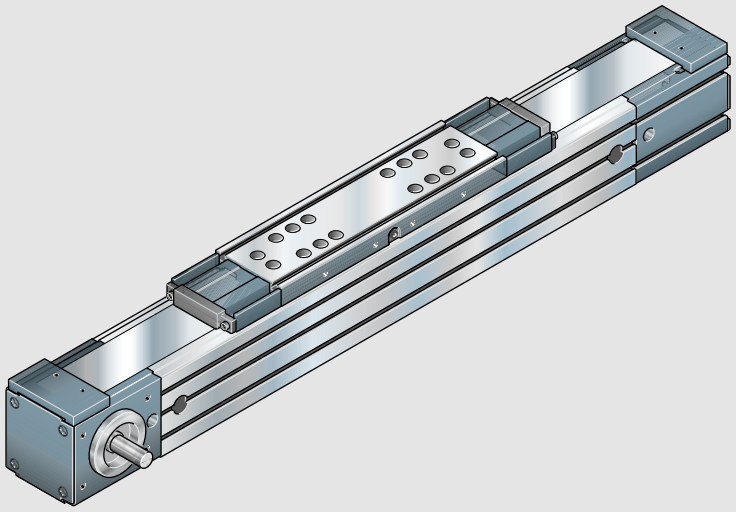
Linear Modules MKR

Product Description

Characteristic features

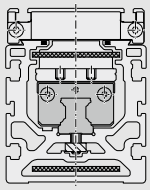
MKR...: Linear Modules with Ball Rail System and Toothed Belt Drive for demanding speed and load requirements

The MKR... Linear Modules comprise:
- a compact, anodized aluminum profile frame
- the integrated Rexroth Profiled Rail System
- a carriage with one-point lubrication
- the pre-tensioned toothed belt (also available without drive unit)
- cover provided by:
  - plastic strip on MKR 12-40 and MKR 15-65
  - corrosion-resistant steel strip per EN 10088 on MKR 20-80 and MKR 25-110
  - the toothed belt on MKR 35-165
- mountable switches
- AC servo motor
- gear reducer for motor attachment
- control units



For mounting and maintenance, see the relevant Instructions.

MKR



Linear Module with one Ball Rail System and Toothed Belt Drive
High load capacities and optimal travel performance enable the integrated, clearance-free Rexroth Profiled Rail System to move large loads at high speed.

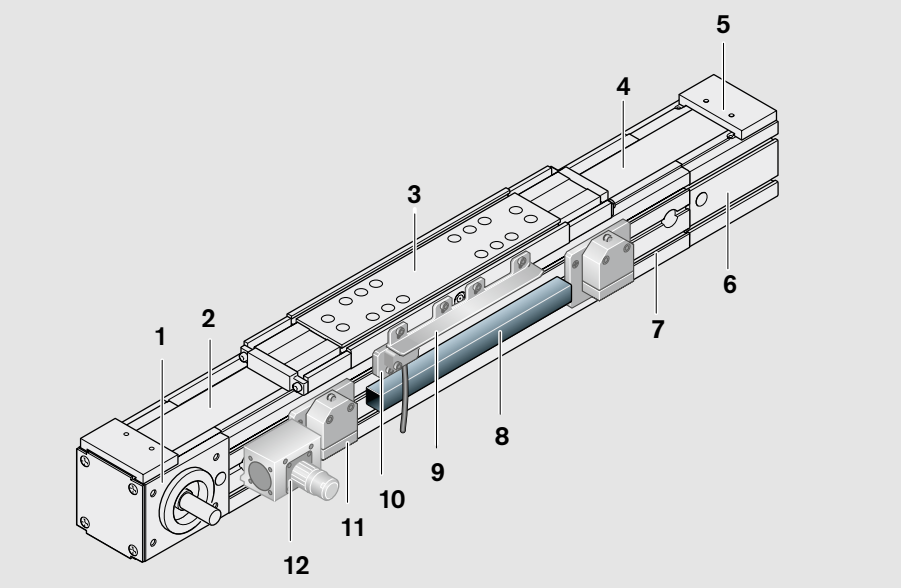
Structural Design

Structural design

1 Drive end enclosure
2 Toothed belt (under sealing strip)
3 Carriage with runner blocks
4 Sealing strip
5 Strip fixing
6 Idler (non-drive) end enclosure
7 Frame

Attachments:

8 Cable duct
9 Switching cam
10 Proximity switch
11 Mechanical switch
12 Socket-plug



Versions

MA01 and MA02

With drive unit (MA) without gear reducer (i = 1), journal for motor attachment right or left.

MA03

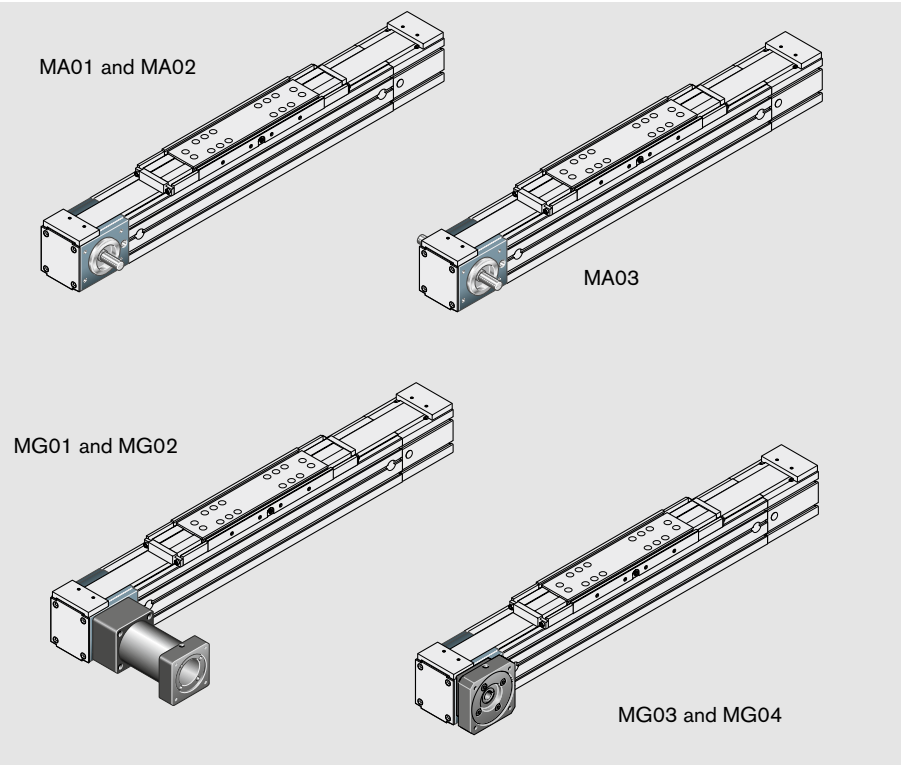
As MA01 and MA02, journal for motor attachment on both sides.

MG01 and MG02

With gear reducer, motor attachment via motor mount and socket.

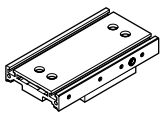
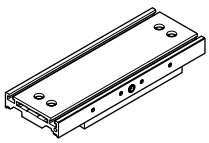
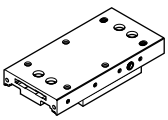
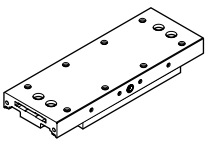
MG03 and MG04

With integrated gear reducer, motor attachment via motor mount and socket.



Carriage variants

For MKR 20-80 and MKR 25-110

Carriage with T-slots		with threaded holes	
Short	**Long**	**Short**	**Long**
			

Linear Modules MKR

Technical Data

General technical data

	Carriage length	Dynamic load capacity	Dynamic load moments		Maximum permissible loads			
					Forces		Moments	
	L_{ca} (mm)	C (N)	M_t (Nm)	M_L (Nm)	$F_{x\,max}$ (N)	$F_{y\,max}$ (N)	$M_{t\,max}$ (Nm)	$M_{l\,max}$ (Nm)
MKR 12-40	135	3750	22.3	129.5	1875	1875	12	65
MKR 15-65	190	11820	112	416	5910	5190	56	208
MKR 20-80	190	17420	221	121	8710	8710	110	60
	260	28300	359	1840	14150	14150	180	920
MKR 25-110	210	21320	300	168	10660	10660	150	84
	305	44670	631	2574	22335	22335	316	1287
MKR 35-165	400	68200	1445	4160	34100	34100	720	2130

1) For a theoretical stroke of 100 mm and excess travel of 30 mm at each end

Modulus of elasticity E

$E = 70\,000\ N/mm^2$

Lengths in excess of L_{max}

Lengths in excess of L_{max} are available on request.

Maximum operating temperature

40 °C

Note on dynamic load capacities and moments

Determination of the dynamic load capacities and moments is based on a travel life of 100,000 m. Often only 50,000 m are actually stipulated.
For comparison:
Multiply values C, M_t and M_L from the table by 1.26.

Mass of the linear system

Weight calculation does not include motor or switch attachments.

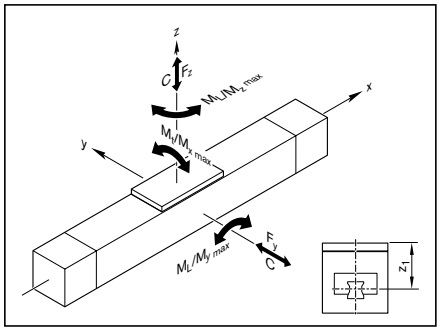
Weight formula:
Weight factor (kg/mm) x length L (mm) + weight of all parts of fixed length (carriage, end blocks, etc.) (kg)

Planar moment of inertia		Length of linear module		Moved mass of system	Drive units	Mass of the linear system
I_x (cm⁴)	I_y (cm⁴)	min. L_{min} [1] (mm)	max. L_{max} (mm)	(kg)		m_s (kg)
10.53	14.61	250	2 500	0.29	Drive i = 1	0.0027 · L + 0.81
					With gear reducer	0.0027 · L + 1.72
81.5	98.8	390	6 000	1.0	Without drive unit	0.0074 · L + 3.0
					Drive i = 1	0.0074 · L + 4.0
					With gear reducer	0.0074 · L + 6.0
141.4	184.0	370	6 000	1.4	Without drive unit	0.0093 · L + 4.1
					Drive i = 1	0.0093 · L + 4.6
					With LP gear reducer	0.0093 · L + 8.0
					With LPB gear reducer	0.0093 · L + 6.0
		430		2.2	Without drive unit	0.0093 · L + 4.9
					Drive i = 1	0.0093 · L + 5.4
					With LP 70 gear reducer	0.0093 · L + 8.8
					With LPB gear reducer	0.0093 · L + 6.8
444.1	608.4	390	9 400	2.5	Without drive unit	0.0158 · L + 8.9
					Drive i = 1	0.0158 · L + 9.2
					With LP 90 gear reducer	0.0158 · L + 16.1
					With LPB gear reducer	0.0158 · L + 13.0
444.1	608.4	458	9 400	5.7	Without drive unit	0.0158 · L + 12.1
					Drive i = 1	0.0158 · L + 12.5
					With LP 90 gear reducer	0.0158 · L + 19.3
					With LPB gear reducer	0.0158 · L + 17.3
2574.0	3527.0	600	12 000	11.5	Drive i = 1	0.0384 · L + 41.0
					With gear reducer	0.0384 · L + 53.0

Combined equivalent load on bearing of the linear guide

$$F_{comb} = |F_y| + |F_z| + C \cdot \frac{|M_x|}{M_t} + C \cdot \frac{|M_y|}{M_L} + C \cdot \frac{|M_z|}{M_L}$$

	Dimension (mm)
	Z_1
MKR 12-40	34.5
MKR 15-65	39.5
MKR 20-80	59.5
MKR 25-110	74.5
MKR 35-165	123.0



Service life

Nominal life of the guideway in meters:

$$L = \left(\frac{C}{F_{comb}}\right)^3 \cdot 10^5$$

Nominal life of the guideway in hours:

$$L_h = \frac{L}{3600 \cdot v_m}$$

C	=	dynamic load capacity	(N)
F_{comb}	=	combined equivalent load on bearing	(N)
F_y	=	force in y-direction	(N)
F_z	=	force in z-direction	(N)
L	=	nominal life in meters	(m)
L_h	=	nominal life in hours	(h)
M_L	=	dynamic longitudinal moment load capacity	(Nm)
M_t	=	dynamic torsional moment load capacity	(Nm)
M_x	=	torsional moment about the x-axis	(Nm)
M_y	=	torsional moment about the y-axis	(Nm)
M_z	=	torsional moment about the z-axis	(Nm)
v_m	=	average travel speed	(m/s)
Z_1	=	application point of the effective force	(mm)

