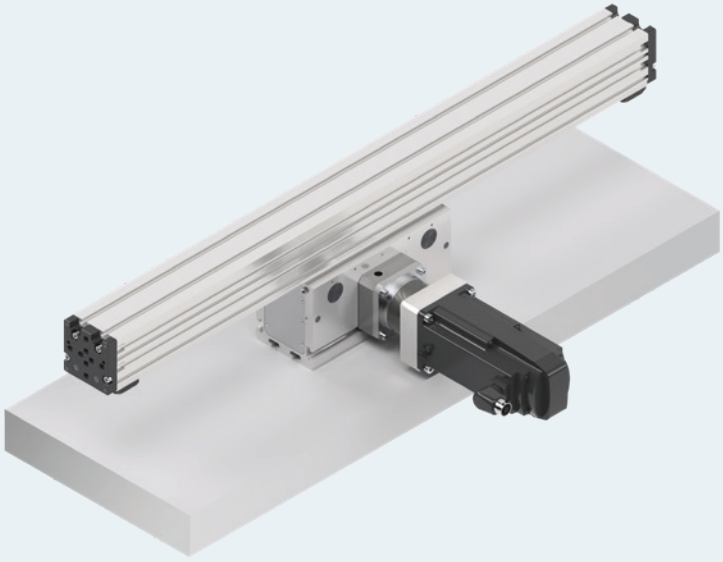
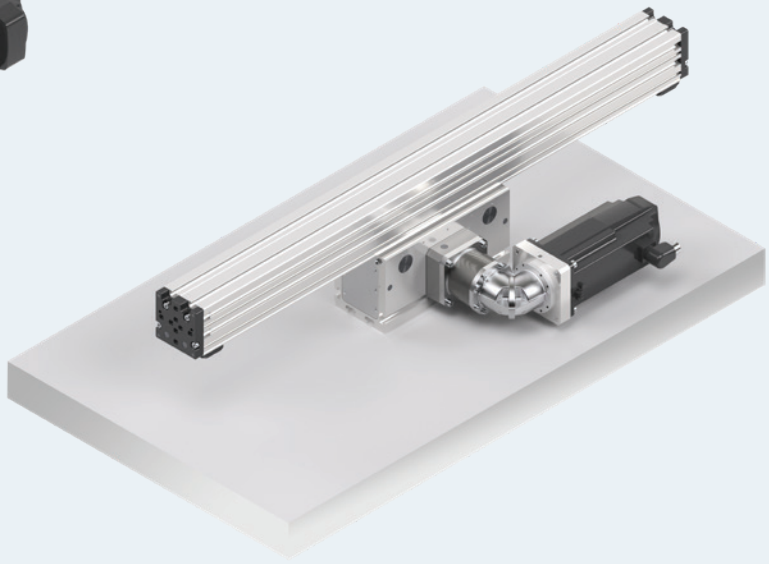
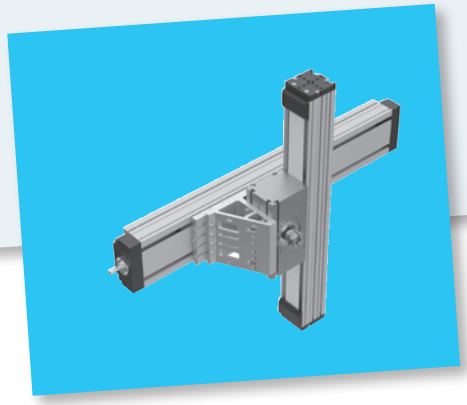
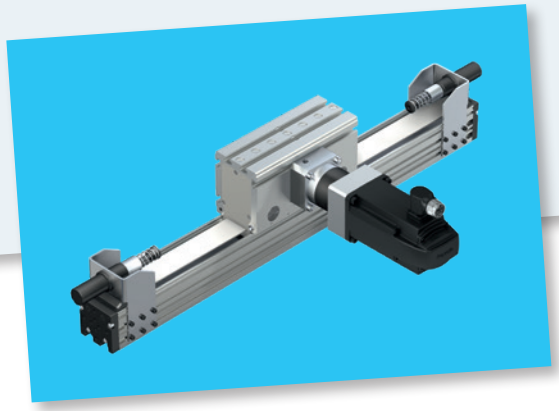
rexroth
A Bosch Company

OBB Omega modules









www.boschrexroth.com

Identification system for short product names

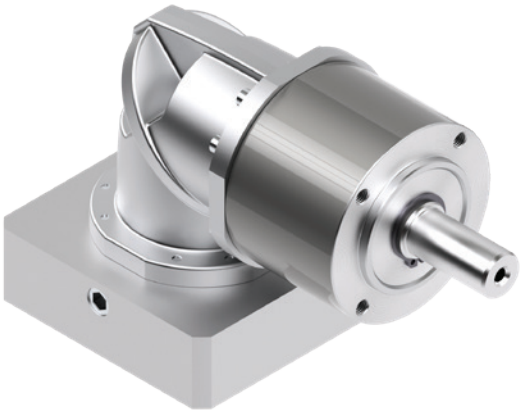
Short product name		Example:	O	B	B	-	085	-	N N	-	1
System	=	**O**mega module									
Guideway	=	Ball guide rail / **B**all rail system									
Drive	=	Toothed **B**elt drive									
Size	=	055 / **085** / 120									
Version	=	Standard version **(N)**									
Generation	=	Product generation **1**									

Short product name
Short product names are used to identify the product family, size, version and product generation of Rexroth linear motion axes.

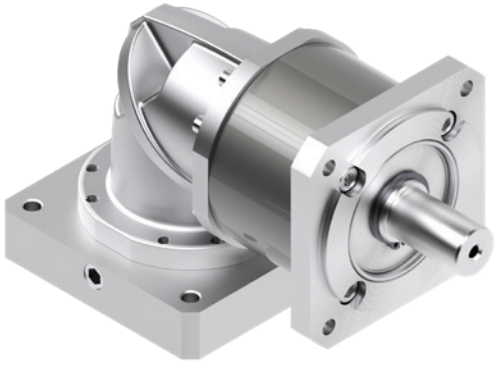
Changes/amendments at a glance

Technical modifications
- Integration of motor types (MS2N)
- New angular planetary gear

General notes
- Some illustrations/figures depict the new angular planetary gearboxes as schematic illustrations. The original illustrations are shown below.



OBB-055



OBB-085 / OBB-120

OBB Omega modules

Product overview

Product description

Omega modules (OBB) with ball rail system and toothed belt drive for speeds of up to 5.0 m/s. Omega modules are ready-to-install linear axes for any installation position in freely configurable lengths of up to 5,500 mm.

Due to the structural design, Omega modules are particularly suited to applications where the frame extends into the working area.

Characteristic features:

- Extremely compact precision aluminum profile with integrated ball rail system for optimal travel performance
- Carriage with central lubrication
- With centering holes in the carriage and on the end blocks
- Driven by a toothed belt for high dynamics and high travel speeds
- Mountable switches
- Available complete with motor, drive control unit, and controller
- With planetary gear (PG) or angular planetary gear (WPG) with various gear ratios
- Pneumatic clamping unit is optional
- Wide range of accessories available

Industries:

- Handling and assembly
- Electronics and semiconductors
- Automotive suppliers and manufacturers
- Robotics and automation
- Special-purpose machinery
- Packaging technology
- Home automation
- Plastics processing
- Textiles

Application areas:

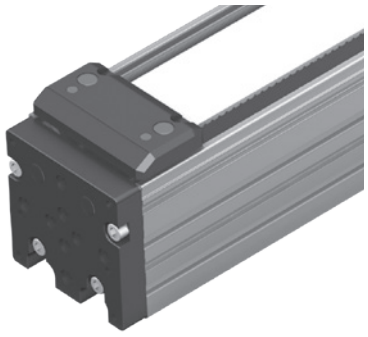
- Pick and place
- Handling systems
- Placement systems, palletizers
- Machine tool feed units
- Inspection and analysis systems
- Feed units in transfer lines
- Motion units

For assembly, maintenance and commissioning, see instructions.

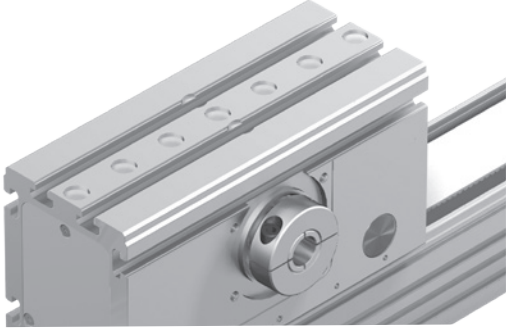
Attachment option

Fastening thread and centering holes

Numerous attachment options on the two end blocks of the frame by suitable fastening threads and centering holes



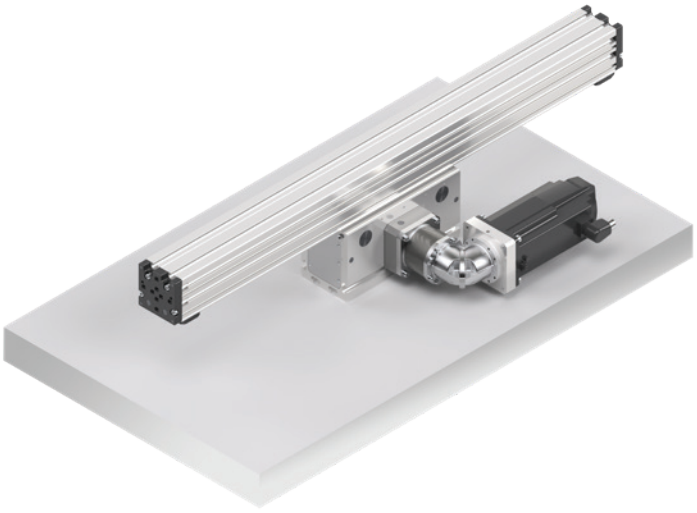
Simple assembly thanks to centering holes in the carriage



Frame moves

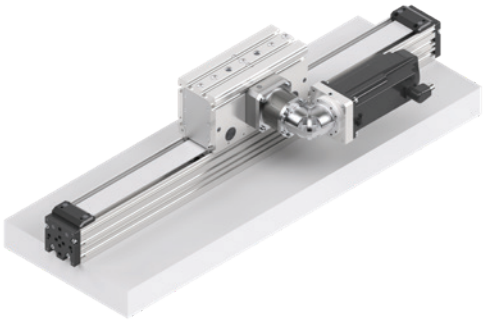
OBB as a vertical axis
Installation case: Frame moves
(carriage fastened)

OBB as a horizontal axis
Installation case: Frame moves
(carriage fastened)



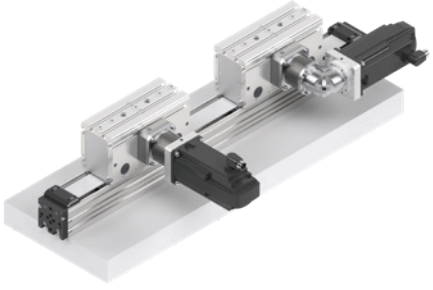
Carriage moves

OBB as a horizontal axis
Installation case: Carriage moves
(frame fastened)



On request:

OBB as a horizontal axis with two carriages
Installation case: Carriages move independently of one another (frame fastened).
Illustration (example): One carriage with planetary gear, one carriage with angular planetary gear.

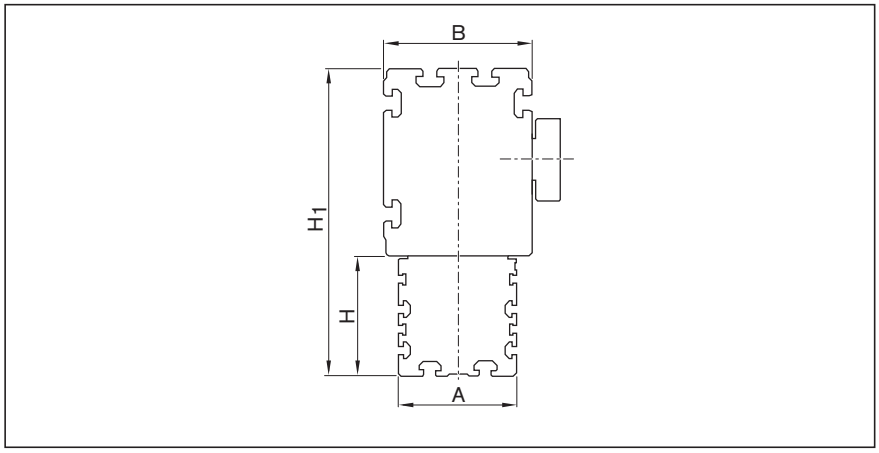


Product overview

Load capacities and sizes

Note on dynamic load capacities and moments:

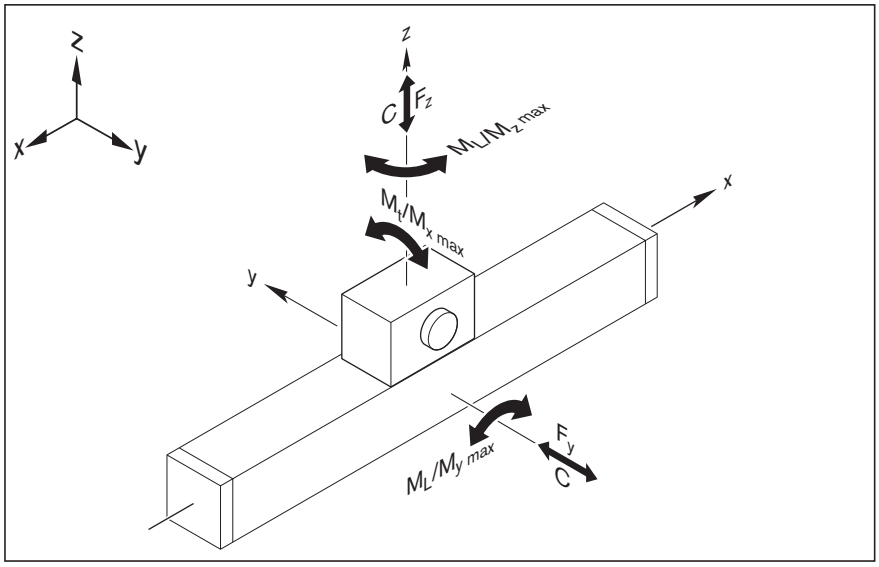
Determination of the dynamic load capacities and moments is based on a total travel of 100,000 m. Often only 50000 m of total travel are actually stipulated.
For comparison: Multiply values C, M_t and M_L by a factor of 1.26.



