

**LINTRA® Corrosion Resistant Rodless Cylinders**  
**Non-magnetic and magnetic piston**  
**Double Acting**  
**Ø 20 to 80 mm**

- **New lightweight design extrusion with integral slots for switch mounting**
- **Capable of withstanding large bending moments and lateral forces**
- **Built-in guidance with internal and adjustable external options**



### Technical Data

**Medium:**

Compressed air, filtered, lubricated or non-lubricated

**Operation:**

VM/46000, VM/46100

Double acting with adjustable cushioning

VM/46000/M, VM/46100/M

Double acting with adjustable cushioning and magnetic piston

**Models:**

VM/46000 with internal guide

VM/46100 with external adjustable guide

**Operating Pressure:**

1 to 10 bar

**Operating Temperature:**

-30°C\* to +80°C max.

\*Consult our Technical Service for use below +2°C

**Cylinder Diameters:**

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

**Standard Strokes:**

Made to order

**Maximum Strokes:**

3500 mm

**Materials:**

End covers: Aluminium (HCR® coated\*)

Carriage: Aluminium (HCR® coated\*)

Yoke: Moulded plastic – Ø 20 mm,

Aluminium (HCR® coated\*) – Ø 25 to 80 mm

Barrel: Extruded aluminium alloy (HCR® coated\*)

Sealing strip & piston seals: Polyurethane

Cover strip: Polyamide

Seals: Nitrile rubber

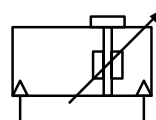
\*HCR®: High Technology Synergistic Coating

### Ordering Examples

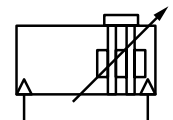
See page 3

### Mountings and Switches

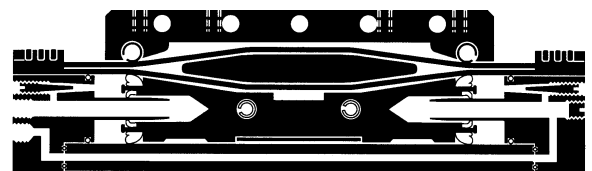
See page 3



Non-magnetic piston



Magnetic piston





## Alternative Cylinders

Symbol	Model (non-magnetic piston)	Symbol	Model (magnetic piston)	Description	Dimensions page
	VM/46000		VM/46000/M	With internal guide (∅ 20 to 80 mm)	6
	VM/46100		VM/46100/M	With external adjustable guide (∅ 20 to 80 mm)	7

## Model Codes

VM/46\*\*\*/\*/\*\*\*\*

Guiding system	Substitute
Internal	0
External adjustable	1

Cylinder Diameters (mm)	Substitute
20	20
25	25
32	32
40	40
50	50
63	63
80	80

Strokes (mm)
Made to order

Variants	Substitute
Magnetic piston	M
Non-magnetic piston	None

Note: Disregard option positions not used.  
For combinations of cylinder variants please consult our Technical Service.

## 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.


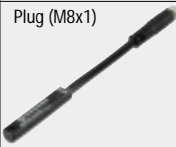
The system designer is warned to consider the failure modes of all component parts used in fluid power systems and to provide adequate safeguards to prevent personal injury or damage to equipment in the event of such failure.

**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.



## Switches




	Cable	Plug (M8x1)
		
Model		
Reed	M/50/LSU/..	M/50/LSU/CP
	M/50/RAC/5V	—
Solid state	M/50/EAP/..	M/50/EAP/CP
	M/50/EAN/..	M/50/EAN/CP

Reed	Model		Voltage		Current Max.	Temperature °C	LED	Features	Cable/Plug	Cable Type	Plug-in Cable		Catalogue Page
	Solid State		V a.c.	V d.c.							Straight	90°	
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 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 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 4.3.005
M/50/LSU/CP	—		10 to 60	10 to 75	180 mA	-20° to +80°	●	—	Plug M8x1	—	M/P73001/5	—	N 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 4.3.007
—	M/50/EAP/CP	—	—	10 to 30	150 mA	-20° to +80°	●	PNP	Plug M8x1	—	M/P73001/5	—	N 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 4.3.007
—	M/50/EAN/CP	—	—	10 to 30	150 mA	-20° to +80°	●	NPN	Plug M8x1	—	M/P73001/5	—	N 4.3.007