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Drive data

	Gear reducer ratio i (–)	Maximum drive torque for mechanical system M_a (Nm)	Lead constant (mm/rev)	Maximum travel speed for mechanical system v_{mech} (m/s)	
MKR 12-40	1	3.90	90.00	3.0	
	5	0.78	18.00	2.4	
	10	0.39	9.00	1.2	
MKR 15-65	1	9.10	110.00	5.0	
	3	3.00	36.67	3.7	
	5	1.80	22.00	2.2	
	10	0.90	11.00	1.1	
MKR 20-80	1	32.00	205.00	5.0	
	1 with keyway	27.00	205.00	5.0	
	3	10.70	68.66	5.0	
	5	6.40	41.00	3.0	
	10	3.20	20.50	1.5	
MKR 25-110	1	80.00	290.00	5.0	
	1 with keyway	27.00	290.00	5.0	
	3	26.60	96.66	5.0	
	5	16.00	58.00	4.0	
	10	8.00	29.00	2.0	
MKR 35-165	1	367.00	440.00	5.0	
	1 with keyway	200.00	440.00	5.0	
	6	60.00	73.30	3.0	
	12	30.00	36.70	1.5	

	Belt data					
	Belt type	Width (mm)	Tooth pitch (mm)	Max. belt drive transmission force (N)	Belt elasticity limit (N)	Specific spring rate c_{spec} (N)
	AT 3	20	3	250	760	$0.2 \cdot 10^5$
	AT 5	32	5	520	2740	$0.56 \cdot 10^6$
	AT 5	50	5	980	3500	$0.875 \cdot 10^6$
	AT 10	50	10	1740	7500	$2.12 \cdot 10^6$
	AT 20	75	20	5250	18000	$4.20 \cdot 10^6$

Toothed belt stretch

$\Delta l = (F \cdot L^*)/c_{spec}$
* Length of the toothed belt

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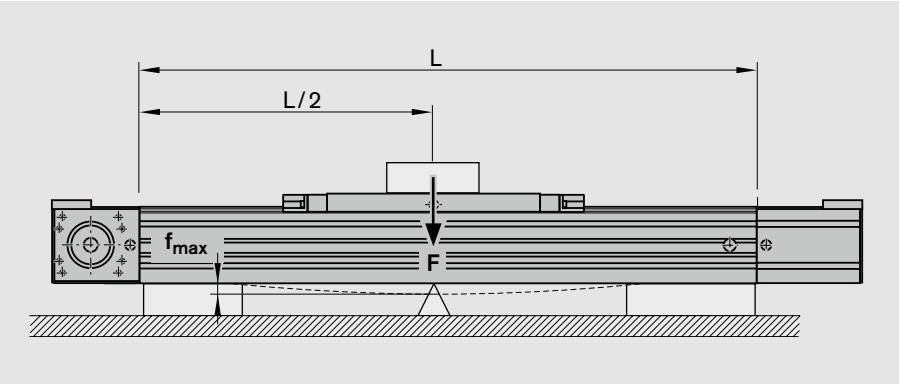
Technical Data

Deflection

A particular feature of Linear Modules is that they can be installed as cantilevered axes.
Deflection must, however, be taken into consideration, because it limits the possible load.
If the maximum permissible deflection is exceeded, additional supports must be provided.



Maximum permissible deflection f_{max}

The maximum permissible deflection f_{max} depends on the length L and the load F.

⚠ **fmax must not be exceeded! If high system dynamics are required, supports must be provided every 300 to 600 mm.**

Example

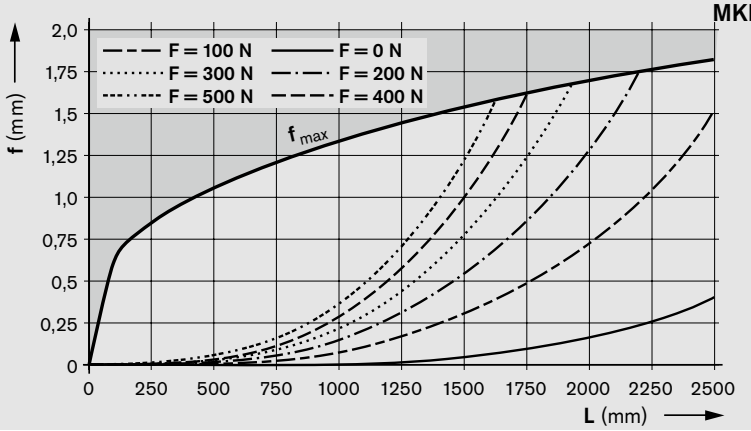
Linear Module MKR 20-80:
L = 3000 mm
F = 500 N
From chart 20-80:
f = 0.9 mm

f_{max} = 3.4 mm

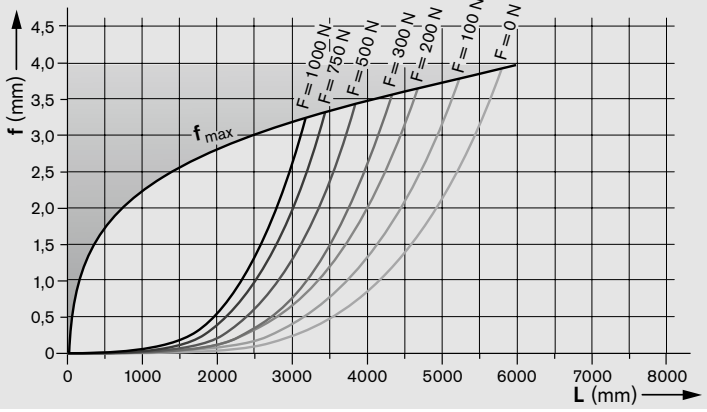
The deflection f lies well below the maximum permissible deflection f_{max}, so no additional supports are required.

The graphs apply under the following conditions:
- Both ends firmly fixed (200 to 250 mm per end)
- 6 to 8 screws per side
- Solid mounting base

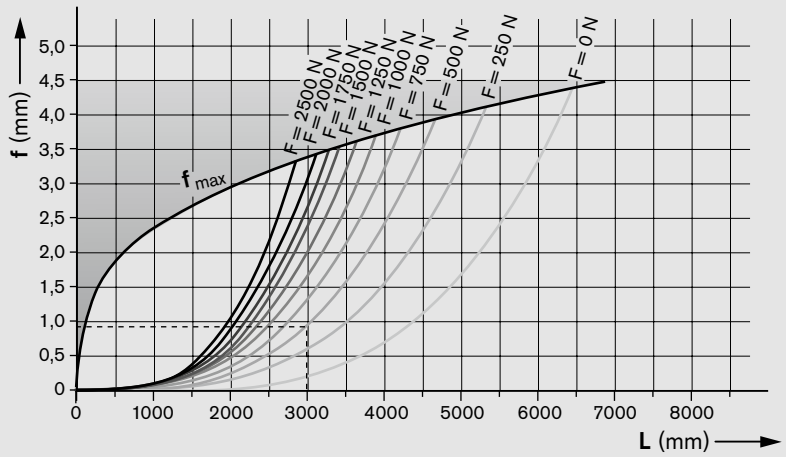
MKR 12-40



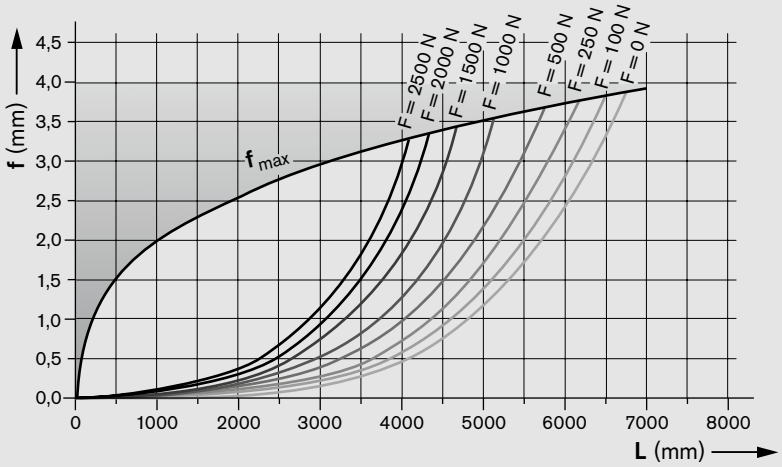
MKR 15-65



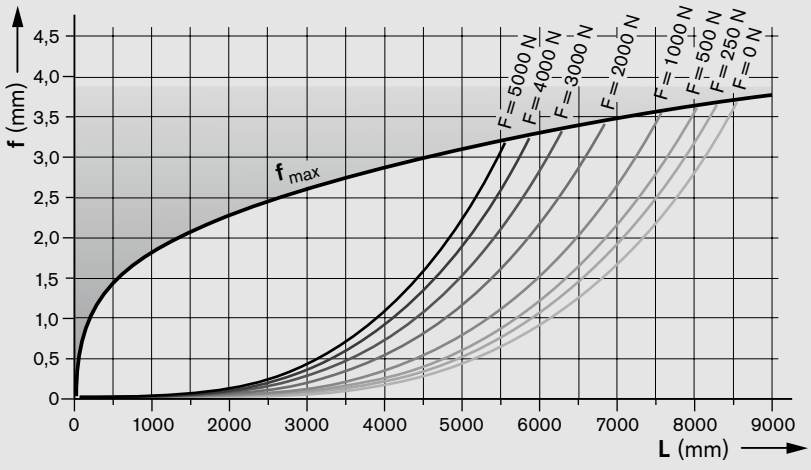
MKR 20-80



MKR 25-110



MKR 35-165



Linear Modules MKR

Performance Data

The tables contain performance data examples for gear-motor-controller combinations. They are intended as a rough guide for selection. The precise performance data must be calculated for each application case.
For more information on motors, controllers and control systems, please refer to the catalogs “IndraDrive Cs” and “IndraDrive C for Linear Motion Systems.” These figures do not include any assessment of the effective torque of the motor-controller combination.

MKR 12-40

Drive data without motor (i = 1)

Belt pulley drive diameter	28.85 mm
Lead constant	90 mm/revolution
Travel speed v_{mech}	Up to 3 m/s
Mass moment of inertia J_s	$(67.84 + L \cdot 0.0181) \cdot 10^{-4}$ kgm²

Horizontal operation

MSK 030C, HCS02.1E-W0012, 3 x 400 V

i		**5**						**10**							
m_{ex}	(kg)	2	4	6	8	10	12	2	4	6	8	10	12	14	16
t_a	(ms)	121	153	185	216	248	280	205	223	240	258	276	293	311	329
s_a	(mm)	146	184	222	260	298	336	123	134	144	155	165	176	187	197
a	(m/s^2)	19.8	15.7	13.0	11.1	9.7	8.6	5.9	5.4	5.0	4.7	4.4	4.1	3.9	3.7
v_{dc}	(m/s)	2.4						1.2							
*	(mm)	± 0.1													

MSM 031B, HCS01.1E-W0006, 230 V

i		**5**					**10**						
m_{ex}	(kg)	1	2	3	4	5	2	4	6	8	10	12	14
t_a	(ms)	24	30	36	42	48	42	48	55	62	68	75	82
s_a	(mm)	11	13	16	19	21	9	11	12	14	15	17	18
a	(m/s^2)	37.7	30.2	25.2	21.6	18.9	10.8	9.3	8.2	7.3	6.6	6.0	5.8
v_{dc}	(m/s)	0.90					0.45						
*	(mm)	± 0.1											

MSM 031C, HCS01.1E-W0009, 230 V

i		**5**					**10**							
m_{ex}	(kg)	2	4	6	8	10	2	4	6	8	10	12	14	16
t_a	(ms)	38	50	62	74	86	61	68	74	81	88	94	101	108
s_a	(mm)	17	23	28	33	39	14	15	17	18	20	21	23	24
a	(m/s^2)	23.4	17.9	14.5	12.1	10.5	7.4	6.6	6.0	5.6	5.1	4.8	4.5	4.2
v_{dc}	(m/s)	0.90					0.45							
*	(mm)	± 0.1												

a = acceleration (m/s^2)
i = gear reduction (-)
m_{ex} = mass (kg)
s_a = acceleration travel (mm)
t_a = acceleration time (ms)
v_{dc} = travel speed (m/s)
* = reproducibility (mm)

MSK = servo motor
MSM = servo motor
VRDM = stepping motor
HCS = digital controller

MKR 15-65

Drive data without motor (i = 1)

Belt pulley drive diameter	35.02 mm
Lead constant	110 mm/revolution
Travel speed v_{mech}	Up to 5 m/s
Mass moment of inertia J_s	$(3.66 + L \cdot 0.000748) \cdot 10^{-4}$ kgm²

Horizontal operation

MSK 030C, HCS02.1E-W0012, 3 x 400 V

i		3			7				
m_{ex}	(kg)	1	2	3	4	8	12	16	22
t_a	(ms)	73	86	100	135	165	195	225	270
s_a	(mm)	110	129	150	90	105	125	145	175
a	(m/s^2)	41	35	30	9.7	7.9	6.7	5.8	4.8
v_{dc}	(m/s)	3			1.3				
*	(mm)	± 0.1							