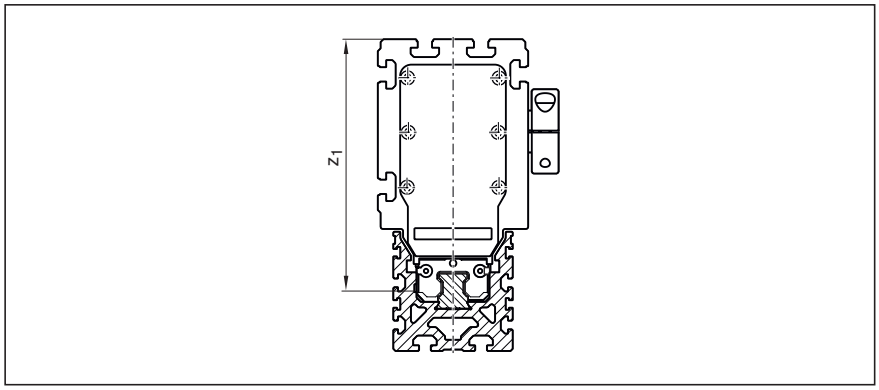
Size	Dimensions (mm)				Load capacities
	A/H	B	H_1	L_{max}	C (N)
OBB-055	55	75	135	5,500	20 790
OBB-085	85	107	222		60 600
OBB-120	120	135	285		96 200

Suitable loads (recommended values on the basis of past experience)

Regarding the desired service life, loads up to around 20% of the dynamic characteristic values (**C**, $\mathbf{M_t}$, $\mathbf{M_L}$) have generally proven suitable.
In this regard, the following must not be exceeded:
- the maximum permissible drive torque
- the maximum permissible load
- the maximum permissible speed
- the maximum permissible acceleration



Application point of the effective force (z_1)

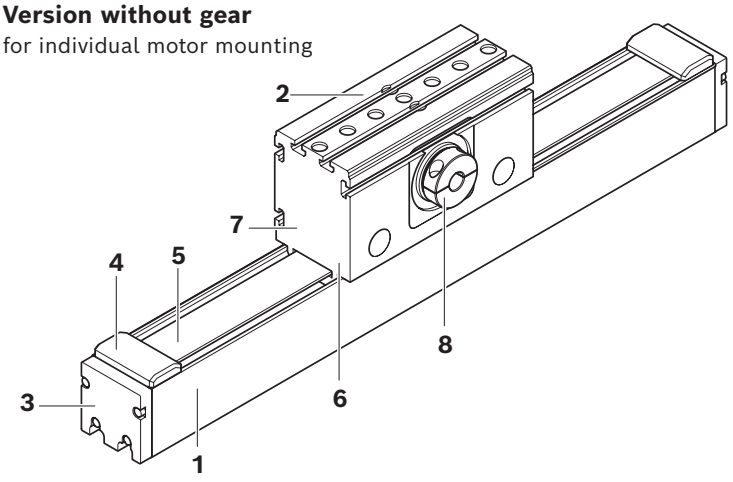


Structural design

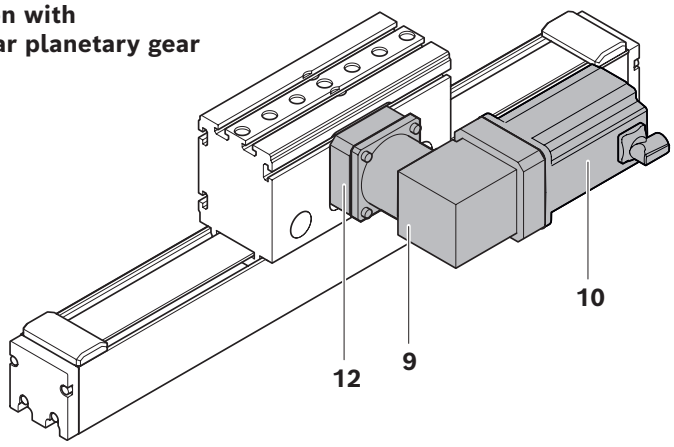
Structural design (without switch)

1 Frame
2 Carriage
3 End block
4 Belt clamp
5 Toothed belt
6 Lube connection (on both end faces)
7 Air connection (for carriage with clamping unit)
8 Clamping hub for motor mounting
9 Angular planetary gear (WPG)
10 Motor
11 Planetary gear (PG)
12 Mounting flange

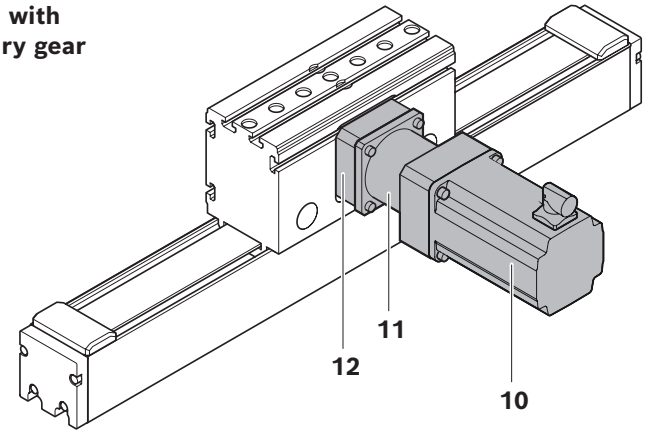
Version without gear
for individual motor mounting



Version with angular planetary gear



Version with planetary gear

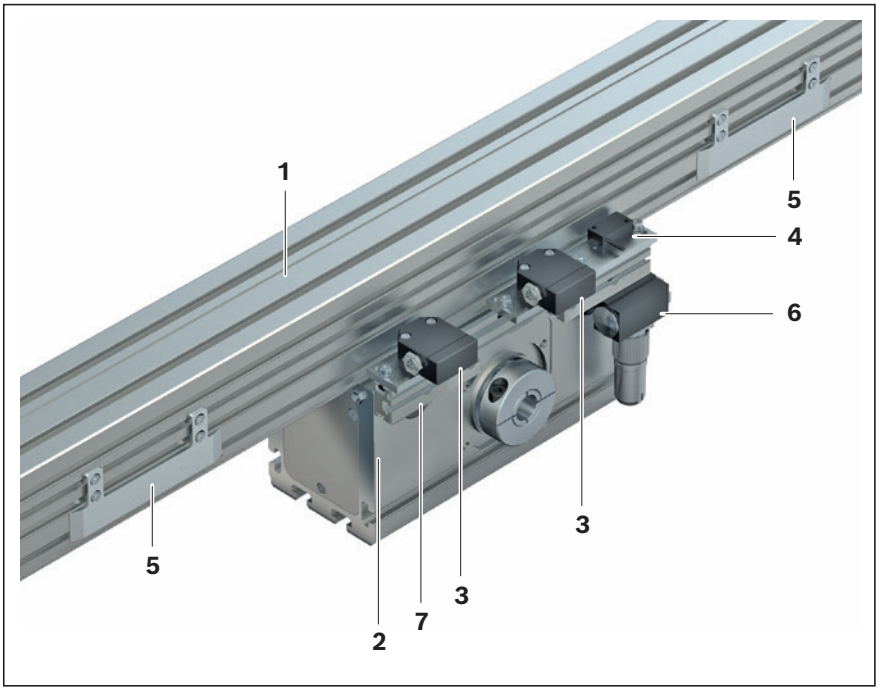


Product overview

Structural design

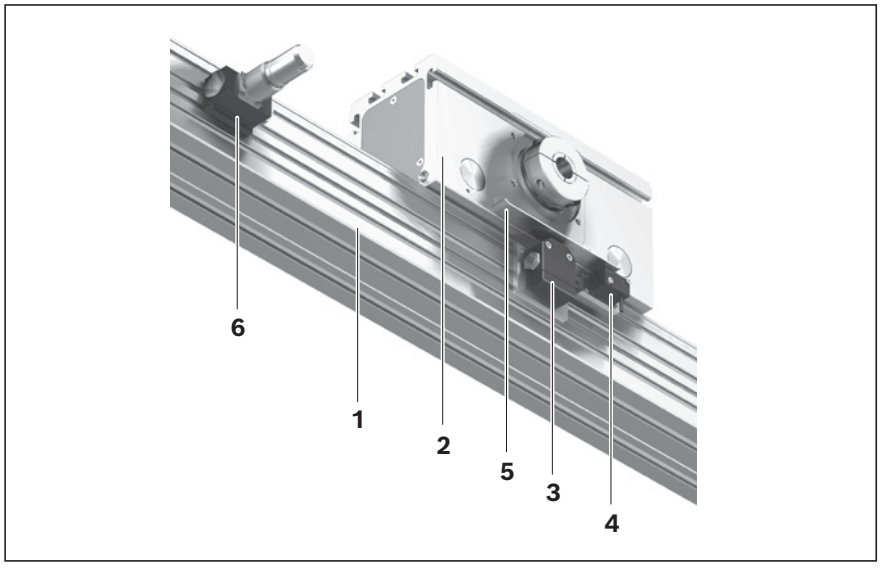
Attachments

Frame moves (carriage fastened)



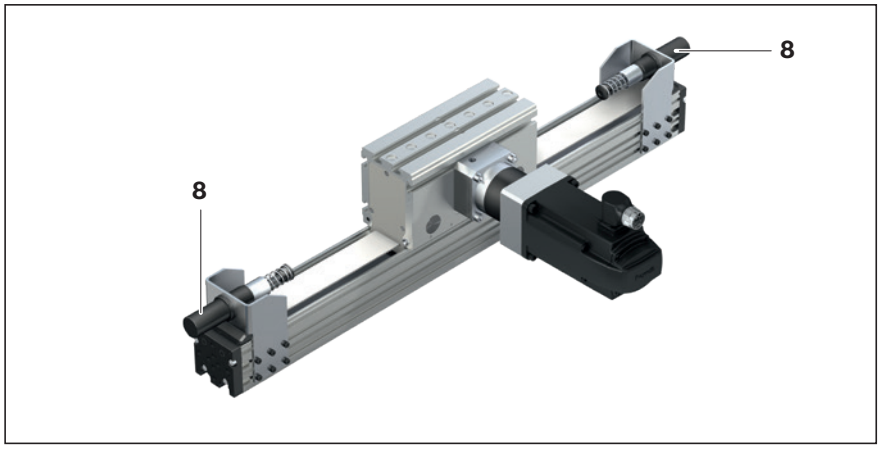
1 Frame
2 Carriage
3 Mechanical switch (with attachments)
4 Proximity switch (with attachments)
5 Control strip on the frame
6 Socket and connector
7 Switch mounting profile

Carriage moves (frame fastened)



1 Frame
2 Carriage
3 Mechanical switch (with attachments)
4 Proximity switch (with attachments)
5 Switching cam (on carriage)
6 Socket and connector

Accessories



8 Shock absorbers

Shock absorbers are available as accessories and can be ordered separately with the corresponding material number (see Page 72).

Form of delivery

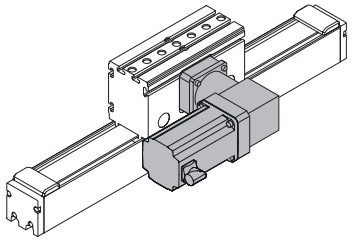
Version

Omega modules come fully assembled. In addition to the mounted Omega module, there is also the option to have the motor attachment and motor mounted, if they have been ordered.

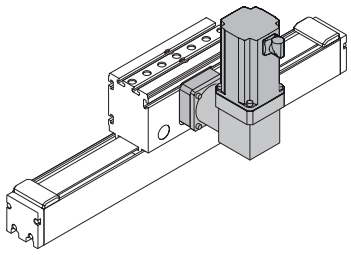
Motor attachment

If a combination of motor and motor attachment has been ordered, then the components are attached as shown in the figure, which also shows the location of the motor connector.
The motor attachment variant is selected and determined during product configuration and is a part of the ordering code.

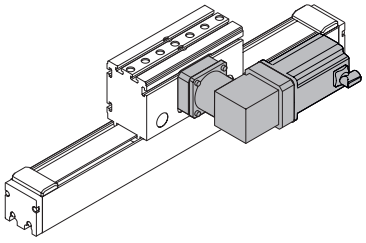
MG01



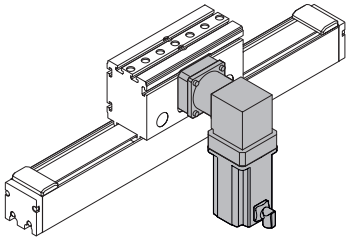
MG02



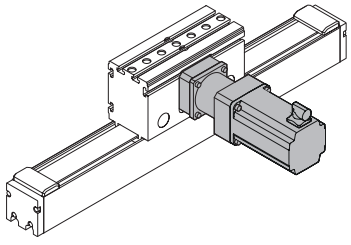
MG03



MG04



MG10



Accessories

Optional accessories such as cable duct, switch, switching cam and socket with connector are included as loose parts.

Lubrication

Omega modules come with initial greasing. For more information on lubricants, see chapter "Lubrication".

Documentation

Each Omega module comes with the instructions necessary for mounting and maintenance, as well as safety instructions and a declaration of incorporation.

Technical data

General technical data

Observe the chapter "Calculation" Page 20!

Size	Carriage	Dynamic characteristic values			Maximum permissible loads					Clamping unit	
	L_{ca}	C_{gw} Guideway	M_t	M_L	$M_{x\,max}$	$M_{y\,max}$	$M_{z\,max}$	$F_{y\,max}$	$F_{z\,max}$	Carriage type	Holding force
	(mm)	(N)	(Nm)	(Nm)	(Nm)	(Nm)	(Nm)	(N)	(N)		(N)
OBB-055	230	20 790	195	1,400	62	440	440	6,500	6,500	without	–
										with	400
OBB-085	260	60 600	860	4 610	280	1,500	1,500	19 760	19 760	without	–
	308	60 600	860	6 100	280	1 960	1 960	19 760	19 760	with	750
OBB-120	330	96 200	2 360	10 390	776	3 424	3 424	31 700	31 700	without	–
										with	1 300

Drive data

Size	Gear type	i	M_P[3]	u[3]	v_{max}[3]	M_{Rs}[3]	Moving part (carriage / frame	$k_{J\,fix}$[3]	$k_{J\,var}$[3]	$k_{J\,m}$[3]	d_3	Belt type B_t	F_{bp}[1]	$F_{t\,perm}$[2]	a_{max}
			(Nm)	(mm/rev)	(m/s)	(Nm)		(kg/mm²)	(kg/mm)	(mm²)	(mm)		(N)	(N)	(m/s²)
OBB-055	without	1	12.0	165.00	5.00	1.10	TT	3 249.16	0.0000	689.59	52.52	25AT5	460	1750	50
							HK	718.37	2.9825						
	PG	3	4.0	55.00	4.12	0.52	TT	458.80	0.0000	76.62					
							HK	93.32	0.3314						
		5	2.4	33.00	2.47	0.32	TT	168.11	0.0000	27.58					
							HK	36.53	0.1193						
		8	1.5	20.63	1.55	0.24	TT	69.12	0.0000	10.77					
							HK	17.72	0.0466						
	WPG	3	4.0	55.00	4.12	0.67	TT	531.20	0.0000	76.62					
							HK	104.42	0.3314						
		5	2.4	33.00	2.47	0.47	TT	201.28	0.0000	27.58					
							HK	47.63	0.1193						
		8	1.5	20.63	1.55	0.34	TT	88.84	0.0000	10.77					
							HK	28.82	0.0466						
OBB-085	without	1	40.0	255.00	5.00	3.00	TT	20 052.44	0.0000	1 647.14	81.17	50AT5	992	3,500	50
							HK	2 724.50	18.0527						
	PG	5	8.0	51.00	3.40	1.00	TT	1 077.70	0.0000	65.89					
							HK	153.98	0.7221						
		8	5.0	31.88	2.13	0.63	TT	442.40	0.0000	25.74					
							HK	81.57	0.2821						
	WPG	5	8.0	51.00	2.85	1.30	TT	1271.13	0.0000	65.89					
							HK	195.88	0.7221						
		8	5.0	31.88	2.13	0.93	TT	543.49	0.0000	25.74					
							HK	123.47	0.2821						
OBB-120	without	1	154.0	340.00	5.00	6.00	TT	62121.14	0.0000	2 928.43	108.23	70AT10	2 844	11 750	50
							HK	13 655.57	50.1933						
	PG	9	17.1	37.78	2.20	1.57	TT	1 310.92	0.0000	36.15					
							HK	430.59	0.6197						
	WPG	9	17.1	37.78	1.86	2.02	TT	1 838.85	0.0000	36.15					
							HK	741.59	0.6197						

1) Maximum force that can be transmitted via the teeth meshing with the belt pulley.
2) The maximum permissible tensile load on the belt cross section (belt elasticity limit) is given here for easier comparability. This value represents the load limit in terms of plastic deformation and must not be used to calculate the max. permissible drive torque.
3) The stated values apply to the combination shown in each case (OBB without gear or OBB with gear) and have been reduced in relation to the specified motor shaft. When using the values, see the chapter "Calculation".

