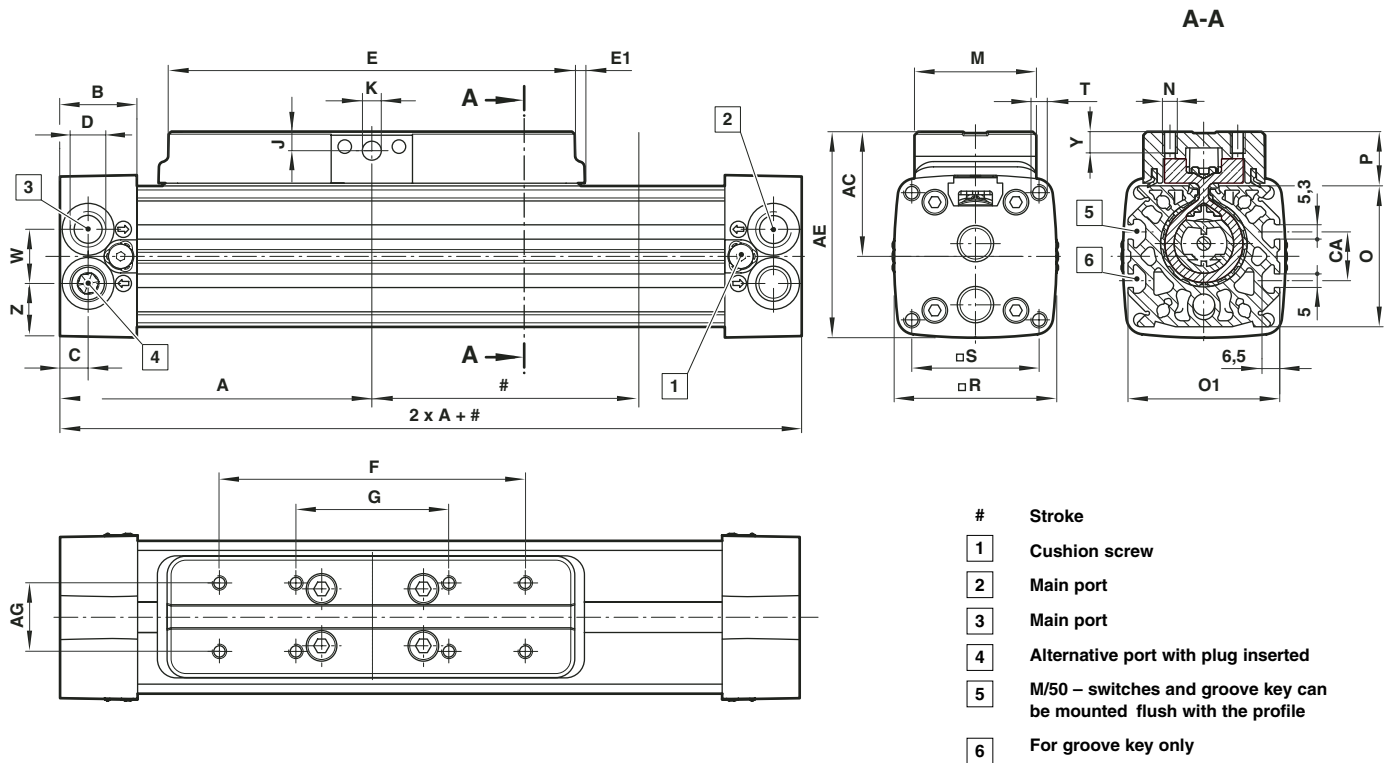


Stroke

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

Basic dimensions

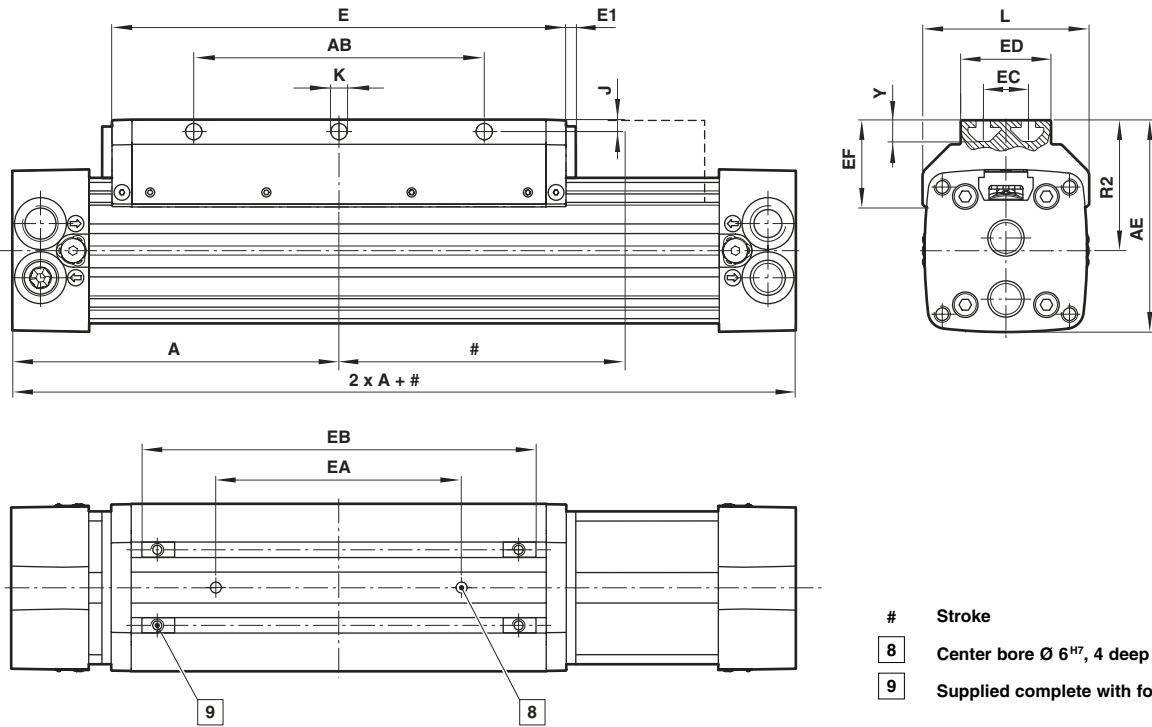
VM/146000 – cylinder with internal guide (ø 25 ... 63 mm)



Type	Ø	A	AC	AE	AG	B	C	CA	D	E	E1	F	G	J	Ø K ⁰⁷
VM/146025/...	25	100	36	56	60	23	8,5	–	G1/8	130	–	90	45	4,7	5
VM/146032/...	32	120	46	76	25	28,5	10,5	18	G1/4	160	3,5	120	60	7	7
VM/146040/...	40	150	52,5	90	25	28,5	11,5	18	G1/4	215	–	160	80	7	7
VM/146050/...	50	180	65,5	110	25	38	15	24	G3/8	250	–	190	95	9,5	9
VM/146063/...	63	215	82,5	125	25	38	17	–	G1/2	320	–	240	120	9,5	9
Type	Ø	M	N	O	O1	P	R	S	T	W	Y	Z	Weight at 0 mm	Weight per 100 mm	
VM/146025/...	25	32	M5	40	46	16	48	37	M5-13*1)	16	7	16	0,7 kg	0,25 kg	
VM/146032/...	32	45	M5	52	56	20	60	47	M6-17*1)	20	8	20	1,40 kg	0,30 kg	
VM/146040/...	40	45	M6	65	68	20	74,5	58	M8-20*1)	25	8	25	2,50 kg	0,42 kg	
VM/146050/...	50	50	M8	80	84	25,5	89	70	M8-20*1)	30	11	29,5	4,40 kg	0,62 kg	
VM/146063/...	63	50	M8	95	97	25	105	84	M10-24*1)	35	11	35	6,90 kg	0,9 kg	

