

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

**Technical data****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 to 8 bar

**Operating temperature:**

-30°C to +80°C max.  
(consult our Technical Service for use below +2°C)

**Cylinder diameter:**

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

**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: polyurethane  
Cover strip: polyamide  
Other seals: nitrile rubber  
Mounting screws: A2E  
Shim ring: stainless steel (A2)

**Ordering example**

see page 4

**Mountings and switches**

see page 3 & 4

**Cylinder with linear position sensor****M/146000/F1**

see page 2 & 16

**Alternative cylinder**

see page 2

Heavy duty cylinders

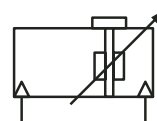
see page 1.6.015

ATEX cylinders

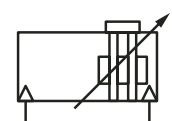
see page N 1.6.009\_ATEX

Corrosion resistant cylinders

see page N 1.6.011



Non-magnetic piston



magnetic piston

**Alternative variants**

Symbol	Type (non-magnetic piston)	Symbol	Type (magnetic piston)	Description	Page
	M/146000		M/146000/M	With internal guide	7, 8, 9
	M/146100		M/146100/M	With external adjustable guide	7, 8, 10
	M/146200		M/146200/M	With precision roller guide (ø 25 ... 63 mm)	11
	M/146200/P		M/146200/PM	With added caged ball linear motion guide (ø 25 ... 63 mm)	12
	M/146000/IC		M/146000/MC	With alternative ports	13
	M/146100/IC		M/146100/MD	Cylinder with double carriages	7, 8, 10
	M/146200/IC		M/146200/MD	With external adjustable guide (ø 16 ... 80 mm)	11
	M/146000/L1		M/146000/L3	With precision roller guide (ø 25 ... 63 mm)	14
	M/146200/L1		M/146200/L3	Active holding brake (ø 25 ... 63 mm)	15
	M/146000/L2		M/146000/L4	Applying pressure activates the brake	14
	M/146200/L2		M/146200/L4	The brake lining is pushed against a stainless steel strip. To release, depressurize.	15
			M/146000/F1	Passive holding brake; (ø 25 ... 63 mm)	14
			M/146100/F1	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.	15
			M/146200/F1	With internal guide and linear position sensor (ø 32 ... 63 mm)	16
			M/146200/F1	With precision roller guide and linear position sensor (ø 32 ... 63 mm)	16

**Options selector**

**M/146\*\*\*\*/\*\*\*\*/\*\*\*\***

Guiding system	Substitute
Internal	0
External	1
Roller	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)	Substitute
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

**Ordering information**

**Cylinder**

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

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

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

Quote: **M/146150/2000**



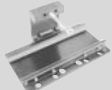
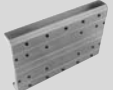







**Mountings**

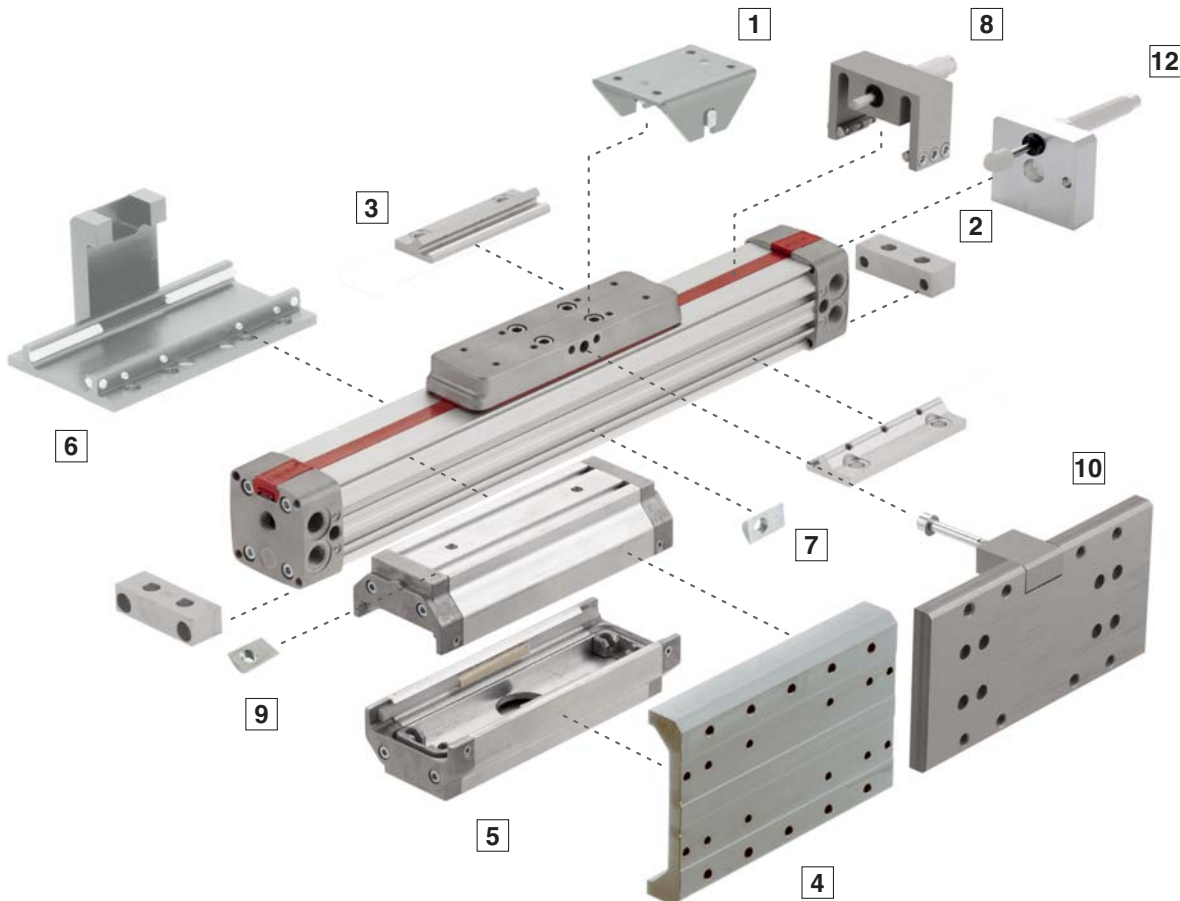
Foot mounting for cylinder Ø 50 mm  
 Quote: **QM/146050/21**

**Switches**

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

**Mountings**

	Type C	Type S	Type UV	Type UW	Type V	Type W
						
	2	1	6	4	3	5
<b>Ø mm</b>	<b>Page 17</b>	<b>Page 18</b>	<b>Page 17</b>	<b>Page 18</b>	<b>Page 17</b>	<b>Page 18</b>
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
	<b>Assembly kit for caged ball linear motion guide</b>	<b>Adjustable stop</b>	<b>Assembly kit for shock absorbers</b>	<b>Groove key for profile barrel</b>	<b>Groove key for guiding bridge</b>	
						
	10	8	12	7	9	
<b>Ø mm</b>	<b>Page 12</b>	<b>Page 19</b>	<b>Page 19</b>	<b>Page 17</b>	<b>Page 17</b>	
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	



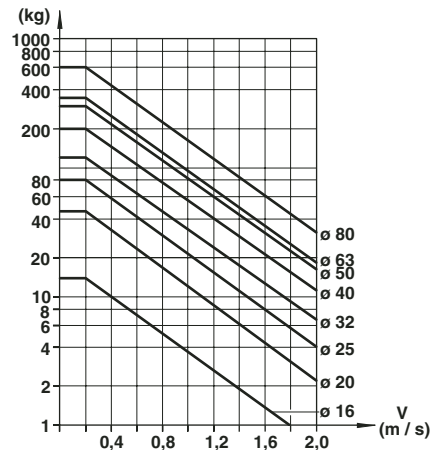
### Switches

Type Reed	With cable		With connector (M8x1)		Current max.	Temperature °C	LED	Features	Cable Connector length	Cable type	Cable with connector straight	Datasheet
	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

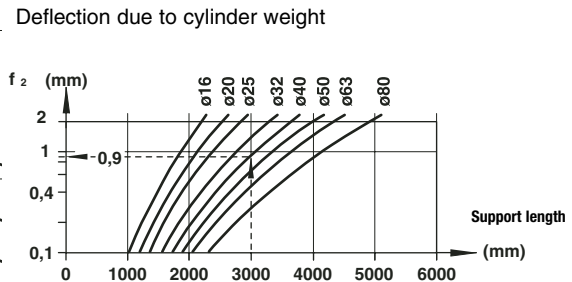
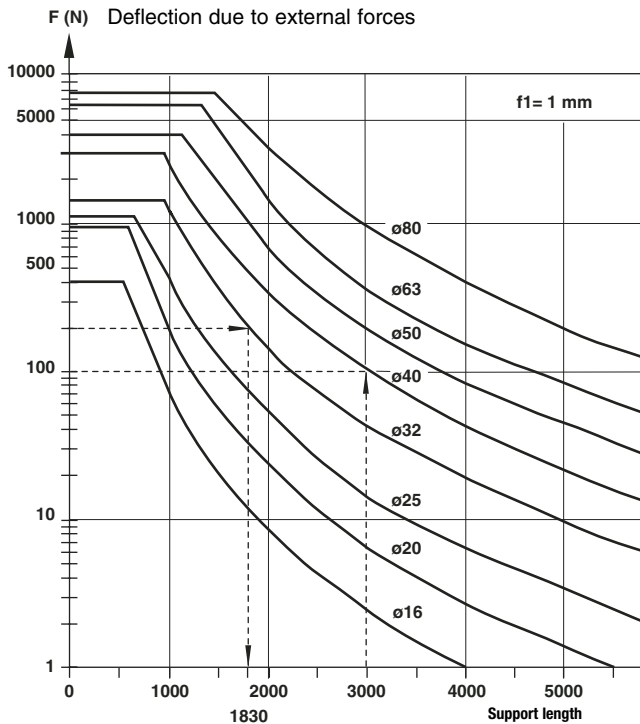
\* Please insert cable length Further information (Technical data, cable material, dimensions) see data sheet

