- **ø 16 ... 80 mm**
- **New lightweight design extrusion with universal mounting grooves**
- **Proved and patented sealing system**
- **Dust protection as standard (ø 25 ... 63 mm)**
- **Interchangeability with series M/46000**

Technical features

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 ... 8 bar (14 ... 116 psi)
Cylinder diameters:
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

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

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: PUR
Cover strip: PA
Other seals: NBR
Mounting screws: A2E
Shim ring: stainless steel (A2)

Technical data

Cylinder Ø (mm)	16	20	25	32	40	50	63	80
Port size	M5	G1/8	G1/8	G1/4	G1/4	G3/8	G1/2	G1/2
Cushion length (mm)	12	26	26	35	50	60	70	75
Theoretical thrusts at 6 bar outstroke (N)	120	188	294	482	754	1178	1870	3016
Air consumption at 6 bar outstroke (l/cm stroke)	0,014	0,022	0,035	0,056	0,088	0,137	0,218	0,35
Holding forces (N) of brake (on dry braking surface)								
Activ (L1 + L3) at 6 bar	—	—	500	900	1500	2500	4000	—
Passive (L2 + L4)	—	—	220	375	630	1000	1650	—

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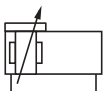
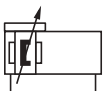
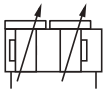
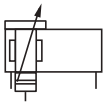
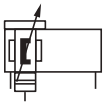
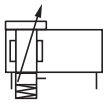
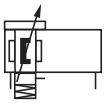
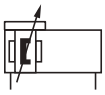
Alternative variants

Symbol	Model (non-magnetic piston)	Symbol	Model (magnetic piston)	Description	Page
	M/146000		M/146000/M	With internal guide	7, 8 & 16
	M/146100		M/146100/M	With external adjustable guide	7, 9 & 16
	M/146200		M/146200/M	With precision roller guide (ø 25 ... 63 mm)	10
	M/146200/P		M/146200/PM	With added caged ball linear motion guide (ø 25 ... 63 mm)	11
	M/146000/IC		M/146000/MC	With alternative ports	12
	M/146100/IC		M/146100/MC	With alternative ports	12
	M/146200/IC		M/146200/MC	With alternative ports	12
	M/146100/ID		M/146100/MD	With external adjustable guide (ø 16 ... 80 mm)	7, 9 & 16
	M/146200/ID		M/146200/MD	With precision roller guide (ø 25 ... 63 mm)	10
	M/146000/L1		M/146000/L3	Active holding brake (ø 25 ... 63 mm)	13
	M/146200/L1		M/146200/L3	Applying pressure activates the brake The brake lining is pushed against a stainless steel strip. To release, depressurize.	14
	M/146000/L2		M/146000/L4	Passive holding brake; (ø 25 ... 63 mm)	13
	M/146200/L2		M/146200/L4	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.	14
			M/146000/F1	With internal guide and linear position sensor (ø 32 ... 63 mm) Electrical data of linear position sensor: Operating voltage: 10 ... 30 V d.c., resolution 16 bit, Repeat accuracy 0,006 %, output 4 ... 20 mA, short-circuit protection, linearity 0,05 % of measuring range, protection class IP67	15
			M/146100/F1	With external adjustable guide and linear position sensor (ø 32 ... 63 mm)	15
			M/146200/F1	With precision roller guide and linear position sensor (ø 32 ... 63 mm)	15

Corrosion resistants cylinders see page N/en 1.6.011

Options selector

M/146★★★/★★/★★★★

Guiding system	Substitute
Internal	**0**
External	**1**
Precision roller guide	**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)	
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

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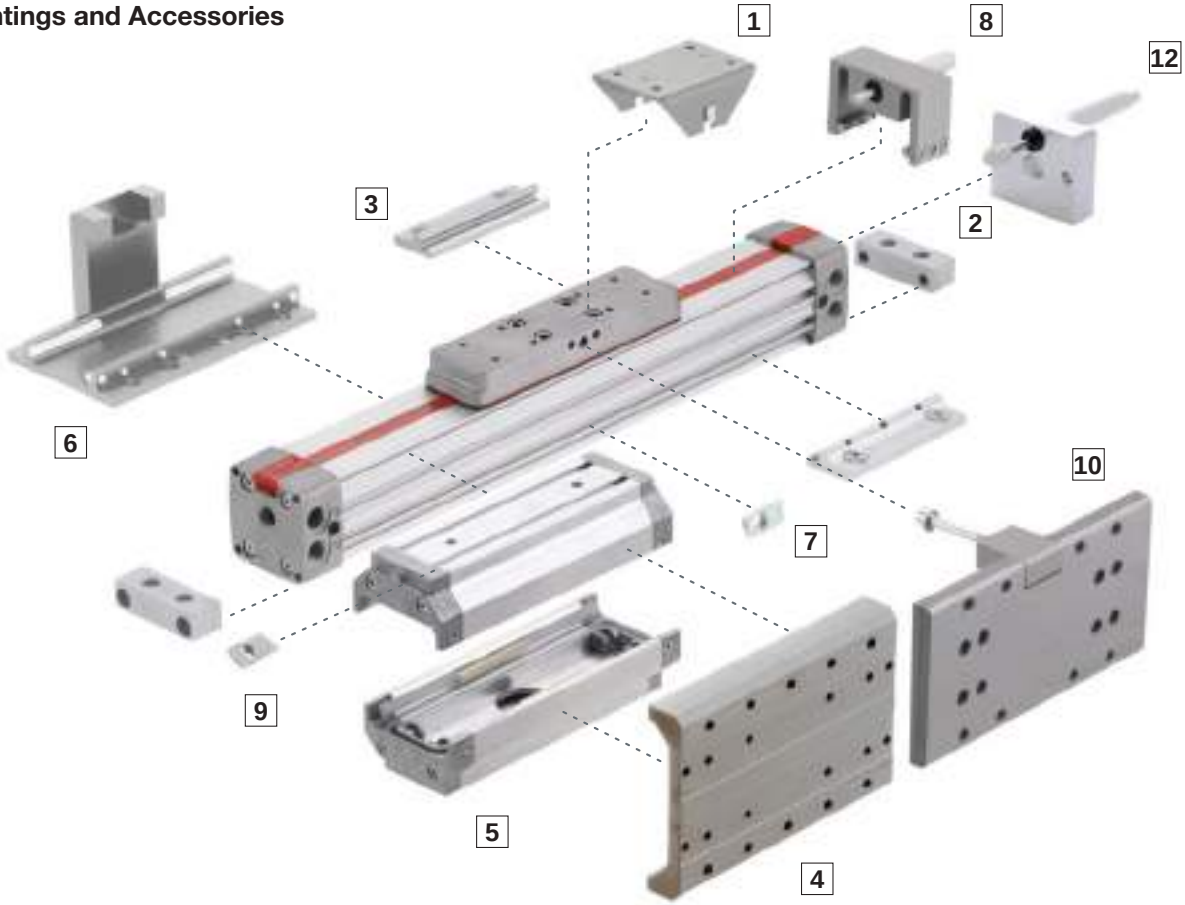
Mountings and Accessories



Ø mm	C 2 Page 17	S *1) 1 Page 18	UV 6 Page 17	UW *2) 4 Page 18	V 3 Page 17	W *2) 5 Page 18
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

Ø mm	Assembly kit for caged ball linear motion guide 10 Page 11	Adjustable stop 8 Page 18	Assembly kit for shock absorbers 12 Page 19	Groove key for profile barrel 7 Page 17	Groove key for guiding bridge 9 Page 17	Magnetically operated switches Page 20 & 21
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	
80	—	—	—	M/P74065	—	

*1) Suitable for internally guided models only (M/146000), *2) Suitable for external guided models only (M/146100)

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Service kit

Guiding systems	ø 16	ø 20	ø 25	ø 32	ø 40	ø 50	ø 63	ø 80	Model
Internal	M/146016, .../M	M/146020, .../M	M/146025, .../M	M/146032, .../M	M/146040, .../M	M/146050, .../M	M/146063, .../M	M/146080, .../M	QM/1460**/88/*
	-	-	-	M/146032/F1	M/146040/F1	M/146050/F1	M/146063/F1	-	
	-	-	M/146025/L1, .../L2	M/146032/L1, .../L2	M/146040/L1, .../L2	M/146050/L1, .../L2	M/146063/L1, .../L2	-	
External	M/146116, .../M	M/146120, .../M	M/146125, .../M	M/146132, .../M	M/146140, .../M	M/146150, .../M	M/146163, .../M	M/146180, .../M	QM/1461**/88/*
	-	-	M/146125/L3, .../L4	M/146132/L3, .../L4	M/146140/L3, .../L4	M/146150/L3, .../L4	M/146163/L3, .../L4	-	
	-	-	-	M/146132/F1	M/146140/F1	M/146150/F1	M/146163/F1	-	
Roller ball	-	-	M/146225/M	M/146232/M	M/146240/M	M/146250/M	M/146263/M	-	QM/1460**/88/*
	-	-	-	M/146232/F1	M/146240/F1	M/146250/F1	M/146263/F1	-	
	-	-	M/146225/P, .../PM	M/146232/P, .../PM	M/146240/P, .../PM	M/146250/P, .../PM	M/146263/P, .../PM	-	

* Insert stroke length in mm
** Insert cylinder diameters for the service kit.

Seal and cover strip

Cylinder Ø	Seal strip	Cover strip
16	M/P 40270/*	M/P 74216/*
20	M/P 40262/*	M/P 74223/*
25	M/P 40262/*	M/P 74131/*
32	M/P 40344/*	M/P73936/*
40	M/P 40263/*	M/P73945/*
50	M/P 40626/*	M/P73946/*
63	M/P 40626/*	M/P 73946/*
80	M/P 40715/*	M/P 74232/*

* Insert stroke length in mm

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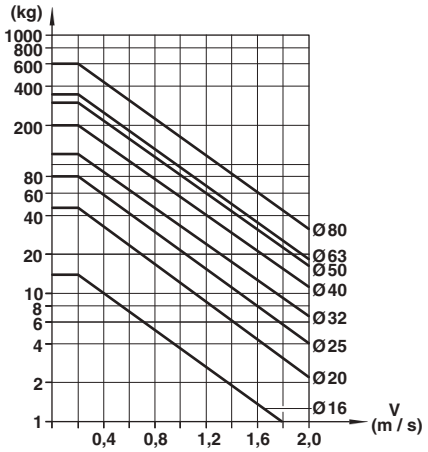
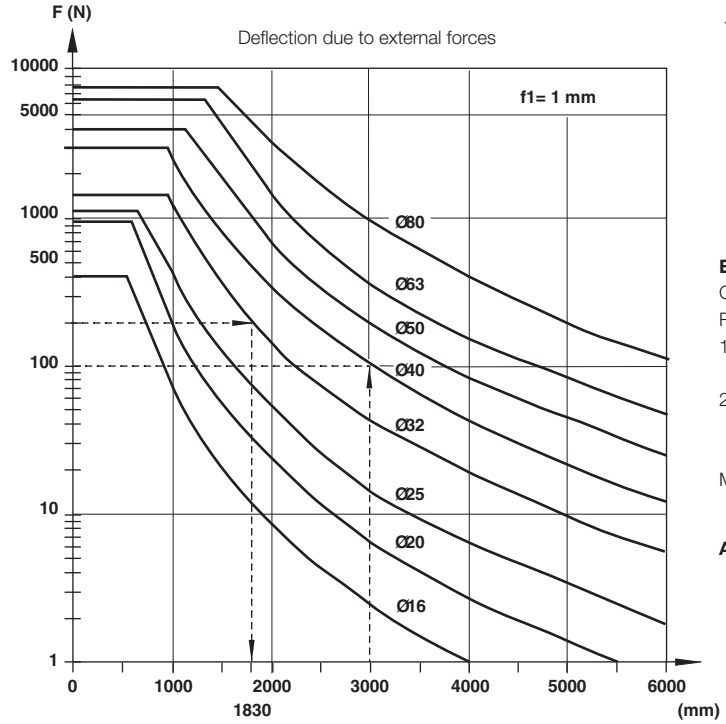
Cushioning performance

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.