*1) deep

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



Missing cylinder dimensions see page 5

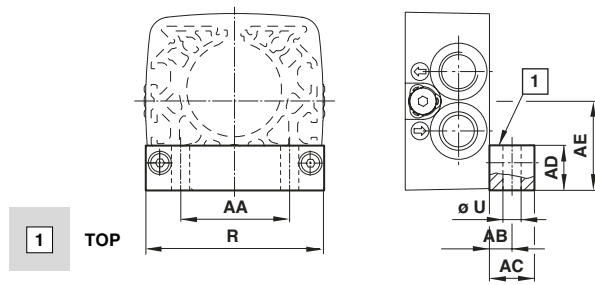
Type	Ø	A	AB	AE	E	E1	EA ±0,05	EB	ED	EC	EF	J	Ø K	L	R 2	Y	Weight at 0 mm	Weight per 100 mm
VM/146125/..	25	100	70	67,5	130	-	50	102	32	20	34	5	5,5	52	43,5	9,5	0,75kg	0,20 kg
VM/146132/..	32	120	90	82	160	4	70	138	45	25	36,5	5	5,5	64	52	6,5	1,50 kg	0,30 kg
VM/146140/..	40	150	120	97,5	215	-	105	193	45	25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

Groove key for carriage (pos. 9)

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



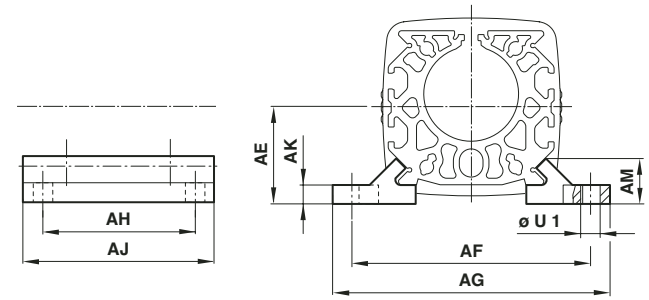
Mountings
Foot mounting C



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

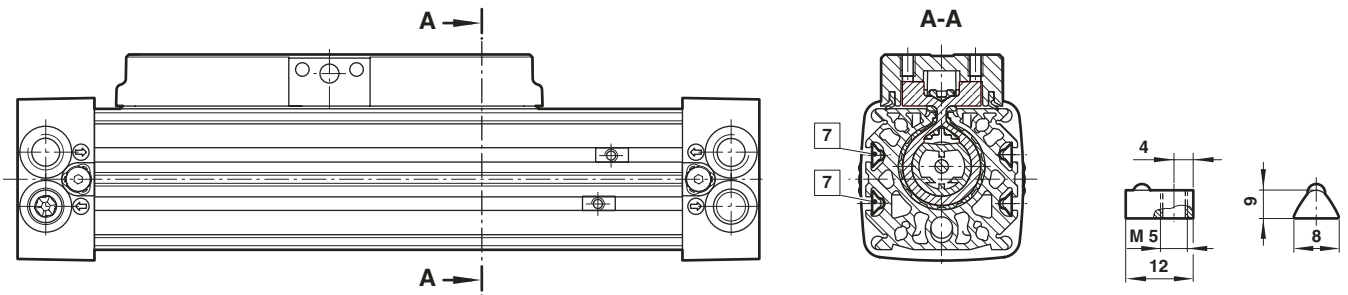
Attention: Foot mounts can be attached to give different distances AE. When used together with a centre support mounting the word **TOP** should be visible on the top face of the mount.