### 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.

**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:

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

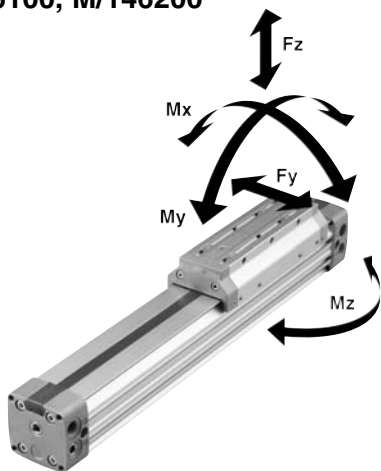
**Max. permitted deflection (f1 + f2) <  $\frac{1 \text{ mm}}{1000 \text{ mm Stroke}}$**

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

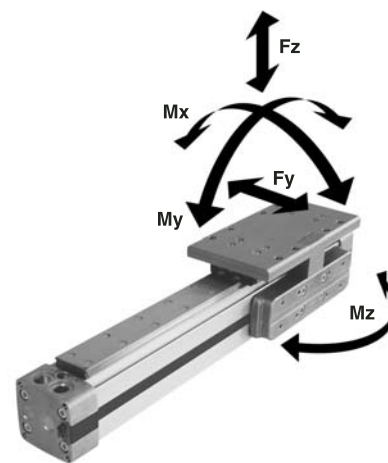
**Theoretical forces, air consumption, cushioning length, holding forces**

Cylinder Ø mm	Theoretical forces (N) at 6 bar	Air consumption (l/cm) of stroke at 6 bar	Cushioning length (mm)	Holding forces (N) of brake (on dry braking surface) active (L1 + L3) at 6 bar	
				passive (L2 + L4)	
16	120	0,014	12	-	-
20	188	0,022	26	-	-
25	294	0,035	26	500	220
32	482	0,056	35	900	375
40	754	0,088	50	1500	630
50	1178	0,137	60	2500	1000
63	1870	0,218	70	4000	1650
80	3016	0,350	75	-	-

**M/146000, M/146100, M/146200**



**M/146200/P**



Ø mm	Internal guide M/146000					External adjustable guide M/146100			Precision roller guide M/146200				Added caged ball linear motion guide M/146200/P		
	Fy (N)	Fz (N)	Mx (Nm)	My (Nm)	Mz (Nm)	Fy, Fz (N)	Mx (Nm)	My, Mz (Nm)	Fy (N)	Fz (N)	Mx (Nm)	My, Mz (Nm)	Fy, Fz	Mx	My, Mz
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	-	-	-	-	-	-	-

Loading values applicable to a speed of ≤ 0,2 m/s. Maximum working life is normally reached below a speed of 1 m/s.  
 \* The forces and moments refers to the centre of the guide. They must not be exceeded in dynamic applications.

**Loading values for LINTRA® cylinders with double carriages**

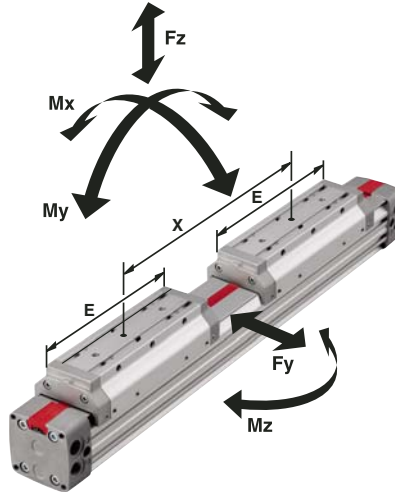
The values given in the table below show the single forces in the directions Fy and Fz and the maximum moments Mx, My and Mz. All values are applicable only for speeds of max. 0,2 m/s. A requirement for using these values is a constant movement (no jerking) of the mass over the whole stroke length of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

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

M/146100/ID, M/146100/MD



External adjustable guide, M/146100/ID and M/146100/MD												
Ø mm	Fy, Fz (N)	Mx (Nm)	My, Mz (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=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												
Ø mm	Fy, Fz (N)	Mx (Nm)	My, Mz (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=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 applicable to a speed of ≤ 0,2 m/s. Maximum working life is normally reached below a speed of 1 m/s.

\* The forces and moments refers to the centre of the guide. They must not be exceeded in dynamic applications.

**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.

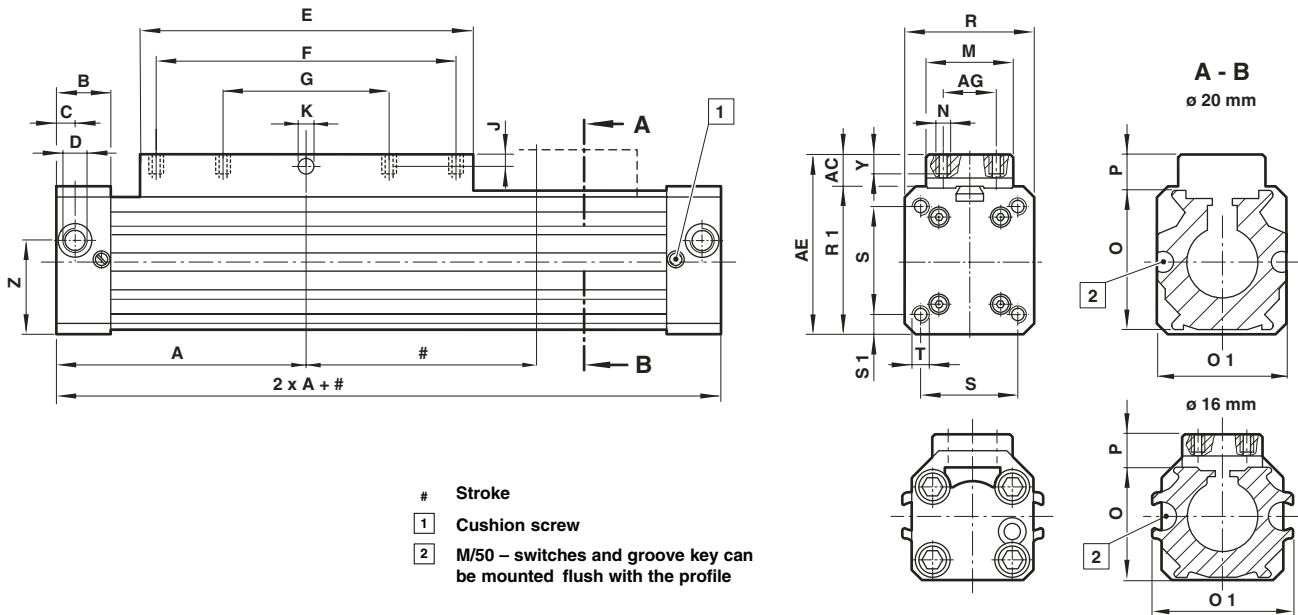
A requirement for using these values is a constant movement (no jerking) of the mass over the whole stroke length of the cylinder. The reference point from which the moments for all cylinders should be calculated is the centre line of the pistons.

**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:

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

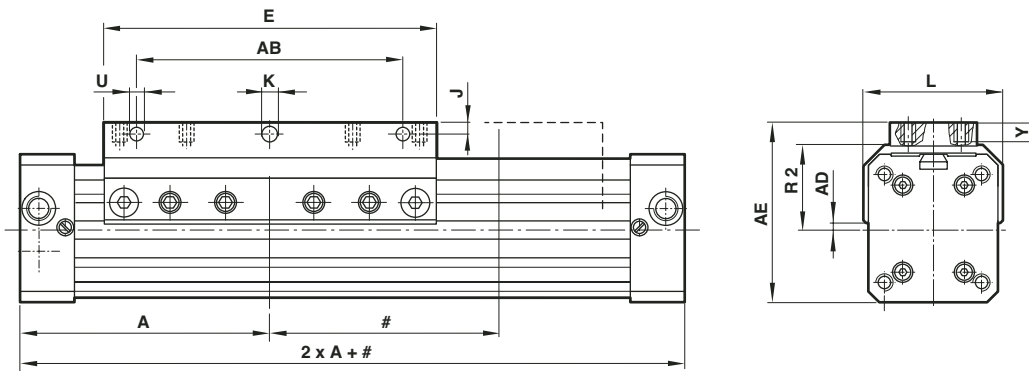
M/146000 – cylinder with internal guide, cylinder  $\varnothing$  16 and 20 mm



Type	$\varnothing$	A	AC	AE	AG	B	C	D	E	F	G	J	$\varnothing$ K <sup>D7</sup>		
M/146016/...	16	62,5	24,5	38	8	17,5	8	M5	80	60	-	7	3		
M/146020/...	20	85	34,5	54	18	23	8	G1/8	110	80	40	7	4,2		
Type	$\varnothing$	M	N	O	O1	P	R	R1	S	S1	T	Y	Z	Weight at 0 mm	Weight per 100 mm
M/146016/...	16	18	M3	25	32	12	27	31	16	5,5	M3-5*1)	4	16,5	0,16 kg	0,10 kg
M/146020/...	20	27	M5	32	38	18,5	40	40	32	4	M5-12*)	12	20,5	0,50 kg	0,15 kg

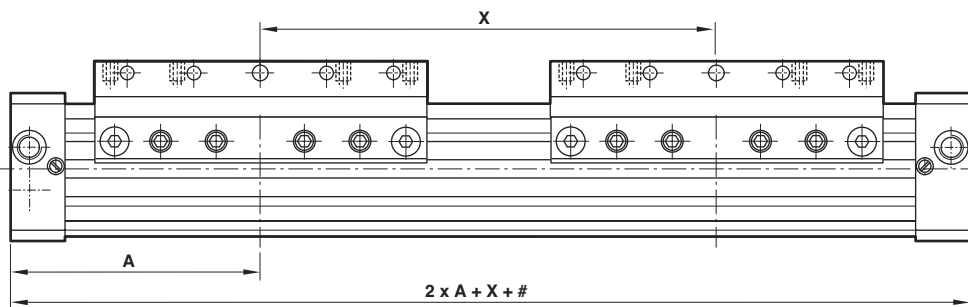
\*1) deep

M/146100 – cylinder with external adjustable guide ( $\varnothing$  16 & 20 mm)