	Length			Application point of the acting force	Version	Carriage mass m_{ca} (kg)		Frame mass			
	L_{ad} [2]	s_{min} [1]	L_{max}	$z_{1\ (mm)}$		Clamping unit		$k_{g\ fix}$	$k_{g\ var}$	I_y	I_z
	(mm)	(mm)	(mm)	(mm)		without	with	(kg)	(kg/mm)	(cm^4)	(cm^4)
	130	110	5,500	93.5	Drive i=1	3.82	4.01	0.55	0.004	24	39
	166				with PG	5.13	5.32				
					with WPG	5.93	6.12				
	120	160	5,500	156	Drive i=1	9.56	11.25	1.05	0.011	148	244
	156				with PG	13.38	15.07				
					with WPG	15.68	17.37				
	170	135	5,500	185	Drive i=1	17.70	18.45	3.08	0.017	664	725
	206				with PG	27.48	28.23				
					with WPG	34.08	34.83				

1) Minimum required travel range to ensure a reliable lubrication distribution, see "Operating conditions".
For short-stroke applications with travel ranges < s_{min}, please consult us.

2) Dimension L_{ad} is required for length calculation (see the chapter "Configuration and ordering" for the respective sizes)

PG = Planetary gear
WPG = Angular planetary gear
TT = Carriage
HK = Frame

Note
Values for the gear are not listed in the "Technical data" tables because the gear is part of the linear motion system and is already taken into account in the technical values.

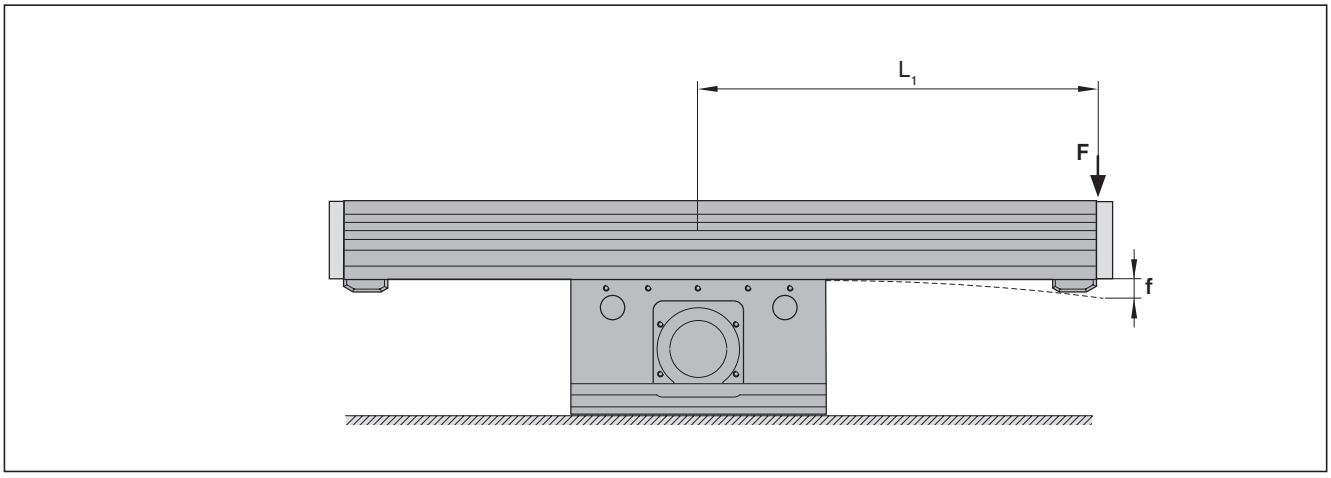
Omega module mass
Weight calculation without motor and switch

$$m_s = k_{g\ fix} + k_{g\ var} \cdot L + m_{ca}$$

Technical data

Bending

A particular feature of Omega modules is that they can be fastened at the carriage, whereby the frame moves and extends into the working area, for example.
If a force (**F**) (operating direction transverse to the direction of travel **X**) acts on the protruding frame in the area of the end block, then the frame will physically undergo a bending (**f**) depending on the length ($\mathbf{L_1}$) (distance between the center of the carriage to the end of the frame).
When using the OBB as a vertical axis in a gantry, for example, the bending of the frame is caused by the acceleration forces of the horizontal axes.
This deflection is reversible, which means that the bending is caused for as long as the acceleration forces are applied.



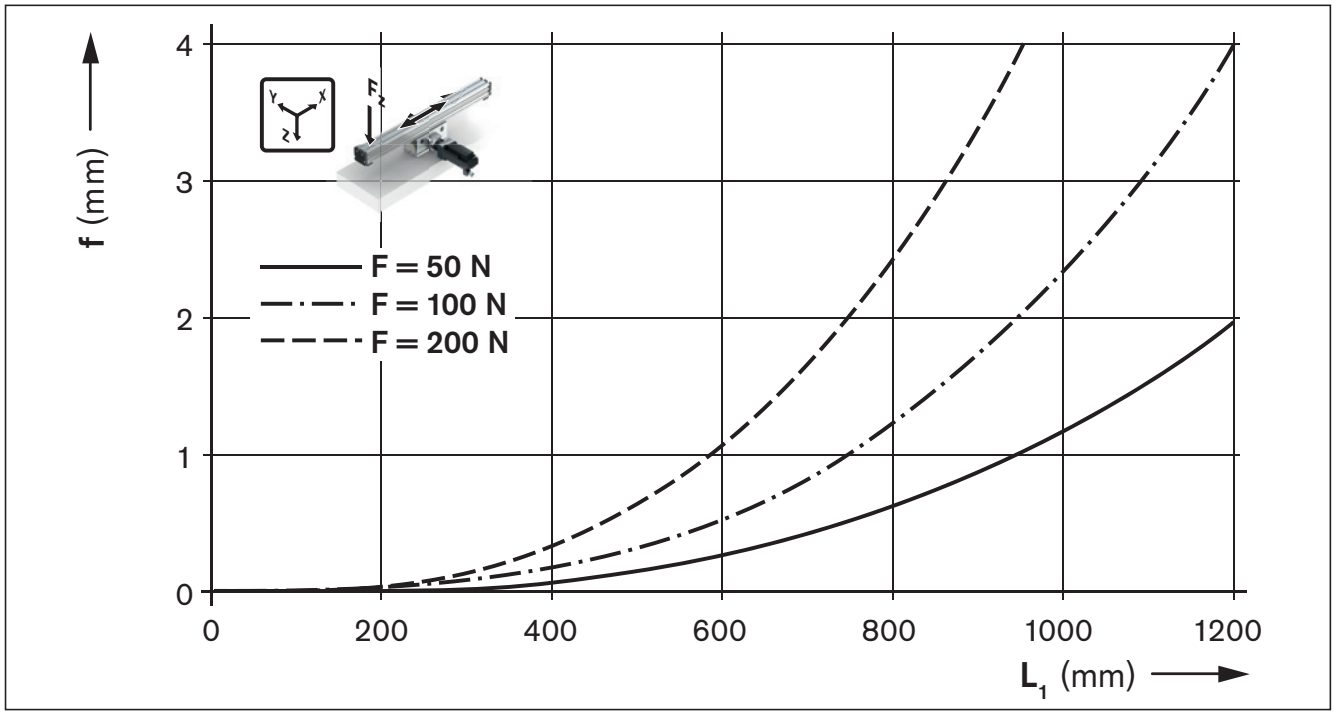
Example

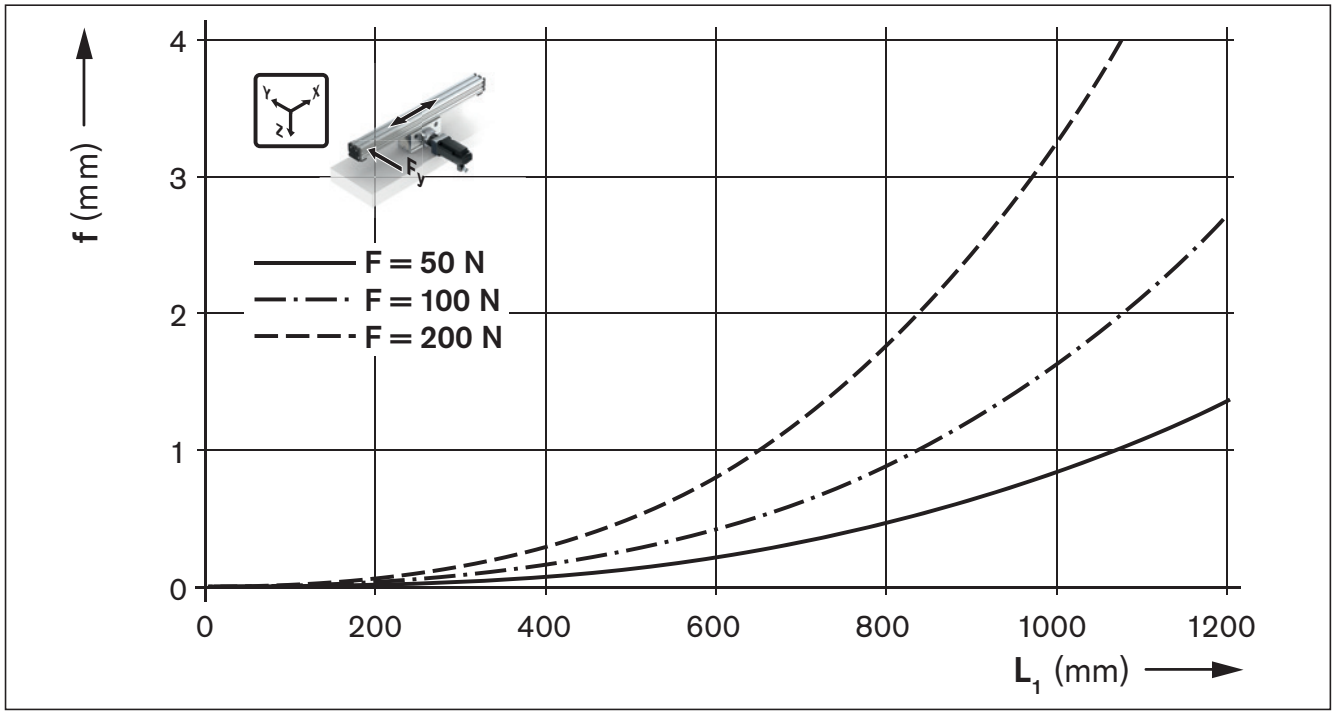
Omega module OBB-055:
L_1 = 800 mm
F = 100 N, action of force in z-direction
f = 1.2 mm

Bending diagramsfor loads from z- and y-direction

OBB-055

The following diagrams apply to fastened carriages that have full contact to the mounting base (see chapter "Fastening at carriage" on Page 66).
For larger lengths or loads please contact us.