\* Insert cable length

Full information on switches (technical data, cable materials, dimensions etc.) please refer to relevant catalogue pages

## Mountings and Accessories

	Style 'C'	Style 'V'	Groove key
			
Ø mm	Page 8	Page 8	Page 8
20	VQM/46020/21	VQM/46020/32	M/P72816
25	VQM/46025/21	VQM/46025/32	M/P72816
32	VQM/46032/21	VQM/46032/32	M/P72816
40	VQM/46040/21	VQM/46040/32	M/P72816
50	VQM/46050/21	VQM/46050/32	M/P72816
63	VQM/46063/21	VQM/46063/32	M/P72816
80	VQM/46080/21	VQM/46080/32	M/P72816

## Ordering Examples

### Cylinders

To order an internally guided cylinder 40 mm bore with a 3000 mm stroke and magnetic piston quote: **VM/46040/M/3000**

To order an externally guided cylinder 50 mm bore with a 2000 mm stroke and non-magnetic piston quote: **VM/46150/2000**

### Mountings

To order a foot mounting style 'C' for 80 mm bore cylinder quote: **VQM/46080/21**

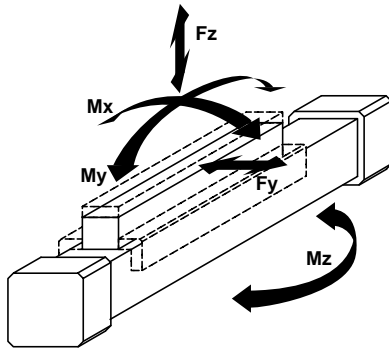
### Switches

To order a reed switch with LED and 2 m cable length quote: **M/50/LSU/2V**



## Theoretical Forces • Cushion Lengths

Ø mm	Theoretical forces (N) at 6 bar	Air consumption (l/cm) per stroke at 6 bar	Cushion 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



### 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 centreline of the piston.

**For speeds up to 2 m/s please use our calculation programme PNEUCALC. It is available upon request. PNEUCALC is suitable for all PC's having MS Windows 95 and higher.**

#### Total loads

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

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

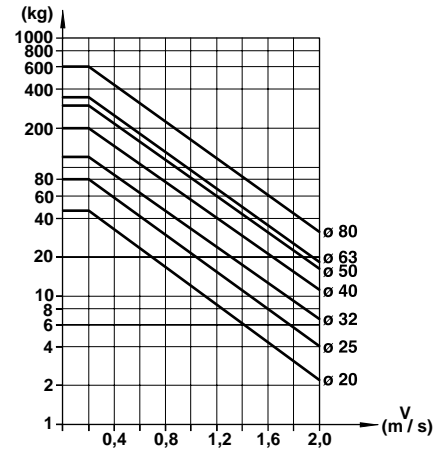
Ø mm	Internal guide, VM/46000					External adjustable guide, VM/46100		
	Fy (N)	Fz (N)	Mx (Nm)	My (Nm)	Mz (Nm)	Fy, Fz (N)	Mx (Nm)	My, Mz (Nm)
20	90	280	0,9	12	3,6	470	6	18
25	110	350	1,3	19	5,6	590	9	28
32	150	460	2,5	30	8,9	780	17	43
40	300	900	5,8	77	22	1600	39	110
50	400	1200	9,8	110	32	2000	65	160
63	640	1900	18	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.