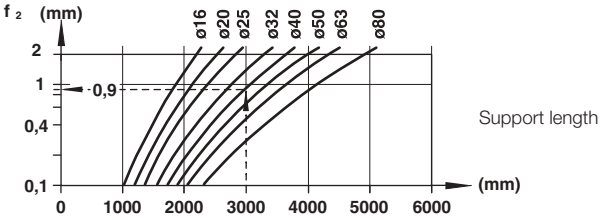


Cylinder deflection



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 (1 mm/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.

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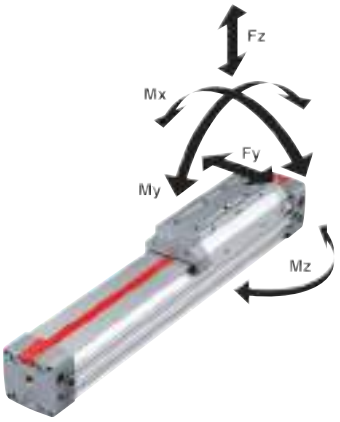
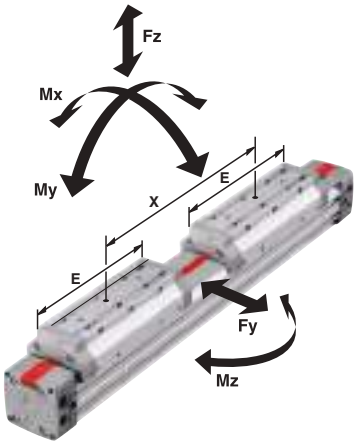
M/146000, M/146100, M/146200



M/146200/P

M/146100/ID, M/146100/MD



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

	External adjustable guide, M/146100/ID and M/146100/MD Fy, Fz	Mx	My, Mz (Nm)									
Ø mm	**(N)**	**(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 = 450 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 Fy, Fz	**Mx**	**My, Mz (Nm)**									
Ø mm	**(N)**	**(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 = 450 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 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 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:

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

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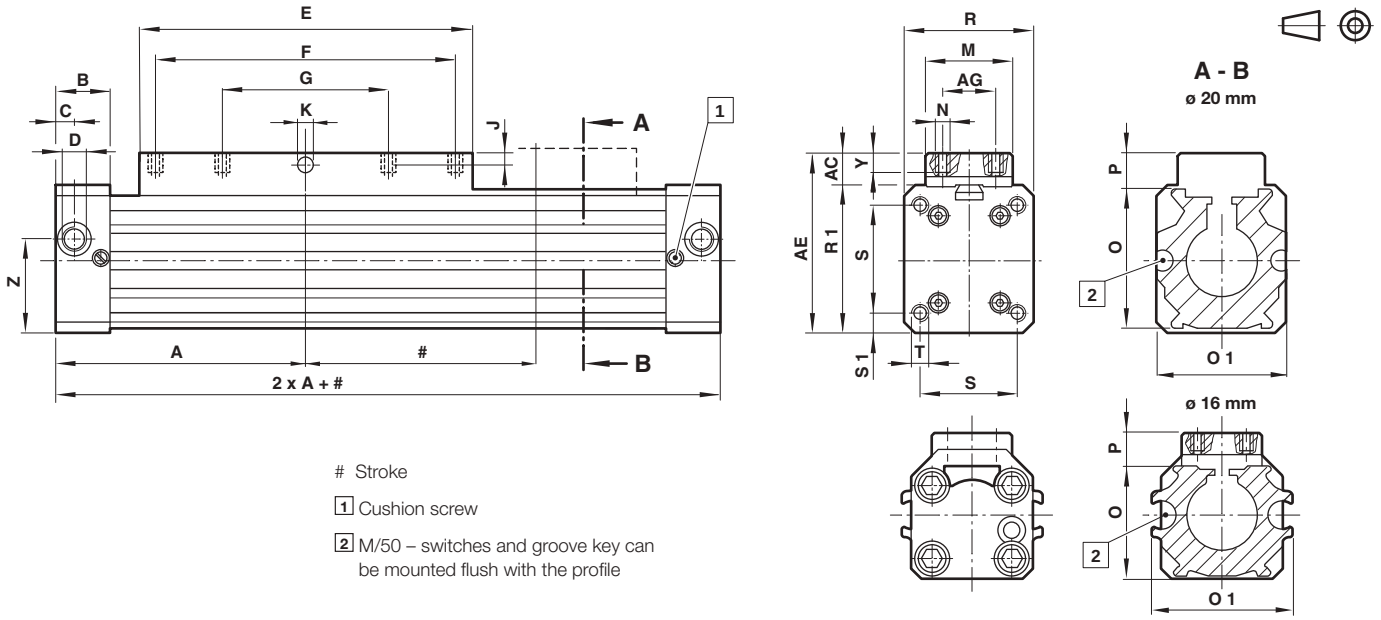
M/146000 – cylinder with internal guide, cylinder ø 16 and 20 mm

Dimensions in mm
Projection/First angle



Stroke

[1] Cushion screw

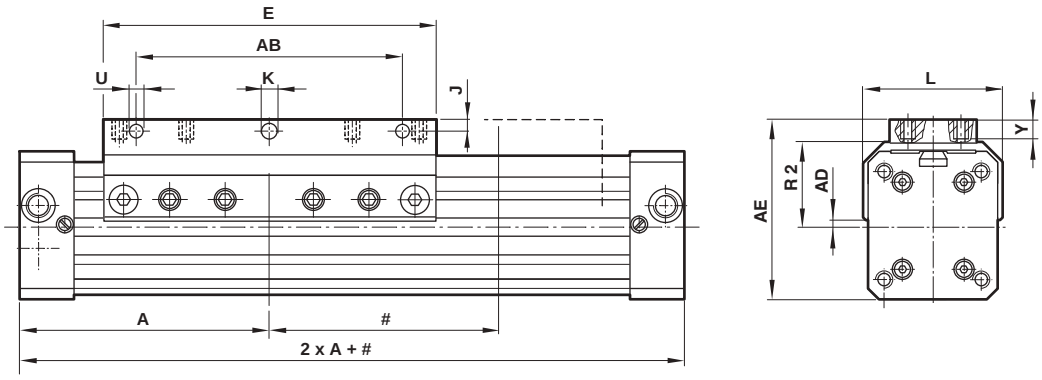
[2] M/50 – switches and groove key can be mounted flush with the profile

Ø	A	AC	AE	AG	B	C	D	E	F	G	J	Ø K D7	M	N	O
16	62,5	24,5	38	8	17,5	8	M5	80	60	–	2,5	3	18	M3	25
20	85	34,5	54	20	23	8	G1/8	110	80	40	3,5	4,2	27	M5	32

Ø	O 1	P	R	R1	S	S1	T	Y	Z	Weight at 0 mm	Weight per 100 mm	Model
16	32	12	27	31	16	5,5	M3 - 5 *1)	4	16,5	0,16 kg	0,10 kg	M/146016/...
20	38	18,5	40	40	32	4	M5 - 12 *)	12	20,5	0,50 kg	0,15 kg	M/146020/...

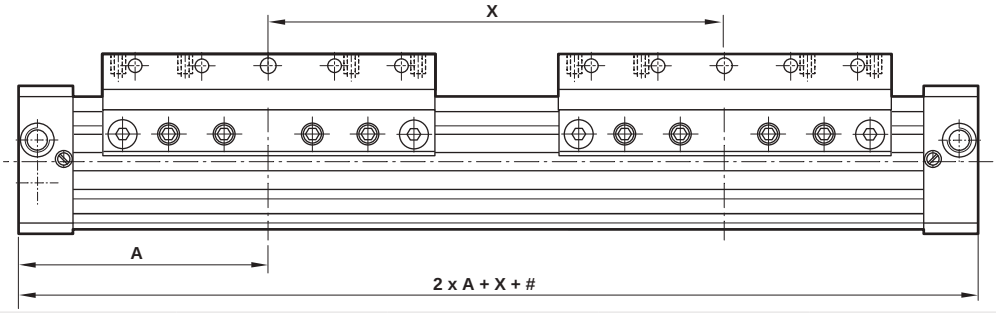
*1) deep

M/146100 – cylinder with external adjustable guide (ø 16 & 20 mm)



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

M/146100/D, .../MD – cylinder with external adjustable guide and double carriages (ø 16 & 20 mm)