MSK 040C, HCS02.1E-W0012, 3 x 400 V

i		3						7					
m_{ex}	(kg)	2	6	10	14	18	22	4	8	12	20	30	38
t_a	(ms)	140	195	245	300	360	430	285	325	350	400	480	524
s_a	(mm)	215	290	375	450	540	643	185	211	230	260	310	352
a	(m/s^2)	21	15.5	12	10	8.3	7	4.5	4	3.7	3.2	2.7	2.4
v_{dc}	(m/s)	3						1.3					
*	(mm)	± 0.1											

MSM 031C, HCS01.1E-W0009, 230 V

i		7					
m_{ex}	(kg)	6	8	10	12	14	16
t_a	(ms)	63	68	75	83	88	95
s_a	(mm)	24	26	29	32	32	36
a	(m/s^2)	12	11	10	9	8.5	7.9
v_{dc}	(m/s)	0.75					
*	(mm)	± 0.1					

MSM 041B, HCS01.1E-W0013, 230 V

i		3				
m_{ex}	(kg)	2	4	8	12	16
t_a	(ms)	52	67	95	120	150
s_a	(mm)	47	60	86	108	135
a	(m/s^2)	34.5	27	19	15	12
v_{dc}	(m/s)	1.8				
*	(mm)	± 0.1				

Vertical operation (frame stationary, carriage travels)

MSK 030C, HCS02.1E-W0012, 3 x 400 V

i		3			7					
m_{ex}	(kg)	1	2	3	2	4	6	8	10	12
t_a	(ms)	75	100	115	135	175	220	285	385	520
s_a	(mm)	110	145	175	85	110	140	184	250	338
a	(m/s^2)	40	31	26	9.8	7.5	6	4.6	3.4	2.5
v_{dc}	(m/s)	3			1.3					
*	(mm)	± 0.1								

MSK 040C, HCS02.1E-W0012, 3 x 400 V

i		3						7				
m_{ex}	(kg)	1	2	4	6	8	10	2	4	8	12	14
t_a	(ms)	130	150	200	255	335	430	300	360	540	430	630
s_a	(mm)	195	225	295	385	500	645	195	235	350	130	190
a	(m/s^2)	23	20	15.2	11.7	9	7	4.3	3.6	2.4	1.4	0.95
v_{dc}	(m/s)	3						1.3			0.6	
*	(mm)	± 0.1										

Linear Modules MKR

Performance Data

MKR 20-80

Drive data without motor (i = 1)

Belt pulley drive diameter	65.27 mm
Travel speed with sealing strip v_{mech}	Up to 5 m/s
Mass moment of inertia J_s (short carriage)	(21.1 + L (mm) · 0.00379) · 10^{-4} kgm²
Mass moment of inertia J_s (long carriage)	(29.7 + L (mm) · 0.00379) · 10^{-4} kgm²

Horizontal operation

MSK 040C, HCS02.1E-W0028, 3 x 400 V

i		3				5					10				
m_{ex}	(kg)	1	2	3	4	4	6	10	14	18	10	20	40	60	80
t_a	(ms)	77	89	100	110	75	85	105	130	155	110	145	210	280	364
s_a	(mm)	190	220	250	278	120	145	180	220	263	110	145	210	280	364
a	(m/s^2)	65	56	50	45	47	40	32	26	22	18	13.5	9.4	7	5.5
v_{dc}	(m/s)	5				3.4					2				
*	(mm)	± 0.1													

MSK 050C, HCS02.1E-W0028/W0054, 3 x 400 V

i		3					5					10				
m_{ex}	(kg)	2	5	8	11	14	6	14	22	30	38	20	40	60	80	100
t_a	(ms)	85	110	135	160	185	145	205	255	315	375	230	300	370	445	510
s_a	(mm)	210	270	335	400	465	300	420	525	645	760	230	300	370	445	510
a	(m/s^2)	60	46	37	31	27	28	20	16	13	11	8.6	6.6	5.4	4.5	3.9
v_{dc}	(m/s)	5					4.1					2				
*	(mm)	± 0.1														

MSM 041B, HCS01.1E-W0013, 230 V

i		5					10						
m_{ex}	(kg)	2	4	6	8	10	10	15	20	25	30	35	40
t_a	(ms)	29	36	43	49	55	42	53	61	69	78	86	95
s_a	(mm)	30	37	43	49	55	21	27	31	35	40	43	48
a	(m/s^2)	68	55	47	40.8	36.2	23	19	16	14.5	12.8	11.5	10.5
v_{dc}	(m/s)	2					1						
*	(mm)	± 0.1											

Vertical operation (frame stationary, carriage travels)

MSK 040C, HCS02.1E-W0028, 3 x 400 V

i		3				5					10				
m_{ex}	(kg)	1	2	3	4	2	6	10	14	18	5	10	15	20	25
t_a	(ms)	80	95	110	125	65	95	125	160	215	105	135	165	208	285
s_a	(mm)	200	230	270	313	105	155	215	275	360	105	135	165	208	285
a	(m/s^2)	63	54	46	40	54	37	27	21	16	19.5	15	12	9.6	7
v_{dc}	(m/s)	5				3.4					2				
*	(mm)	± 0.1													

MSK 050C, HCS02.1E-W0028/W0054, 3 x 400 V

i		3					5					10				
m_{ex}	(kg)	2	5	8	11	14	5	10	15	20	25	10	20	30	40	50
t_a	(ms)	85	115	155	195	230	150	205	265	342	436	235	340	500	400	740
s_a	(mm)	215	290	380	465	570	310	420	540	700	895	235	340	500	200	370
a	(m/s^2)	58	43	33	26	22	27	20	15.5	12	9.4	8.5	5.9	4	2.5	1.35
v_{dc}	(m/s)	5					4.1					2			1	
*	(mm)	± 0.1														

MKR 25-110

Drive data without motor (i = 1)

Belt pulley drive diameter	92.2 mm
Travel speed with sealing strip v_{mech}	Up to 5 m/s
Mass moment of inertia J_s (short carriage)	(77.05 + L (mm) · 0.0123) · 10^{-4} kgm²
Mass moment of inertia J_s (long carriage)	(146.35 + L (mm) · 0.0123) · 10^{-4} kgm²

Horizontal operation

MSK 060C, HCS02.1E-W0054, 3 x 400 V

i		**3**				**5**						**10**				
m_{ex}	(kg)	3	5	7	9	8	16	24	32	40	50	20	60	100	140	180
t_a	(ms)	85	95	105	115	120	155	190	215	250	300	175	260	350	435	520
s_a	(mm)	210	235	260	285	275	350	420	480	555	665	210	310	420	520	626
a	(m/s^2)	59	53	48	44	37	29	24	21	18	15	13.5	9.2	6.9	5.5	4.6
v_{dc}	(m/s)	5				4.5						2.4				
*	(mm)	± 0.1														

MSK 076 C, HCS02.1E-W0054, 3 x 400 V

i		**3**						**5**						**10**					
m_{ex}	(kg)	4	8	12	16	20	24	10	20	40	60	80	100	20	60	100	140	180	200
t_a	(ms)	150	170	185	210	230	240	275	310	380	340	390	440	476	555	615	690	770	800
s_a	(mm)	380	430	465	520	570	600	550	615	760	505	585	660	476	555	615	690	770	800
a	(m/s^2)	33	29	27	24	22	21	14.5	13	10.5	8.9	7.7	6.8	4.2	3.6	3.25	2.9	2.6	2.5
v_{dc}	(m/s)	5						4			3			2					
*	(mm)	± 0.1																	

Vertical operation (frame stationary, carriage travels)

MSK 060C, HCS02.1E-W0054, 3 x 400 V

i		**3**				**5**						**10**						
m_{ex}	(kg)	3	5	7	9	6	10	18	26	34	40	20	30	40	50	60	80	100
t_a	(ms)	85	100	110	125	120	140	190	423	205	250	210	260	320	410	520	370	835
s_a	(mm)	215	245	275	310	266	315	420	545	310	375	250	310	385	490	625	185	420
a	(m/s^2)	58	51	45	40	38	32	24	18.5	14.5	12	11.5	9.3	7.5	5.9	4.6	2.7	1.2
v_{dc}	(m/s)	5				4.5				3		2.4					1	
*	(mm)	± 0.1																

MSK 076 C, HCS02.1E-W0054, 3 x 400 V

i		**3**					**5**						**10**				
m_{ex}	(kg)	4	8	12	16	20	6	10	18	26	34	40	20	40	60	80	100
t_a	(ms)	160	180	210	240	265	210	220	265	310	366	417	280	375	540	870	1800
s_a	(mm)	390	445	520	595	655	310	330	395	465	550	625	140	190	270	435	910
a	(m/s^2)	32	28	24	21	19	14.5	13.6	11.4	9.7	8.2	7.2	3.56	2.66	1.85	1.15	0.55
v_{dc}	(m/s)	5					4.5		3				1				
*	(mm)	± 0.1															

a = acceleration (m/s^2)
i = gear reduction (-)
m_{ex} = mass (kg)
s_a = acceleration travel (mm)
t_a = acceleration time (ms)
v_{dc} = travel speed (m/s)
* = reproducibility (mm)

MSK = servo motor
MSM = servo motor
VRDM = stepping motor
HCS = digital controller

Linear Modules MKR

Performance Data

MKR 35-165

Drive data without motor (i = 1)

Belt pulley drive diameter	140.05 mm
Travel speed v_{mech}	Up to 5 m/s
Mass moment of inertia J_s	$(743 + L \cdot 0.07797) \cdot 10^{-4}$ kgm²

Horizontal operation

MSK 076C, HCS02.1E-W0070, 3 x 400 V

i		**6**						**12**					
m_{ex}	(kg)	10	20	40	60	80	100	50	100	200	300	400	500
t_a	(ms)	125	145	175	210	245	280	138	165	225	285	265	333
s_a	(mm)	250	285	350	420	490	560	138	165	225	285	200	250
a	(m/s²)	32	28	22.5	19	16	14	14.5	12	8.9	7	5.8	4.5
v_{dc}	(m/s)	4						2				1.5	
*	(mm)	± 0.1											

Vertical operation

MSK 076C, HCS02.1E-W0070, 3 x 400 V

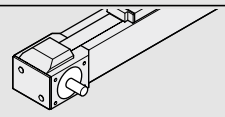
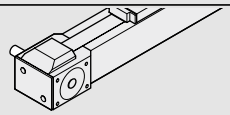
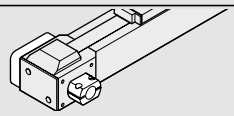
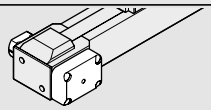
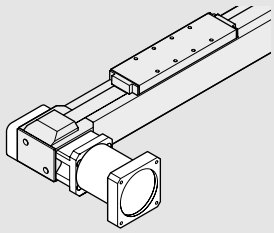
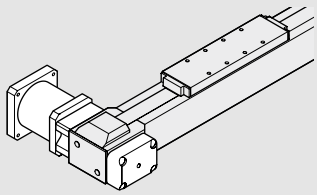
i		**6**					**12**					
m_{ex}	(kg)	10	20	40	60	80	20	40	80	120	160	200
t_a	(ms)	135	160	210	290	360	190	220	300	200	270	375
s_a	(mm)	265	315	420	570	730	280	335	450	148	200	280
a	(m/s²)	30	25.5	19	14	11	16	13.5	10	7.6	5.6	4
v_{dc}	(m/s)	4					1.5					
*	(mm)	± 0.1										

a = acceleration (m/s²)
i = gear reduction (-)
m_{ex} = mass (kg)
s_a = acceleration travel (mm)
t_a = acceleration time (ms)
v_{dc} = travel speed (m/s)
* = reproducibility (mm)

MSK = servo motor
MSM = servo motor
VRDM = stepping motor
HCS = digital controller

Linear Modules MKR

Linear Modules MKR 12-40 Components and Ordering Data

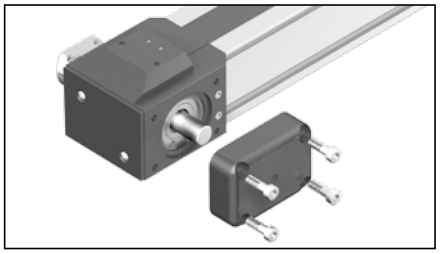
Version[1]		Part number, length R1140 660 00, ... mm	Guideway	Drive unit	Drive journal	Carriage L_{ca} = 135 mm	
With drive unit (MA)	MA01		01	Journal at right	01	01	
	MA02		01	Journal at left	02		
	MA05		01	Hollow shaft at right	05		
	MA06		01	Hollow shaft at left	06		
With gear reducer (MG)	MG10		01	Gear reducer at right	11		
	MG11		01	Gear reducer at left	12		

1) Without drive unit: see MKK 12-40 ☞ 36-37

L_{ca} = carriage length

Ordering example: see “Inquiry/Order”

Please check whether the selected combination is a permissible one (load capacities, moments, maximum speeds, motor data, etc.)!