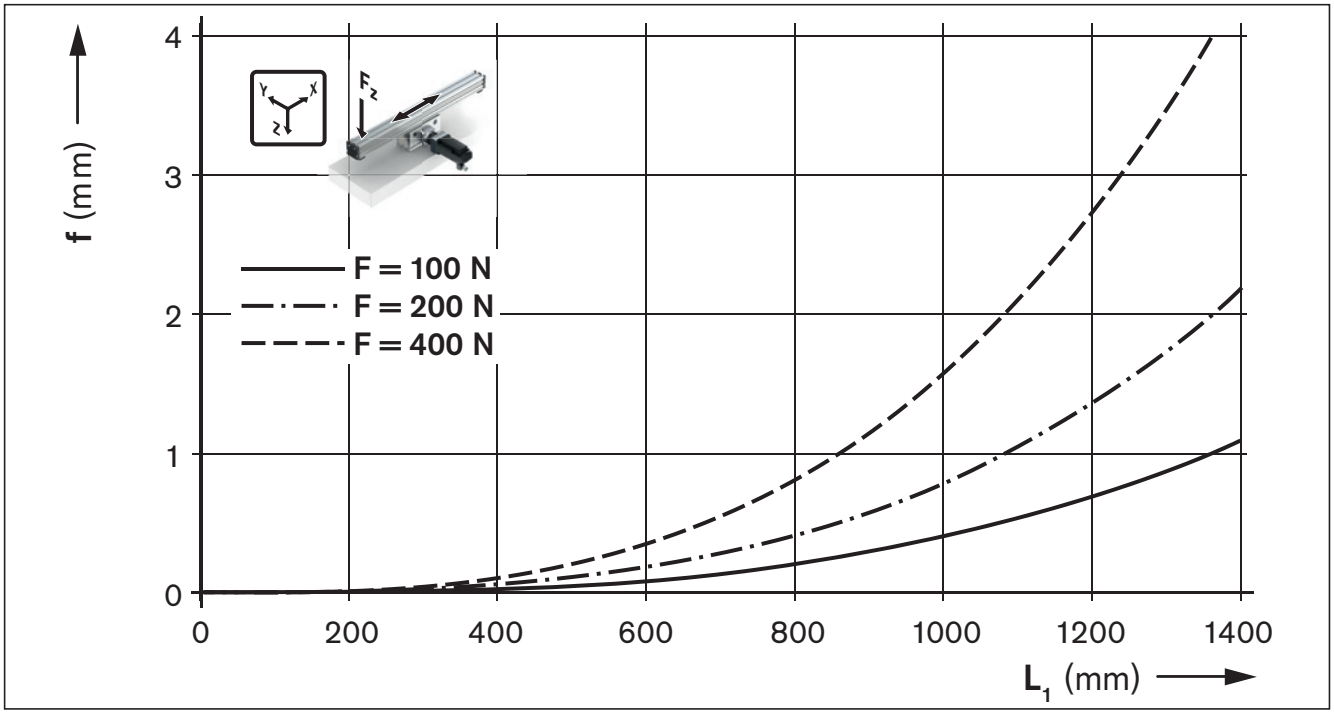
Technical data

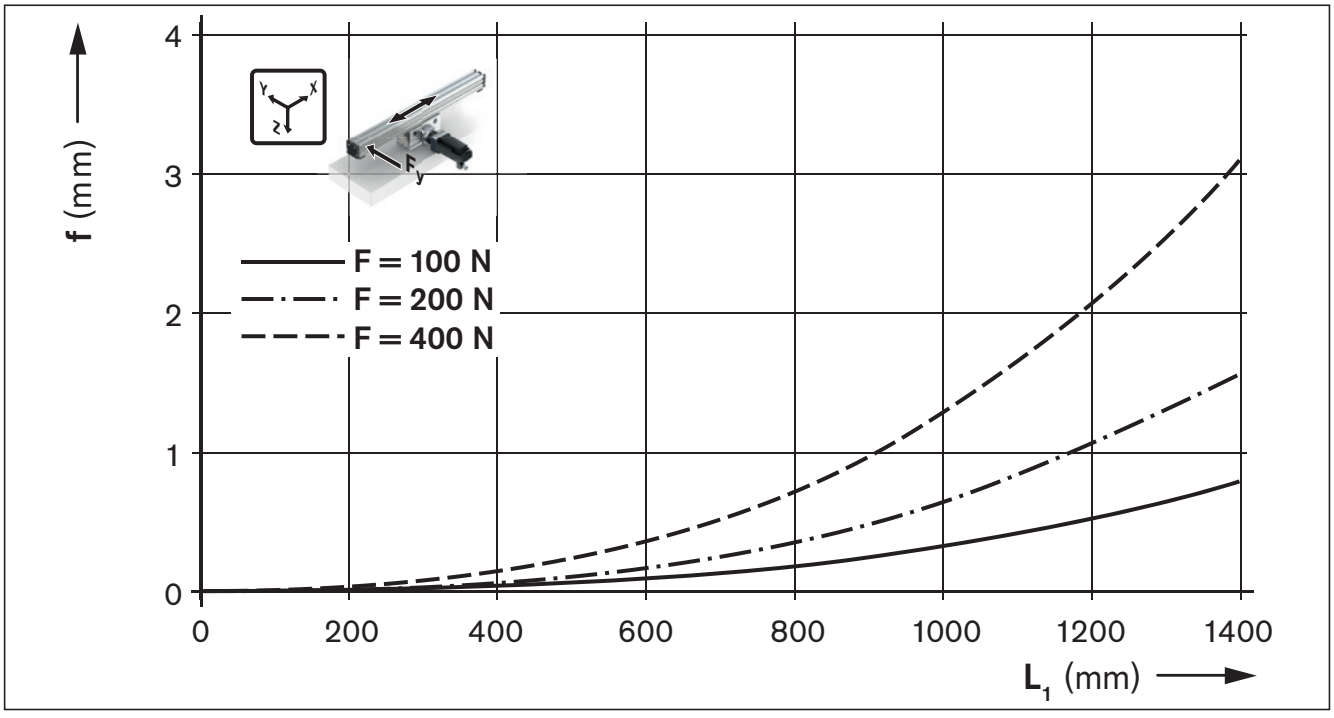
Bending

Bending diagrams for loads from z- and y-direction

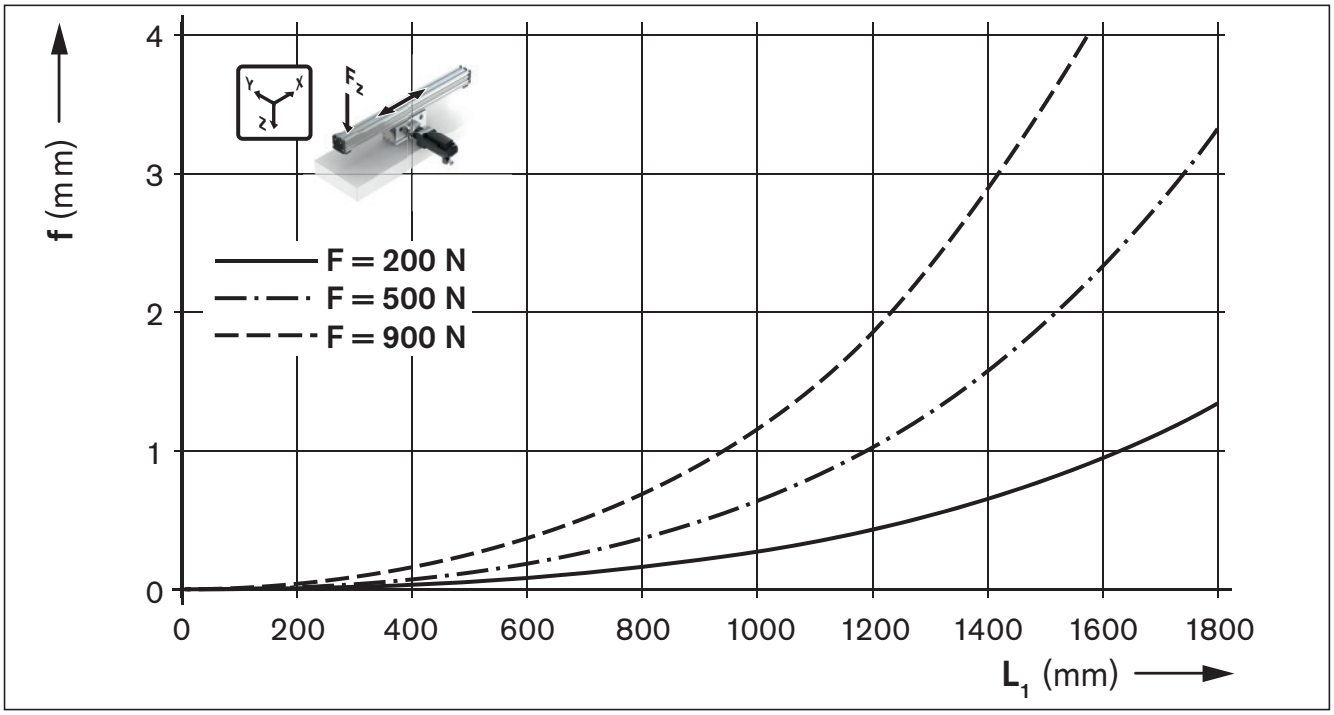
OBB-085

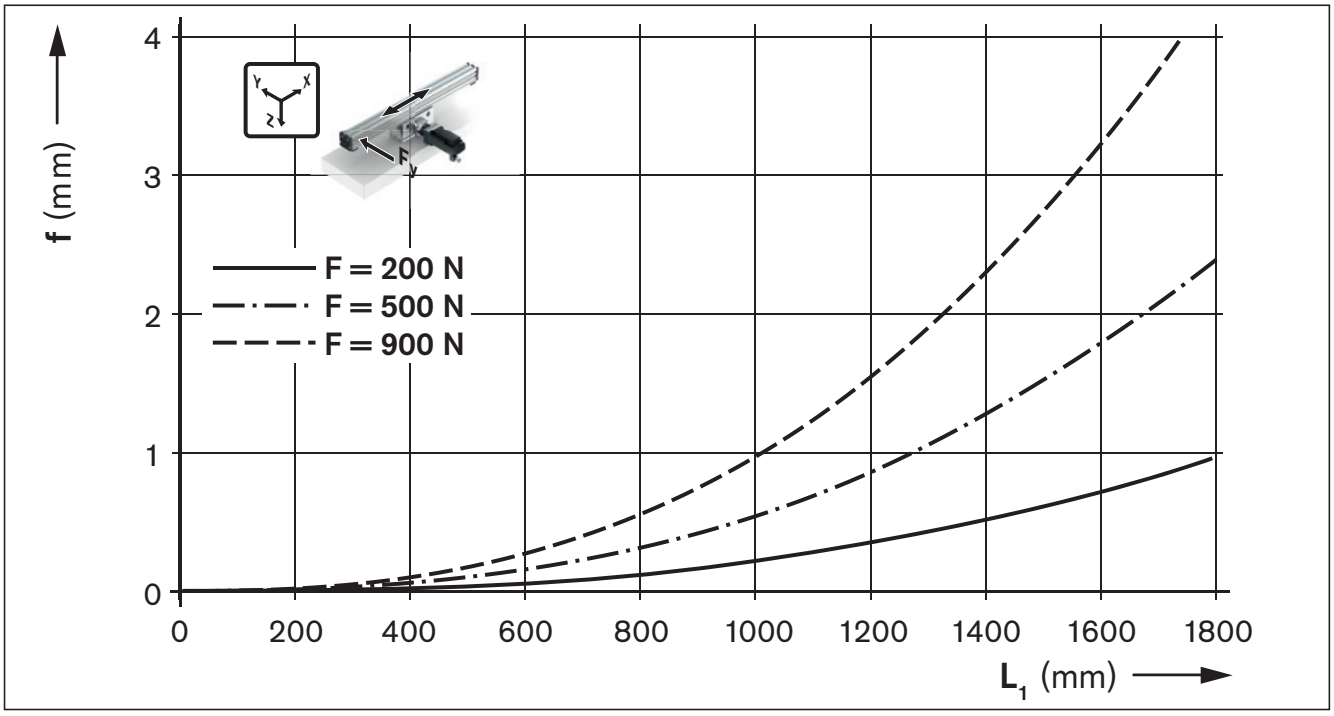
The following diagrams apply to fastened carriages that have full contact to the mounting base (see chapter "Fastening at carriage" on Page 66).
For larger lengths or loads please contact us.





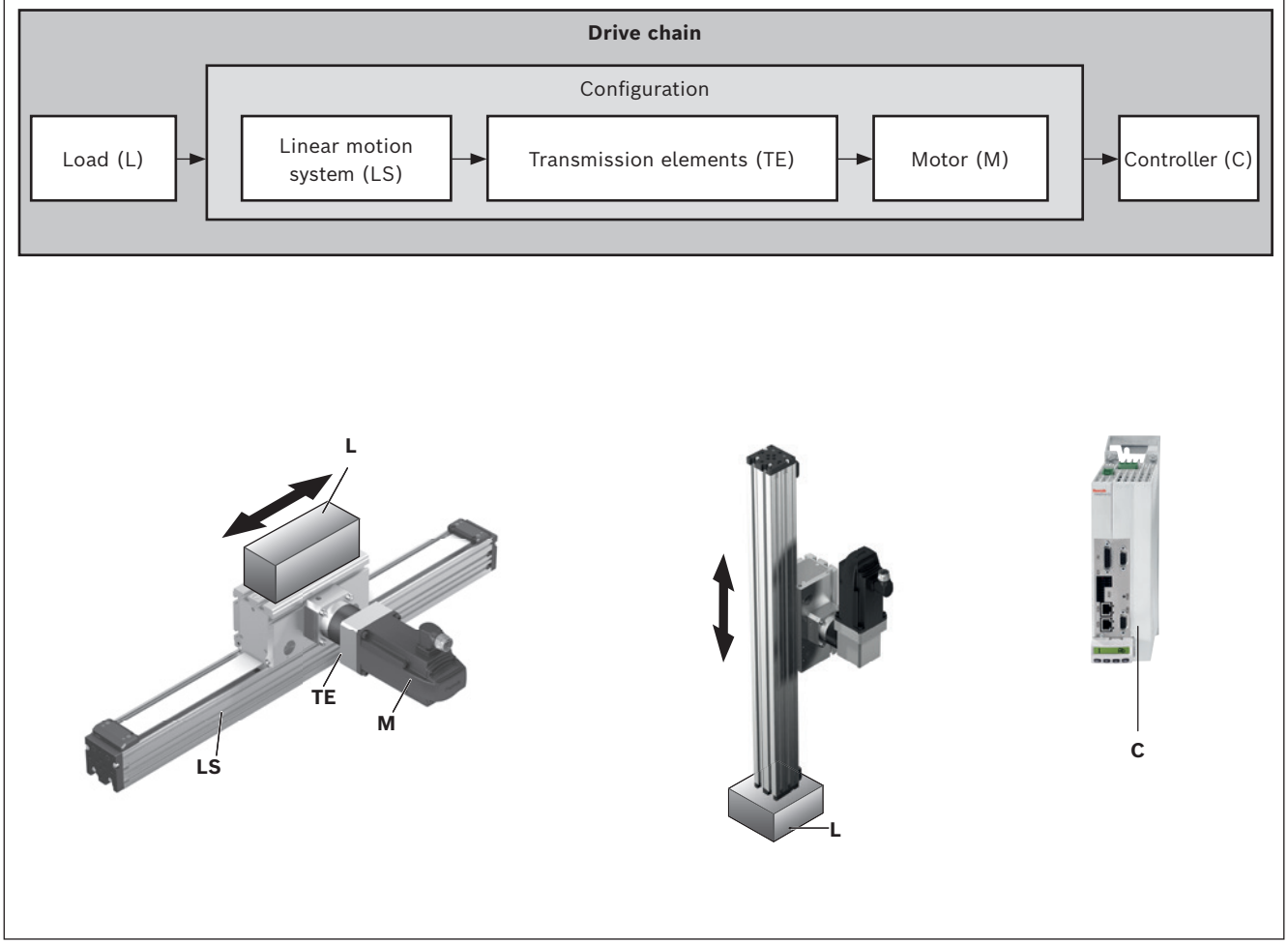
OBB-120


f (mm)
4
3
2
1
0
0
200
400
600
800
1000
1200
1400
1600
1800
L1 (mm)
F = 200 N
F = 500 N
F = 900 N
Y
X
Z
Fz


f (mm)
4
3
2
1
0
0
200
400
600
800
1000
1200
1400
1600
1800
L1 (mm)
F = 200 N
F = 500 N
F = 900 N
Y
X
Z
Fy

Calculation

Calculation principles



The correct dimensioning and assessment of an application requires structured consideration of the drive chain as a whole.

The basic element of the drive chain is the configuration – made up of the linear motion system, the transmission element (gear unit) and the motor – which can be ordered in that constellation in the catalog.

For the explanation of the abbreviations refer to ➠ chapter "Abbreviations"

Maximum permissible load

When selecting linear motion systems, the maximum permissible loads and forces must be taken into account; they can be found in the chapter "General technical data" on page 10. The values in this chapter are system-based, i.e. the limits are based not only on the load capacity of the bearings, but also on design/material limits.

Conditions for combined loads:

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

Service life

The service life of the rolling bearing points contained in a linear motion system can be calculated using the formulas given below.
The rolling bearing point that is relevant to the life in a linear motion system with toothed belt drive is generally the linear guideway.
The computed service life specification for the linear motion system is decisively determined by the service life specification of the linear guide.

Linear guide service life

The linear guideway in the linear motion system must withstand the load, the lateral moments of motor attachment / motor as well as any process forces that occur.

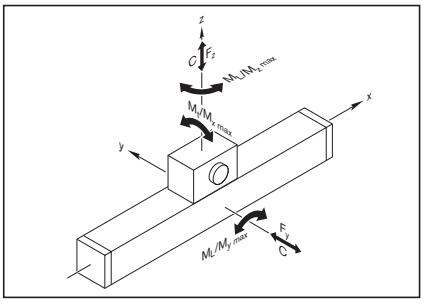
Nominal service life

Nominal service life in meters:

$$L_{gw} = \left(\frac{C_{gw}}{F_{mgw}}\right)^3 \cdot 10^5$$

Nominal service life in hours:

$$L_{hgw} = \frac{L_{gw}}{3600 \cdot v_{mgw}}$$



Dynamically equivalent load on bearing of the guideway:

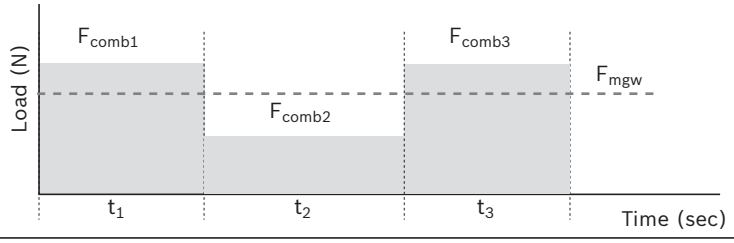
$$F_{mgw} = \sqrt[3]{|F_{eff1}|^3 \cdot \frac{q_{t1}}{100\%} + |F_{eff2}|^3 \cdot \frac{q_{t2}}{100\%} + |F_{eff3}|^3 \cdot \frac{q_{t3}}{100\%} + |F_{effn}|^3 \cdot \frac{q_{tn}}{100\%}}$$

The following applies to linear motion systems:

$$F_{eff} = F_{comb}$$

Combined equivalent bearing load of the guideway:

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



Average speed of the guideway:

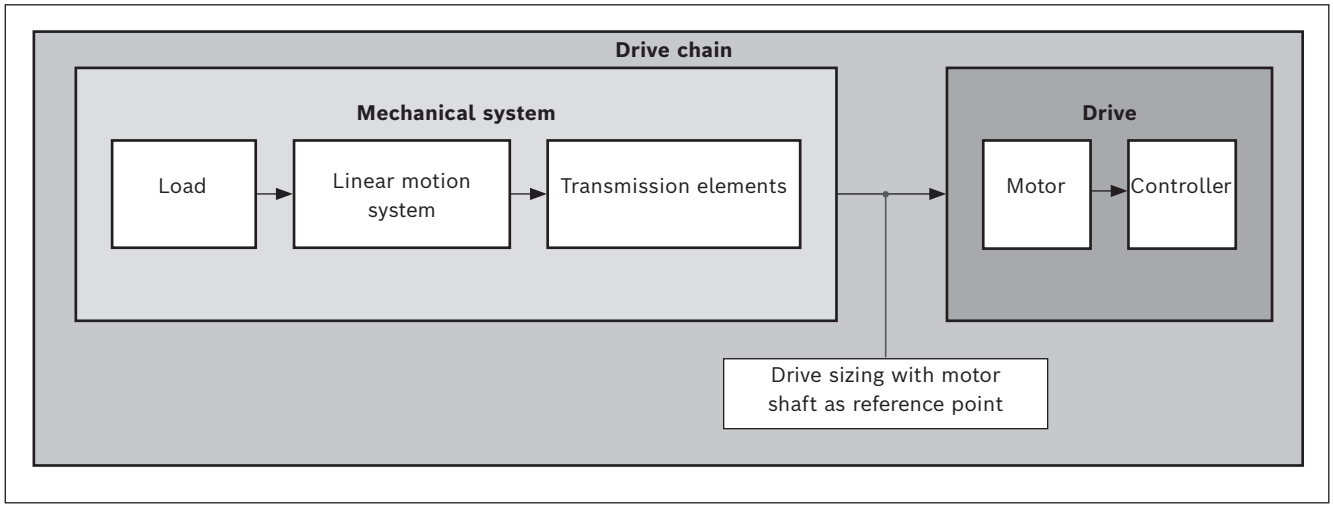
$$v_{mgw} = \frac{|v_1| \cdot q_{t1} + |v_2| \cdot q_{t2} + \cdots + |v_n| \cdot q_{tn}}{100\%}$$

Calculation

General notes

Drive sizing - Basics

For drive sizing, the drive chain can be divided into the areas mechanical system and drive system.
The **mechanical system** area includes the linear motion system component (including gear unit transmission element) and the consideration of the load.
The electric **drive** is a motor-controller combination with corresponding performance data. The sizing and/or dimensioning of the electric drive is done taking the motor shaft as a reference point.
For drive sizing, limits must be taken into account as well as base values. The limits must not be exceeded in order to avoid damaging the mechanical components.