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

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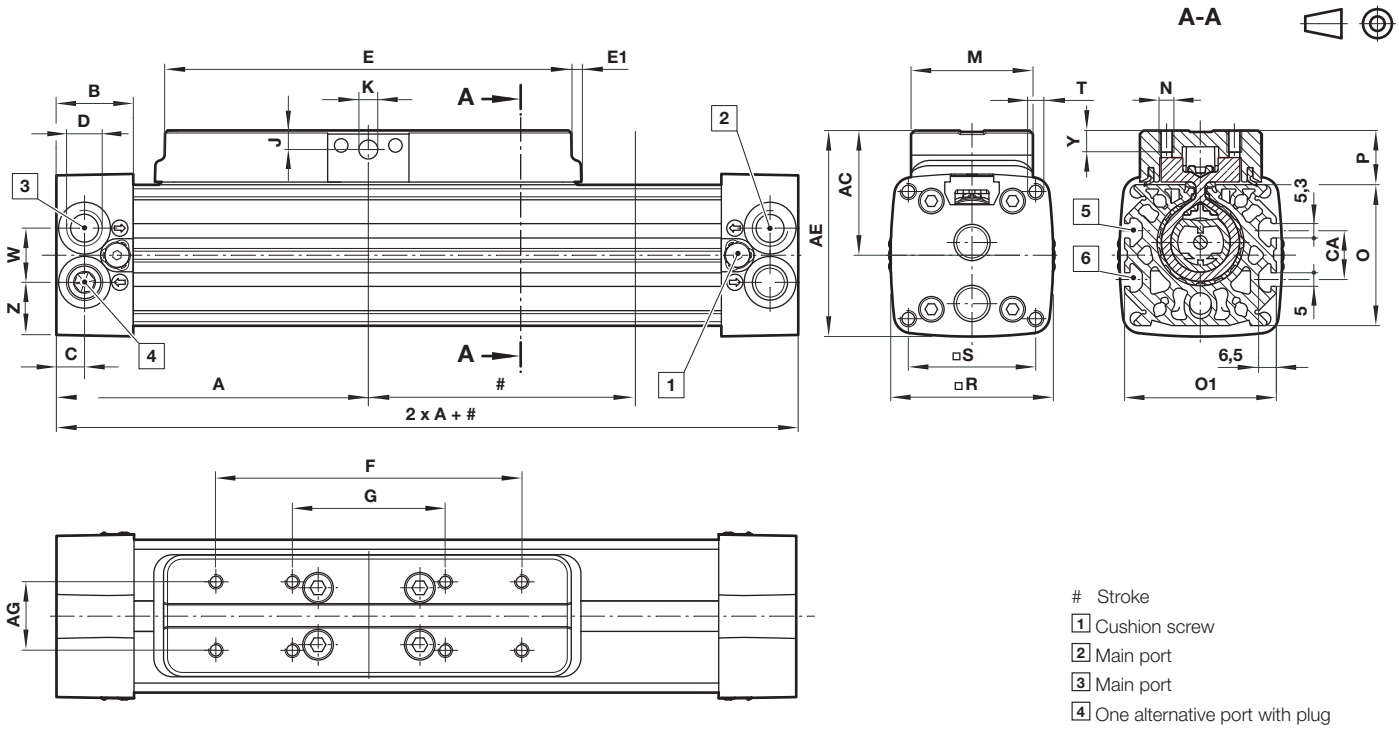
M/146000 – cylinder with internal guide (ø 25 ... 63 mm)

Dimensions in mm
Projection/First angle



Stroke
1 Cushion screw
2 Main port
3 Main port
4 One alternative port with plug inserted
5 M/50 – switches and groove key can be mounted flush with the profile
6 For groove key only

Ø	A	AC	AE	AG	B	C	CA	D	E	E1	F	G	J	Ø K D7
25	100	36	60	20	23	8,5	–	G1/8	130	–	90	45	4,7	5
32	120	46	76	25	28,5	10,5	18	G1/4	160	3,5	120	60	7	7
40	150	52,5	90	25	28,5	11,5	18	G1/4	215	–	160	80	7	7
50	180	65,5	110	25	38	15	24	G3/8	250	–	190	95	9,5	9
63	215	82,5	125	25	38	17	24	G1/2	320	–	240	120	9,5	9

Ø	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	M/146025/...
32	45	M5	52	56	20	60	47	M6 - 17*1)	20	8	20	1,40 kg	0,30 kg	M/146032/...
40	45	M6	65	68	20	74,5	58	M8 - 20*1)	25	8	25	2,50 kg	0,42 kg	M/146040/...
50	50	M8	80	84	25,5	89	70	M8 - 20*1)	30	11	29,5	4,40 kg	0,62 kg	M/146050/...
63	50	M8	95	97	25	105	84	M10 - 24*1)	35	11	35	6,90 kg	0,9 kg	M/146063/...

*1) deep

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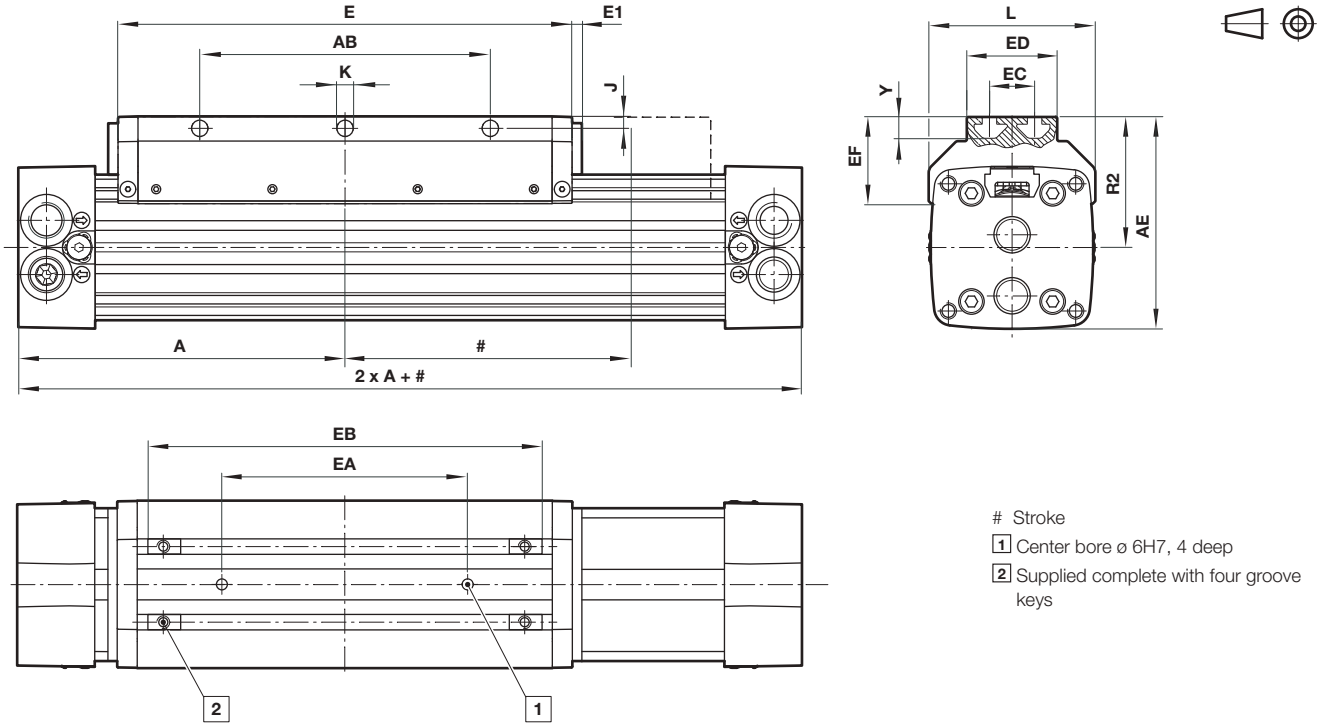
M/146100 – cylinder with external adjustable guide (Ø 25 ... 63 mm)

Dimensions in mm
Projection/First angle



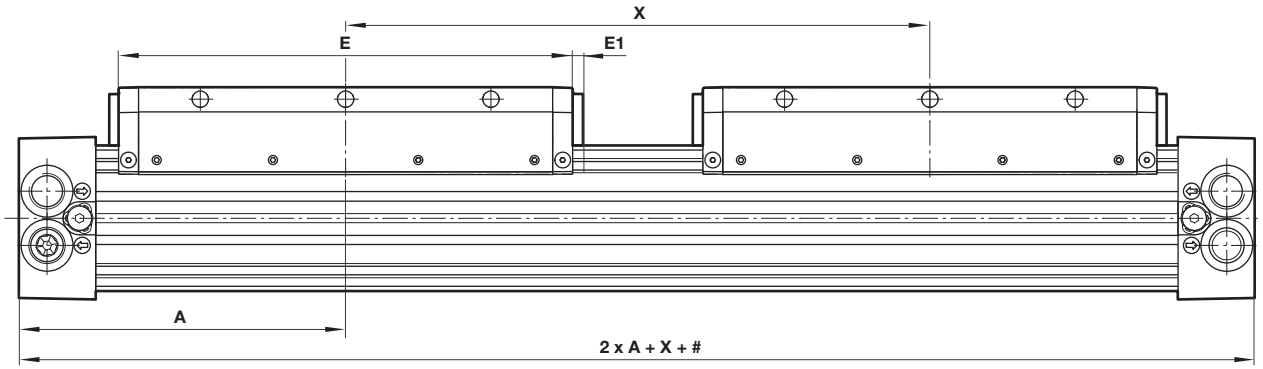
Stroke
1 Center bore ø 6H7, 4 deep
2 Supplied complete with four groove keys

Missing cylinder dimensions, see previous page 8

Ø	A	AB	AE	E	E1	EA ±0,05	EB	ED	EC	EF	J	ØK	L	R 2	Y	Weight at 0 mm	Weight per 100 mm	Model
25	100	70	67,5	130	-	50	102	32	20	34	5	5,5	52	–	-9,5	0,75kg	0,20 kg	M/146125/...
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/146132/...
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/146140/...
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/146150/...
63	215	190	137	320	-	150	292	50	25	59	7,5	9	110	84,5	11,5	7,20kg	0,90 kg	M/146163/...

*1) deep

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



Missing cylinder dimensions, see previous page 8

Stroke

Ø	A	E	E1	X min.	X max.	Weight at 0 mm	Weight per 100 mm	Model
25	100	130	-	130	500	1,50 kg	0,20 kg	M/146125/.D/...
32	120	160	4	168	500	2,00 kg	0,30 kg	M/146132/.D/...
40	150	115	–	215	500	3,20 kg	0,42 kg	M/146140/.D/...
50	180	250	–	250	500	5,40 kg	0,62 kg	M/146150/.D/...
63	215	320	-	320	500	8,40 kg	1,00 kg	M/146163/.D/...