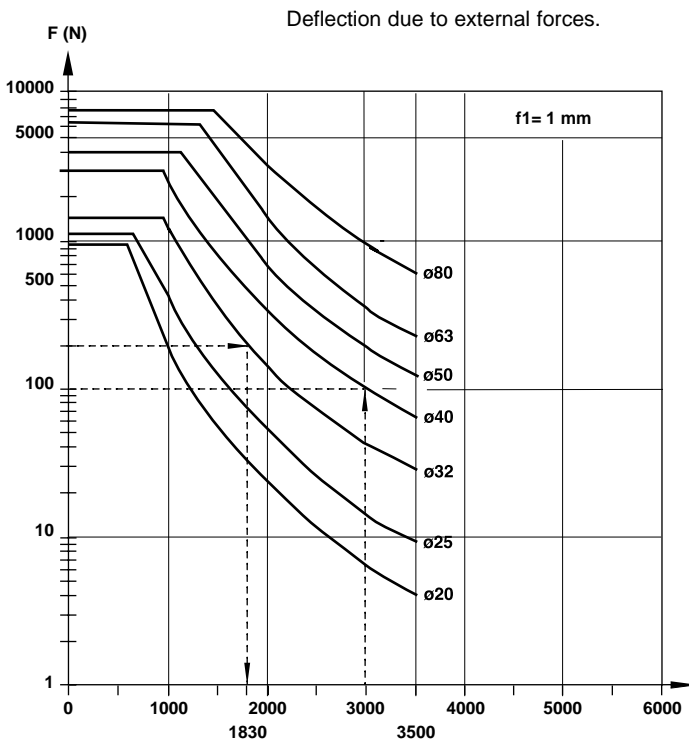


## Cushioning Performance

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 centre of gravity of the mass.



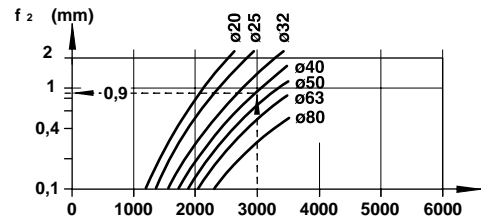
## Cylinder Deflection Diagram 1



**Example:**  
 Cylinder Ø 32 mm, stroke length 3500 mm, external load 200 N and a deflection of 1 mm  
 Required: Supported length  
 Maximum distance between supports = 1830 mm (see diagram 1)  
 Result: An additional support is required.

## Diagram 2

Deflection due to cylinder weight.