Drive journal

Versions MA05, MA06, MG10 and MG11 also offer a drive journal, which can be accessed by removing the screws and the cover.

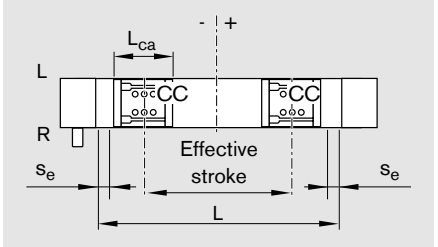
Motor attachment			Motor		Cover		Switches / Cable duct / Socket-plug	Documentation	
Reduction i =	Attachment kit[2] with gear reducer	for motor	without Brake	with Brake	without Sealing strip[3]	with Sealing strip[3]		Standard report	Measurement report
–	00	–	00		00	01	Without switches 00 Proximity switch PNP NC 36-.±.... Switching cam 18 PNP NO 38-.±.... Cable duct 25 Switch type / Mounting side (R/L) / Direction of travel / Switching distance Socket-plug 28 Magnetic field sensor with cable Reed sensor 51 Cable duct 25 Hall sensor PNP NC 52 Socket-plug 28 Magnetic field sensor with connector Reed sensor 58 Hall sensor PNP NC 59	01	02 Friction moment 05 Positioning accuracy
–	00	–	00						
–	00	–	00						
–	00	–	00						
i = 5	13	MSM 031B	106	107					
i = 10	14								
i = 5	15	MSM 031C	108	109					
i = 10	16								
i = 5	11	MSK 030	84	85					
i = 10	12								

2) Attachment kit also available without motor (when ordering: enter “00” for motor)
3) Plastic sealing strip

Length L

$$L = (\text{effective stroke} + 2 \cdot \text{excess travel } s_e) + 10\ \text{mm} + L_{ca}$$

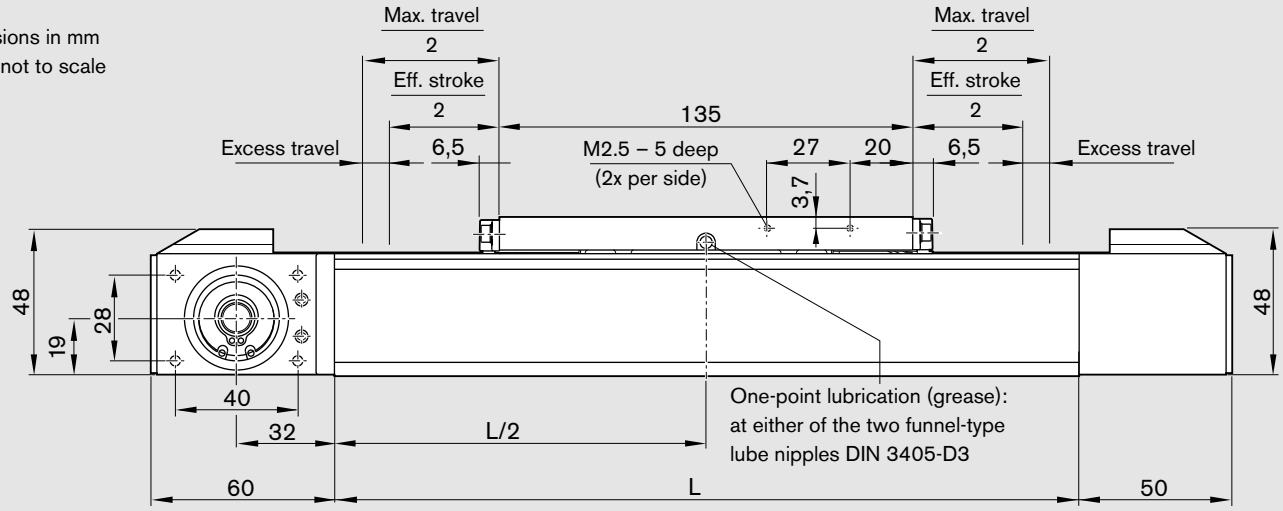
Effective stroke = maximum travel of carriage center (CC) between the outermost switch activation points.
The excess travel s_e must be longer than the braking distance. The acceleration travel can be taken as a guideline value for the braking distance.

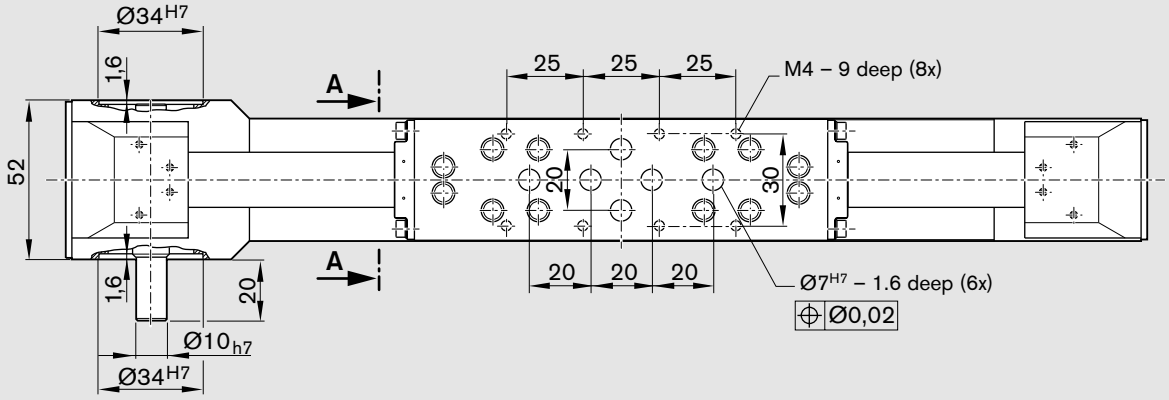


Linear Modules MKR

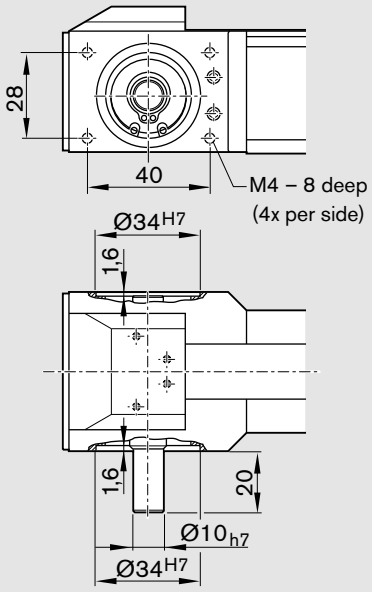
Linear Modules MKR 12-40 Dimensions

All dimensions in mm
Drawings not to scale

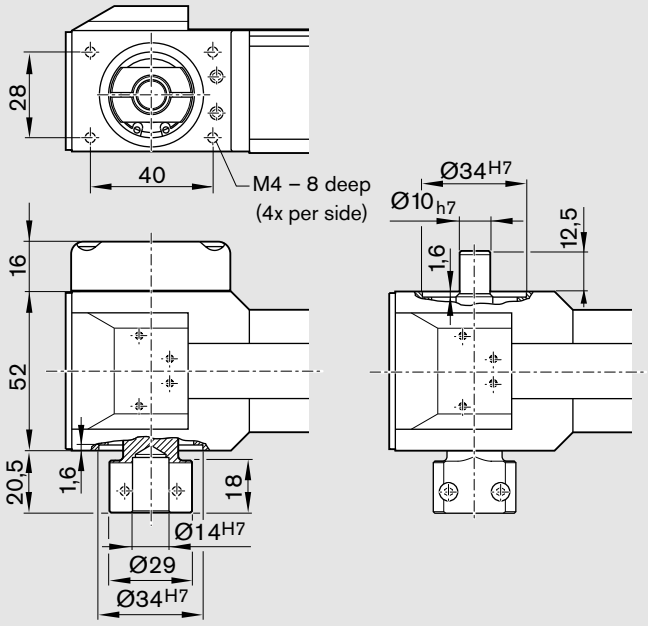




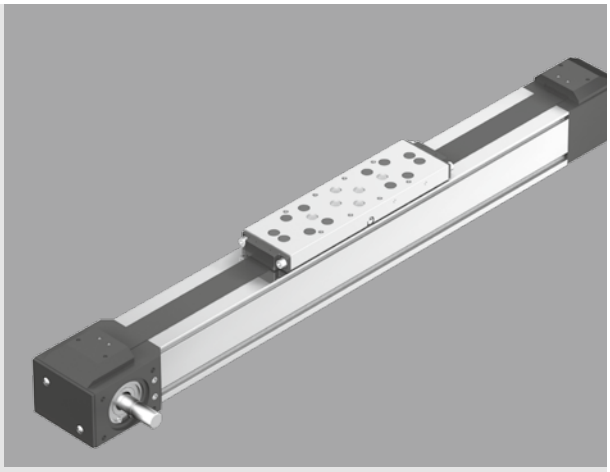
MA01, MA02

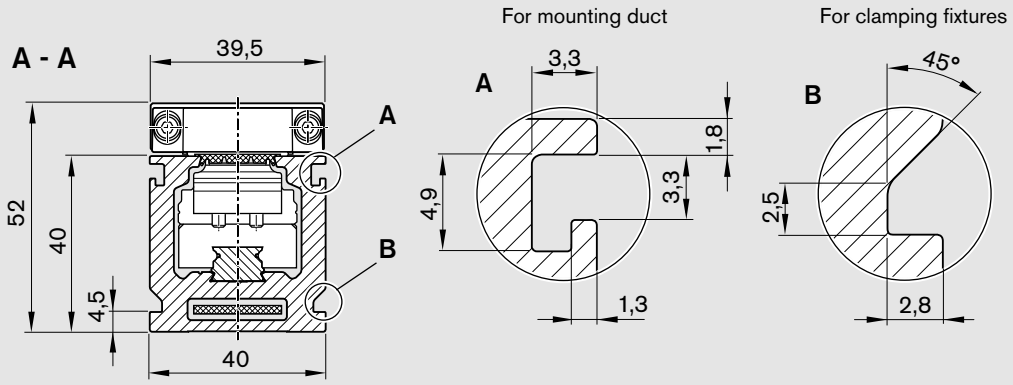


MA05, MA06

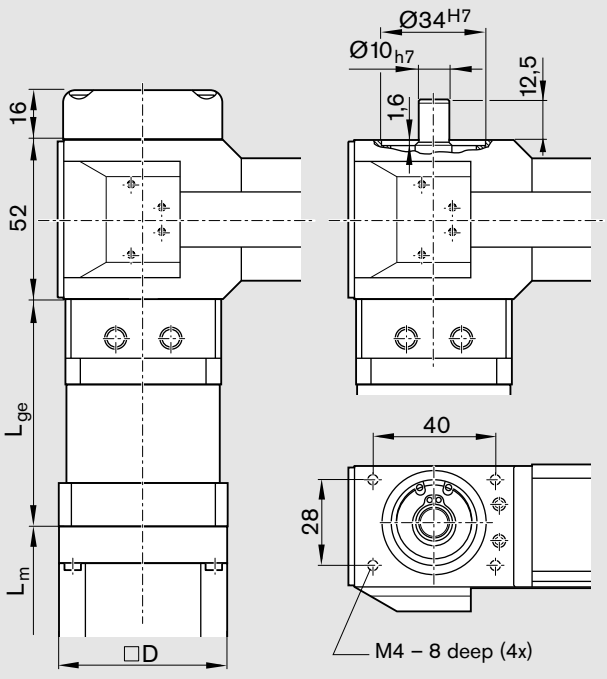


A second journal can be accessed by removing the cover.





MG10, MG11

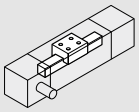
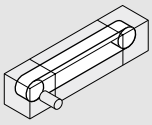
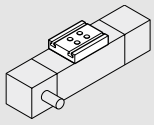
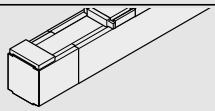
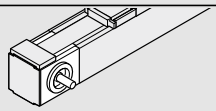
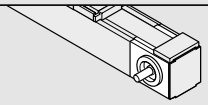
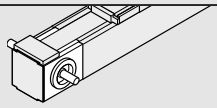


Version	Motor	Dimensions (mm)			
		D	L_{ge}	L_m without brake	L_m with brake
MG10, MG11	MSM 031B	60	101	79.0	115.5
	MSM 031C	60	111	98.5	135.0
	MSK 030C	54	91	188.0	213.0

CAD configurator available on the Internet at www.boschrexroth.com/dcl

Linear Modules MKR

Linear Modules MKR 15-65 Components and Ordering Data

Part number, length R1140 060 00, ... mm		Guideway	Drive unit						Carriage	
										
Version			Drive journal	Reduction				MSM 041B	L_{ca} = 190 mm	
				i = 1 [1]	i = 1 [2]	i = 3	i = 7	i = 3		
Without drive unit	OA01 	02	–	00					01	
With drive unit (MA), without gear reducer i = 1	MA01 	01	Right	01	03	–	–	–	01	
	MA02 	01	Left	01	03	–	–	–	01	
	MA03 	01	On both sides	02	04	–	–	–	01	

Ordering example: see “Inquiry/Order”

Please check whether the selected combination is a permissible one (load capacities, moments, maximum speeds, motor data, etc.)!