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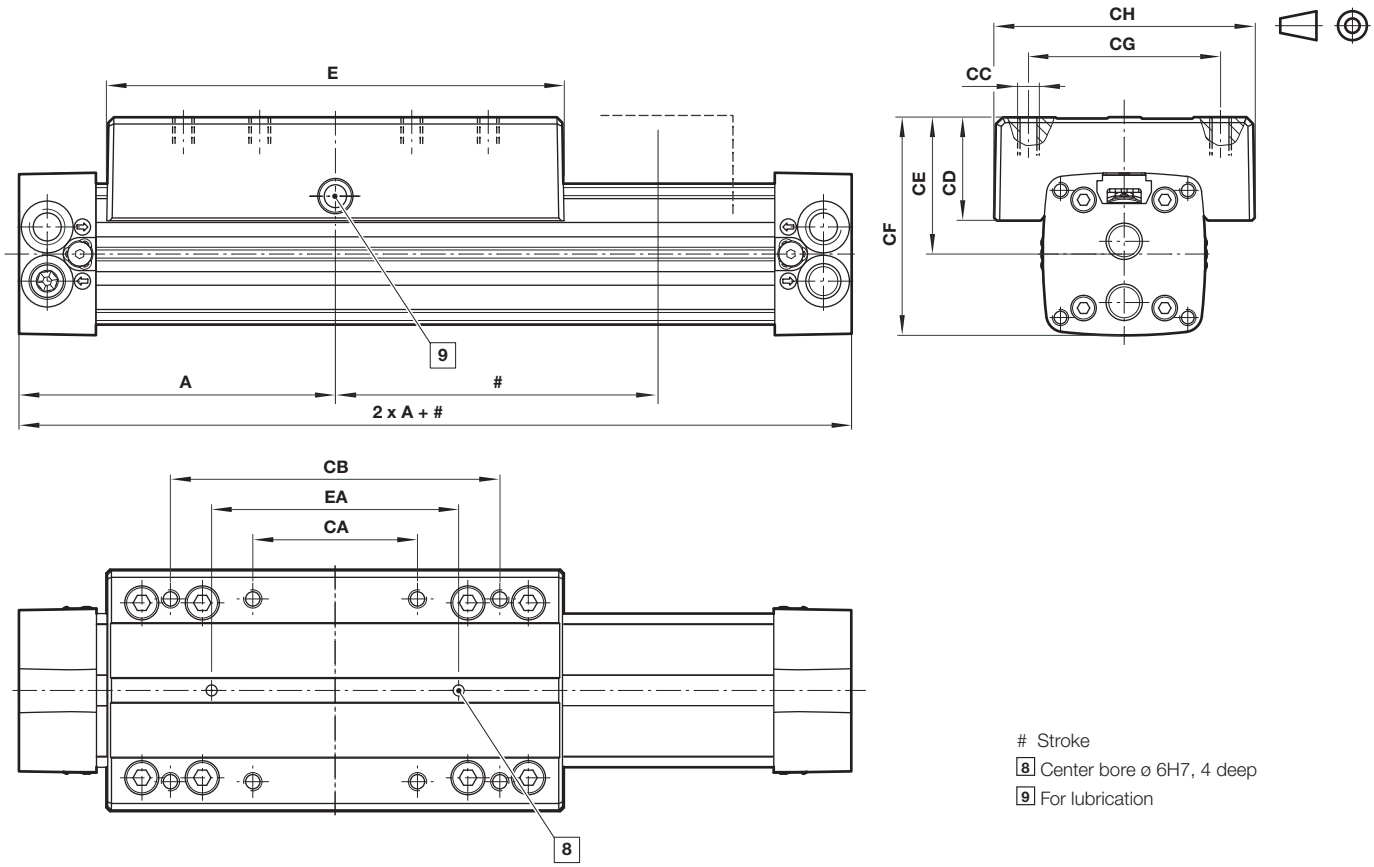
M/146200, .../M – cylinder with precision roller guide (Ø 25 ... 63 mm)

Dimensions in mm
Projection/First angle



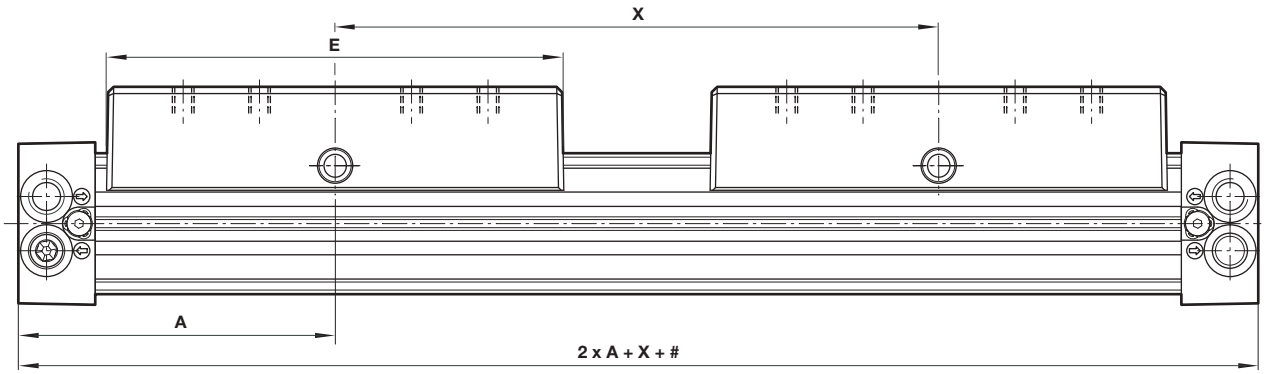
Stroke
8 Center bore ø 6H7, 4 deep
9 For lubrication

Missing cylinder dimensions, see previous page 8

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

*1) deep

M/146200/ID and .../MD – cylinder with precision roller guide and double carriages (Ø 25 ... 63 mm)



Missing cylinder dimensions, see previous page 8

Stroke

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

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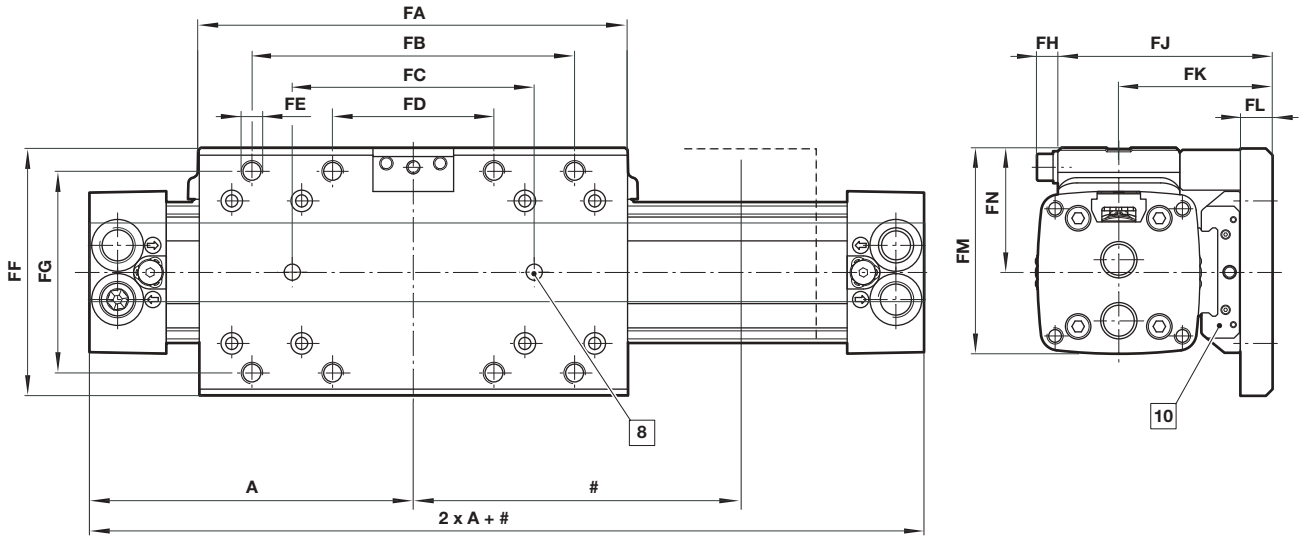
M/146200/P and M/146200/PM
cylinder with added caged ball linear motion guide (ø 25 ... 63 mm)

Dimensions in mm
Projection/First angle

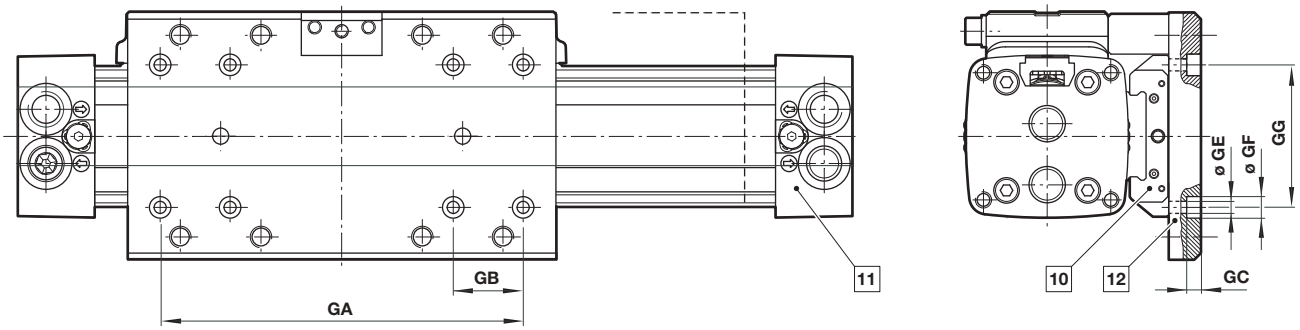


Missing cylinder dimensions, see previous page 8

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

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)



Missing cylinder dimensions, see previous page 8

Recommended supplier/series for caged ball linear motion guide

Cylinder Ø 25	Cylinder Ø 32 & 40	Cylinder Ø 50 & 63
THK/SHW12CAM	IKO/LWFF33	IKO/LWFF42
	NSK/LW17ELZ	NSK/LW27ELZ
	THK/SHW17CAM	THK/SHW27CA

\# Stroke
8 Center bore ø 6H7, 4 deep
10 Recommended supplier/series for caged ball linear motion guide
11 Standard cylinder M/146000
12 Assembly kit for caged ball linear motion guide