**Example:**

Cylinder Ø 40 mm, external force 180 N, distance between supports 3000 mm

Required: Total deflection

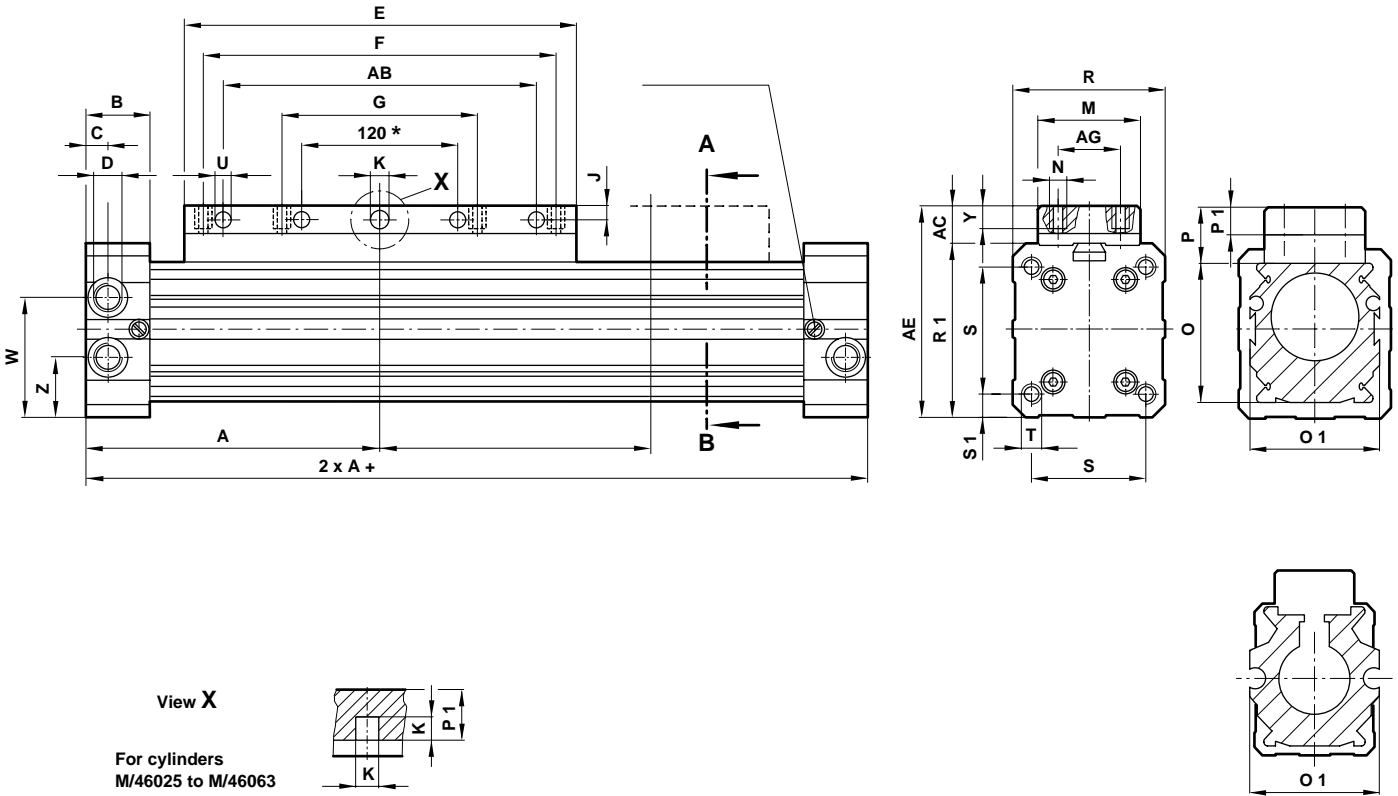
1. Deflection due to external force:  
 See diagram 1 → (1 mm/100 N) · 180 N      **1,8 mm**
  2. Deflection due to cylinder weight: See diagram 2      **+ 0,9 mm**
- Total deflection:**      **2,7 mm**