1) Without keyway
2) With keyway
3) Attachment kit also available without motor (when ordering: enter “00” for motor)
4) Plastic sealing strip

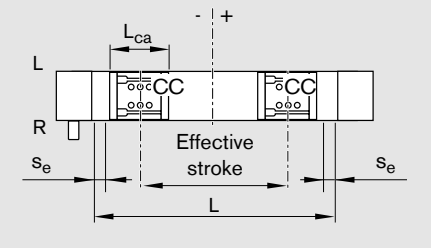
L_{ca} = carriage length

Motor attachment				Motor	Cover		Switches / Cable duct / Socket-plug	Documentation	
Reduction i =	Attachment kit [3]	for motor		without Brake	without Sealing strip [4]	with Sealing strip [4]		Standard report	Measurement report
–	00	–		00	00	01 without side sealing	**Without switch and cable duct** 00 **Switches:** – PNP NC 11- . ± ... mm – PNP NO 13- . ± ... mm – Mechanical 15- . ± ... mm **Ordering data:** Switch type Mounting side (R/L) Direction of travel Switching distance **Cable duct (loose)** – Length 20, ... mm **External socket/ plug (loose)** 17 **Switching cam at one end** 16 **Switching cam at both ends** 26	01	02 Friction moment 05 Positioning accuracy
i = 1	00	–		00					
i = 3	72	**MSK 040C**							
i = 5	74	**MSK 040C**		–		02 with side sealing			
i = 10	77	**MSK 040C**		–					

Length L

L = (effective stroke + 2 · excess travel s_e) + 40 mm + L_{ca}

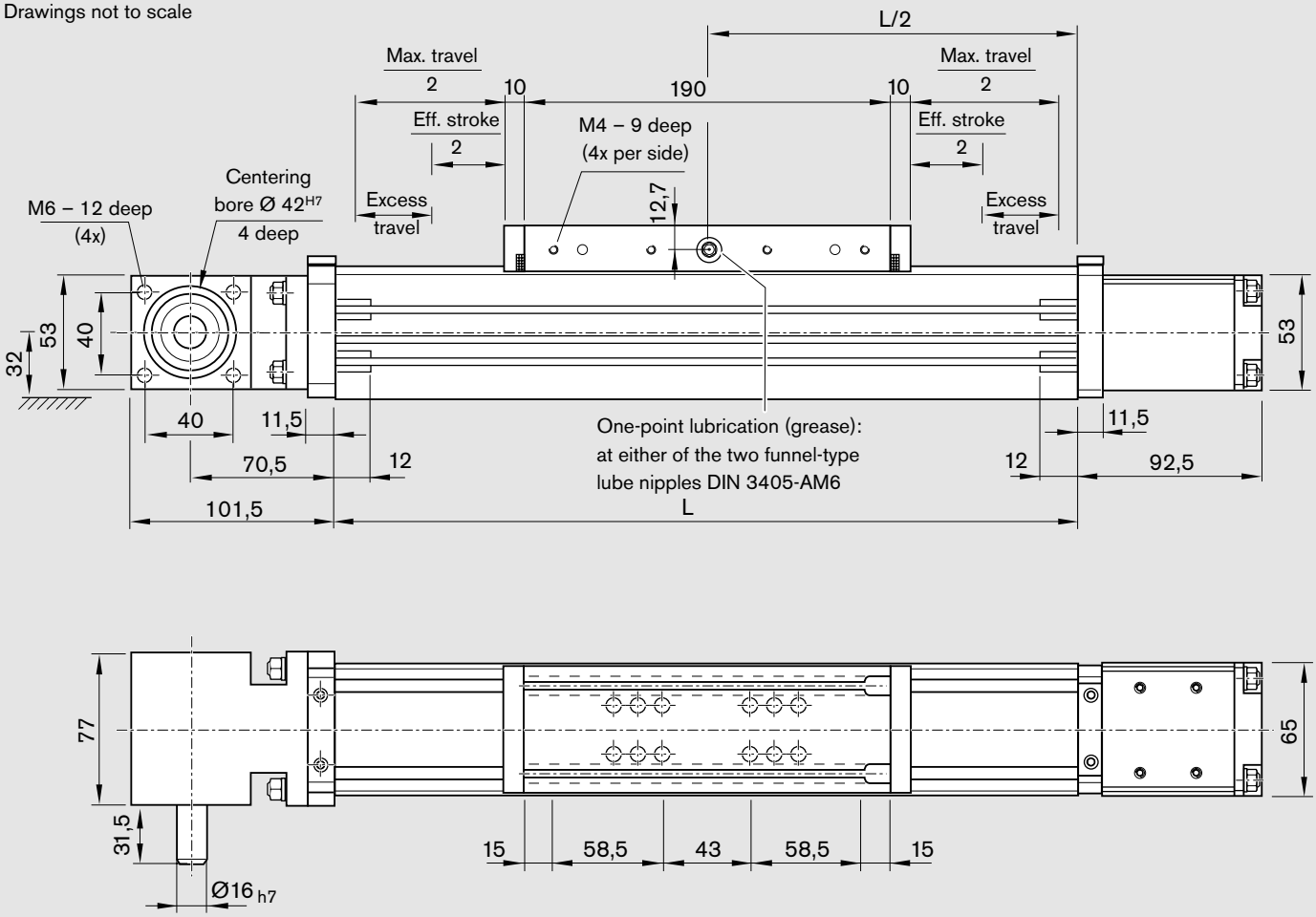
Effective stroke = maximum travel of carriage center (CC) between the outermost switch activation points.
The excess travel s_e must be longer than the braking distance. The acceleration travel can be taken as a guideline value for the braking distance.



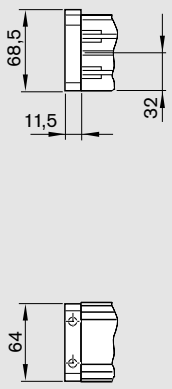
Linear Modules MKR

Linear Modules MKR 15-65 Dimensions

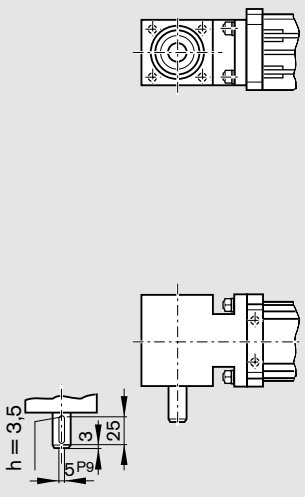
All dimensions in mm
Drawings not to scale



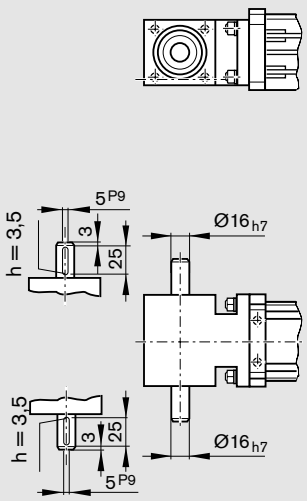
OA01

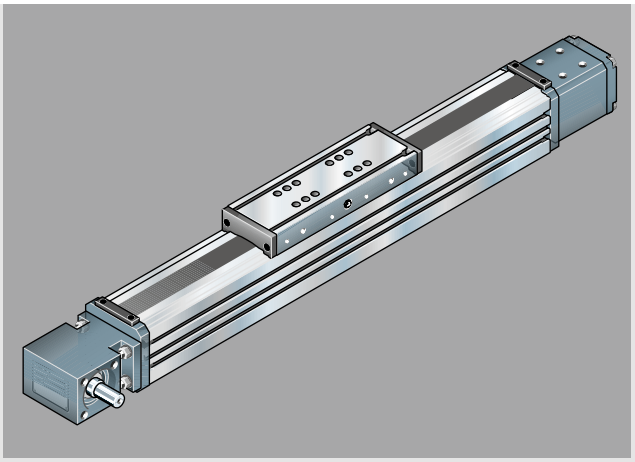


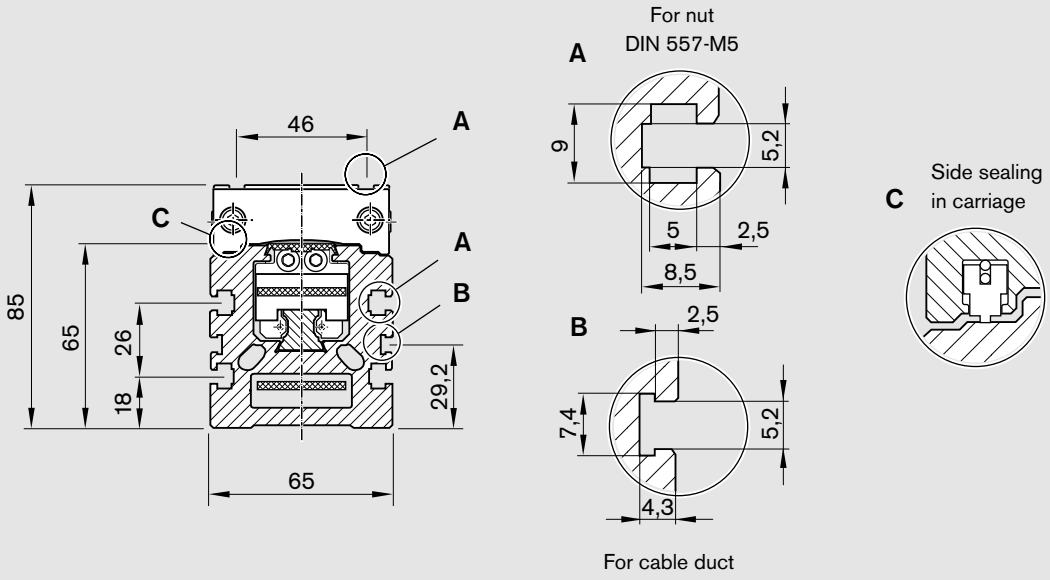
MA01, MA02



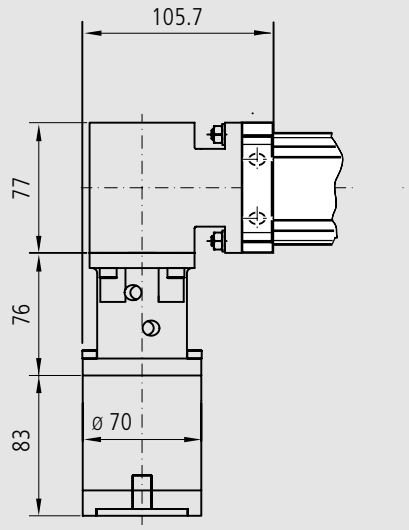
MA03







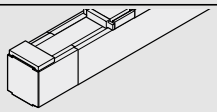
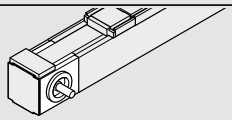
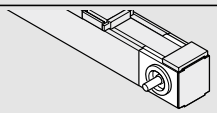
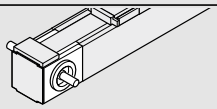
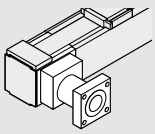
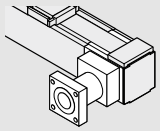
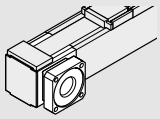
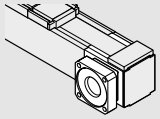
LP070 External Gearbox



CAD configurator available on the Internet at www.boschrexroth.com/dcl

Linear Modules MKR

Linear Modules MKR 20-80 Components and Ordering Data

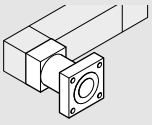
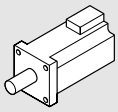
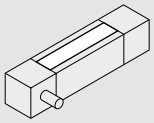
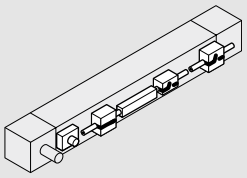
Part number, length R1140 160 10, ... mm Version		Guideway	Drive unit Drive journal	Reduction i = 1 1)	i = 1 2)	i = 3	i = 5	i = 10	Carriage L_{ca} = 190 mm with T-slot	with thr.	L_{ca} = 260 mm with T-slot	with thr.	
Without drive unit	OA01 	02	Without	50					01	02	11	12	
With drive unit (MA), without gear reducer i = 1	MA01 	01	Journal at right	01	03	–							
	MA02 	01	Journal at left	01	03	–							
	MA03 	01	Journal on both sides	02	04	–							
With gear (MG), external gear reducer	MG01  MG02 	01	Gear reducer at right / at left	–	–	10							
			Gear reducer at right / at left	–	–	11 Gear reducer with second journal							
With gear (MG), integrated LPB gear reducer	MG03  MG04 	01	Gear reducer at right / at left	–	–	20							

Ordering example: see “Inquiry/Order”

Please check whether the selected combination is a permissible one (load capacities, moments, maximum speeds, motor data, etc.)!