Centre support V



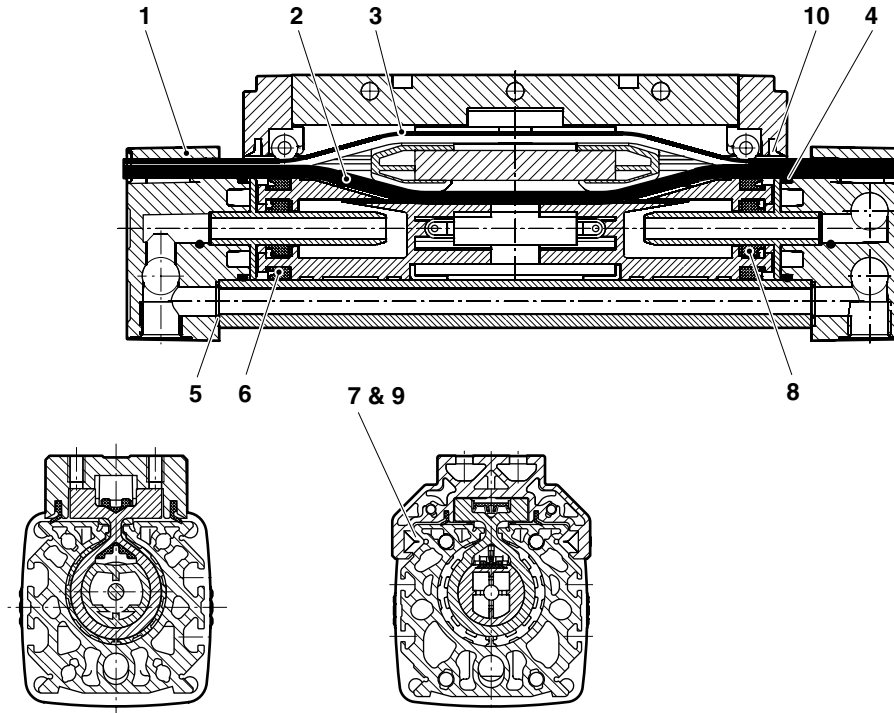
Type	Ø	AE	AF	AG	AH	AJ	AK	AM	Ø U1	kg
VQM/146020/32	20	21,5	52	62	45	60	4,5	12	5,5	0,03
VQM/146025/32	25	26,5	60	72	60	80	5,5	13	6,6	0,04
VQM/146032/32	32	30,5	76	92	70	100	6,5	13,5	9	0,07
VQM/146040/32	40	37,5	92	108	90	120	7,5	18,5	9	0,2
VQM/146050/32	50	45	110	128	110	140	7,5	18,5	11	0,2
VQM/146063/32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

M/P74110 – Groove key for profile barrel
Weight: 0,01 kg



7 Groove key for profile barrel

Spares



For VM/146000, .../M

Ø	Type	Spares kit	Comprising item	Description	Quantity	Seal strip Item 2	Cover strip Item 3
20	VM/146020,.../M	QM/146020/88/*	1	Clamping lever	2	M/P 40262/*	M/P 74223/*
25	VM/146025,.../M	QM/146025/88/*	2 + 3	Seal-/cover strip	1	M/P 40262/*	M/P 74131/*
32	VM/146032,.../M	QM/146032/88/*	4 + 5	O-ring	2	M/P 40344/*	M/P73936/*
40	VM/146040,.../M	QM/146040/88/*	6	Seal	2	M/P 40263/*	M/P73945/*
50	VM/146050,.../M	QM/146050/88/*	8	Seal	2	M/P 40262/*	M/P73946/*
63	VM/146063,.../M	QM/146063/88/*	10	Wiper	1	M/P 40262/*	M/P 73946/*
80	VM/146080,.../M	QM/146080/88/*		Grease	1	M/P 40715/*	M/P 74232/*

* Insert stroke length
 Note: Please quote the cylinder type number when ordering spare parts

For VM/146100, .../M

Ø	Type	Spares kit	Comprising item	Description	Quantity	Seal strip Item 2	Cover strip Item 3
20	VM/146120,.../M	QM/146120/88/*	1	Clamping lever	2	M/P 40262/*	M/P 74223/*
25	VM/146125,.../M	QM/146125/88/*	2 + 3	Seal-/cover strip	1	M/P 40262/*	M/P 74131/*
32	VM/146132,.../M	QM/146132/88/*	4 + 5	O-ring	2	M/P 40344/*	M/P73936/*
40	VM/146140,.../M	QM/146140/88/*	6	Seal	2	M/P 40263/*	M/P73945/*
50	VM/146150,.../M	QM/146150/88/*	7	Guide bar	4	M/P 40263/*	M/P73946/*
63	VM/146163,.../M	QM/146163/88/*	8	Seal	2	M/P 40262/*	M/P73946/*
80	VM/146180,.../M	QM/146180/88/*	9	Felt	2	M/P 40262/*	M/P 73946/*
			10	Wiper	1	M/P 40715/*	M/P 74232/*
				Grease	1		

* Insert stroke length
 Note: Please quote the cylinder type number when ordering spare parts

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 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 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.