**Maximum permitted deflection (f1 + f2) < 1 mm per 1000 mm stroke**

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



## Basic Dimensions VM/46000 – Cylinders with Internal Guide

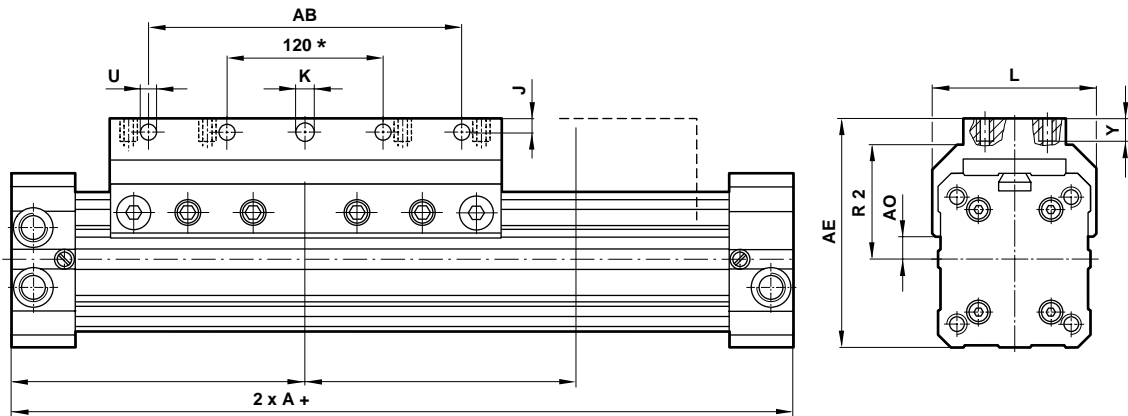


∅	A	AB	AC	AE	AG	B	C	D	E	F	G	J	K	M	N
20	85	-	14	54	18	23	8	G1/8	110	80	40	3,5	∅ 4,2 <sup>D7</sup>	27	M5
25	100	-	12	60	20	23	14,5	G1/8	130	90	45	-	□ 4,5	32	M5
32	120	-	16	76	25	27	10,5	G1/4	160	120	60	-	□ 6	45	M5
40	150	-	15	90	25	30	11,5	G1/4	215	160	80	-	□ 6	45	M6
50	180	-	20	110	25	35	14	G3/8	250	190	95	-	□ 8	50	M8
63	215	-	20	125	25	40	17	G1/2	320	240	120	-	□ 8	50	M8
80	260	240	24	154	25	45	17	G1/2	390	300	150	9	∅ 12 <sup>E7</sup>	50	M10
∅	O	O 1	P	P 1	R	R 1	S	S 1	T	∅ U	W	Y	Z	Weight at 0 mm	per 100 mm
20	32	32	18,5	-	40	40	32	4	M5-12#	-	-	12	21,5	0,50 kg	0,15 kg
25	40	40	16	7,5	48	48	37	5,5	M5-13#	-	33	7	17	0,80 kg	0,20 kg
32	52	52	20	10	60	60	47	6,5	M6-17#	-	40	8	20	1,60 kg	0,35 kg
40	65	65	20	10	75	75	58	8,5	M8-20#	-	50	8	25	2,70 kg	0,50 kg
50	80	80	25	13	90	90	70	10	M8-18#	-	60	11	30	4,80 kg	0,75 kg
63	95	95	25	14	105	105	84	10,5	M10-24#	-	70	11	35	7,20 kg	1,00 kg
80	120	120	29	-	130	130	100	15	M12-26#	11	90	15	40	13,20 kg	1,50 kg

# deep



**VM/46100 – Cylinders with External Adjustable Guide**

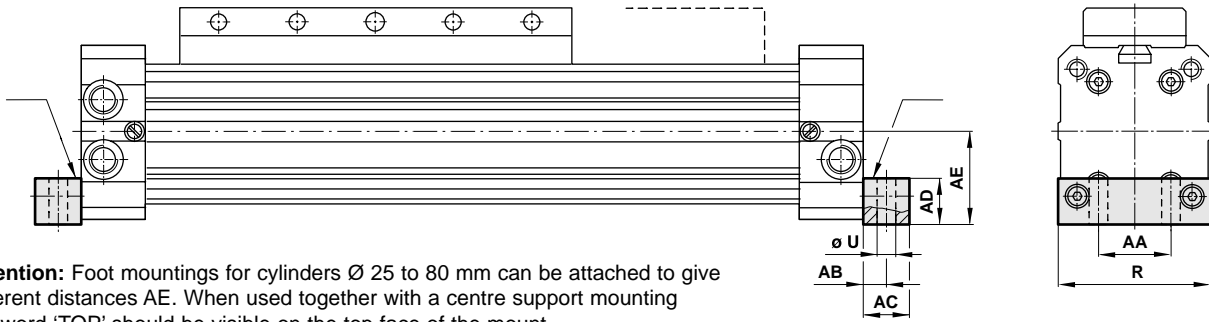


For full dimensions see page 6

∅	A	AB	AE	A0	J	∅ K	L	R 2	∅ U	Y	Weight at 0 mm	per 100 mm
20	85	60	59	6,5	7,5	5,5	42	24	5,5	12	0,60 kg	0,15 kg
25	100	70	67,5	9,5	5	5,5	52	34	5,5	12	0,90 kg	0,20 kg
32	120	90	82	15,5	5	5,5	64	42,5	5,5	12	1,70 kg	0,35 kg
40	150	120	97,5	16,5	5	6,6	79	49,5	6,6	12	2,90 kg	0,50 kg
50	180	160	117	24	6,5	9	92	58,5	9	17	4,90 kg	0,75 kg
63	215	190	137	25,5	7,5	9	110	68	9	20	7,70 kg	1,00 kg
80	260	240	165	38	10	12	130	81	11	25	13,40 kg	1,50 kg