L_{ca} = carriage length
thr. = thread

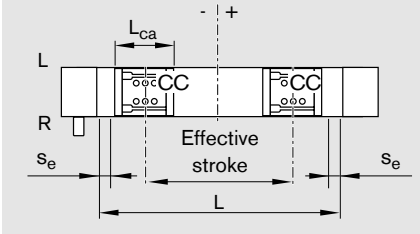
1) Without keyway
2) With keyway
3) Attachment kit also available without motor (when ordering: enter “00” for motor)
4) Stepping motors on request
5) Steel sealing strip, permissible up to L = 3500 mm

Motor attachment				Motor		Cover		Switches / Cable duct / Socket-plug	Documentation	
										
Reduction i =	Attachment kit[3] with gear reducer	for motor[4]		without	with	without	with		Standard report	Measurement report
				Brake		Sealing strip[5]				
–	00	–		00		00	10 without sealing lip	**Without switch and cable duct** 00	01	02 Friction moment
–	00	–		00				**Switches:** – PNP NC 11- . ± ... mm – PNP NO 13- . ± ... mm – Mechanical 15- . ± ... mm **Ordering data:** Switch type, Mounting side (R/L), Direction of travel, Switching distance		
–	00	–		00				**Cable duct (loose)** – Length 20, ... mm		
–	00	–		00				**External socket/ plug (loose)** 17		05 Positioning accuracy
i = 3	01	**MSK 040C**		86	87	00		**External switching cam** 16		
i = 5	10									
i = 10	20									
i = 3	02	**MSM 041B**		110	111					
i = 5	11									
i = 10	21									
i = 3	04	**MSK 050C**		88	89					
i = 5	14									
i = 10	24									
i = 3	50	**MSK 040C**		86	87		15 with sealing lip			
i = 5	55									
i = 10	60									
i = 3	51	**MSM 041B**		110	111					
i = 5	56									
i = 10	61									
i = 3	54	**MSK 050C**		88	89					
i = 5	58									
i = 10	63									

Length L

$$L = (\text{effective stroke} + 2 \cdot \text{excess travel } s_e) + 20 \text{ mm} + L_{ca}$$

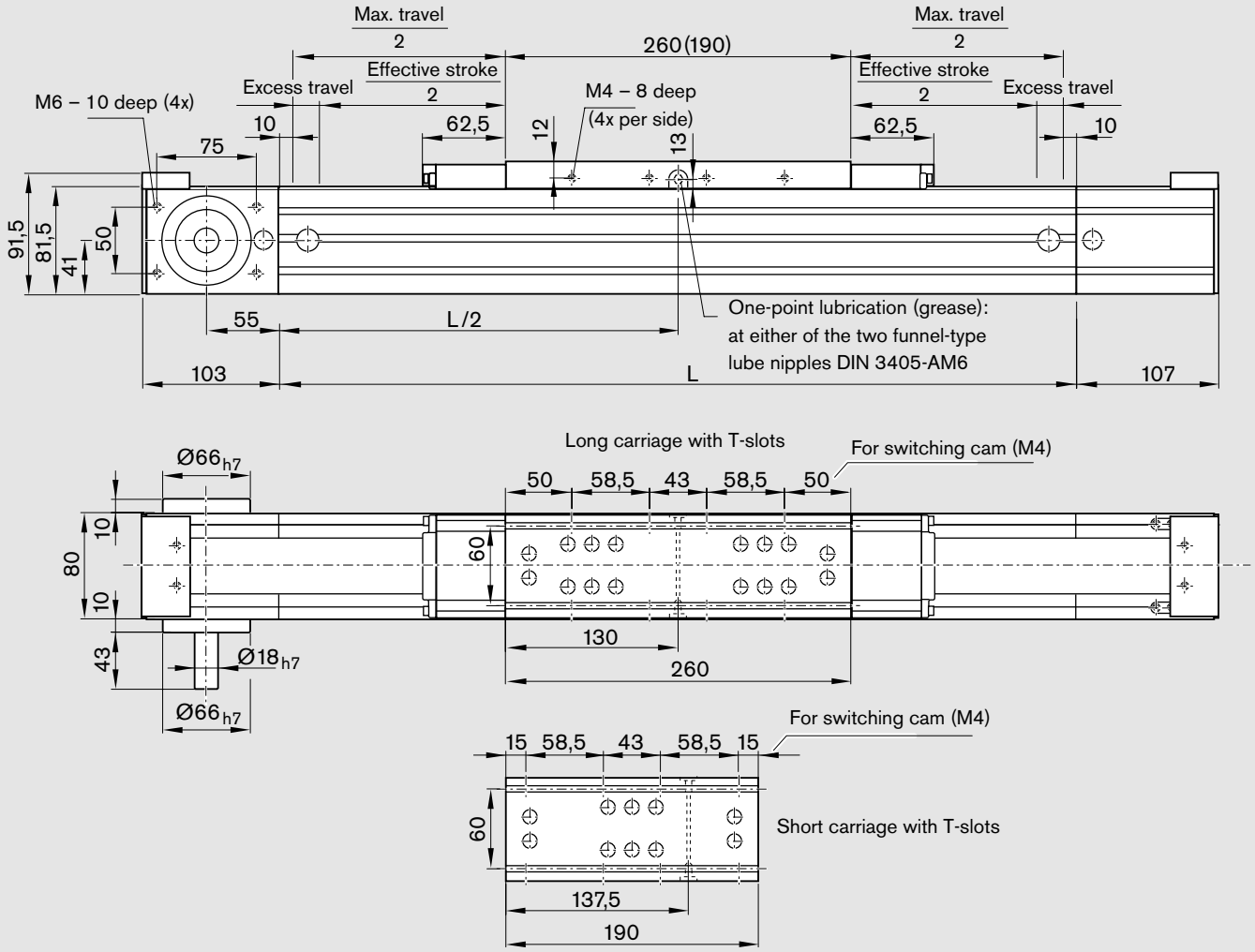
Effective stroke = maximum travel of carriage center (CC) between the outermost switch activation points.
The excess travel s_e must be longer than the braking distance. The acceleration travel can be taken as a guideline value for the braking distance.



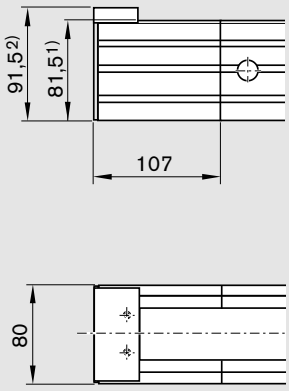
Linear Modules MKR

Linear Modules MKR 20-80 Dimensions

All dimensions in mm
Drawings not to scale

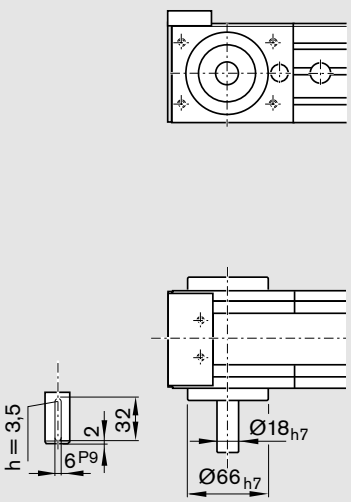


OA01

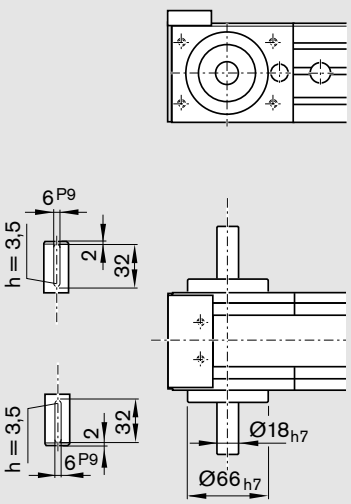


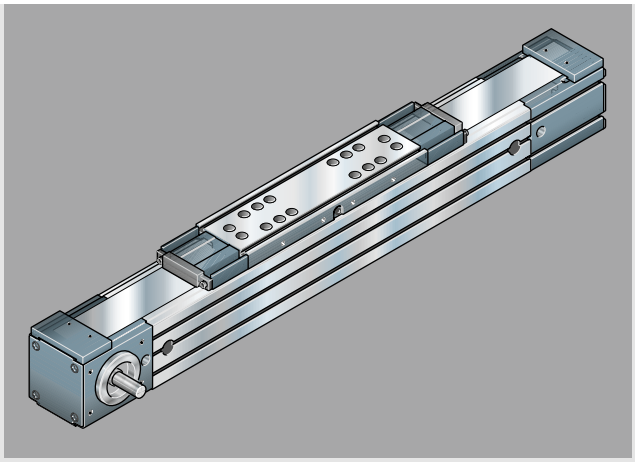
1) Without sealing strip
2) With sealing strip

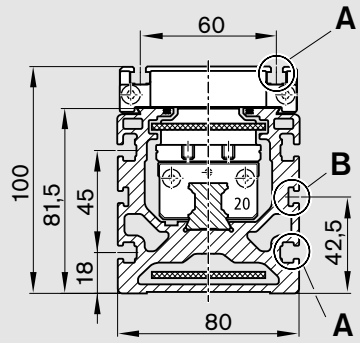
MA01, MA02



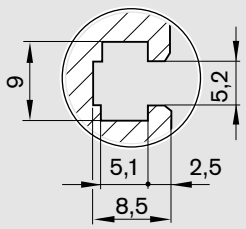
MA03

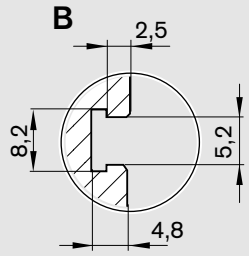






For nut
DIN 557-M5

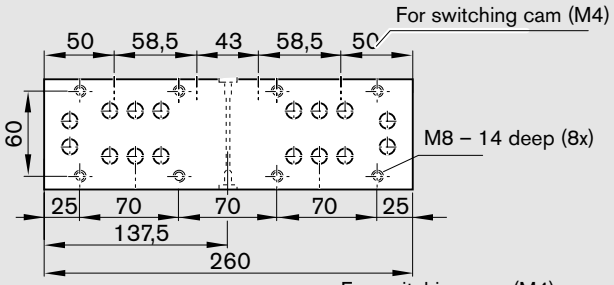




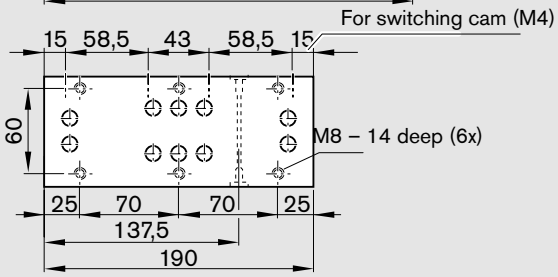
For cable duct

Side sealing
in carriage

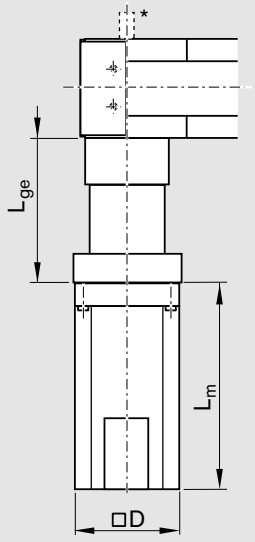
Long carriage
with threads



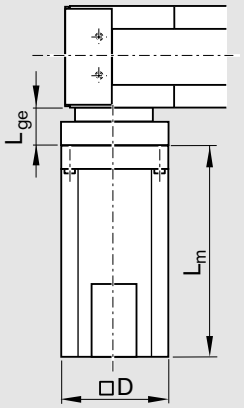
Short carriage
with threads



MG01*, MG02*



MG03, MG04



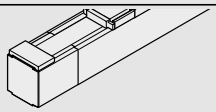
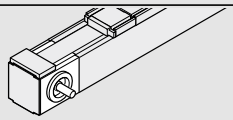
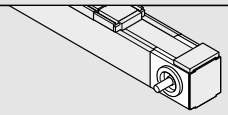
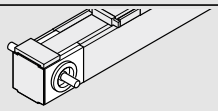
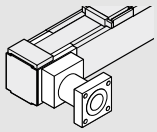
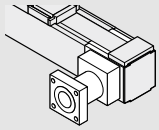
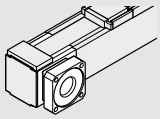
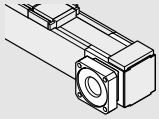
Motor	Dimensions (mm)				
	Gear unit		Motor		
	L_{ge}		D		L_m
	MG01 MG02	MG03 MG04		without brake	with brake
MSK 040C	135	41	82	185.5	215.5
MSK 050C	145	51	98	203.0	233.0
MSM 041B	140	46	80	112.0	149.0

* For drive unit Option 11: second journal Ø18 x 43

CAD configurator available on the Internet at www.boschrexroth.com/dcl

Linear Modules MKR

Linear Modules MKR 25-110 Components and Ordering Data

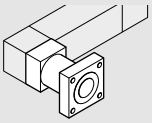
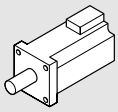
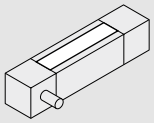
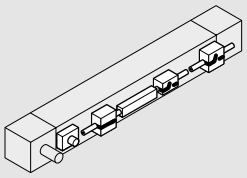
Part number, length R1140 260 10, ... mm Version		Guideway	Drive unit Drive journal	Reduction i = 1 [1]	i = 1 [2]	i = 3	i = 5	i = 10	Carriage L_{ca} = 210 mm with T-slot	with thr.	L_{ca} = 305 mm with T-slot	with thr.	
Without drive unit	OA01 	02	Without	50					01	02	11	12	
With drive unit (MA), without gear reducer i = 1	MA01 	01	Journal at right	01	03	–							
	MA02 	01	Journal at left	01	03	–							
	MA03 	01	Journal on both sides	02	04	–							
With gear (MG), external gear reducer	MG01  MG02 	01	Gear reducer at right / at left	–	–	10							
			Gear reducer at right / at left	–	–	11 Gear reducer with second journal							
With gear (MG), integrated LPB gear reducer	MG03  MG04 	01	Gear reducer at right / at left	–	–	20							

Ordering example: see “Inquiry/Order”

Please check whether the selected combination is a permissible one (load capacities, moments, maximum speeds, motor data, etc.)!