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

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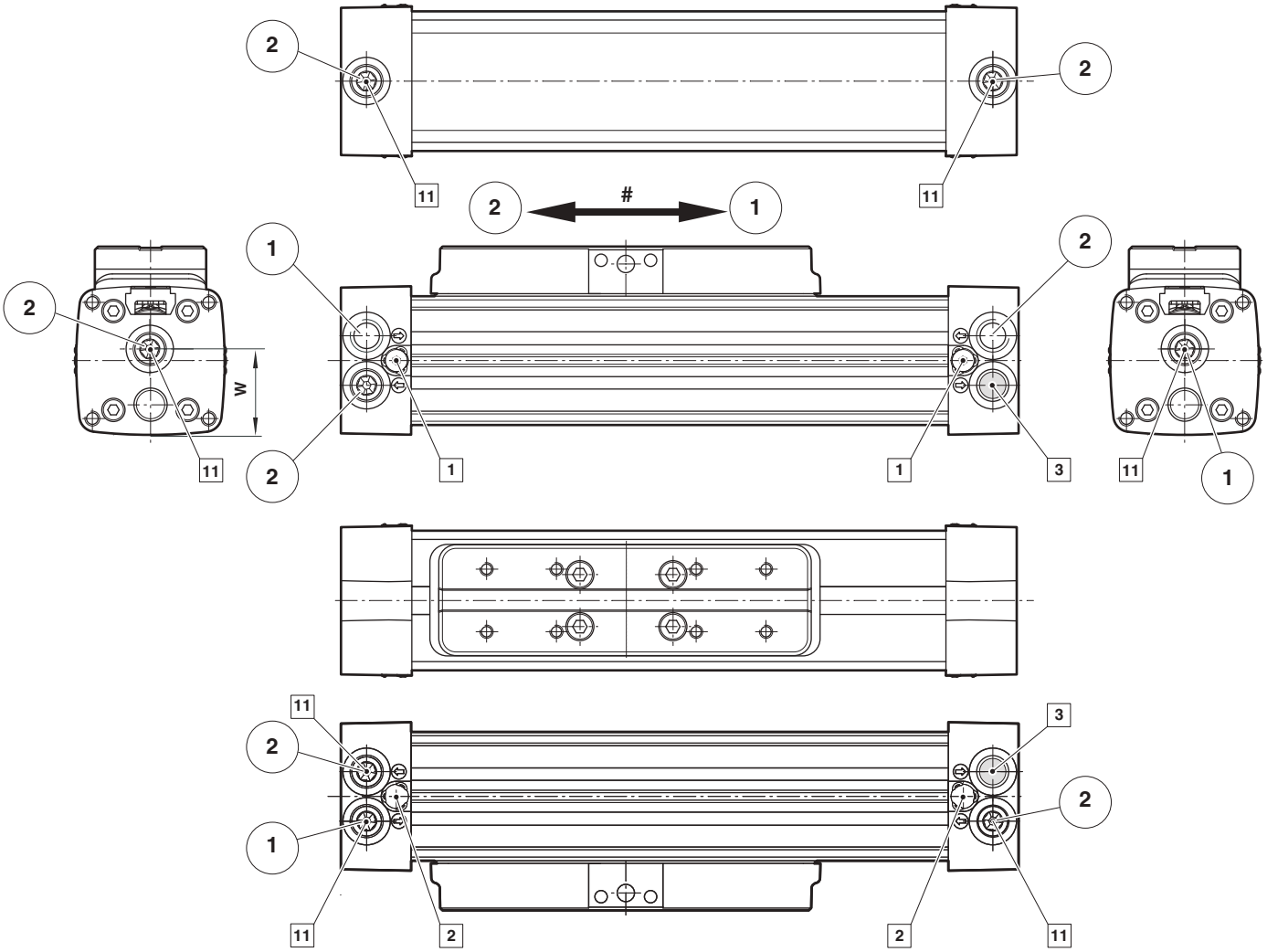
M/146000/IC, .../MC; M/146100/IC, .../MC; M/146200/IC, .../MC cylinder with alternative ports (Ø 25 ... 63 mm)

Dimensions in mm
Projection/First angle



Missing cylinder dimensions and weights, see previous page 8 & 9

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

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

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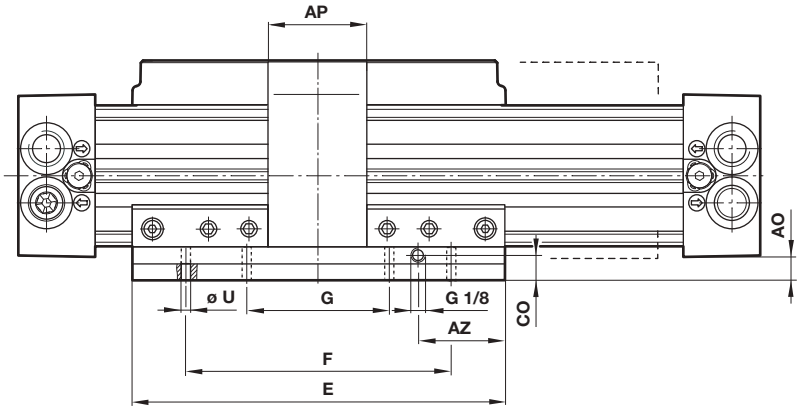
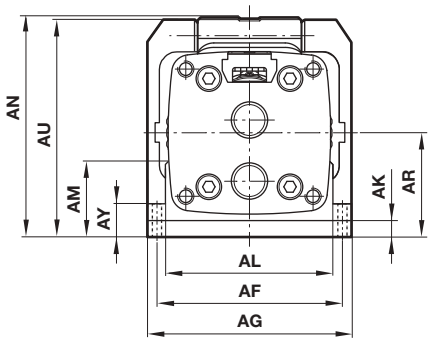
M/146000/L1, M/146000/L3 – cylinder with active brake (ø 25 ... 63 mm)

Dimensions in mm
Projection/First angle

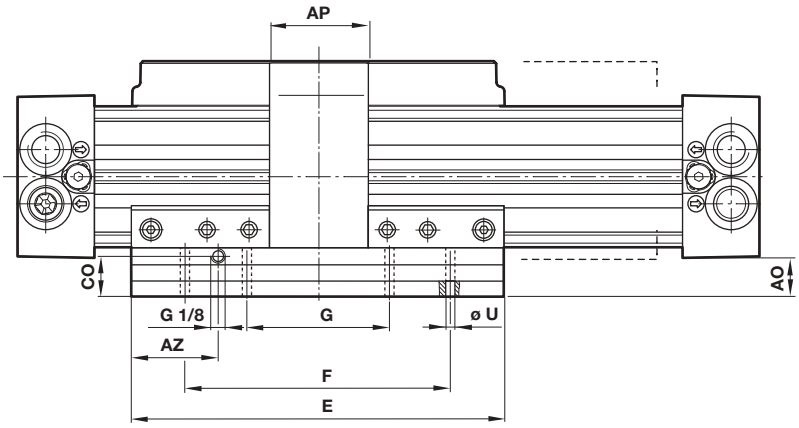


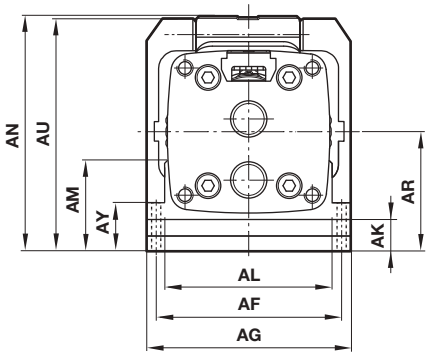


Missing cylinder dimensions, see previous page 8

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	Model
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/146025/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/146032/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/146040/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/146050/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/146063/L./...

M/146000/L2, M/146000/L4 – cylinder with passive brake (ø 25 ... 63 mm)





Missing cylinder dimensions, see previous page 8

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	Model
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/146025/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/146032/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/146040/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/146050/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/146063/L./...

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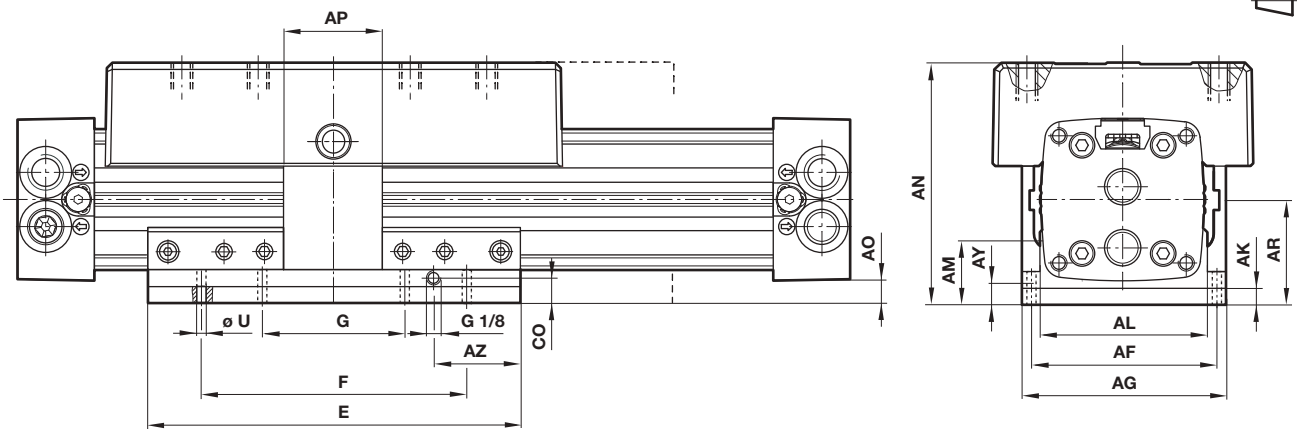
M/146200/L1, M/146200/L3 – cylinder with precision roller guide and active brake (Ø 25 ... 63 mm)

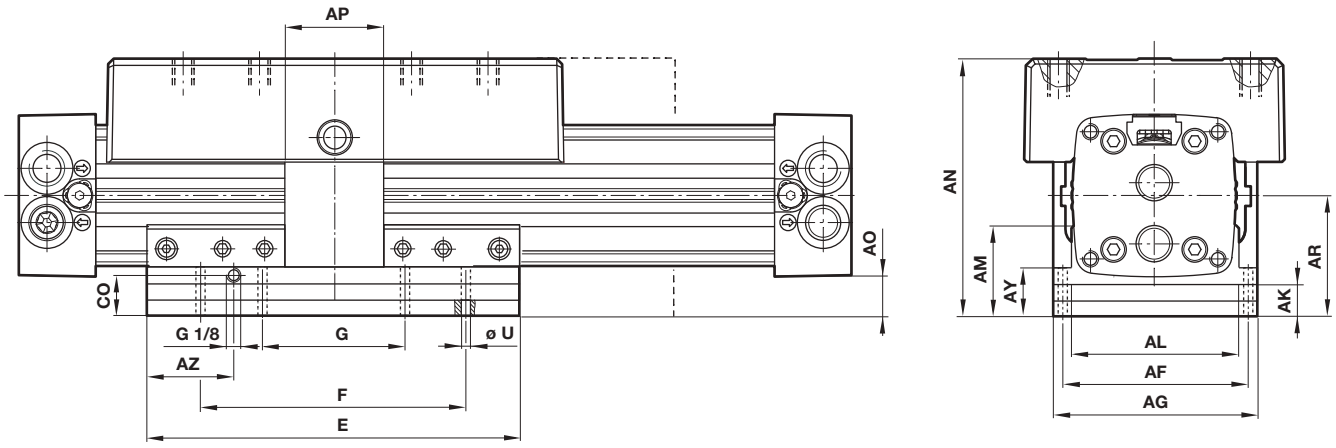
Dimensions in mm
Projection/First angle



Missing cylinder dimensions, see previous page 8 & 10

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	Model
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/146225/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/146232/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/146240/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/146250/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/146263/L./...

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



Missing cylinder dimensions, see previous page 8 & 10

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	Model
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/146225/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/146232/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/146240/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/146250/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/146263/L/...