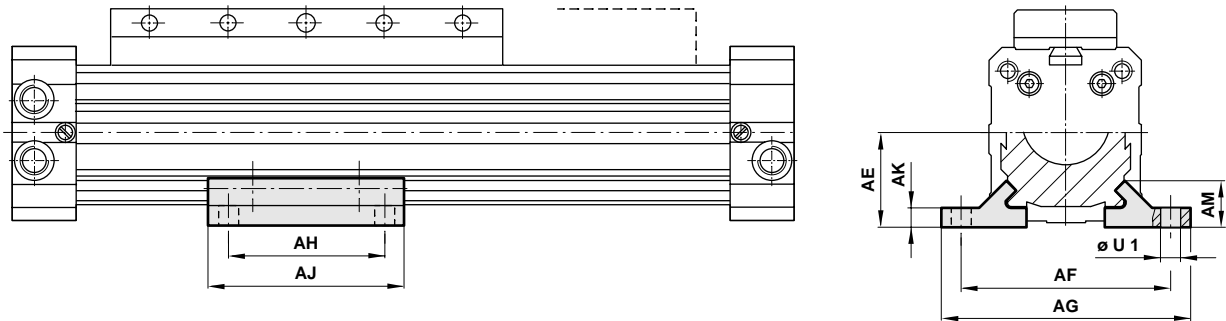


### VQM/46000/21 – Foot Mounting Style ‘C’



**Attention:** Foot mountings for cylinders  $\varnothing$  25 to 80 mm 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.

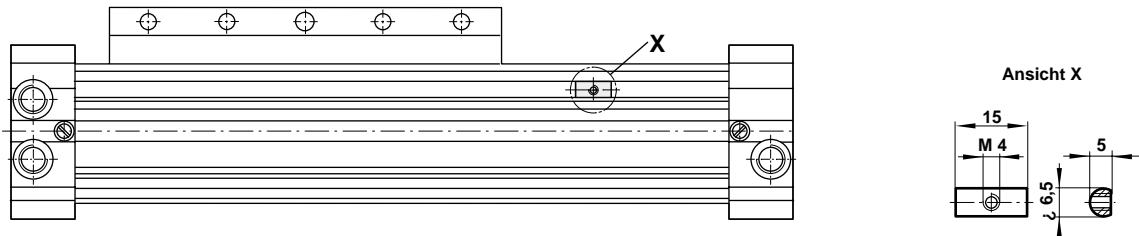
### VQM/46000/32 – Centre Support Mounting Style ‘V’



$\varnothing$	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AM	AN	R	$\varnothing$ U	$\varnothing$ U1	Style C	Style V
20	17	5	10	10	21,5	52	62	45	60	4,5	12	56	40	5,5	5,5	0,03 kg	0,03 kg
25	18	7	15	13,5	24	60	72	60	80	5,5	13	62,5	48	7	6,6	0,01 kg	0,04 kg
32	26	11	22	16,5	30,5	76	92	70	100	6,5	13,5	79	60	9	9	0,10 kg	0,07 kg
40	30	11	22	19,5	37,5	92	108	90	120	7,5	18,5	93	75	9	9	0,20 kg	0,20 kg
50	42	12	25	24	45	110	128	110	140	7,5	18,5	114	90	11	11	0,30 kg	0,20 kg
63	48	13	25	27,5	54	132	154	120	160	9	25	130	105	13	13	0,40 kg	0,30 kg
80	64	12,5	25	35	70	155	180	140	180	12	28,3	159	130	14	14	0,40 kg	0,40 kg