L_{ca} = carriage length
thr. = thread

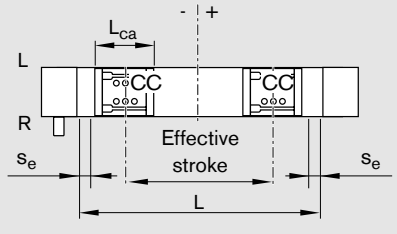
1) Without keyway
2) With keyway
3) Attachment kit also available without motor (when ordering: enter “00” for motor)
4) Stepping motors on request
5) Steel sealing strip, permissible up to L = 3500 mm
6) Motor without brake

Motor attachment				Motor		Cover		Switches / Cable duct / Socket-plug	Documentation	
										
Reduction i =	Attachment kit[3] with gear reducer	for motor[4]		without	with	without	with		Standard report	Measurement report
				Brake		Sealing strip[5]				
–	00	–		00		10 without sealing lip		**Without switch and cable duct** 00	01	02 Friction moment
–	00	–		00				**Switches:** – PNP NC 11- . ± ... mm – PNP NO 13- . ± ... mm – Mechanical 15- . ± ... mm **Ordering data:** Switch type Mounting side (R/L) Direction of travel Switching distance		
–	00	–		00						
–	00	–		00						05 Positioning accuracy
i = 3	06	MSK 060C		90	91	00		**Cable duct (loose)** – Length 20, ... mm		
i = 5	16									
i = 10	26									
i = 3	02	MSK 076C		92	93			**External socket/ plug (loose)** 17		
i = 5	11									
i = 10	21									
i = 3	05	MSK 060C		90	91		15 with sealing lip	**Switching cam at one end** 16		
i = 5	15									
i = 10	25									
i = 3	04	MSK 076C		92	93			**Switching cam at both ends** 26		
i = 5	14									
i = 10	24									

Length L

$$L = (\text{effective stroke} + 2 \cdot \text{excess travel } s_e) + 20 \text{ mm} + L_{ca}$$

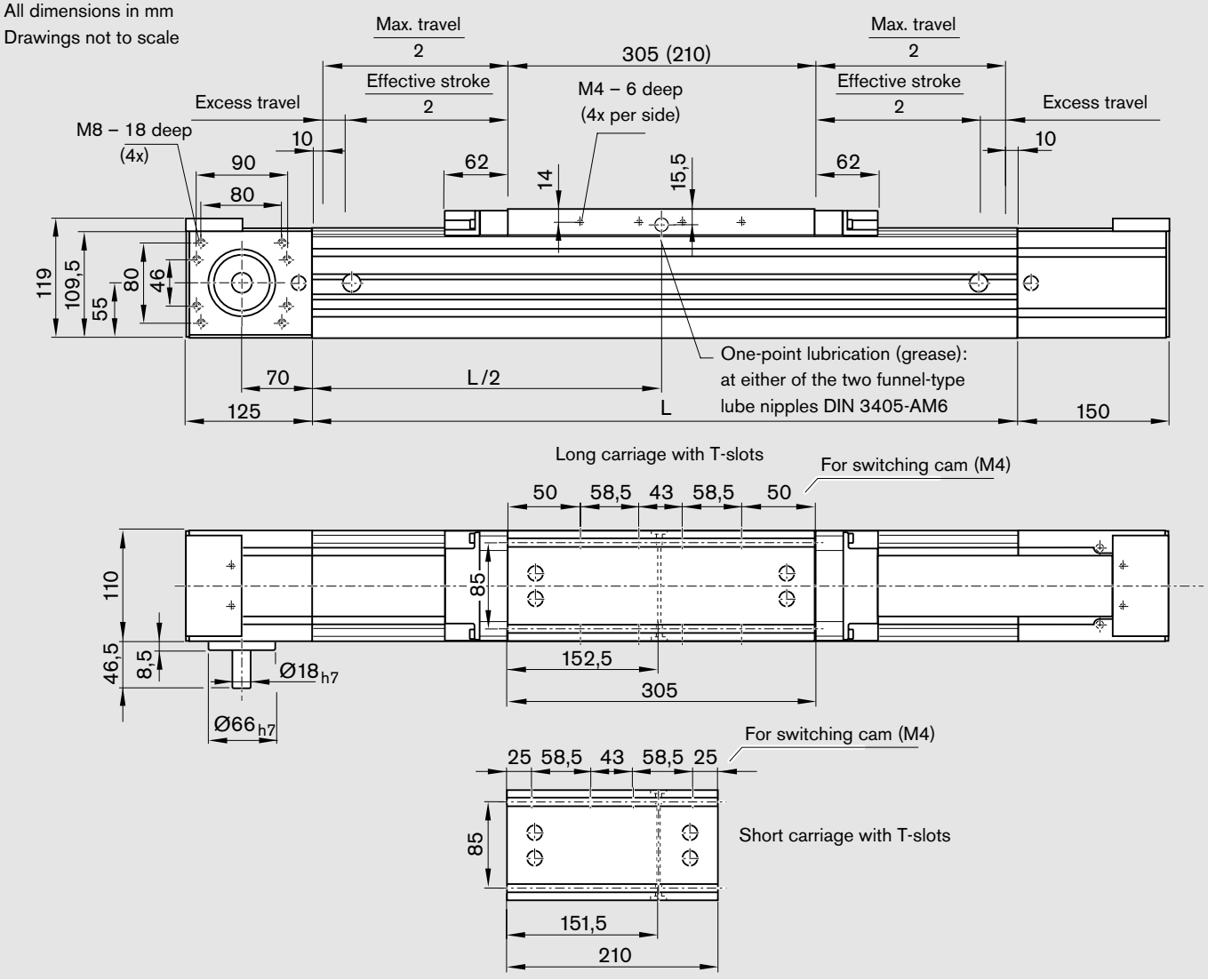
Effective stroke = maximum travel of carriage center (CC) between the outermost switch activation points.
The excess travel s_e must be longer than the braking distance. The acceleration travel can be taken as a guideline value for the braking distance.



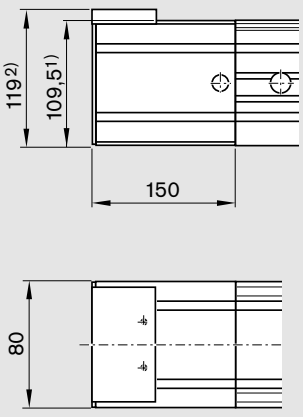
Linear Modules MKR

Linear Modules MKR 25-110 Dimensions

All dimensions in mm
Drawings not to scale

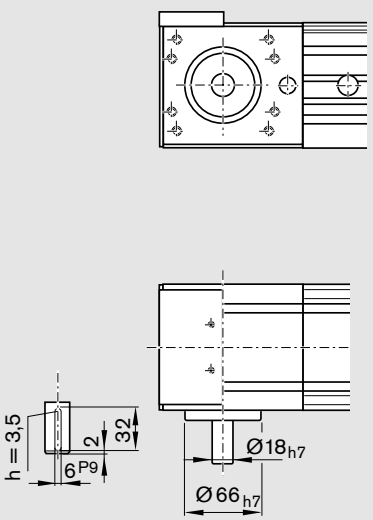


OA01

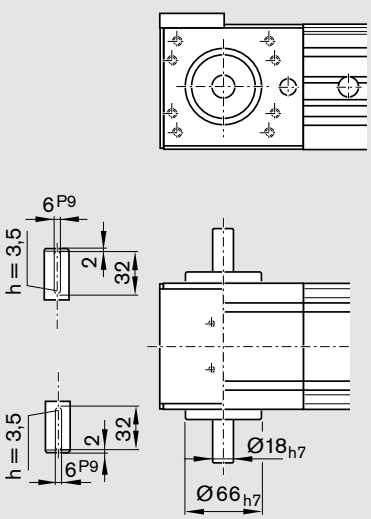


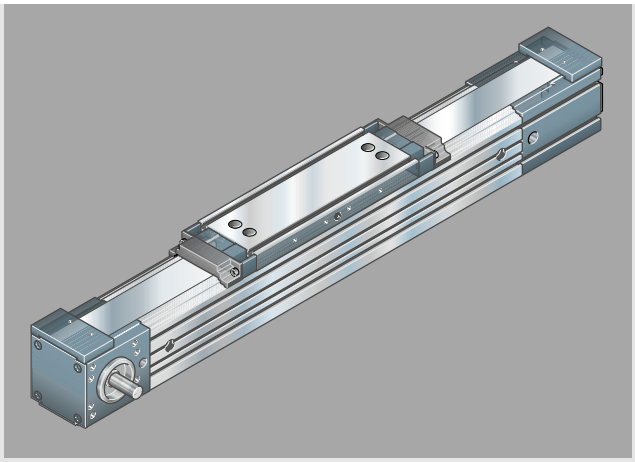
1) Without sealing strip
2) With sealing strip

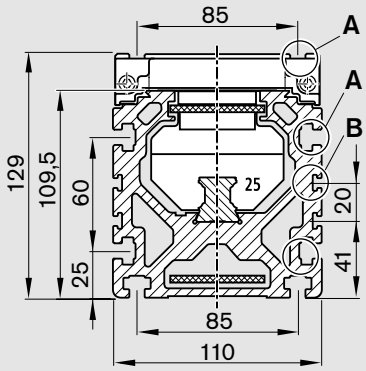
MA01, MA02



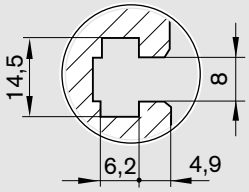
MA03



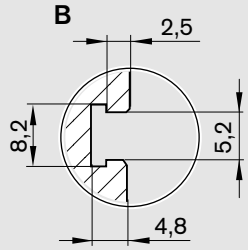




For nut
A DIN 508-M6

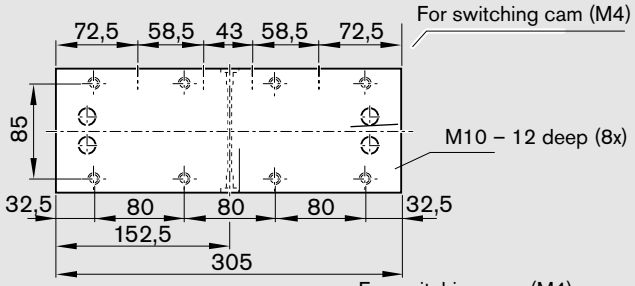


Side sealing
in carriage

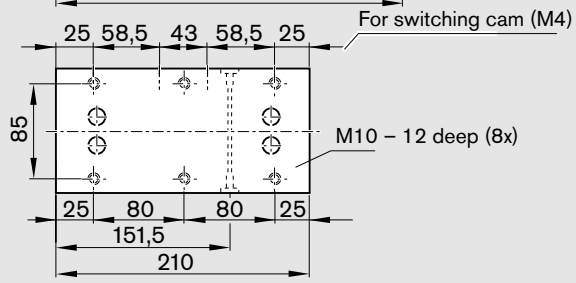


For cable duct

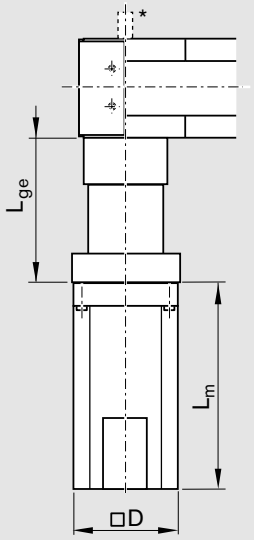
Long carriage
with threads



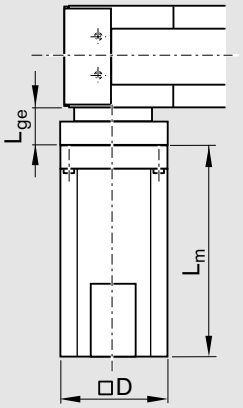
Short carriage
with threads



MG01*, MG02*



MG03, MG04



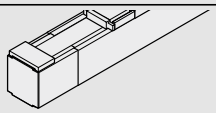
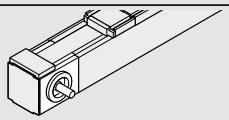
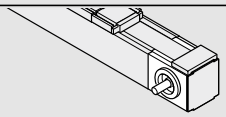
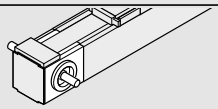
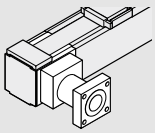
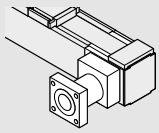
Motor	Dimensions (mm)				
	Gear unit		Motor		
		L_{ge}	D		L_m
	MG01 MG02	MG03 MG04		without brake	with brake
MSK 060C	162	50	116	226.0	259.0
MSK 076C	172	60	140	292.5	292.5