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

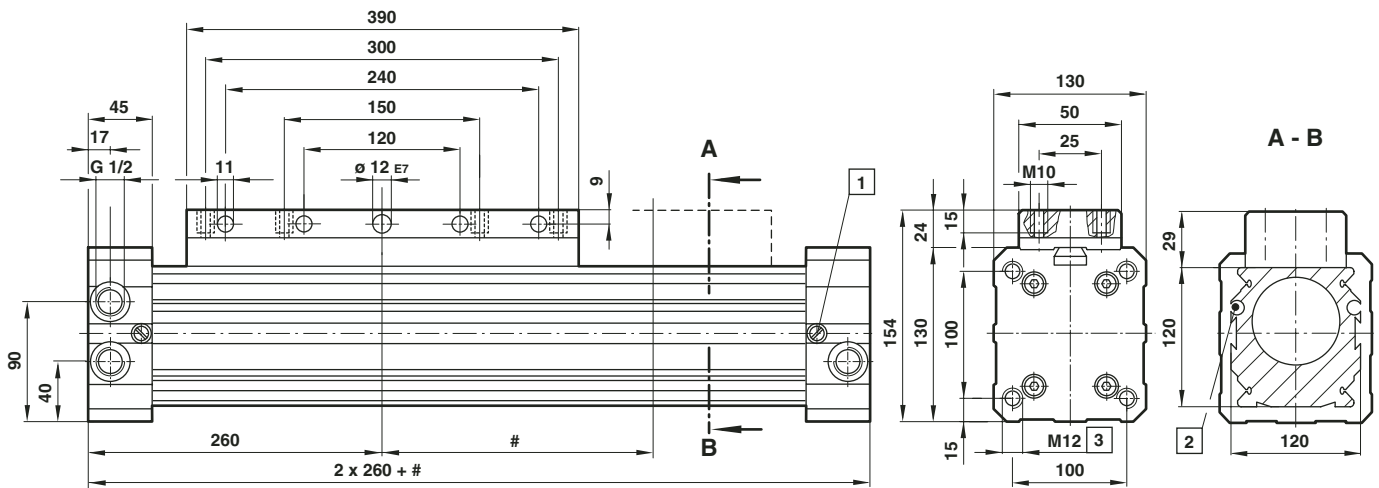
M/146100/ID, .../MD – cylinder with external adjustable guide and double carriages ( $\varnothing$  16 & 20 mm)



Type	$\varnothing$	A	E	X min.	X max.	Weight at 0 mm	Weight per 100 mm
M/146116/D	16	62,5	80	80	500	0,20 kg	0,10 kg
M/146120/D	20	85	110	110	500	0,80 kg	0,15kg



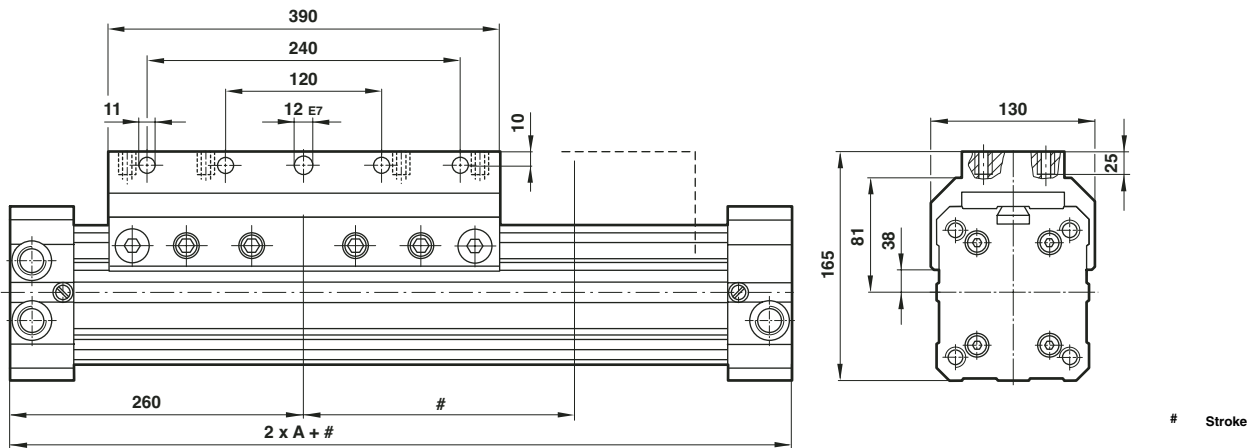
M/146080 – cylinder with internal guide (ø 80 mm)



- # 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
M/146080/	80	13,20 kg	1,50 kg

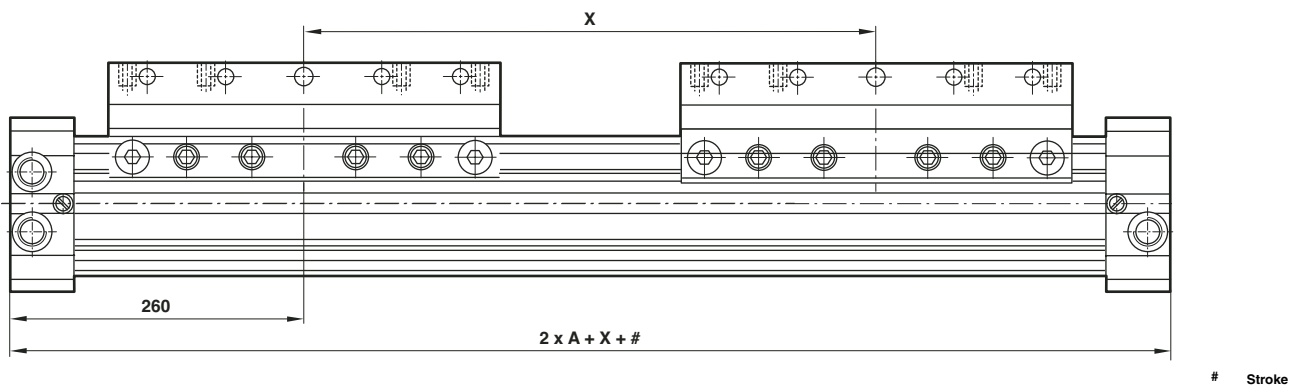
M/146180 – cylinder with external adjustable guide (ø 80 mm)