Technical data and formula symbols for the mechanical system

The technical values for the linear motion system already contain the relevant gear data and the gear ratio. In other words, the corresponding maximum permissible limits for drive torque and speed, as well as the underlying friction torque and mass moment of inertia with respect to the motor shaft are reduced, and can be taken directly from the tables, see chapter "Drive data".

The following technical data with the associated formula symbols are used when considering the basic mechanical system requirements in the design calculations for the drive sizing. The data listed in the table below can be found in the chapter "Technical data" or is determined using formulas based on the descriptions on the following pages.

	Mechanical system	
	Load	**Linear motion system including gear transmission element**
Weight moment (Nm)	M_g [5)]	–
Friction torque (Nm)	– [4)]	M_{Rs} [3)]
Mass moment of inertia (kg/m²)	J_t [1)]	J_S [2)]
Max. permissible speed (m/s)	–	v_{max} [3)]
Max. permissible rotary speed (min⁻¹)	–	n_P [1)]
Max. permissible drive torque (Nm)	–	M_P [3)]

1) Determine the value using the appropriate formula
2) Length-dependent value, determined using the appropriate formula
3) Use the value from the table
4) Any additional process forces are to be taken into consideration as load moments
5) For vertical installation position: Determine the value using the appropriate formula

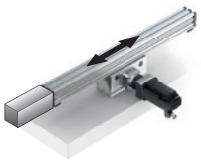
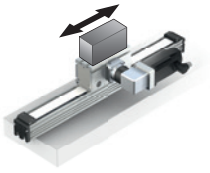
Drive sizing with motor shaft as reference point:

When sizing the drive, all relevant design calculation values for the mechanical components in the drive chain have to be determined and be expressed/reduced to the motor shaft. In other words, for a combination of mechanical components within the drive chain, this will result in one value for each of the following:
- Friction torque $\mathbf{M_R}$
- Mass moment of inertia $\mathbf{J_{ex}}$
- Max. permissible speed $\mathbf{v_{mech}}$ and/or max. permissible rotary speed $\mathbf{n_{mech}}$
- max. permissible drive torque $\mathbf{M_{mech}}$

The determination of the values for the **mechanical system** contained in the drive chain in relation to the motor shaft as a reference point differs with regard to the "frame moves" and "carriage moves" constellation and the corresponding formulas are presented to illustrate the differences. For better clarity, the installation positions "**horizontal**" and "**vertical**" are considered and shown in separate chapters.

Calculation

Installation position HORIZONTAL

Installation case	Frame moves	Carriage moves	
			For an explanation of the abbreviations, see ➠ the chapter "Abbreviations"

Friction torque M_R

The value for the friction torque of the linear motion system already includes the friction for an appropriately configured gear unit and has been reduced with reference to the motor shaft.

Friction torque	Frame moves	Carriage moves	
	$M_R = M_{Rs}$	$M_R = M_{Rs}$	For an explanation of the abbreviations, see ➠ the chapter "Abbreviations"

Mass moment of inertia J_{ex}

The constants $k_{J\,fix}$, $k_{J\,var}$ and $k_{J\,m}$ used in the formulas are determined depending on the installation case "frame moves" or "carriage moves" and can therefore be found in the table "Drive data" on page 10. The inertia of a configured gear is already taken into account and reduced in relation to the motor shaft.

	Frame moves	Carriage moves	
Mass moment of inertia of the mechanical system	$J_{ex} = J_s + J_t$	$J_{ex} = J_s + J_t$	
Mass moment of inertia of the linear motion system	$J_s = (k_{J\,fix} + k_{J\,var} \cdot L) \cdot 10^{-6}$	$J_s = (k_{J\,fix} + k_{J\,var} \cdot L) \cdot 10^{-6}$	
Translative mass moment of inertia of the additionally moved masses	$J_t = m_{ex} \cdot k_{J\,m} \cdot 10^{-6}$	$J_t = (m_{ex} + m_m + m_{br}) \cdot k_{J\,m} \cdot 10^{-6}$	For an explanation of the abbreviations, see ➠ the chapter "Abbreviations"

Maximum permissible speed v_{mech} and/or max. permissible rotary speed n_{mech}

The permissible rotary speed of an appropriately configured gear is already taken into account in the value for the maximum permissible speed of the linear motion system.

	Frame moves	Carriage moves	
Maximum permissible speed	$v_{mech} = v_{max}$	$v_{mech} = v_{max}$	
Maximum permissible rotary speed	$n_{mech} = \frac{v_{mech} \cdot i \cdot 1\,000 \cdot 60}{\pi \cdot d_3}$	$n_{mech} = \frac{v_{mech} \cdot i \cdot 1\,000 \cdot 60}{\pi \cdot d_3}$	For an explanation of the abbreviations, see ➠ the chapter "Abbreviations"

Maximum permissible drive torque M_{mech}

The lowest (minimum) of all the values for permissible drive torque of all mechanical components contained in the drive chain determines the maximum permissible drive torque of the mechanical system which has to be taken into consideration as the upper limit for the drive when sizing the motor.

	Frame moves	Carriage moves	
Maximum permissible drive torque	$M_{mech} = M_p$	$M_{mech} = M_p$	For an explanation of the abbreviations, see ➠ the chapter "Abbreviations"

⚠ When considering the complete drive chain (mechanical system + motor/controller), the maximum torque of the motor can lie below the limit for the mechanical system (Mmech) and thus limit the maximum permissible drive torque of the overall drive chain.
If the maximum torque of the motor lies above the limit for the mechanical system (Mmech), the maximum motor torque must be limited to the permissible value for the mechanical system.

General motor preselection
The motor can be generally preselected using the following conditions.

Condition 1
The rotary speed of the motor must be greater than or equal to the rotary speed of the mechanical system (but not exceed the maximum permissible limit value).

$$n_{max} \geq n_{mech}$$

Calculation

Installation position HORIZONTAL

Condition 2
Consideration of the ratio of mass moments of inertia of the mechanical system and the motor. The mass moment of inertia ratio serves as an indicator for the control performance of a motor-controller combination. The mass moment of inertia of the motor is directly related to the motor size.

$$V = \frac{J_{ex}}{J_m + J_{br}}$$

For preselection, experience has shown that the following ratios will result in high control performance. These are not rigid limits, but values exceeding them will require closer consideration of the specific application.

Application area	V
Handling	≤ 6.0
Machining	≤ 1.5

Condition 3
Estimation of the torque ratio of the static load moment to the continuous torque of the motor.
The torque ratio must be less than or equal to an empirical value of 0.6. This condition roughly factors in the dynamic characteristics of an exact motion profile that are still missing here with the required motor torques.

$$\frac{M_{stat}}{M_0} \leq 0.6$$

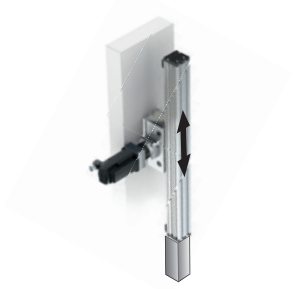
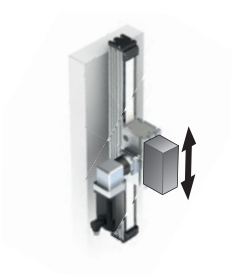
	Frame moves	Carriage moves	
Static load moment	$M_{stat} = M_R$	$M_{stat} = M_R$	For an explanation of the abbreviations, see ➠ the chapter "Abbreviations"

Potential additional forces by using e.g. energy chains are not included in the consideration of the moved total mass and must also be taken into account in the calculation, if applicable.

In the **Configuration and ordering** overview, users can put together standard configurations, including gears and motor, for the various linear motion system sizes by selecting the appropriate options. By checking the three conditions, it is possible to see whether a standard motor selected in a particular configuration will generally be of a suitable size for the specific application.

Precise drive sizing
Preselecting the motor according to this rough guide is no substitute for the required precise design calculations for the drive, taking all moments/torques and rotary speed levels into account. For precise calculation of the electric drive, including consideration of the specific motion profile, please refer to the performance data in the catalogs **IndraDrive Cs** and **IndraDrive C**.
When sizing the drive, the maximum permissible values for speed, drive torque and acceleration must not be exceeded, in order to avoid damaging the mechanical system.

Installation position VERTICAL

Installation case	Frame moves	Carriage moves
		

For an explanation of the abbreviations, see ➠ the chapter "Abbreviations"

Friction torque M_R

The value for the friction torque of the linear motion system already includes the friction for an appropriately configured gear unit and has been reduced with reference to the motor shaft.

Friction torque	Frame moves	Carriage moves
	$M_R = M_{Rs}$	$M_R = M_{Rs}$

For an explanation of the abbreviations, see ➠ the chapter "Abbreviations"

Mass moment of inertia J_{ex}

The constants $k_{J\,fix}$, $k_{J\,var}$ and $k_{J\,m}$ used in the formulas are determined depending on the installation case "frame moves" or "carriage moves" and can therefore be found in the table "Drive data" on page 10. The inertia of a configured gear is already taken into account and reduced in relation to the motor shaft.

	Frame moves	Carriage moves
Mass moment of inertia of the mechanical system	$J_{ex} = J_s + J_t$	$J_{ex} = J_s + J_t$
Mass moment of inertia of the linear motion system	$J_s = (k_{J\,fix} + k_{J\,var} \cdot L) \cdot 10^{-6}$	$J_s = (k_{J\,fix} + k_{J\,var} \cdot L) \cdot 10^{-6}$
Translative mass moment of inertia of the additionally moved masses	$J_t = m_{ex} \cdot k_{J\,m} \cdot 10^{-6}$	$J_t = (m_{ex} + m_m + m_{br}) \cdot k_{J\,m} \cdot 10^{-6}$

For an explanation of the abbreviations, see ➠ the chapter "Abbreviations"

Calculation

Installation position VERTICAL

Maximum permissible speed v_{mech} and/or max. permissible rotary speed n_{mech}

The permissible rotary speed of an appropriately configured gear is already taken into account in the value for the maximum permissible speed of the linear motion system.

	Frame moves	Carriage moves	
Maximum permissible speed	$v_{mech} = v_{max}$	$v_{mech} = v_{max}$	
Maximum permissible rotary speed	$n_{mech} = \frac{v_{mech} \cdot i \cdot 1\,000 \cdot 60}{\pi \cdot d_3}$	$n_{mech} = \frac{v_{mech} \cdot i \cdot 1\,000 \cdot 60}{\pi \cdot d_3}$	For an explanation of the abbreviations, see ➠ the chapter "Abbreviations"

Maximum permissible drive torque M_{mech}

The lowest (minimum) of all the values for permissible drive torque of all mechanical components contained in the drive chain determines the maximum permissible drive torque of the mechanical system which has to be taken into consideration as the upper limit for the drive when sizing the motor.

	Frame moves	Carriage moves	
Maximum permissible drive torque	$M_{mech} = M_p$	$M_{mech} = M_p$	For an explanation of the abbreviations, see ➠ the chapter "Abbreviations"

⚠ When considering the complete drive chain (mechanical system + motor/controller), the maximum torque of the motor can lie below the limit for the mechanical system (M_{mech}) and thus limit the maximum permissible drive torque of the overall drive chain.
If the maximum torque of the motor lies above the limit for the mechanical system (M_{mech}), the maximum motor torque must be limited to the permissible value for the mechanical system.

General motor preselection
The motor can be generally preselected using the following conditions.

Condition 1
The rotary speed of the motor must be greater than or equal to the rotary speed of the mechanical system (but not exceed the maximum permissible limit value).

$$n_{max} \geq n_{mech}$$

Condition 2
Consideration of the ratio of mass moments of inertia of the mechanical system and the motor. The mass moment of inertia ratio serves as an indicator for the control performance of a motor-controller combination. The mass moment of inertia of the motor is directly related to the motor size.

$$V = \frac{J_{ex}}{J_m + J_{br}}$$

For preselection, experience has shown that the following ratios will result in high control performance. These are not rigid limits, but values exceeding them will require closer consideration of the specific application.

Application area	V
Handling	≤ 6.0
Machining	≤ 1.5

Condition 3
Estimation of the torque ratio of the static load moment to the continuous torque of the motor.
The torque ratio must be less than or equal to an empirical value of 0.6.
This condition roughly factors in the dynamic characteristics of an exact motion profile that are still missing here with the required motor torques.

$$\frac{M_{stat}}{M_0} \leq 0.6$$

	Frame moves	Carriage moves
Static load moment	$M_{stat} = M_R + M_g$	$M_{stat} = M_R + M_g$
Weight moment	$M_g = d_3 \cdot \frac{m_{tot\ mb} \cdot g}{2000 \cdot i}$	$M_g = d_3 \cdot \frac{m_{tot\ ca} \cdot g}{2000 \cdot i}$
Moved total mass	$m_{tot\ mb} = m_{ex} + m_{mb}$ $m_{mb} = k_{g\ fix} + k_{g\ var} \cdot L$	$m_{tot\ ca} = m_{ex} + m_{ca} + m_m + m_{br}$

For an explanation of the abbreviations, see ➠ the chapter "Abbreviations"

Potential additional forces by using e.g. energy chains are not included in the consideration of the moved total mass and must also be taken into account in the calculation, if applicable.

In the **Configuration and ordering** overview, users can put together standard configurations, including gears and motor, for the various linear motion system sizes by selecting the appropriate options. By checking the three conditions, it is possible to see whether a standard motor selected in a particular configuration will generally be of a suitable size for the specific application.

Precise drive sizing
Preselecting the motor according to this rough guide is no substitute for the required precise design calculations for the drive, taking all moments/torques and rotary speed levels into account. For precise calculation of the electric drive, including consideration of the specific motion profile, please refer to the performance data in the catalogs **IndraDrive Cs** and **IndraDrive C**.
When sizing the drive, the maximum permissible values for speed, drive torque and acceleration must not be exceeded, in order to avoid damaging the mechanical system.

Calculation

Calculation example

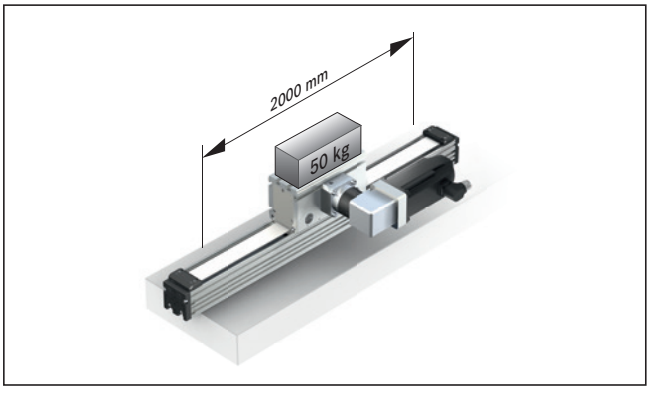
Installation position HORIZONTAL

Arrangement: Carriage moves (frame fastened at the mounting base)

Given data

In a handling task, an object with a mass of 50 kg needs to be moved horizontally 2000 mm at a speed of 1.5 m/s. The frame is to be fastened to the mounting base (carriage moves). No additional axial forces act. The following was selected based on the technical data and the installation space:

Omega module OBB-120:
- Carriage length = 330 mm (without clamping unit)
- Motor attachment via angular planetary gear, i = 9
- with servo motor MS2N06-D1BNN without brake



Module length L:
(In most cases, the general guideline value for excess travel is 2x lead constant. The excess travel must be greater than the excess travel stopping distance, which is calculated for exact sizing of the electrical drive.)