* For drive unit Option 11: second journal Ø18 x 43

CAD configurator available on the Internet at www.boschrexroth.com/dcl

Linear Modules MKR

Linear Modules MKR 35-165 Components and Ordering Data

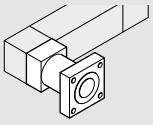
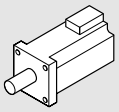
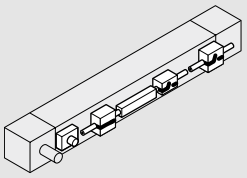
Part number, length R1140 360 00, ... mm Version		Guideway	Drive unit Drive journal	Reduction i = 1 [1]	i = 1 [2]	i = 6	i = 12	Carriage L_{ca} = 400 mm	
Without drive unit	OA01 	01		50				05	
With drive unit (MA), without gear reducer i = 1	MA01 	01	Right	01	03	–	–		
	MA02 	01	Left	01	03	–	–		
	MA03 	01	On both sides	02	04	–	–		
With gear (MG), external gear reducer	MG01  MG02 	01	Gear reducer with socket	–	–	10	11		

Ordering example: see “Inquiry/Order”

Please check whether the selected combination is a permissible one (load capacities, moments, maximum speeds, motor data, etc.)!

L_{ca} = carriage length

1) Without keyway
2) With keyway

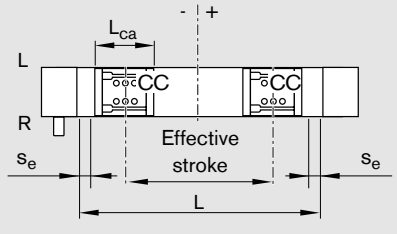
Motor attachment			Motor		Switches / Cable duct / Socket-plug	Documentation	
							
Reduction i =	Attachment kit [3]	for motor	without Brake	with Brake		Standard report	Measurement report
–	00	–	00		**Without switch and cable duct** 00	01	02 Friction moment 05 Positioning accuracy
–	00	–	00		**Switches:** – PNP NC 11- . ± ... mm – PNP NO 13- . ± ... mm – Mechanical 15- . ± ... mm **Ordering data:** Switch type Mounting side (R/L) Direction of travel Switching distance		
–	00	–	00				
–	00	–	00		**Cable duct (loose)** – Length 20, ... mm		
i = 6	01	**MSK 076C**	92	93	**External socket/plug (loose)** 17		
					Switching cam at one end 16		
i = 12	02	**MSK 076C**	92	93	**Switching cam at both ends** 26		

3) Attachment kit also available without motor
(when ordering: enter “00” for motor)

Length L

$$L = (\text{effective stroke} + 2 \cdot \text{excess travel } s_e) + 40 \text{ mm} + L_{ca}$$

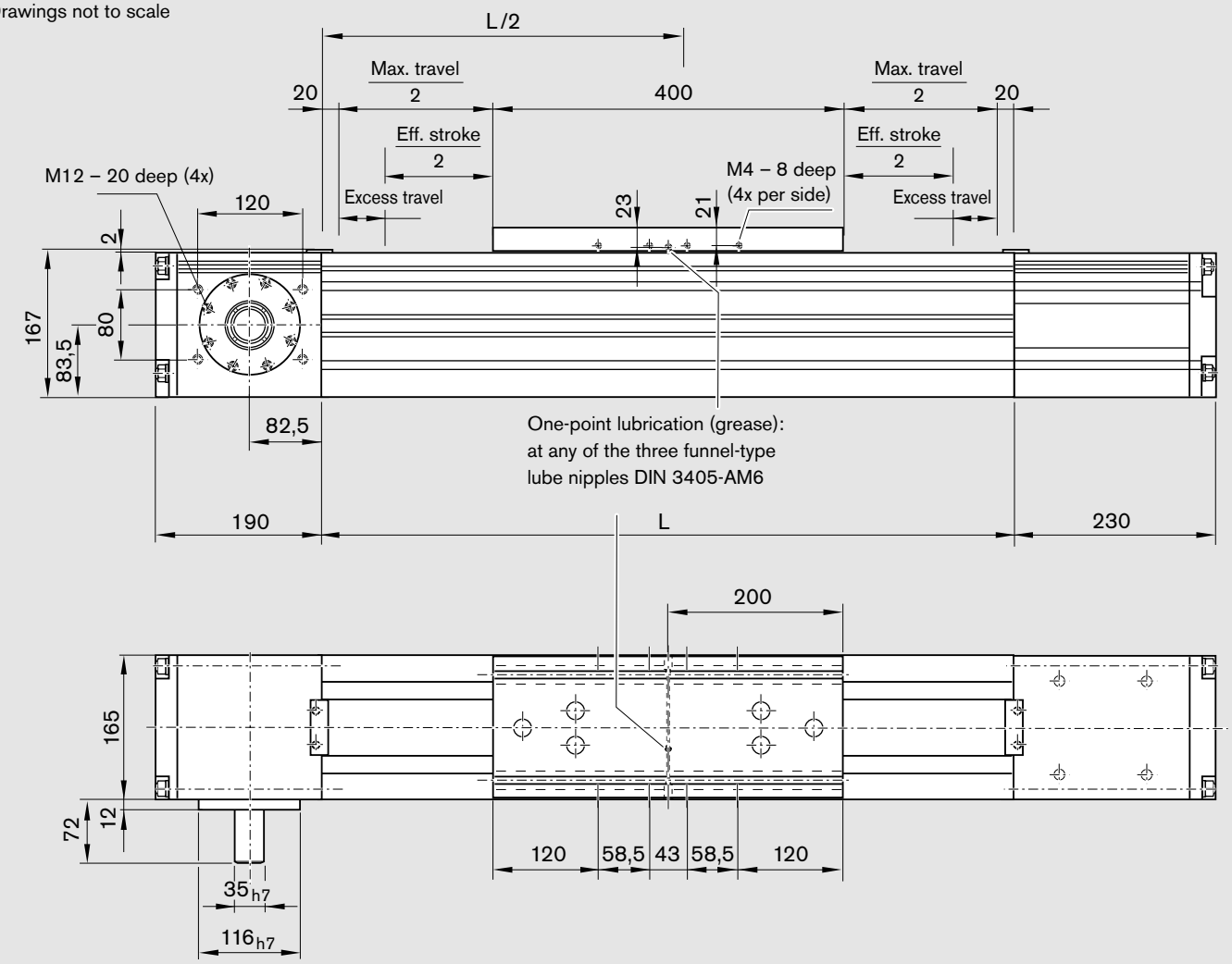
Effective stroke = maximum travel of carriage center (CC) between the outermost switch activation points.
The excess travel s_e must be longer than the braking distance. The acceleration travel can be taken as a guideline value for the braking distance.



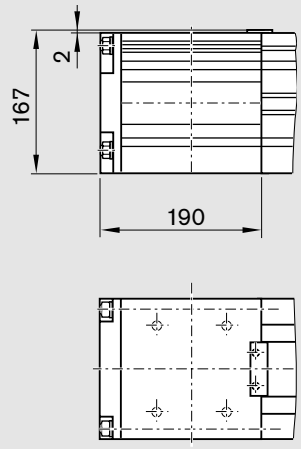
Linear Modules MKR

Linear Modules MKR 35-165 Dimensions

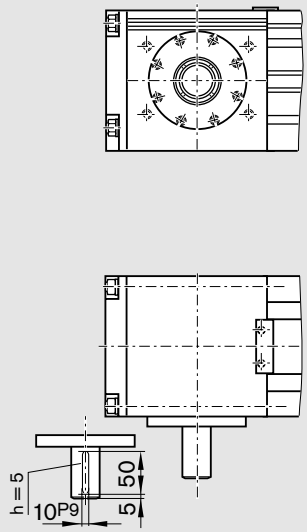
All dimensions in mm
Drawings not to scale



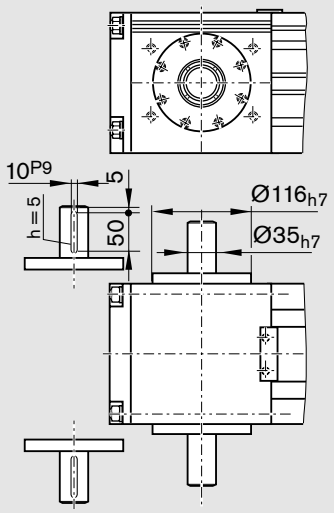
OA01

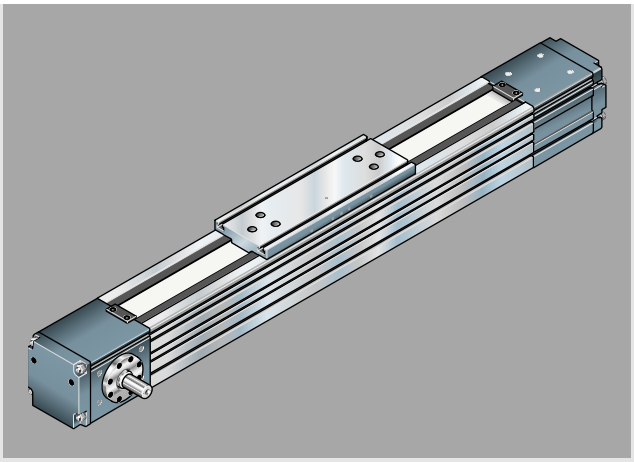


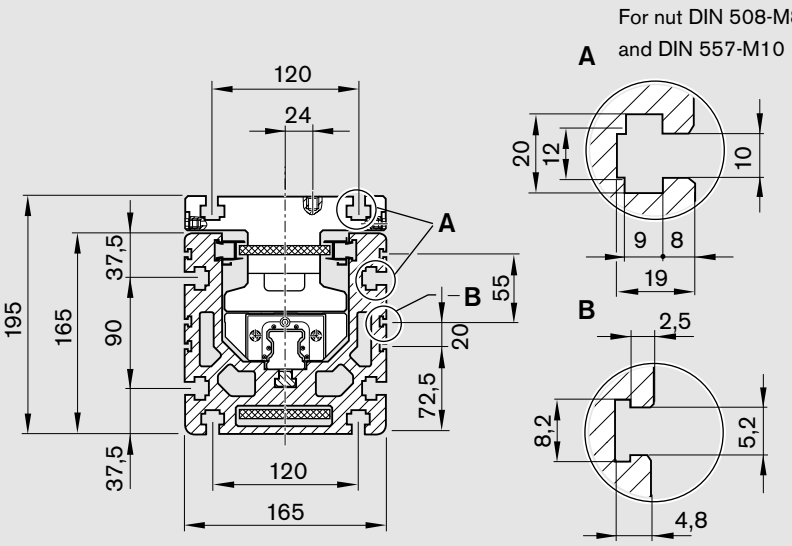
MA01, MA02



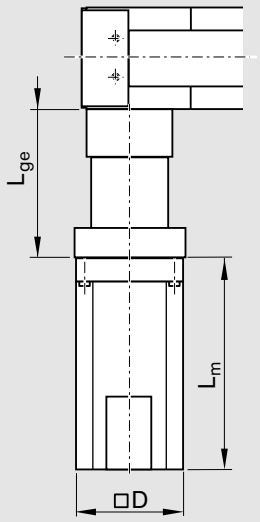
MA03







MG01, MG02



Motor	Dimensions (mm)				
	Gear unit		Motor		
		L_{ge}	D		L_m
	i = 6	i = 12		without brake	with brake
MSK 076C	35	78	140.0	292.5	292.5

CAD configurator available on the Internet at www.boschrexroth.com/dcl