# Stroke

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

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

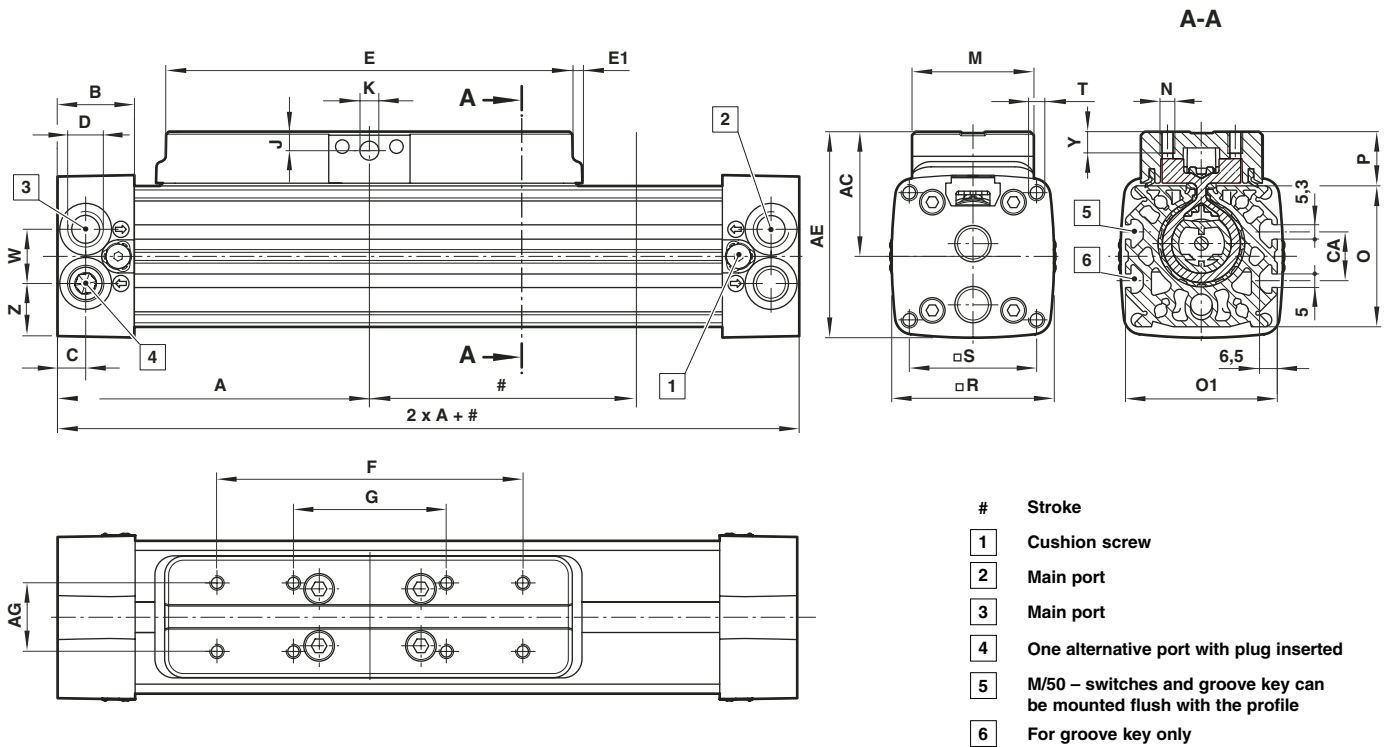


# Stroke

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



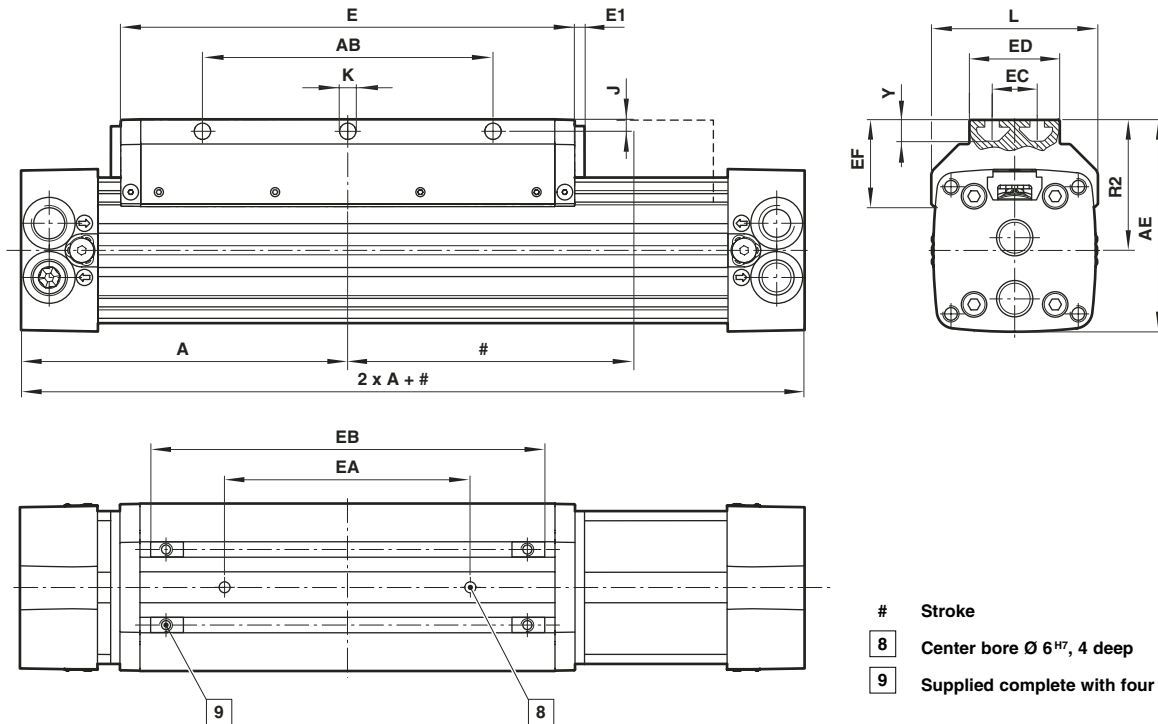
M/146000 – cylinder with internal guide (ø 25 ... 63 mm)



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

\*1) deep

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

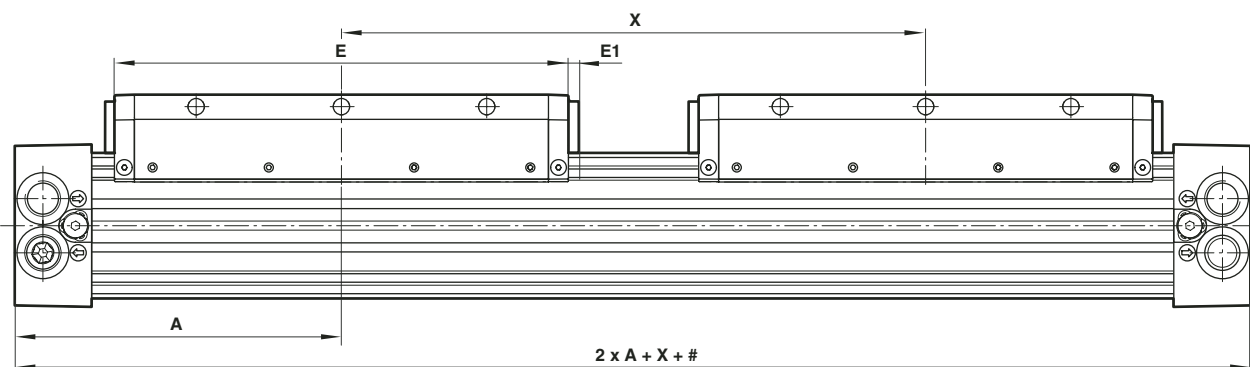


Missing cylinder dimensions see page 9

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
M/146125/..	25	100	70	67,5	130	-	50	102	32	20	34	5	5,5	52	-9,5	0,75kg	0,20 kg	
M/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
M/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
M/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
M/146163/..	63	215	190	137	320	-	150	292	50	25	59	7,5	9	110	84,5	16,5	7,20kg	0,90 kg

\*1) deep

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

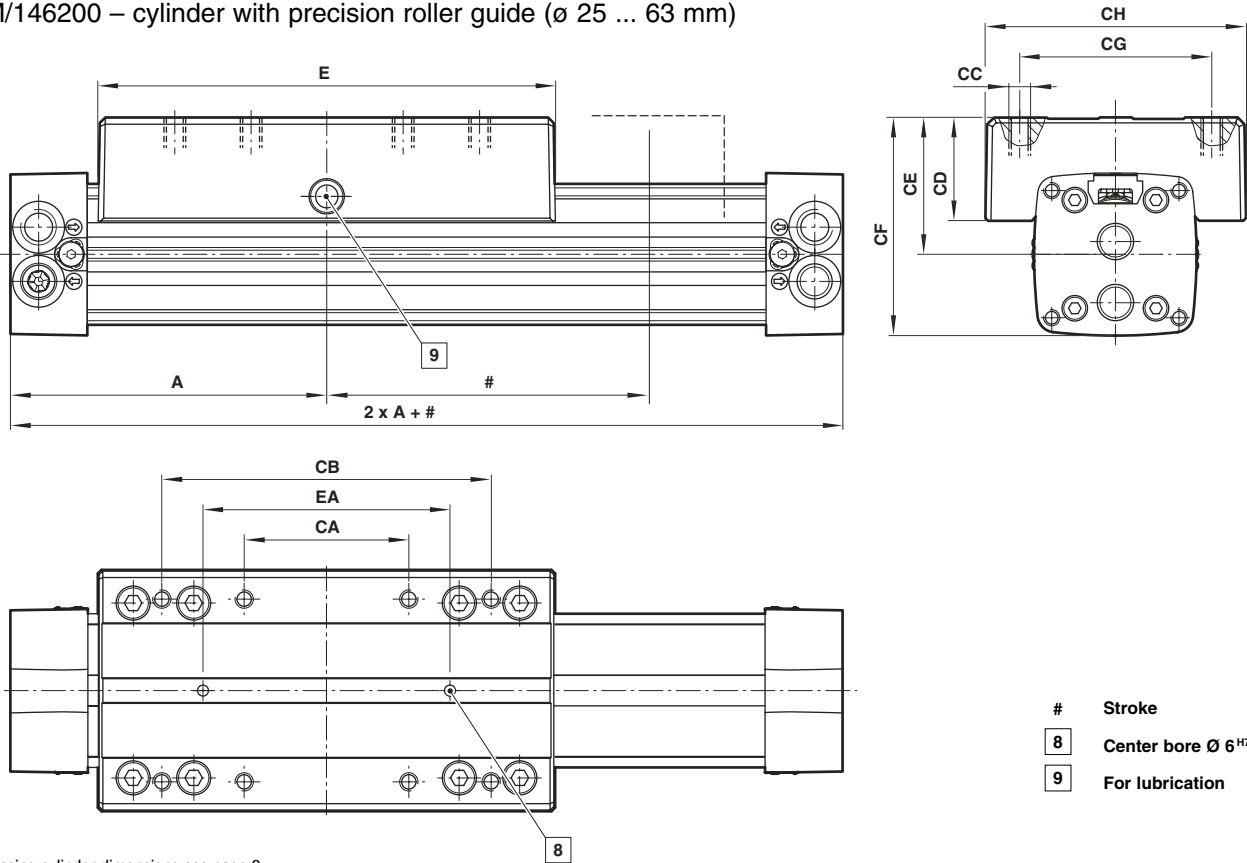


# Stroke

Missing cylinder dimensions see page 9

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

M/146200 – cylinder with precision roller guide (ø 25 ... 63 mm)