$L = s_{max} + L_{ca} + L_{ad}$

Excess travel: $s_e = 2 \cdot u = 2 \cdot 37.78 = 75.74 = 76$ mm

Max. travel range: $s_{max} = s_{eff} + 2 \cdot s_e = 2000 + 2 \cdot 76 = 2152$ mm

OBB length: $L = 2152 + 330 + 170 = 2652$ mm

Friction torque M_R: (including gear unit with gear ratio i = 9)

$M_R = M_{Rs}$

Linear module: $M_{Rs} = 2.02$ Nm

Mass moment of inertia J_{ex}: (including gear unit with gear ratio i = 9)

$J_{ex} = J_s + J_t$

OBB: $J_s = (k_{J\,fix} + k_{J\,var} + L) \cdot 10^{-6} = (1838.85 + 0 \cdot 2652) \cdot 10^{-6} = 1838.85 \cdot 10^{-6}$ kg/m²

External load: $J_t = (m_{ex} + m_m + m_{br}) \cdot k_{J\,m} \cdot 10^{-6} = (50 + 9 + 0) \cdot 36.15 \cdot 10^{-6} = 2132.85 \cdot 10^{-6}$ kgm²

Mass moment of inertia: $J_{ex} = 1838.85 \cdot 10^{-6} + 2132.85 \cdot 10^{-6} = 3971.70 \cdot 10^{-6}$ kgm²

Maximum permissible rotary speed n_{mech}: (Motor attachment via gear, without considering the motor)
Application tolerance

$n_{mech} = (V_{mech} \cdot i \cdot 1000 \cdot 60) / \pi \cdot d3$

Max. permissible speed: $V_{mech} = V_{max} = 1.86$ m/s

Max. permissible rotary speed: $n_{mech} = (1.86 \cdot 9 \cdot 1000 \cdot 60) / \pi \cdot 108.23) = 2954$ min⁻¹

Maximum rotary speed of application M_{mech}: (Motor attachment via gear) Application tolerance

Speed: $v_{mech} = 1.5$ m/s

Rotary speed: $n_{mech} = (1.5 \cdot 9 \cdot 1000 \cdot 60) / \pi \cdot 108.23) = 2382$ min⁻¹

Maximum permissible drive torque M_{mech}: (Motor attachment via gear) Application tolerance

$M_{mech} = M_P$

Drive torque: $M_{mech} = 17.1$ Nm

Motor preselection check: selected MS2N06-D1BNN without brake

Condition 1:
Rotary speed: $n_{max} \geq n_{mech}$; 6000 ≥ 2382; Condition met – motor size OK

Condition 2:

Mass moment of inertia ratio:	$V = J_{ex} / (J_m + J_{Br})$
Motor inertia:	$J_m = 1400 \cdot 10^{-6}$ kgm²
Brake moment of inertia:	$J_{Br} = 0$ kgm² (without brake)
Moment of inertia ratio:	V = 3971.70 · 10–6/(1 400 · 10–6 + 0 · 10–6) = 2.84
Handling condition:	V ≤ 6; 2.84 ≤ 6; Condition met – motor size OK

Condition 3:

Torque ratio:	$M_{stat} / M_0 \leq 0.6$
Static load moment:	$M_{stat} = M_R + Mg$
Weight moment:	$M_g = 0$ Nm (horizontal installation position)
Static load moment:	$M_{stat} = 2.02$ Nm
Continuous torque of the motor:	$M_0 = 9$ Nm
Torque ratio:	2.02 / 9 = 0.23: 0.23 ≤ 0.6; Condition met – motor size OK

Result:

Omega module OBB-120

Length:	L = 2652 mm
Max. travel range:	s_{max} = 2152 mm
Carriage length	L_{ca} = 330 mm
Drive:	Toothed belt drive
Motor attachment via angular planetary gear	
Gear ratio:	i = 9
Motor preselection:	MS2N06-D1BNN without brake
Arrangement:	Frame fastened at the mounting base, carriage moved, Installation position horizontal

For precise sizing of the electric drive, the motor-controller combination must always be considered, as the performance data (e.g. maximum useful speed and maximum torque) will depend on the controller used.

When doing this, the following data must be considered:

– Friction torque: $M_R = 2.02$ Nm
– Mass moment of inertia: $J_{ex} = 3971.70 \cdot 10^{-6}$ kgm²
– Speed: $v_{mech} = 1.5$ m/s ($n_{mech} = 2382$ min^{-1})
– Drive torque limit: $M_{mech} = 17.1$ Nm

The motor torque must be limited to 17.1 Nm on the drive side.

– Acceleration limit: $a_{max} = 50$ m/s²
– Limit for speed: $v_{mech} = 1.86$ m/s ($n_{mech} = 2954$ min^{-1})

After determining the excess travel stopping distance during precise sizing, the selected excess travel must be checked to see whether it is sufficient and adjusted if necessary. Besides the preferred type MS2N06, other motors with identical connection dimensions can be adapted while taking care not to exceed the calculated limit values.

For the explanation of the abbreviations refer to ➠ chapter "Abbreviations"

Calculation

Calculation example

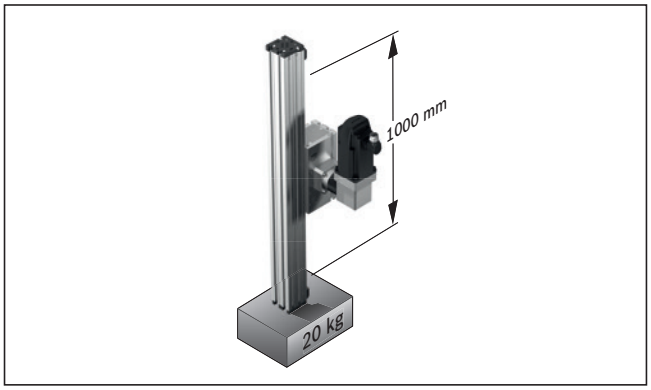
Installation position VERTICAL

Arrangement: Frame moves (carriage fastened at the mounting base)

Given data

In a handling task, an object with a mass of 20 kg needs to be moved vertically 1000 mm at a speed of 1.5 m/s. No additional axial forces act. The frame is to be inserted into the working area (frame moved).
The following was selected based on the technical data and the installation space.

Omega module OBB-085:
- Carriage length = 260 mm (without clamping unit)
- Motor attachment via angular planetary gear, i = 8
- with servo motor MS2N05-C0BTN with brake



OBB length L:
(In most cases, the general guideline value for excess travel is 2x lead constant. The excess travel must be greater than the excess travel stopping distance, which is calculated for exact sizing of the electrical drive.)

$L = s_{max} + L_{ca} + L_{ad}$
Excess travel: $s_e = 2 \cdot u = 2 \cdot 31.88 = 63.76 = 64$ mm
Max. travel range: $s_{max} = s_{eff} + 2 \cdot s_e = 1000 + 2 \cdot 64 = 1128$ mm
OBB length: $L = 1128 + 260 + 120 = 1508$ mm

Friction torque M_R: (including gear unit with gear ratio i = 8)
$M_R = M_{Rs}$
OBB: $M_{Rs} = 0.93$ Nm

Mass moment of inertia J_{ex}: (including gear unit with gear ratio i = 8)
$J_{ex} = J_s + J_t$
OBB: $J_s = (k_{J\,fix} + k_{J\,var} + L) \cdot 10^{-6} = (123.47 + 0.2821 \cdot 1508) \cdot 10^{-6} = 548.877 \cdot 10^{-6}$ kg/m²
External load: $J_t = m_{ex} \cdot k_{J\,m} \cdot 10^{-6} = 20 \cdot 25.74 \cdot 10^{-6}$ kgm² $= 514.732 \cdot 10^{-6}$ kgm²
Mass moment of inertia: $J_{ex} = 548.877 \cdot 10^{-6} + 514.732 \cdot 10^{-6} = 1063.609 \cdot 10^{-6}$ kg/m²

Maximum permissible rotary speed n_{mech}: (Motor attachment via gear, without considering the motor)
Limit for mechanical system
$n_{mech} = (V_{mech} \cdot i \cdot 1000 \cdot 60) / \pi \cdot d_3$
Max. permissible speed: $V_{mech} = V_{max} = 2.13$ m/s
Max. permissible rotary speed: $n_{mech} = (2.13 \cdot 8 \cdot 1000 \cdot 60) / \pi \cdot 81.17) = 4009$ min⁻¹

Maximum rotary speed of application M_{mech}: (Motor attachment via gear) Application tolerance
Speed: $v_{mech} = 1.5$ m/s
Rotary speed: $n_{mech} = (1.5 \cdot 8 \cdot 1000 \cdot 60) / \pi \cdot 81.17) = 2823$ min⁻¹

Maximum permissible drive torque M_{mech}: (Motor attachment via gear) Limit for mechanical system
$M_{mech} = M_P$
Drive torque: $M_{mech} = 5$ Nm

Motor preselection check:
selected motor MS2N05-C0BTN with brake

Condition 1:
Rotary speed:$n_{max} \geq n_{mech}$
6000 ≥ 2823, Condition met – motor size OK

Condition 2:

Mass moment of inertia ratio:	V = Jex / (Jm+ JBr)
Motor inertia:	J_m = 290 · 10–6 kgm2
Brake moment of inertia:	J_{Br} = 110 · 10–6 kgm2 (with brake)
Moment of inertia ratio:	V = 1063.609 · 10–6/(290 · 10–6 + 110 · 10–6) = 2.66
Handling condition:	V ≤ 6, 2.66 ≤ 6, Condition met – motor size OK

Condition 3:

Torque ratio:	$M_{stat} / M_0 \leq 0.6$
Static load moment:	$M_{stat} = M_R + M_g$
Weight moment:	$M_g = d_3 \cdot (mex + mmb) \cdot g / 2000 \cdot i$
Mass of the moved frame:	m_{mb} = kg fix + kg var · L = 1.05 + 0.011 · 1508 = 17.64 kg
Moved external load	m_{ex} = 20 kg M_g = 81.17 · (17.64 + 20) · 9.81 / 2000 · 8 = 1.87 Nm
Static load moment:	M_{stat} = 0.93 + 1.87 = 2.80 Nm
Continuous torque of the motor:	M_0 = 6.1 Nm
Torque ratio:	2.8/6.1 = 0.46, 0.46 ≤ 0.6 Condition met – motor size OK

Result:
Omega module OBB-085

Length	L	= 1508 mm
Max. travel range	s_{max}	= 1128 mm
Carriage length	L_{ca}	= 260 mm
Drive	Toothed belt drive	
Motor attachment	via angular planetary gear	
Gear ratio	i = 8	
Motor preselection:	MS2N05-C0BTN with brake, Arrangement: Carriage fastened at the mounting base, Frame moves	
	Vertical installation position	

For precise sizing of the electric drive, the motor-controller combination must always be considered, as the performance data (e.g. maximum useful speed and maximum torque) will depend on the controller used.

When doing this, the following data must be considered:

– Friction torque:	M_R	= 0.93 Nm
– Mass moment of inertia:	J_{ex}	= 1063.609 · 10^{-6} kgm^2
– Speed:	v_{mech}	= 1.5 m/s (n_{mech} = 2823 min^{-1})
– Drive torque limit:	M_{mech} = 5 Nm	

The motor torque must be limited to 5 Nm on the drive side.

– Acceleration limit:	a_{max}	= 50 m/s^2
– Limit for speed: v_{mech}	= 2.13 m/s (n_{mech} = 4009 min^{-1})	

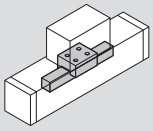
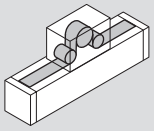
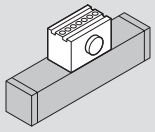
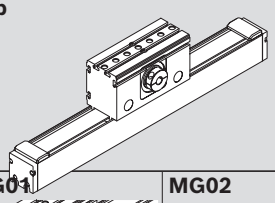
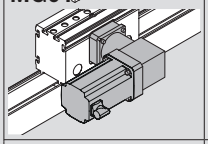
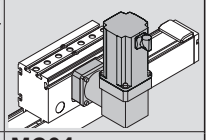
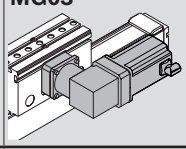
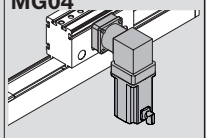
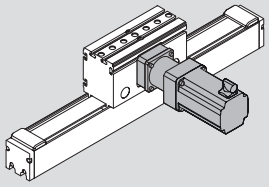
After determining the excess travel stopping distance during precise sizing, the selected excess travel must be checked to see whether it is sufficient and adjusted if necessary. Besides the preferred type MS2N05, other motors with identical connection dimensions can be adapted while taking care not to exceed the calculated limit values.

For the explanation of the abbreviations refer to ➠ chapter "Abbreviations"

Configuration and ordering

OBB-055

Configuration and ordering

Short product name, length OBB-055-NN-1, ... mm		Guideway	Drive		Carriage		
							
Version[2]			Gear ratio		L_{ca} = 230 mm without	L_{ca} = 230 mm with	
			i = 1	Gearing	Clamping unit		
with drive (MA), without gear unit i = 1	**MA01, hollow shaft with clamping hub** 	01	01	–	01	02	
with gear unit (MG), angular planetary gear WPG	**MG01**  **MG02**  **MG03**  **MG04** 	01	–	10	01	02	
with gear unit (MG), planetary gear PG	**MG10** 	01	–	10	01	02	

For ordering example, see "Inquiry/order"

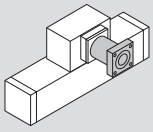
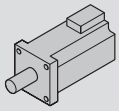
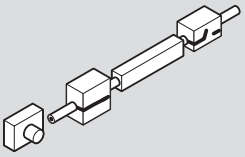
Note:
When a shock absorber is used, for structural design reasons, there is a reduction of the max. travel range (s_{max}).
For this reason, the maximum travel range must be reduced by the value s_{red} per side or per shock absorber, see chapter "Accessories".

Length L (mm)**:**

$$L = s_{max} + L_{ca} + L_{ad}$$

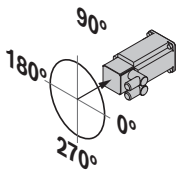
$$s_{max} = s_{eff} + 2 \cdot s_e$$

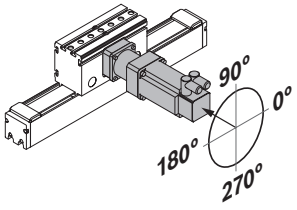
1) The delivery length of the cable duct corresponds to the length of the profiled support. If the length differs, please order the cable duct as an individual item (ordering the "switches and attachments" Page 44)
2) If a module has been ordered with an attached servo motor, it will only be delivered with the motor mounting shown in the chapter "Form of delivery". (Note the position of the motor connectors)!
3) Attachment kit also available without motor.
When ordering, enter the motor type "00"!
4) The selection of the switches depends on the installation situation (carriage / frame moves)! See the chapter "Switch mounting".