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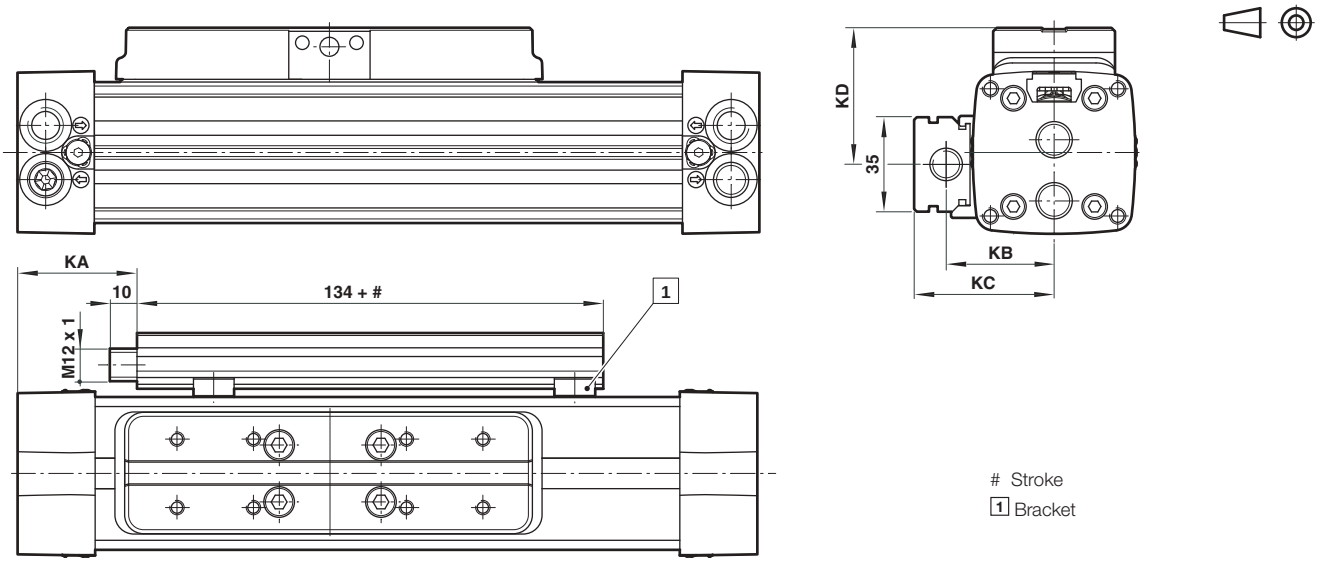
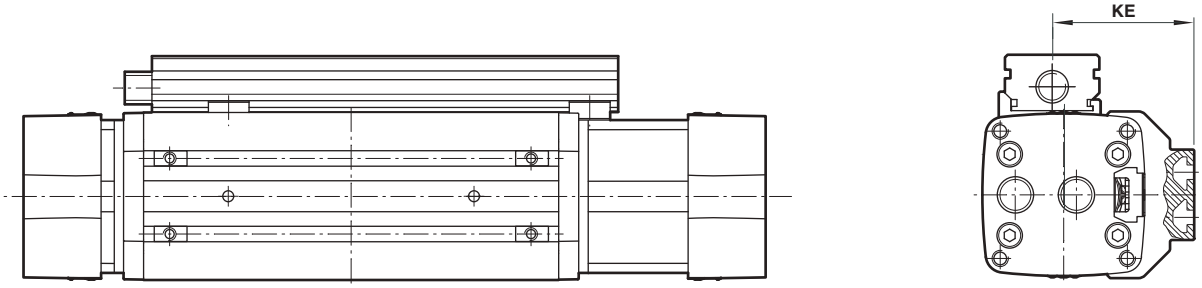
M/146000/F1 – cylinder with linear sensor and internal guide

Dimensions in mm
Projection/First angle

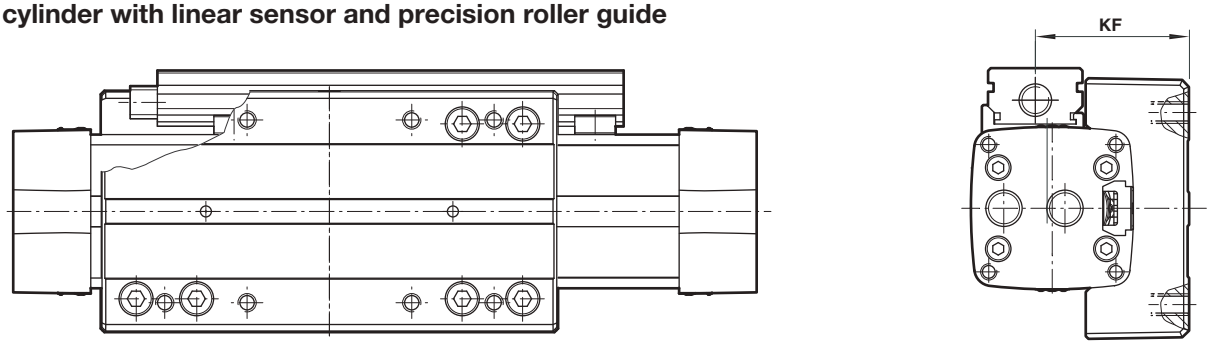


Stroke
1 Bracket

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



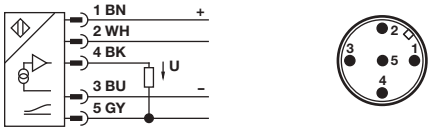
M/146200/F1 – cylinder with linear sensor and precision roller guide



Missing cylinder dimensions and weights, see previous page 10 & 11
Electrical features see option selector on page 2

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

Connector details



Pin no.	Color	Function
1	Brown (BN)	+
2	White (WH)	Program input
3	Blue (BU)	-
4	Black (BK)	Output +
5	Grey (GY)	Output -

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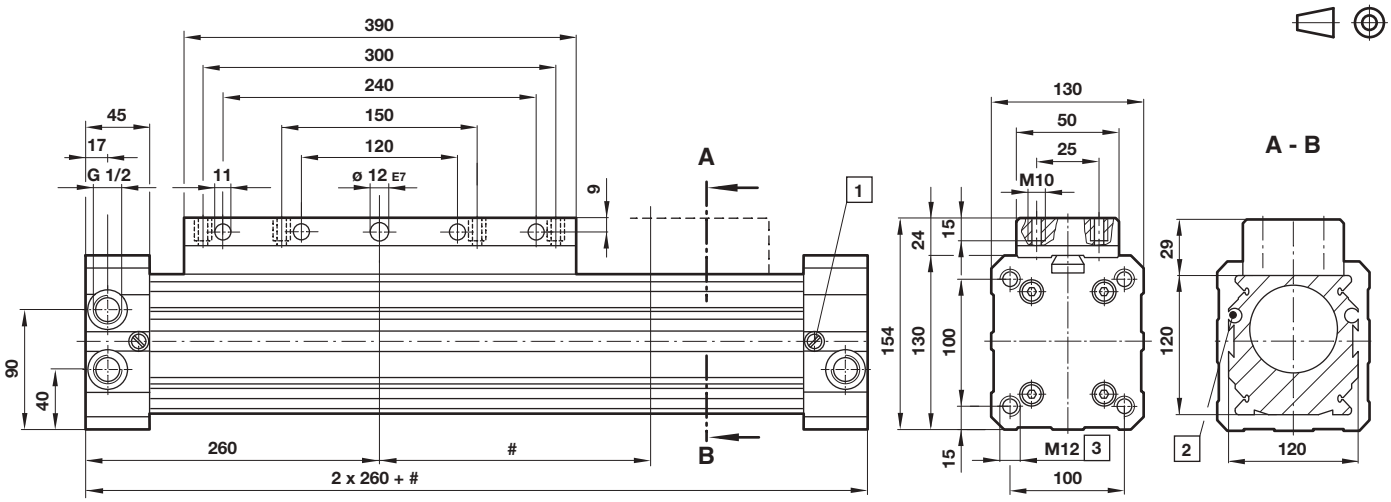
M/146080 – cylinder with internal guide (ø 80 mm)

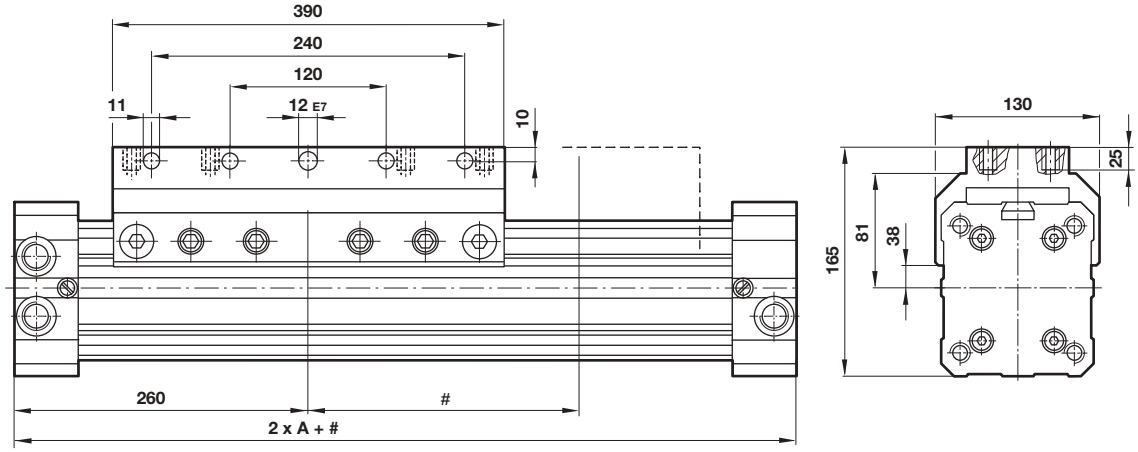
Dimensions in mm
Projection/First angle



Ø	Weight at 0 mm	Weight per 100 mm	Model
80	13,20 kg	1,50 kg	M/146080/...