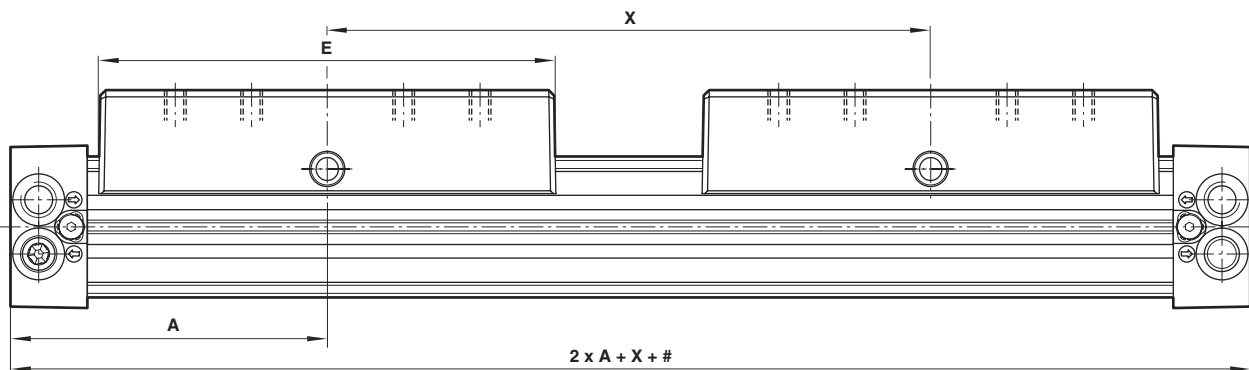


Missing cylinder dimensions see page 9

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

\*1) depp

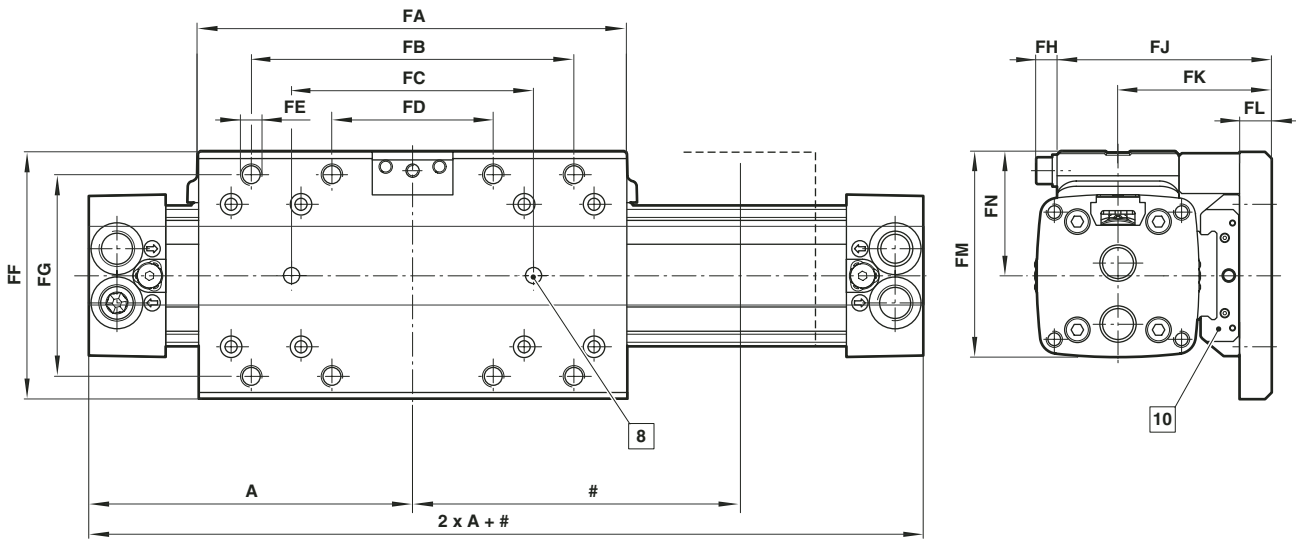
M/146200/ID and .../MD – cylinder with precision roller guide and double carriages



Missing cylinder dimensions see page 9

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

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

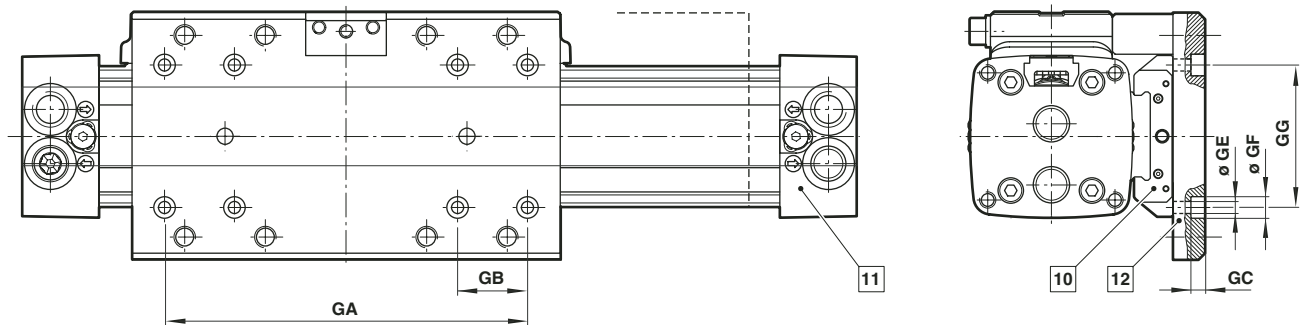


Missing cylinder dimensions see page 9

Type	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
M/146225/P/..	25	100	130	90	70	45	M6	72	60	7	61	45	10	60	36	1,90 kg	0,40 kg
M/146232/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/146240/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/146250/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/146263/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

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)

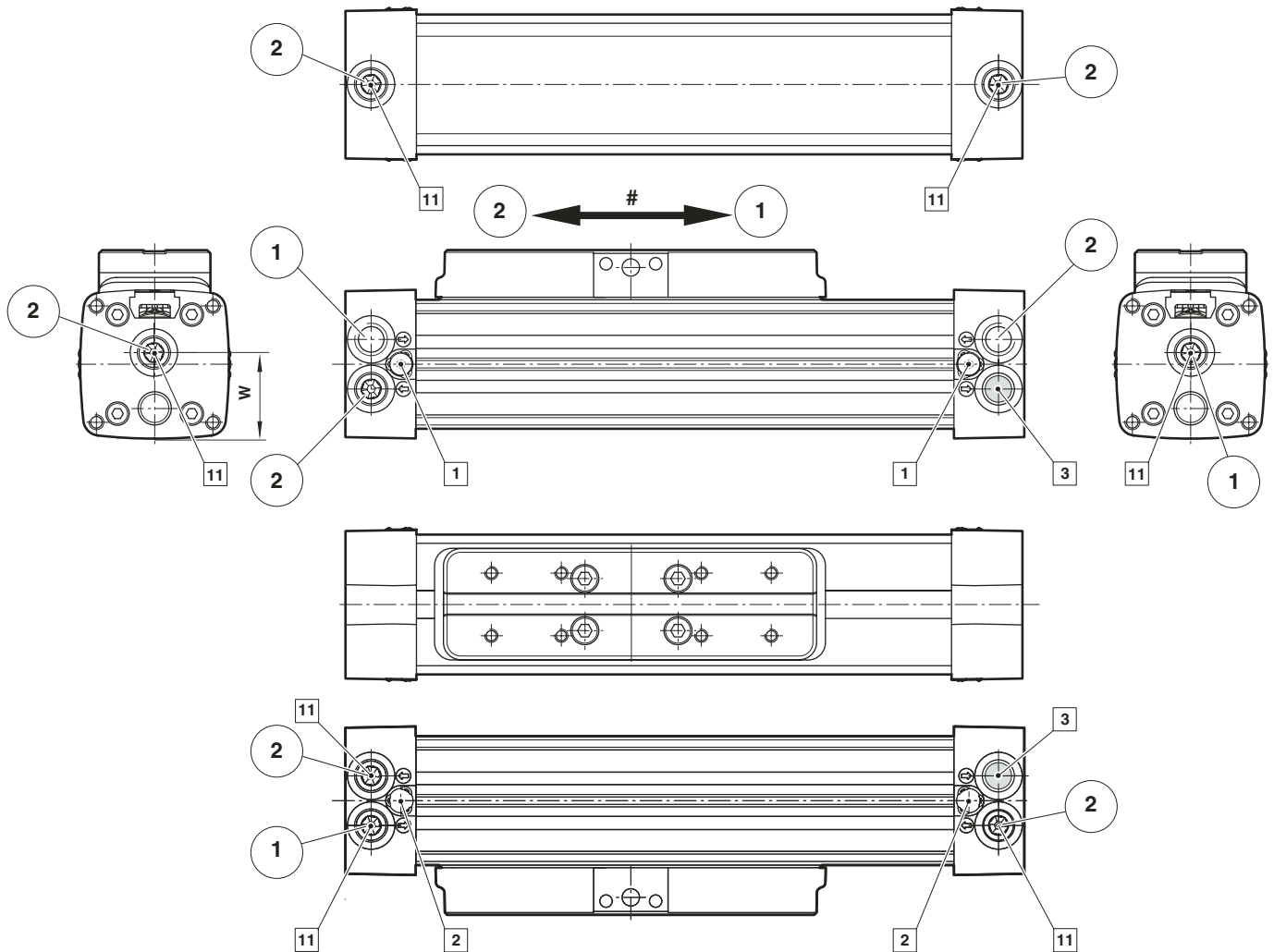


- # Stroke
- 8 Center bore Ø 6<sup>H7</sup>, 4 deep
- 10 Recommended supplier/series for caged ball linear motion guide  
 Cylinder Ø 25  
 THK/SHW12CAM  
 Cylinder Ø 32 and 40  
 IKO/LWFF33  
 NSK/LW17ELZ  
 THK/SHW17CAM  
 Cylinder Ø 50 & 63  
 IKO/LWFF42  
 NSK/LW27ELZ  
 THK/SHW27CA
- 11 Standard cylinder M/146000
- 12 Assembly kit for caged ball linear motion guide

Missing cylinder dimensions see above

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

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

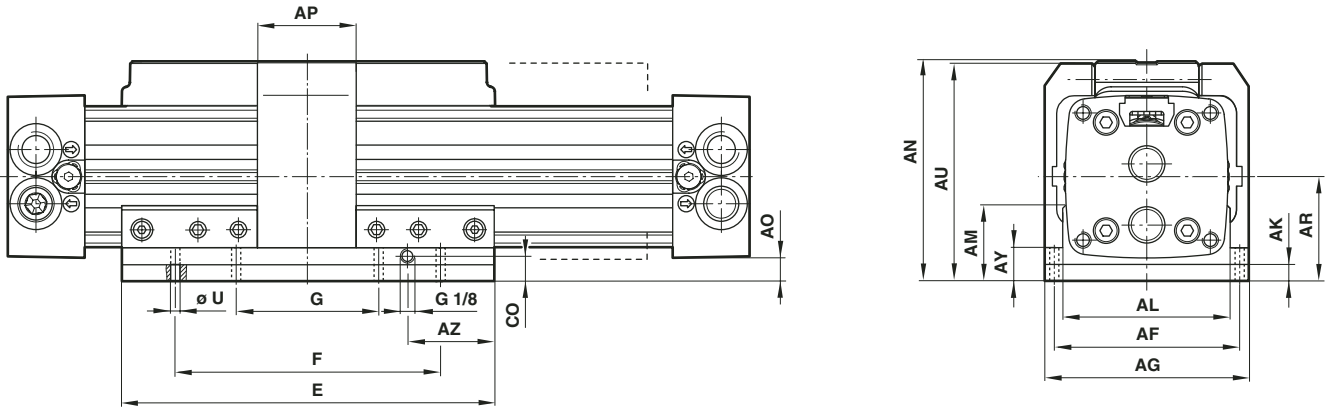


Missing cylinder dimensions and weights see the corresponding series on page 9 ... 11