### M/P72816 – Groove key

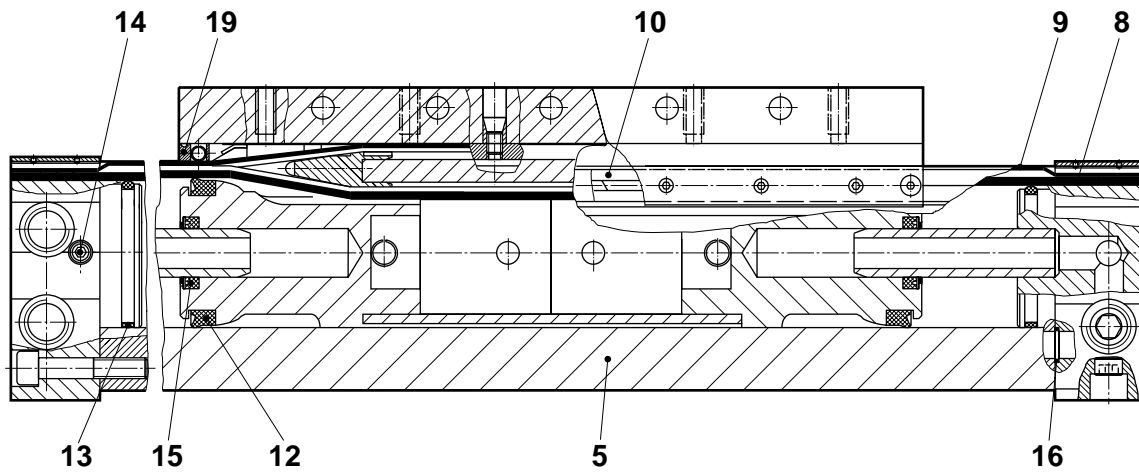
Weight: 0,010 kg







Spares



For VM/46000, .../M

∅	Model	Spares kit	Comprising Item	Description	Quantity	Seal strip Item 8	Cover strip Item 9
20	VM/46020,.../M	QM/46020/*/88	8 + 9	Seal/cover strip	1	M/P 40262/*	M/P 19567/2/*
25	VM/46025,.../M	QM/46025/*/88	12	Seal	2	M/P 40262/*	M/P 19567/2/*
32	VM/46032,.../M	QM/46032/*/88	13, 14, 16	O-Ring	2	M/P 40344/*	M/P 19587/2/*
40	VM/46040,.../M	QM/46040/*/88	15	Seal	2	M/P 40263/*	M/P 19606/2/*
50	VM/46050,.../M	QM/46050/*/88	19	Closer assy.	2	M/P 40626/*	M/P 19644/2/*
63	VM/46063,.../M	QM/46063/*/88		Grease	1	M/P 40626/*	M/P 19644/2/*
80	VM/46080,.../M	QM/46080/*/88				M/P 40715/*	M/P 41076/*

\* Insert stroke length

Note: Please quote the cylinder type number when ordering spare parts

For VM/46100, .../M

∅	Model	Spares kit	Comprising Item	Description	Quantity	Seal strip Item 8	Cover strip Item 9
20	VM/46120,.../M	QM/46120/*/88	8 + 9	Seal/cover strip	1	M/P 40262/*	M/P 19567/2/*
25	VM/46125,.../M	QM/46125/*/88	10	Guide rail	2	M/P 40262/*	M/P 19567/2/*
32	VM/46132,.../M	QM/46132/*/88	12	Seal	2	M/P 40344/*	M/P 19587/2/*
40	VM/46140,.../M	QM/46140/*/88	13, 14, 16	O-Ring	2	M/P 40263/*	M/P 19606/2/*
50	VM/46150,.../M	QM/46150/*/88	15	Seal	2	M/P 40626/*	M/P 19644/2/*
63	VM/46163,.../M	QM/46163/*/88	19	Closer assy.	2	M/P 40626/*	M/P 19644/2/*
80	VM/46180,.../M	QM/46180/*/88		Grease	1	M/P 40715/*	M/P 41076/*

\* Insert stroke length

Note: Please quote the cylinder type number when ordering spare parts