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

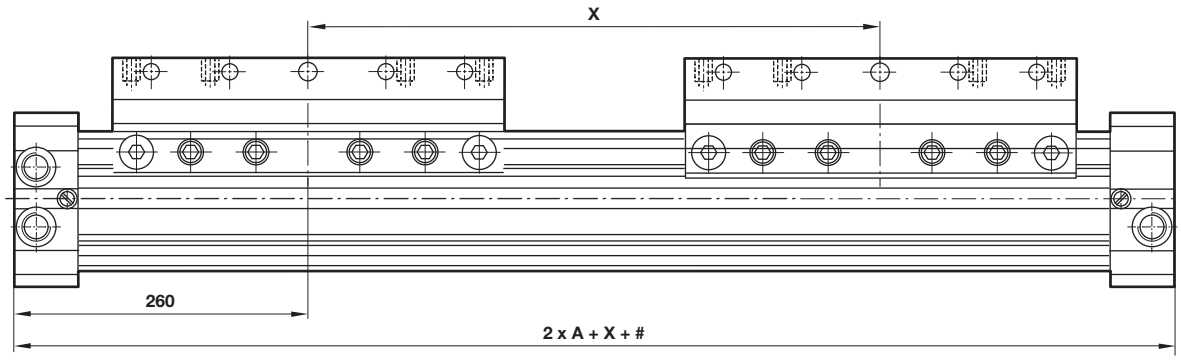
M/146180 – cylinder with external adjustable guide (ø 80 mm)



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

Stroke

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



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

Stroke

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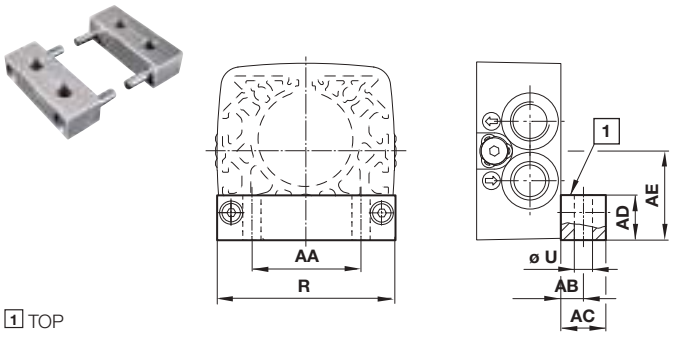
Foot mounting C

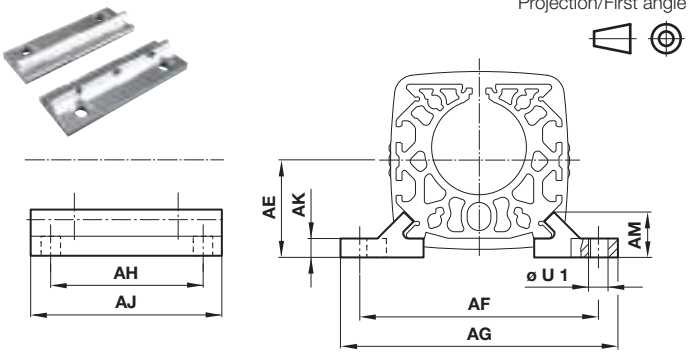


Ø	AA	AB	AC	AD	AE	R	Ø U	(kg)	Model
16	16	10	15	3	16	27	5,5	0,01	QM/146016/21
20	17	5	10	10	21,5	40	5,5	0,03	QM/146020/21
25	18	7	15	13,5	24 (26,5)	48	7	0,1	QM/146025/21
32	26	11	22	16,5	30,5 (33)	60	9	0,1	QM/146032/21
40	30	11	22	19,5	37,5 (40,5)	75	9	0,2	QM/146040/21
50	42	12	25	24	45 (49)	90	11	0,3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

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.

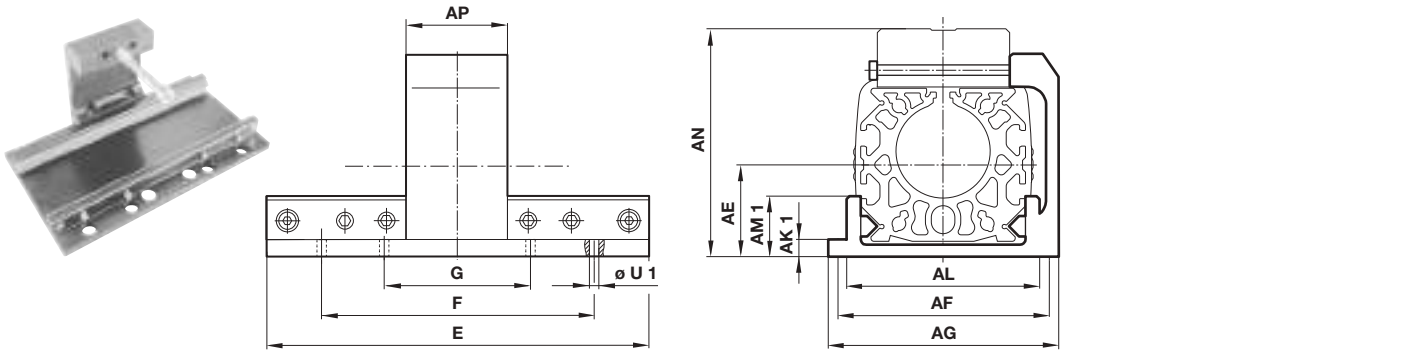
Centre support V

Dimensions in mm
Projection/First angle



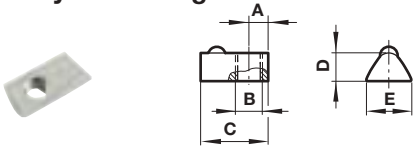
Ø	AE	AF	AG	AH	AJ	AK	AM	Ø U1	(kg)	Model
16	16	40	50	20	30	3,5	9	5,5	0,01	QM/146016/32
20	21,5	52	62	45	60	4,5	12	5,5	0,03	QM/146020/32
25	26,5	60	72	60	80	5,5	13	6,6	0,04	QM/146025/32
32	30,5	76	92	70	100	6,5	13,5	9	0,07	QM/146032/32
40	37,5	92	108	90	120	7,5	18,5	9	0,2	QM/146040/32
50	45	110	128	110	140	7,5	18,5	11	0,2	QM/146050/32
63	54	132	154	120	160	9	25	13	0,3	QM/146063/32
80	70	155	180	140	180	12	28,3	14	0,4	QM/146080/32

Carriage plate mounting UV



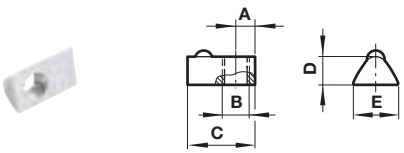
Ø	AE	AF	AG	AK1	AL	AM1	AN	AP	E	F	G	ØU1	(kg)	Model
16	16	40	50	3,5	31	8,5	40,5	30	80	60	–	5,5	0,1	QM/146016/34
20	21,5	52	62	5,5	42	14,5	56	36	110	80	40	5,5	0,2	QM/146020/34
25	26,5	60	75	5,5	52	17,5	62,5	45	130	90	45	6,6	0,3	QM/146025/34
32	33	78	92	6,5	64	18	79	55	160	120	60	9	0,4	QM/146032/34
40	40,5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

Groove key for carriage



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

Groove key for profile barrel



Ø	A	B	C	D	E	(kg)	Model
16 ... 80	4	M5	12	4,25	8	0,01	M/P74065

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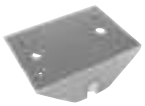
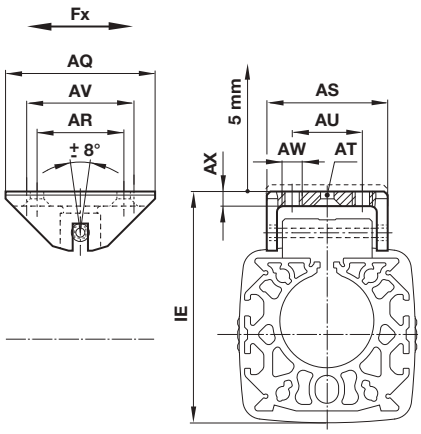
Swinging bridge S
For cylinders with internal guiding only

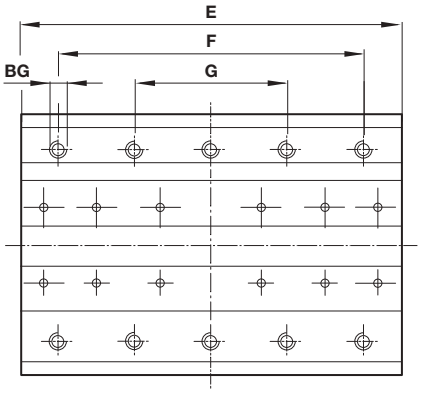
Dimensions in mm
Projection/First angle

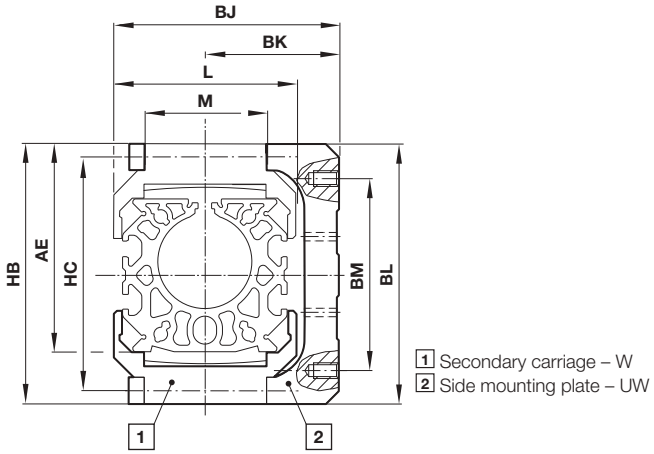




Ø	AQ	AR	AS	AT	AU	AV	AW	AX	IE	Fx (N)	(kg)	Model
16	40	–	26	–	12	30	M4	4	48 +4	100	0,02	QM/146016/37
20	50	35	38	DIN74-Bm5	20	40	M5	5	65,5 +5	150	0,10	QM/146020/37
25	60	40	44	DIN74-Bm5	20	45	M5	5	70 +5	250	0,20	QM/146025/37
32	80	50	59	DIN74-Bm6	30	60	M6	5,5	88,5 +5	410	0,30	QM/146032/37
40	80	50	59	DIN74-Bm6	30	60	M6	5,5	102,5 +5	640	0,30	QM/146032/37
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/146050/37
80	100	60	65	DIN74-Bm8	40	80	M8	6,5	168,5 +5	2400	0,50	QM/146080/37

Secondary carriage W
Side mounting plate UW



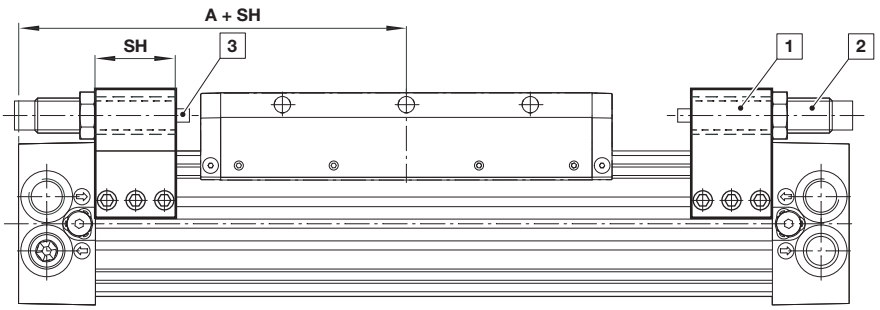


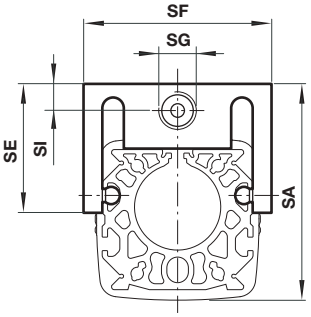
1 Secondary carriage – W
2 Side mounting plate – UW