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

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

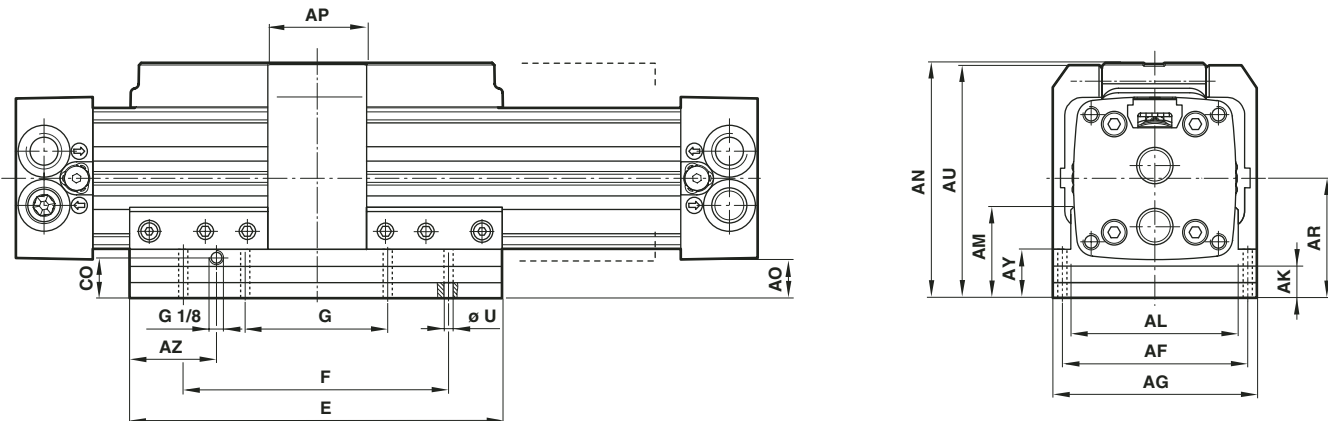
M/146000/L1, M/146000/L3 – cylinder with active brake (ø 25 ... 63 mm)



Missing cylinder dimensions see page 9

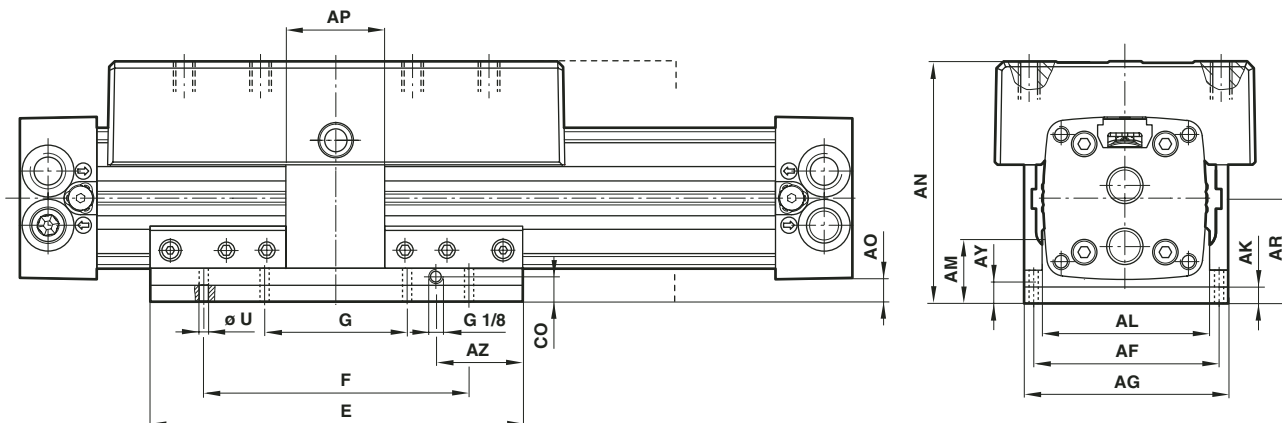
Type	Ø	AF	AG	AK	AL	AM	AN	AO	AP	AR	AU	AY	AZ	CO	E	F	G	Ø U	Weight at 0 mm	Weight per 100 mm
M/146025/L	25	62	75	12	52	28,5	73,5	13,5	45	37,5	73	16,5	30	6	130	90	45	6,6	1,60 kg	0,2 kg
M/146032/L	32	78	92	12	64	29	90	14	55	44	89,5	17,5	32,5	6	160	120	60	9	2,50 kg	0,35 kg
M/146040/L	40	94	112	12	81	34,5	103,5	13,5	65	51	103	18	52,5	6	215	160	80	9	4,20 kg	0,50 kg
M/146050/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/146063/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/146000/L2, M/146000/L4 – cylinder with passive brake (ø 25 ... 63 mm)



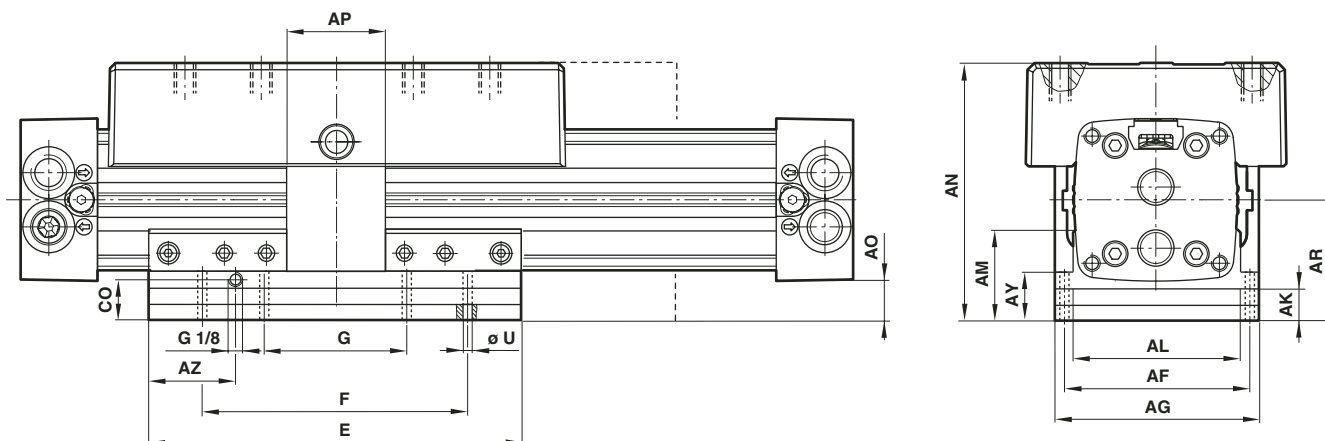
Missing cylinder dimensions see page 9

Type	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
M/146025/L	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/146032/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/146040/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/146050/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/146063/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/146200/L1, M/146200/L3 – cylinder with precision roller guide and active brake ( $\varnothing$  25 ... 63 mm)**


Missing cylinder dimensions see page 9, 11

Type	$\varnothing$	AF	AG	AK	AL	AM	AN	AO	AP	AR	AU	AY	AZ	CO	E	F	G	$\varnothing$ U	Weight at 0 mm	Weight per 100 mm
M/146225/L	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/146232/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/146240/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/146250/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/146263/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

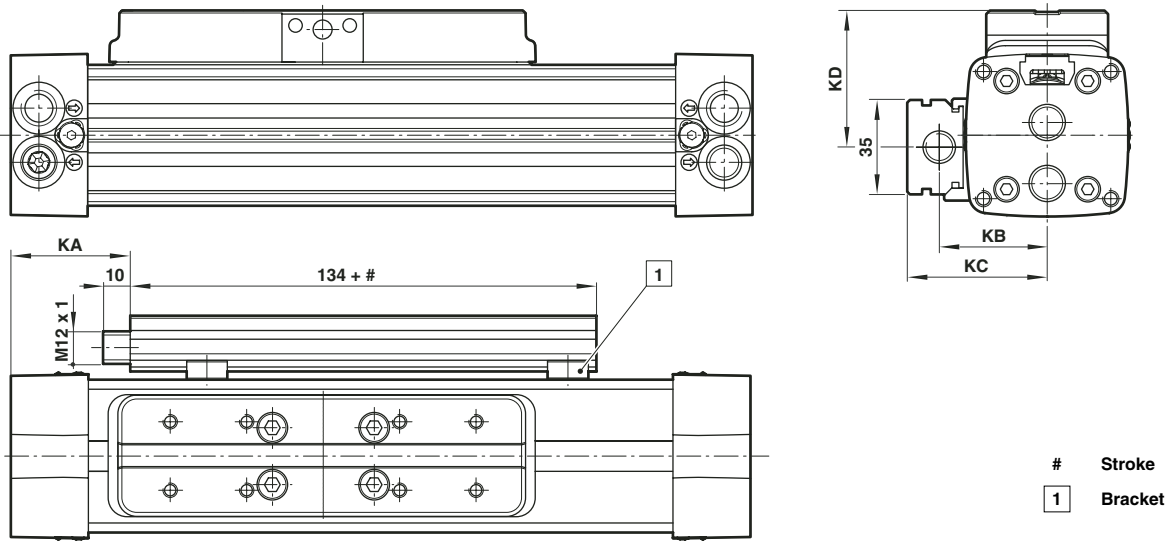
**M/146200/L2, M/146200/L4 – cylinder with precision roller guide and passive brake ( $\varnothing$  25 ... 63 mm)**


Missing cylinder dimensions see page 9, 11

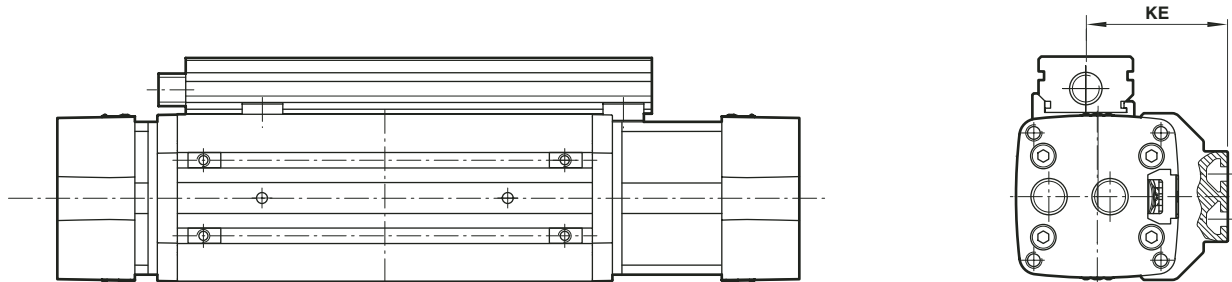
Type	$\varnothing$	AF	AG	AK	AL	AM	AN	AO	AP	AR	AU	AY	AZ	CO	E	F	G	$\varnothing$ U	Weight at 0 mm	Weight per 100 mm
M/146225/L	25	62	75	22	52	38,5	89,5	23,5	40	47,5	83	26,5	30	16	130	90	45	6,6	1,90 kg	0,20 kg
M/146232/L	32	78	92	24	64	41	106	26	55	56	101,5	29,5	32,5	18	160	120	60	9	4,00 kg	0,35 kg
M/146240/L	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/146250/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/146263/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