Motor attachment				Motor					Motor connector position	Switching system[4]		Documentation
												
Gear ratio i =	Attachment kit[3] with gear unit MG01 MG03	MG02 MG04	MG10	Motor code	2 cables Brake without	2 cables Brake with	1 cable Brake without	1 cable Brake with				Standard report
–	00		–	00						**Without switch and without cable duct**	00	01
										Carriage moves		
										Switches:		
										– PNP NC	71	
										– PNP NO	73	
										– Mechanical	75	
i = 3	45	55	–	MS2N04-C0BTN	–	–	215	216	000	**Cable duct[1]**	20	
i = 5	47	57	–							**Socket-plug**	17	
i = 8	59	60	–	MS2N04-D0BQN	–	–	219	220		**Switching cam**	36	
i = 5	46	56	–	MSM031C	138	139	–	–	090			
i = 8	44	54	–							**Frame moves**		
										Switches:		
										– PNP NC	61	
										– PNP NO	63	
										– Mechanical	65	
i = 3	–	–	41	MS2N04-C0BTN	–	–	215	216	180	**1 switching cam**	38	
i = 5	–	–	43							**2 switching cams**	39	
i = 8	–	–	58	MS2N04-D0BQN	–	–	219	220		**Socket-plug**	17	
i = 5	–	–	42	MSM031C	138	139	–	–	270			
i = 8	–	–	40									

	0°	90°	180°	270°
MG01	000 ★	090	180	270
MG02	000	090	180	270 ★
MG03	000	090	180 ★	270
MG04	000	090 ★	180	270
MG10	000	090 ★	180	270

★ Standard delivery (connector position)





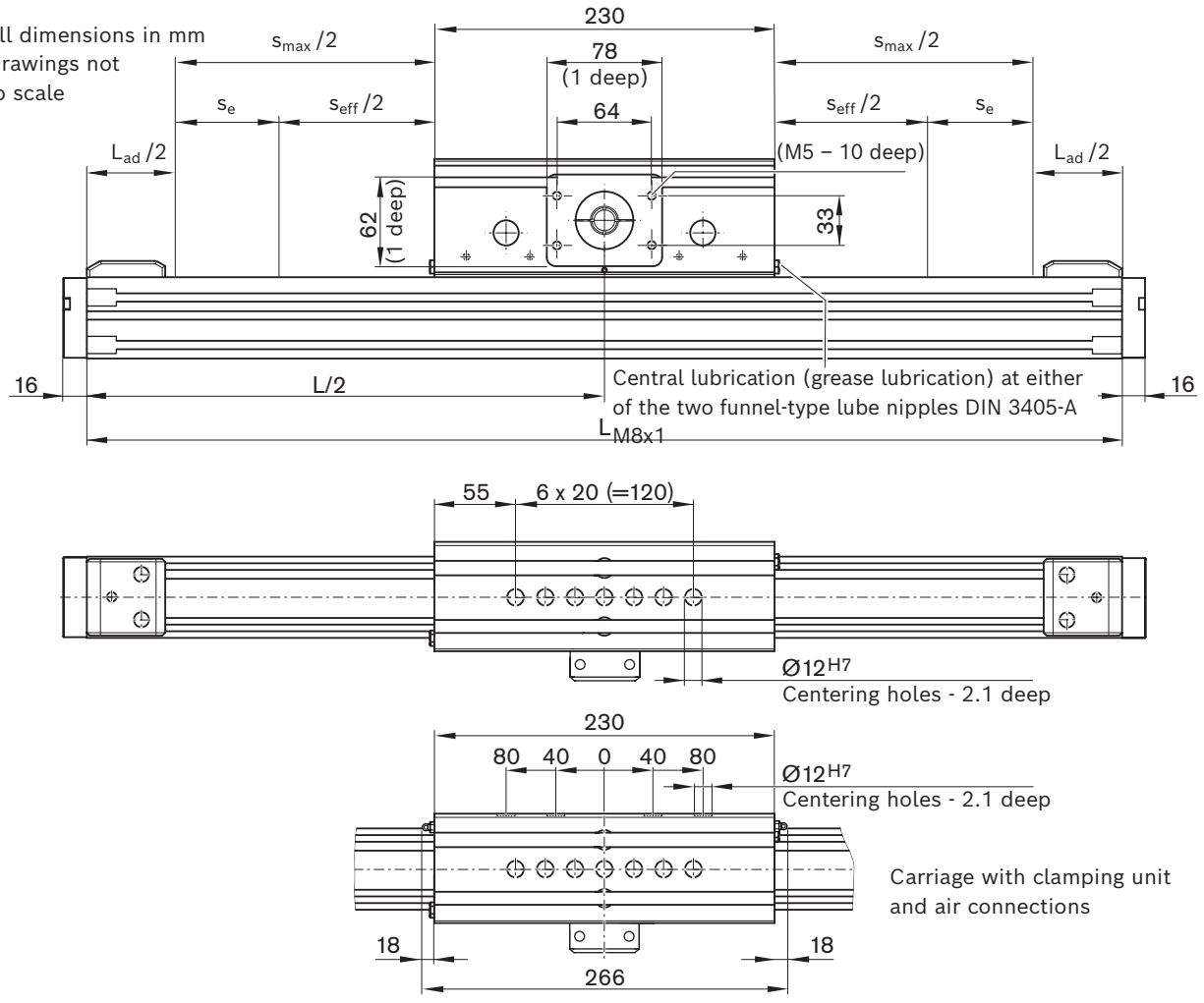
Example:
Version MG10
Motor connector position 90°

Configuration and ordering

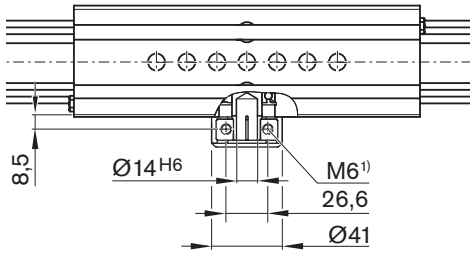
OBB-055

Dimension drawings

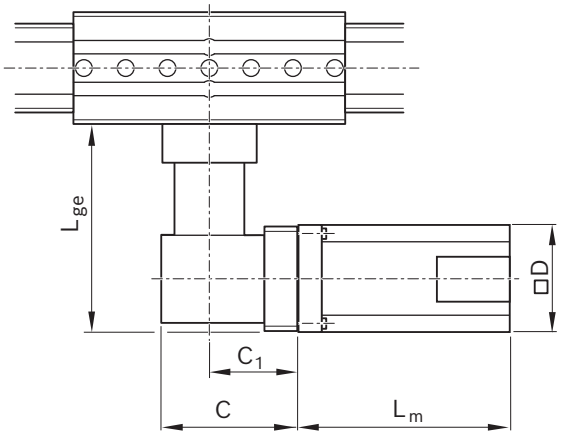
All dimensions in mm
Drawings not to scale

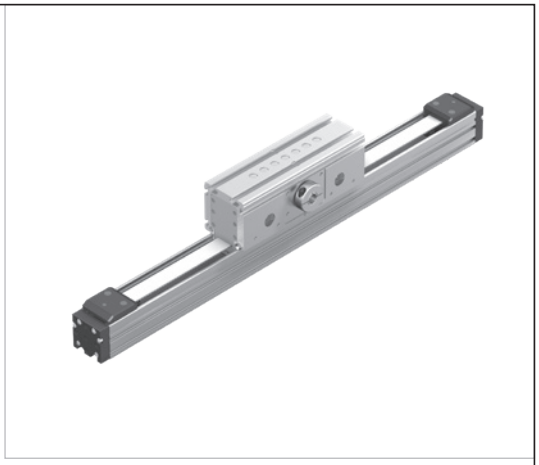


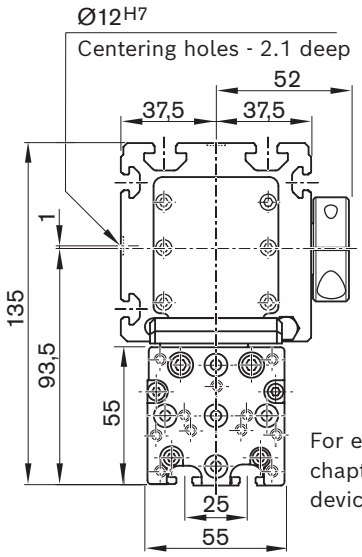
MA01



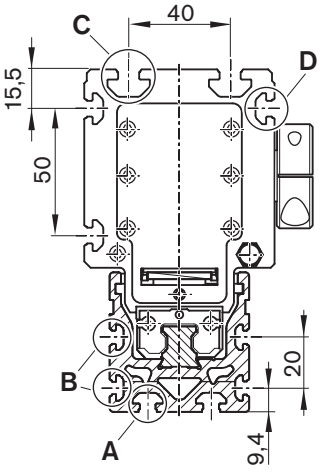
MG01, MG02, MG03, MG04

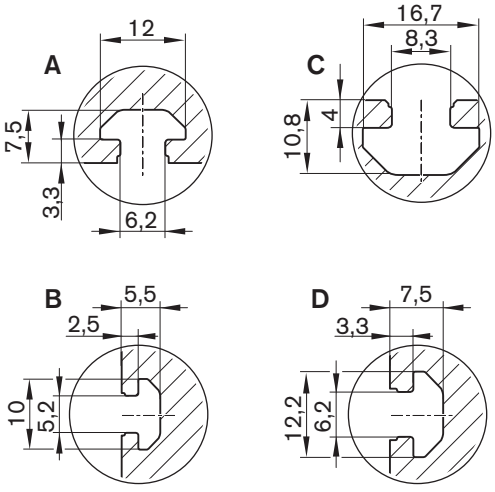




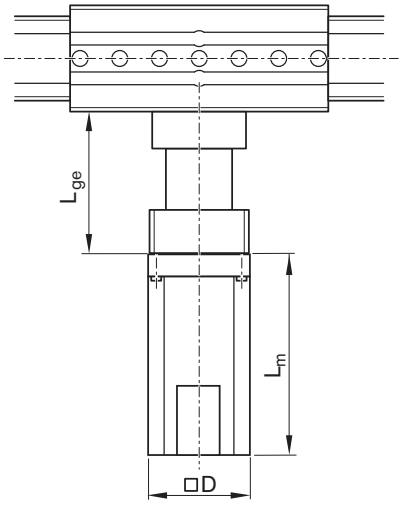


For end block dimensioning, see chapter "Attachment of additional devices"





MG10



(mm)

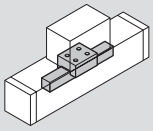
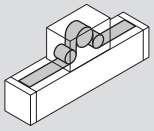
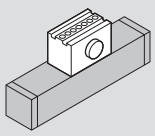
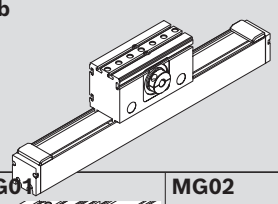
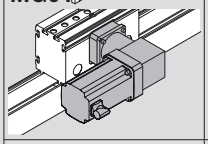
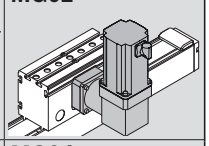
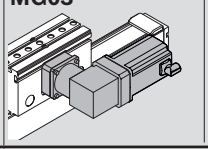
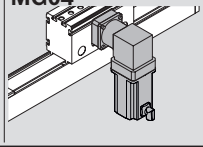
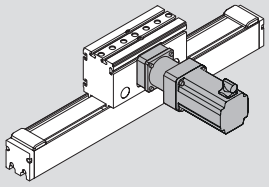
	MG 01/02/03/04			MG 10
	L_{ge}	C	C_1	L_{ge}
MS2N06	144	93	63	101.5
MSM031C	134	93	63	101.5

74/76

Configuration and ordering

OBB-085

Configuration and ordering

Short product name, length OBB-085-NN-1, ... mm		Guideway	Drive		Carriage		
							
			Gear ratio		L_{ca} = 260 mm	L_{ca} = 308 mm	
Version[2]					without	with	
			i = 1	Gearing	Clamping unit		
with drive (MA), without gear unit i = 1	**MA01, hollow shaft with clamping hub** 	01	01	–	01	02	
with gear unit (MG), angular planetary gear WPG	**MG01**  **MG02**  **MG03**  **MG04** 	01	–	10	01	02	
with gear unit (MG), planetary gear PG	**MG10** 	01	–	10	01	02	

For ordering example, see "Inquiry/order"

Note:
When a shock absorber is used, for structural design reasons, there is a reduction of the max. travel range (s_{max}).
For this reason, the maximum travel range must be reduced by the value s_{red} per side or per shock absorber, see chapter "Accessories".

Length L (mm)**:**

$$L = s_{max} + L_{ca} + L_{ad}$$

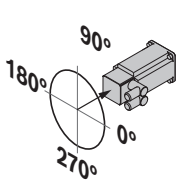
$$s_{max} = s_{eff} + 2 \cdot s_e$$

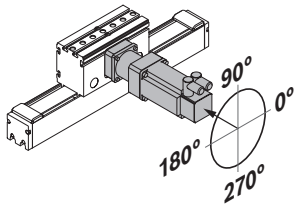
1) The delivery length of the cable duct corresponds to the length of the profiled support. If the length differs, please order the cable duct as an individual item (ordering the "switches and attachments" Page 44)
2) If a module has been ordered with an attached servo motor, it will only be delivered with the motor mounting shown in the chapter "Form of delivery". (Note the position of the motor connectors)!
3) Attachment kit also available without motor.
When ordering, enter the motor type "00"!
4) The selection of the switches depends on the installation situation (carriage / frame moves)! See the chapter "Switch mounting".

Motor attachment				Motor					Motor connector position	Switching system[4]	Documentation
Gear ratio i =	Attachment kit[3] with gear unit MG01 MG03	MG02 MG04	MG10	Motor code	2 cables Brake without	2 cables Brake with	1 cable Brake without	1 cable Brake with			Standard report
–	00		–	00						**Without switch and without cable duct** 00	01
										Carriage moves	
i = 5	33	43	–	MS2N05-C0BTN	–	–	227	228	000	**Switches:** – PNP NC 71 – PNP NO 73 – Mechanical 75	
i = 8	35	45	–	MS2N05-D0BRN	–	–	231	232	000	**Cable duct[1]** 20	
i = 8	34	44	–	MSM041B	140	141	–	–	090	**Socket-plug** 17	
										Switching cam 36	
										Frame moves	
i = 5	33	43	–	MS2N05-C0BTN	–	–	227	228	180	**Switches:** – PNP NC 61 – PNP NO 63 – Mechanical 65	
i = 8	35	45	–	MS2N05-D0BRN	–	–	231	232	180	**1 switching cam** 40	
i = 8	34	44	–	MSM041B	140	141	–	–	270	**2 switching cams** 41	
										Socket-plug 17	

	0°	90°	180°	270°
MG01	000 ★	090	180	270
MG02	000	090	180	270 ★
MG03	000	090	180 ★	270
MG04	000	090 ★	180	270
MG10	000	090 ★	180	270

★ Standard delivery (connector position)