Ø	AE	BG	BJ	BK	BL	BM	E	F	G	HB	HC	L	M	W (kg)	UW (kg)	Model (W)	Model (UW)
16	38	–	–	–	–	–	80	–	–	49	–	–	18	0,04	–	QM/146116/35	–
20	59	M 5 x 10*1)	54	33	78	55	110	80	40	79	64	42	27	0,19	0,25	QM/146120/35	QM/146120/36
25	67,5	M 5 x 10*1)	63	37	86	65	130	90	45	87	77	52	32	0,27	0,33	QM/146125/35	QM/146125/36
32	82	M 5 x 12*1)	77	45	103	80	160	120	60	104	94	64	45	0,50	0,50	QM/146132/35	QM/146132/36
40	97,5	M 6 x 12*1)	77	58,5	119	90	215	160	80	120	110	79	45	0,65	1,08	QM/146140/35	QM/146140/36
50	117	M 6 x 15*1)	98	71,5	143	120	250	190	95	144	131	92	50	1,10	1,85	QM/146150/35	QM/146150/36
63	137	M 8 x 20*1)	117,5	84,5	168	140	320	240	120	169	154	110	50	1,90	3,46	QM/146163/35	QM/146163/36
80	165	–	–	–	–	–	390	–	–	200	–	–	50	2,50	–	QM/146180/35	–

*1) deep

Adjustable stop - for M/146100, /.., ../M, M/146200/..., .../M





Missing cylinder dimensions and weights see pages 9 & 10

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

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

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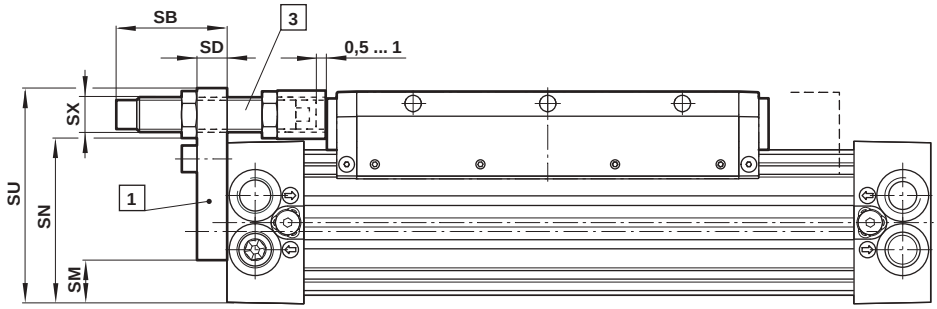
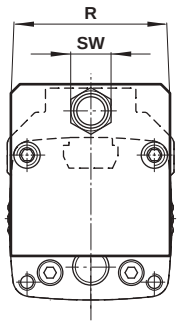
Assembly kit for shock absorber - for cylinder series M/146100, M/146100/M

Dimensions in mm
Projection/First angle



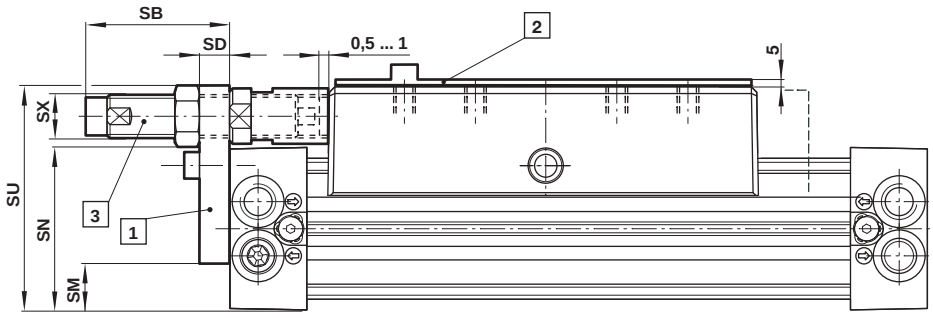


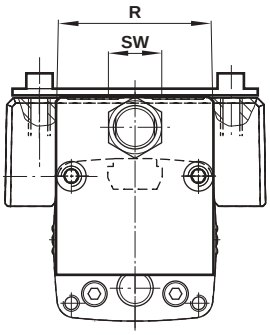
Missing cylinder dimensions, see on page 8 & 9

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

Please order shock absorber and plate separately.

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





Missing cylinder dimensions, see on page 8 & 10

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

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.

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

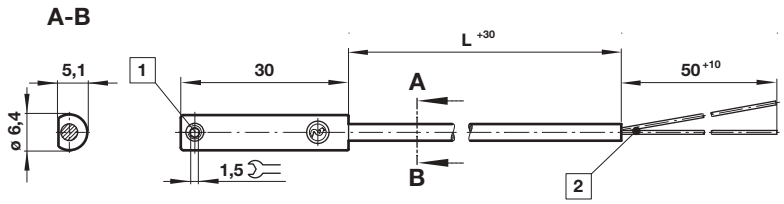
Symbol	Voltage (V a.c.)	Voltage (V d.c.)	Current maximum (mA)	Function	Operating temperature (°C)	LED	Protection class	Plug	Cable length (m)	Cable type	Weight (g)	Model
± BN ~ BU	10 ... 240	10 ... 170	180	Closer	-25 ... +80	•	IP66	—	2, 5 or 10	PVC 2 x 0,25	37	M/50/LSU/*V
	10 ... 240	10 ... 170	180	Closer	-25 ... +80	•	IP66	—	5	PUR 2 x 0,25	37	M/50/LSU/5U
BN BU	10 ... 240	10 ... 170	180	Closer	-25 ... +150	—	IP66	—	2	Silicon 2 x 0,25	37	TM/50/RAU/2S
BK BU BN	10 ... 240	10 ... 170	180	Changeover	-25 ... +80	—	IP66	—	5	PVC 3 x 0,25	37	M/50/RAC/5V
1 ± BN ~ 4 ~ BK	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

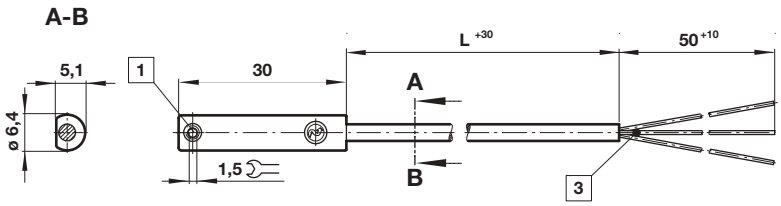
Drawings

Dimensions in mm
Projection/First angle

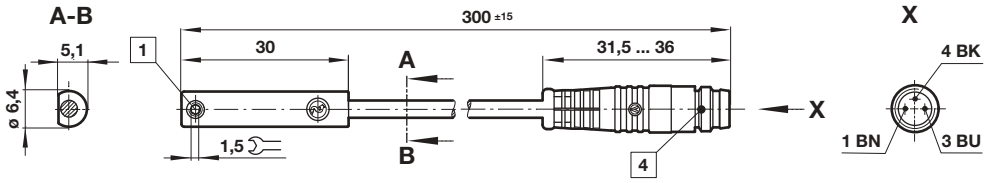
M/50/LSU/*V, M/50/LSU/5U, TM/50/RAU/2S
Cable length L = 2, 5 or 10 m



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

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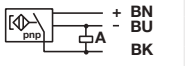
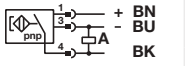
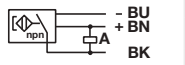
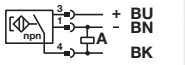
Technical data - Solid state - additional informations see data sheet N/en 4.3.007

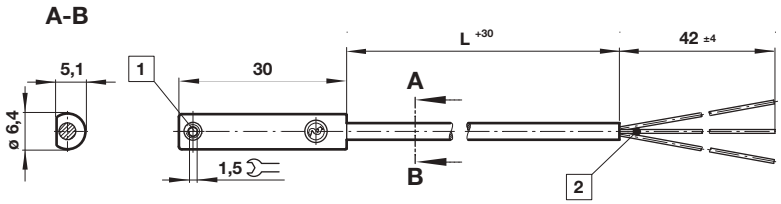
Symbol	Voltage (V d.c.)	Current maximum (mA)	Function	Operating temperature (°C)	LED	Protection class	Plug	Cable length (m)	Cable type	Weight (g)	Model
	10 ... 30	150	PNP	-40 ... +80	•	IP67	—	2, 5 or 10	PVC 3 x 0,12	37	M/50/EAP/*V
	10 ... 30	150	PNP	-40 ... +80	•	IP68	—	5	PUR 3 x 0,14	37	M/50/EAP/5U
	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

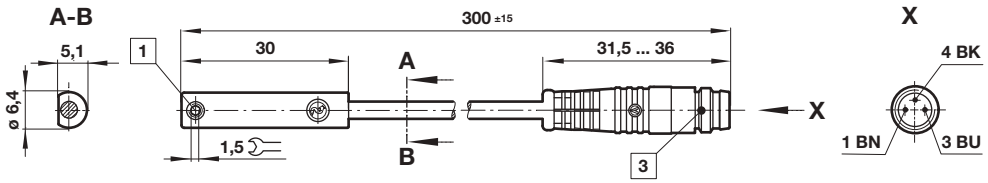
Drawings

Dimensions in mm
Projection/First angle

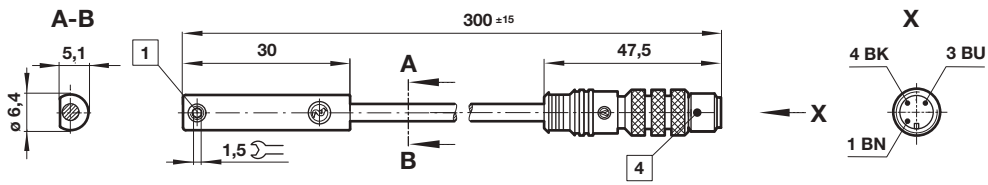
M/50/EAP/*V,
M/50/EAN/*V
Cable length L = 2, 5 or 10 m



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



M/50/EAP/CC



1 Fixing screw
2 Color code:
BK = black;
BN = brown;
BU = blue
3 Plug M8 x 1
4 Plug M12 x 1

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

Our policy is one of continued research and development. We therefore reserve the right to amend, without notice, the specifications given in this document. (2007 - 1249i) © 2015 Norgren GmbH

Warning

These products are intended for use in industrial compressed air systems only. Do not use these products where pressures and temperatures can exceed those listed under »**Technical features/data**«.
Before using these products with fluids other than those specified, for non-industrial applications, life-support systems or other applications not within published specifications, consult
IMI Precision Engineering, Norgren GmbH.

Through misuse, age, or malfunction, components used in fluid power systems can fail in various modes. The system designer is warned to consider the failure modes of all component parts used in fluid power systems and to provide adequate safeguards to prevent personal injury or damage to equipment in the event of such failure.
System designers must provide a warning to end users in the system instructional manual if protection against a failure mode cannot be adequately provided.
System designers and end users are cautioned to review specific warnings found in instruction sheets packed and shipped with these products.

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