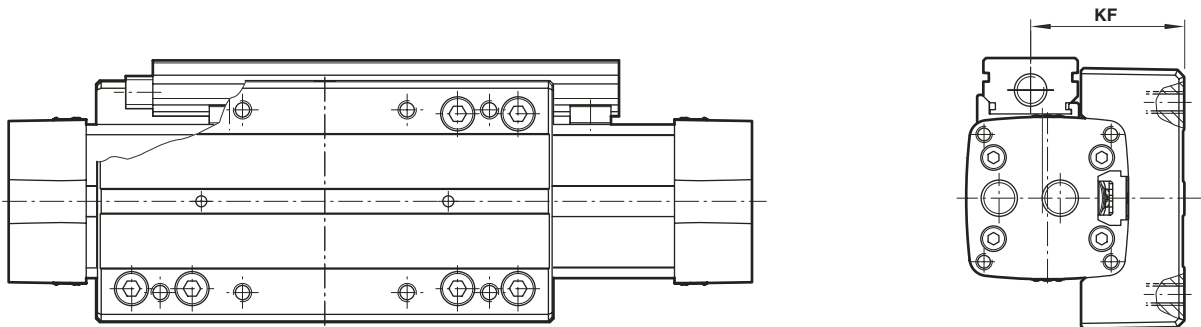
M/146000/F1 – cylinder with linear sensor and internal guide



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



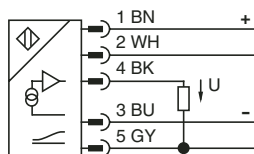
M/146200/F1 – cylinder with linear sensor and precision roller guide



Missing cylinder dimensions and weights see pages 9 ... 11  
 Electrical data see page 2

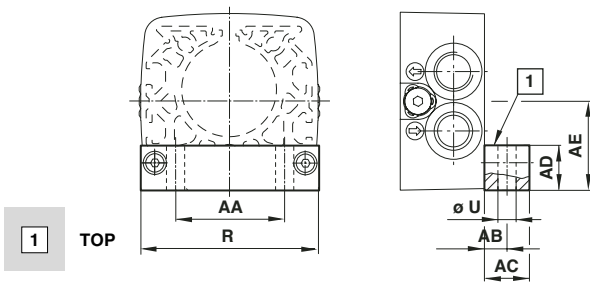
Type	Ø	KA	KB	KC	KD	KE	KF
M/146.32/F1/...	32	44	40	51,5	50,5	56	56,5
M/146.40/F1/...	40	74	46	57,5	56,5	64	62,5
M/146.50/F1/...	50	104	54	65,5	68,5	75	70
M/146.63/F1/...	63	139	61	72	67,5	79,5	69,5

Connector details



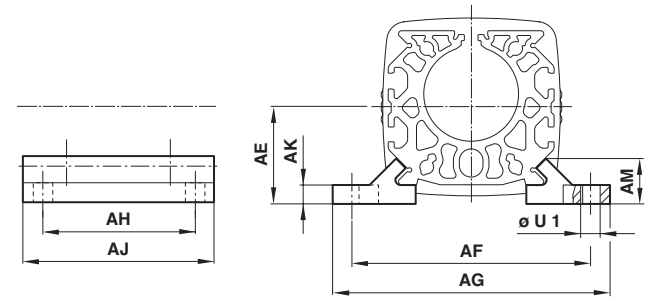
Pin-No.	Colour	Function
1	Brown	+
2	White	Program input
3	Blue	-
4	Black	Output +
5	Grey	Output -

**Mountings (ø 16 ... 80 mm)  
Foot mounting C**



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

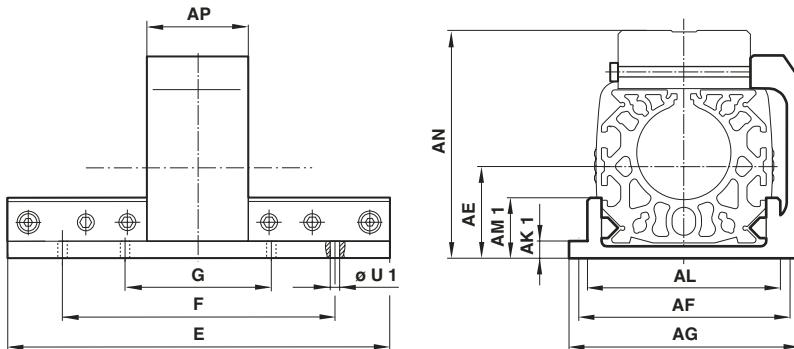
**Centre support V**



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

**Carriage plate mounting UV**



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

**Groove key for carriage**

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

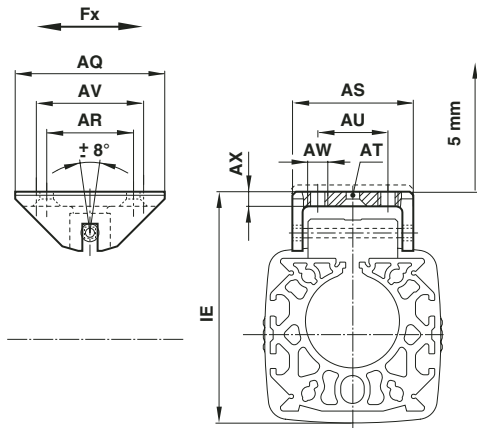


**Groove key for profile barrel**

Type	Ø	A	B	C	D	E	Weight (kg)
M/P74065	32	4	M5	12	4,25	8	0,01

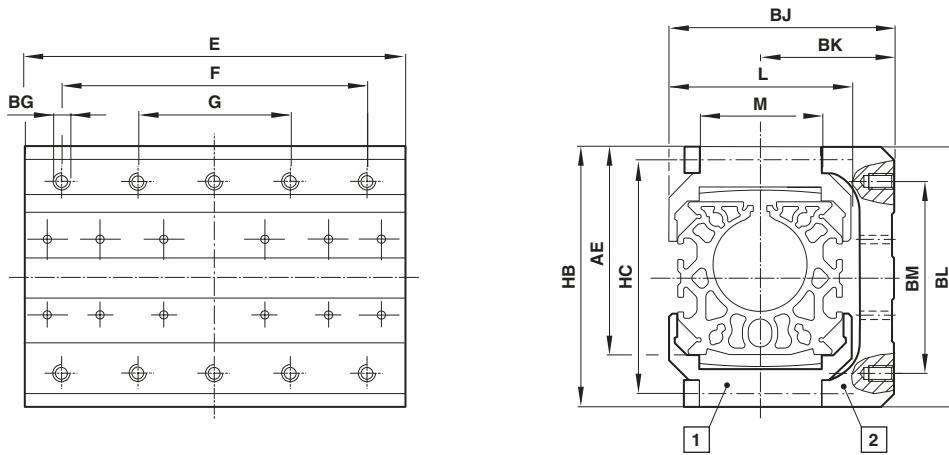
### Swinging bridge S

For cylinders with internal guiding only



Type	Ø	AQ	AR	AS	AT	AU	AV	AW	AX	IE	Fx (N)	kg
QM/146016/37	16	40	-	26	-	12	30	M4	4	48+4	100	0,02
QM/146020/37	20	50	35	38	DIN74-Bm5	20	40	M5	5	65,5+5	150	0,10
QM/146025/37	25	60	40	44	DIN74-Bm5	20	45	M5	5	70+5	250	0,20
QM/146032/37	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/146050/37	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/146080/37	80	100	60	65	DIN74-Bm8	40	80	M8	6,5	168,5+5	2400	0,50

### Secondary carriage W Side mounting plate UW



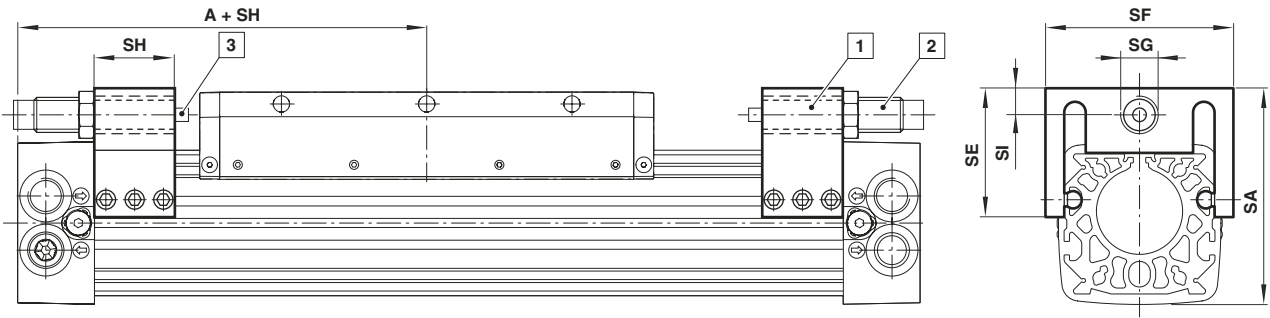
- 1 Secondary carriage – W
- 2 Side mounting plate – UW

Type (W)	Type (UW)	Ø	AE	BG	BJ	BK	BL	BM	E	F	G	HB	HC	L	M	W	UW
QM/146116/35	-	16	38	-	-	-	-	-	80	-	-	49	-	-	18	0,04 kg	-
QM/146120/35	QM/146120/36	20	59	M 5 x 10*1)	54	33	78	55	110	80	40	79	64	42	27	0,19 kg	0,25 kg
QM/146125/35	QM/146125/36	25	67,5	M 5 x 10*1)	63	37	86	65	130	90	45	87	77	52	32	0,27 kg	0,33 kg
QM/146132/35	QM/146132/36	32	82	M 5 x 12*1)	77	45	103	80	160	120	60	104	94	64	45	0,50 kg	0,50 kg
QM/146140/35	QM/146140/36	40	97,5	M 6 x 12*1)	77	58,5	119	90	215	160	80	120	110	79	45	0,65 kg	1,08 kg
QM/146150/35	QM/146150/36	50	117	M 6 x 15*1)	98	71,5	143	120	250	190	95	144	131	92	50	1,10 kg	1,85 kg
QM/146163/35	QM/146163/36	63	137	M 8 x 20*1)	117,5	84,5	178	140	320	240	120	169	154	110	50	1,90 kg	3,46 kg
QM/146180/35	-	80	165	-	-	-	-	-	390	-	-	200	-	-	50	2,50 kg	-

\*1) deep

### Adjustable stop

For M/146100, /..., .../M, M/146200/..., .../M



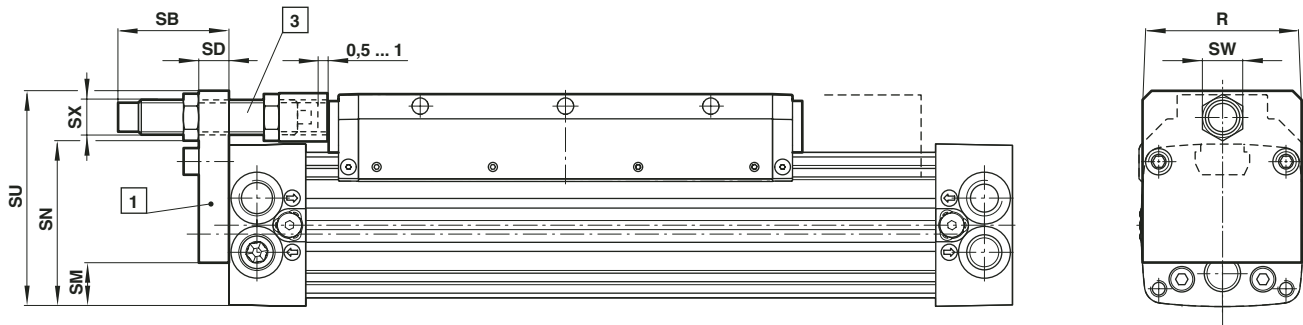
Missing cylinder dimensions and weights see pages 7 or 8.

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

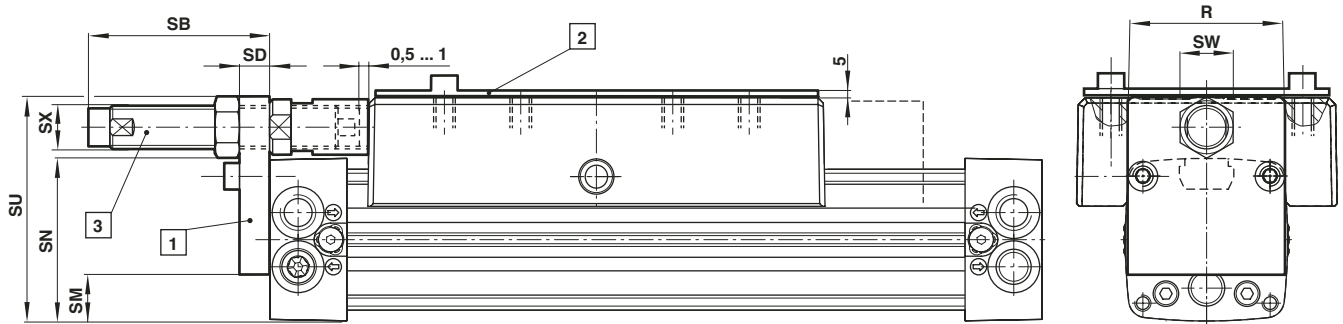
- 1** Assembly kit
- 2** Please order shock absorber separately, see ACE program
- 3** Reaction forces (Q max)  
 ø 25 = 1200 N, ø 32 = 1500 N,  
 ø 40 = 1850 N

### Assembly kit for shock absorber

For cylinder series M/146100, M/146100/M



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



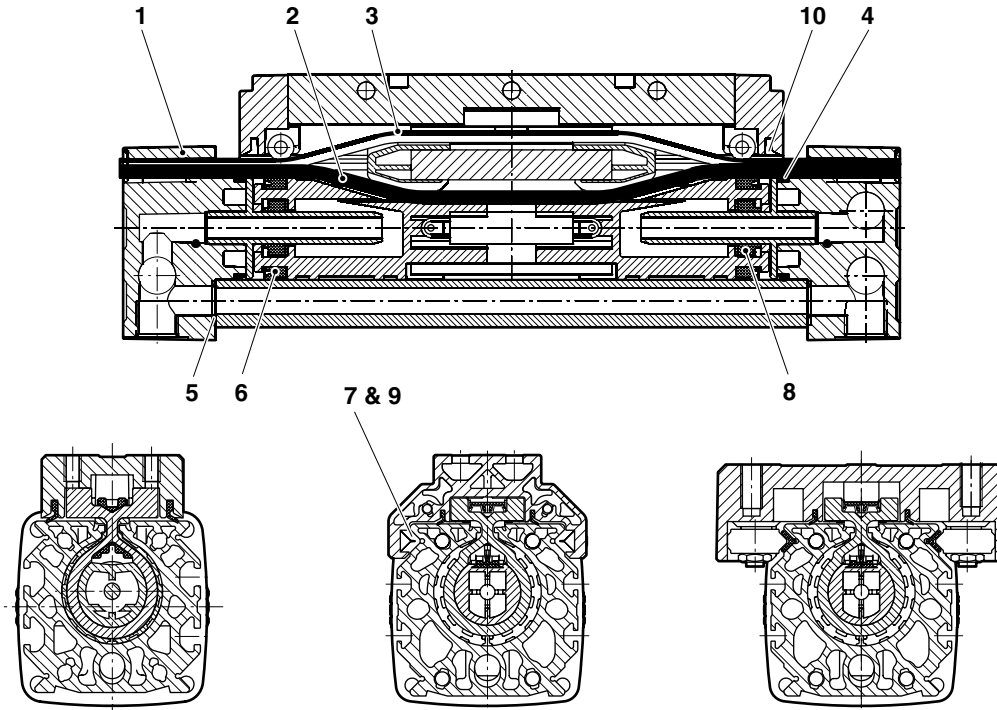
- 1** Assembly kit
- 2** Plate
- 3** Please order shock absorber separately, see ACE program

Cylinder	Ø	Assembly kit for shock absorber Position 1	Plate Position 2	R	SB	SD	SC	SM	SN	SU	SW	SX
M/146125	25	QM/146125/67	-	48	45,5	12	-	19	49	69,5	17	M14x1,5
M/146132	32	QM/146132/67	-	60	40,5	12	-	24	61	81,5	17	M14x1,5
M/146140	40	QM/146140/67	-	75	81,5	15	-	29	74	109,5	30	M25x1,5
M/146150	50	QM/146150/67	-	90	69	15	-	33	91	127,5	30	M25x1,5
M/146163	63	QM/146163/67	-	105	69	15	-	41	105,5	141,5	30	M25x1,5
M/146180	80	QM/146180/67	-	130	85	20	-	53	130,5	173,5	Ø 40	M33x1,5
M/146225	25	QM/146125/67	-	48	45,5	12	-	19	49	69,5	17	M14x1,5
M/146232	32	QM/146132/67	-	60	40,5	12	-	24	61	81,5	17	M14x1,5
M/146240	40	QM/146140/67	M/P41434	75	81,5	15	31	29	74	109,5	30	M25x1,5
M/146250	50	QM/146150/67	M/P41435	105	69	15	36	33	91	127,5	30	M25x1,5
M/146263	63	QM/146163/67	M/P41436	130	69	15	35	41	105,5	141,5	30	M25x1,5

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.

**Spares**



**For M/146000, .../M, M/146200, .../M**

Ø	Type	Spares kit	Comprising Item	Description	Quantity	Seal strip Item 2	Cover strip Item 3
16	M/146016,.../M	QM/146016/88/*	1	Clamping lever (ø 25 ... 63)	2	M/P 40270/*	M/P 74216/*
20	M/146020,.../M	QM/146020/88/*	2 + 3	Seal-/cover strip	1	M/P 40262/*	M/P 74223/*
25	M/146025,.../M, M/146225,.../M	QM/146025/88/*	4 + 5	O-ring	2	M/P 40262/*	M/P 74131/*
32	M/146032,.../M, M/146232,.../M	QM/146032/88/*	6	Seal	2	M/P 40344/*	M/P73936/*
40	M/146040,.../M, M/146240,.../M	QM/146040/88/*	8	Seal	2	M/P 40263/*	M/P73945/*
50	M/146050,.../M, M/146250,.../M	QM/146050/88/*	10	Wiper	1	M/P 40626/*	M/P73946/*
63	M/146063,.../M, M/146263,.../M	QM/146063/88/*		Grease	1	M/P 40626/*	M/P 73946/*
80	M/146080,.../M	QM/146080/88/*				M/P 40715/*	M/P 74232/*

\* Insert stroke length

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

**For M/146100, .../M**

Ø	Type	Spares kit	Comprising Item	Description	Quantity	Seal strip Item 2	Cover strip Item 3
16	M/146116,.../M	QM/146116/88/*	1	Clamping lever (ø 25 ... 63)	2	M/P 40270/*	M/P 74216/*
20	M/146120,.../M	QM/146120/88/*	2 + 3	Seal-/cover strip	1	M/P 40262/*	M/P 74223/*
25	M/146125,.../M	QM/146125/88/*	4 + 5	O-ring	2	M/P 40262/*	M/P 74131/*
32	M/146132,.../M	QM/146132/88/*	6	Seal	2	M/P 40344/*	M/P73936/*
40	M/146140,.../M	QM/146140/88/*	7	Guide bar	4	M/P 40263/*	M/P73945/*
50	M/146150,.../M	QM/146150/88/*	8	Seal	2	M/P 40626/*	M/P73946/*
63	M/146163,.../M, M/146180,.../M	QM/146163/88/*	9	Felt	2	M/P 40626/*	M/P 73946/*
80	M/146180,.../M	QM/146180/88/*	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.