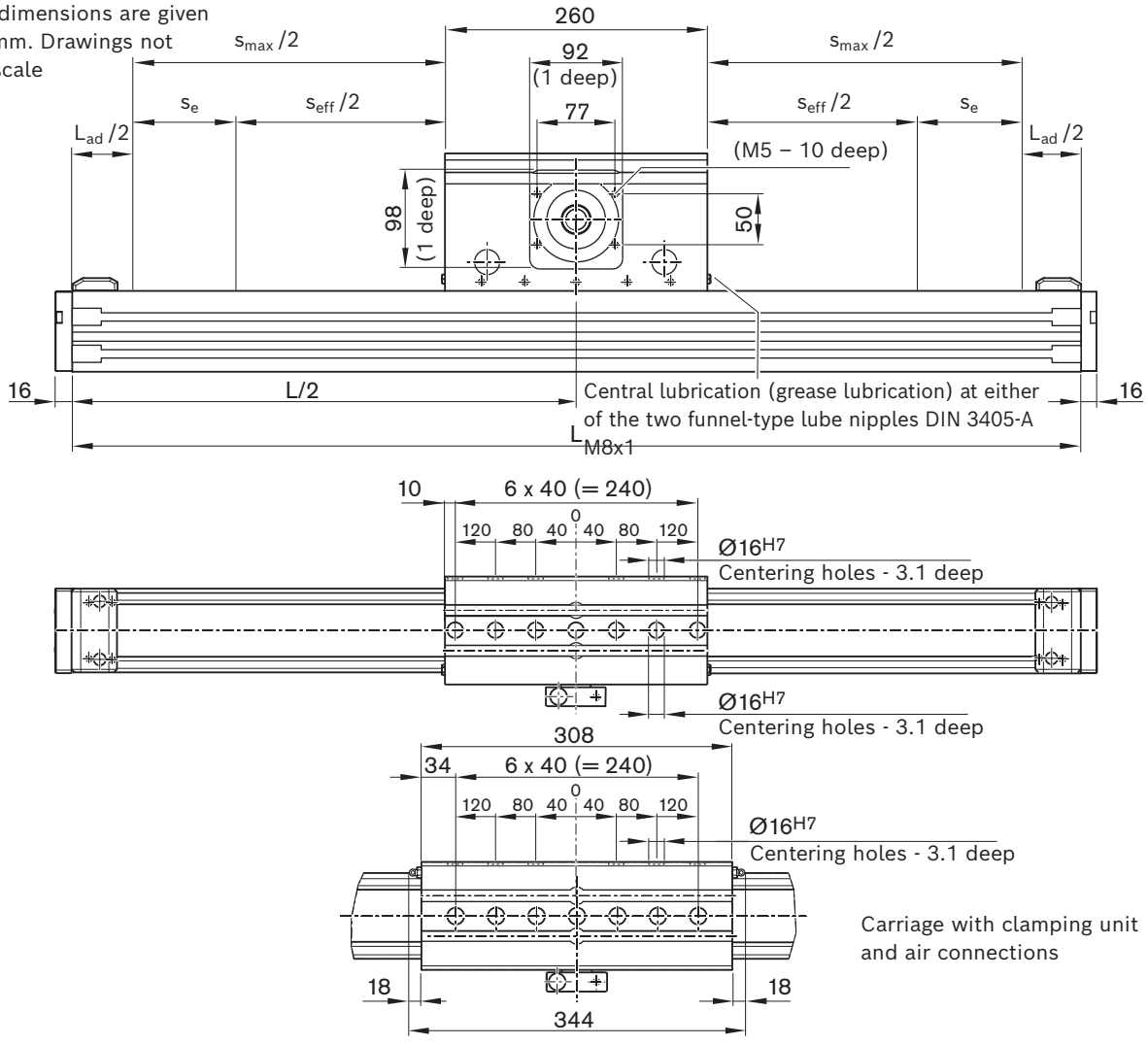
Example:
Version MG10
motor connector
position 90°

Configuration and ordering

OBB-085

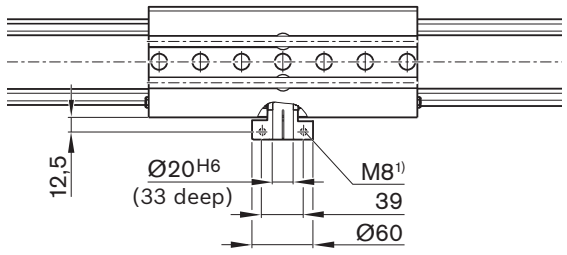
Dimension drawings

All dimensions are given in mm. Drawings not to scale



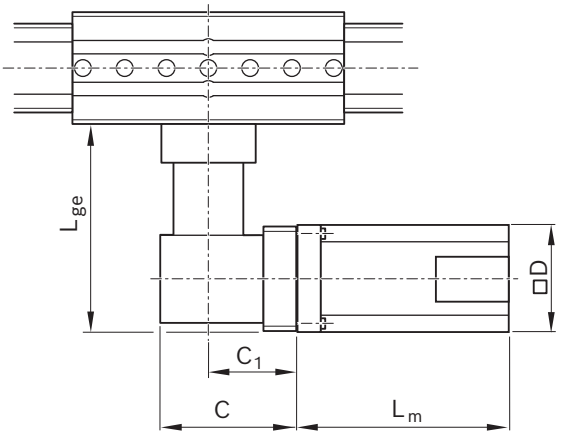
Carriage with clamping unit and air connections

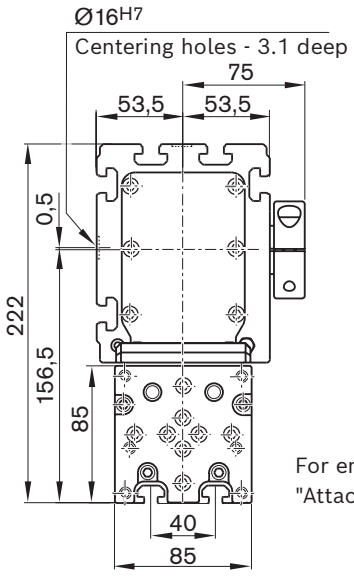
MA01

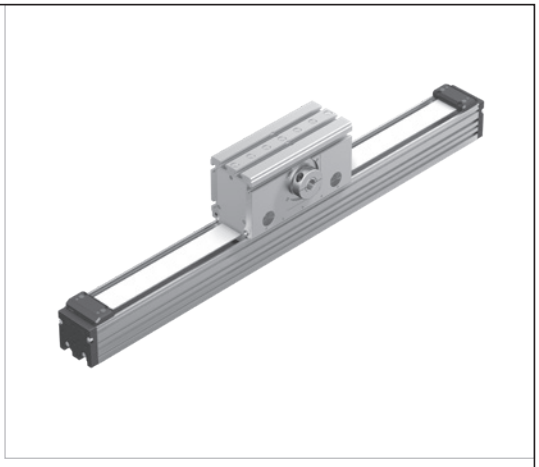


[1)] Hex socket head cap screw ISO 4762

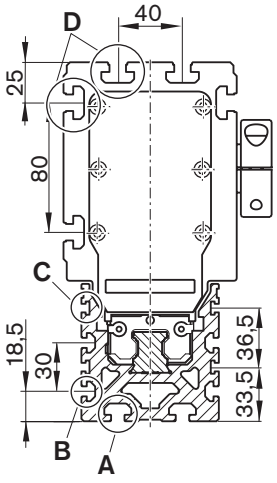
MG01, MG02, MG03, MG04

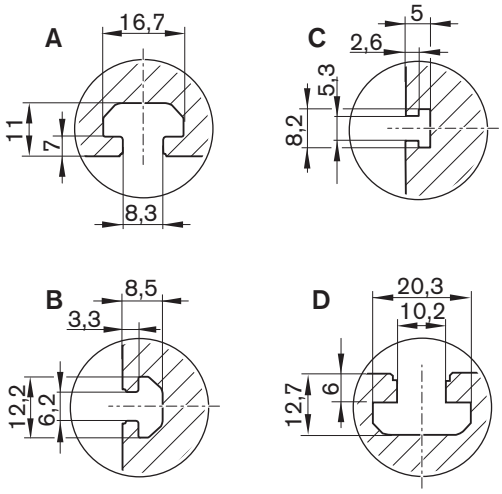




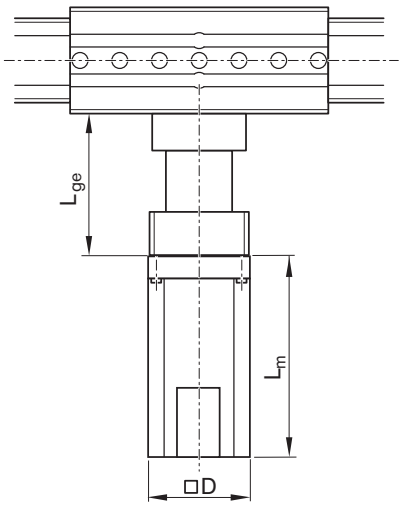


For end block dimensioning, see chapter "Attachment of additional devices"





MG10



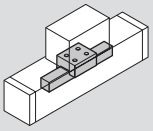
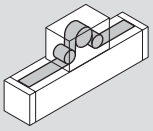
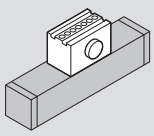
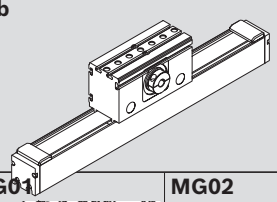
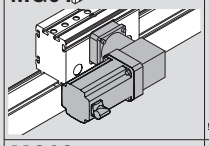
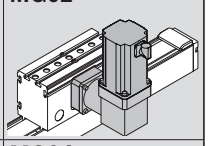
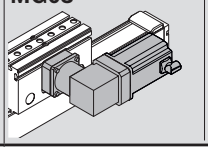
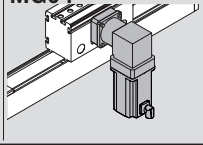
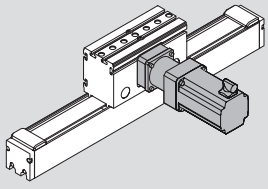
(mm)

	MG 01/02/03/04			MG 10	
	L_{ge}	C	C_1	L_{ge}	
MS2N05	184.5	118	73	101.5	74/76
MSM041B	179.5	123	78	101.5	

Configuration and ordering

OBB-120

Configuration and ordering

Short product name, length OBB-120-NN-1, ... mm		Guideway	Drive		Carriage		
							
			Gear ratio		L_{ca} = 330 mm	L_{ca} = 330 mm	
Version[2]					without	with	
			i = 1	Gearing	Clamping unit		
with drive (MA), without gear unit i = 1	**MA01, hollow shaft with clamping hub** 	01	01	–	01	02	
with gear unit (MG), angular planetary gear WPG	**MG01**  **MG02**  **MG03**  **MG04** 	01	–	10	01	02	
with gear unit (MG), planetary gear PG	**MG10** 	01	–	10	01	02	

For ordering example, see "Inquiry/order"

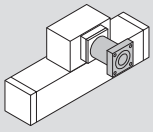
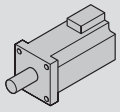
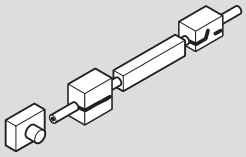
Note:
When a shock absorber is used, for structural design reasons, there is a reduction of the max. travel range (s_{max}).
For this reason, the maximum travel range must be reduced by the value s_{red} per side or per shock absorber, see chapter "Accessories".

Length L (mm)**:**

$$L = s_{max} + L_{ca} + L_{ad}$$

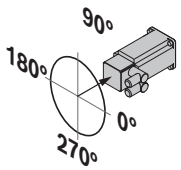
$$s_{max} = s_{eff} + 2 \cdot s_e$$

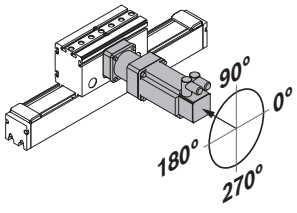
1) The delivery length of the cable duct corresponds to the length of the profiled support. If the length differs, please order the cable duct as an individual item (ordering the "switches and attachments" Page 44)
2) If a module has been ordered with an attached servo motor, it will only be delivered with the motor mounting shown in the chapter "Form of delivery". (Note the position of the motor connectors)!
3) Attachment kit also available without motor. When ordering, enter the motor type "00"!
4) The selection of the switches depends on the installation situation (carriage / frame moves)! See the chapter "Switch mounting".

	Motor attachment				Motor					Motor connector position	Switching system[4]	Documentation
												
	Gear ratio i =	Attachment kit[3] with gear unit MG01 MG03	MG02 MG04	MG10	Motor code	2 cables Brake without	2 cables Brake with	1 cable Brake without	1 cable Brake with			Standard report
	–	00		–	00						**Without switch and without cable duct** 00 **Carriage moves** **Switches:** – PNP NC 71 – PNP NO 73 – Mechanical 75 **Cable duct[1]** 20 **Socket-plug** 17 **Switching cam** 36 **Frame moves** **Switches:** – PNP NC 61 – PNP NO 63 – Mechanical 65 **1 switching cam** 42 **2 switching cams** 43 **Socket-plug** 17	01
	i = 9	34	35	–	MS2N06-D1BNN	–	–	247	248	000		
					MS2N06-D0BRN	–	–	243	244	090		
	i = 9	–	–	33	MS2N06-D1BNN	–	–	247	248	180		
					MS2N06-D0BRN	–	–	243	244	270		

	0°	90°	180°	270°
MG01	000 ★	090	180	270
MG02	000	090	180	270 ★
MG03	000	090	180 ★	270
MG04	000	090 ★	180	270
MG10	000	090 ★	180	270

★ Standard delivery (connector position)





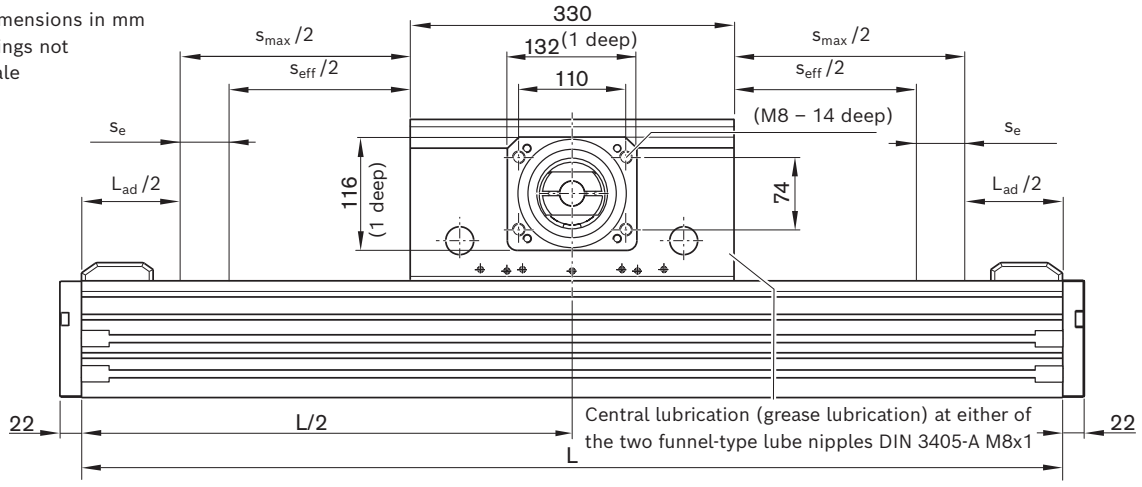
Example:
Version MG10
motor connector
position 90°

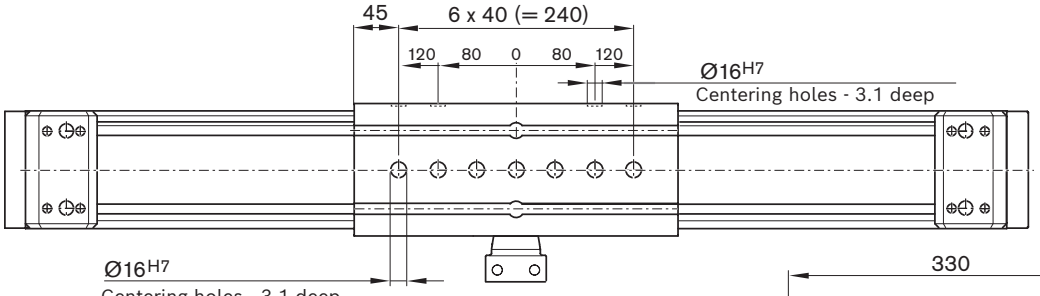
Configuration and ordering

OBB-120

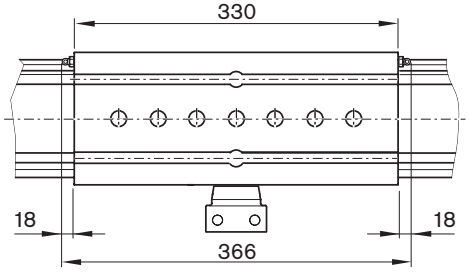
Dimension drawings

All dimensions in mm
Drawings not to scale

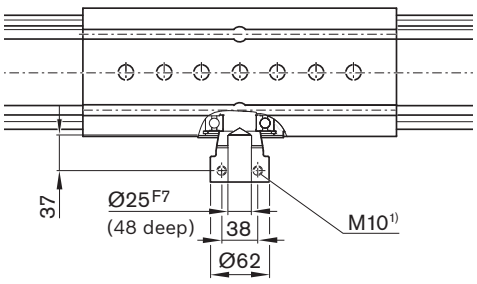




Carriage with clamping unit and air connections

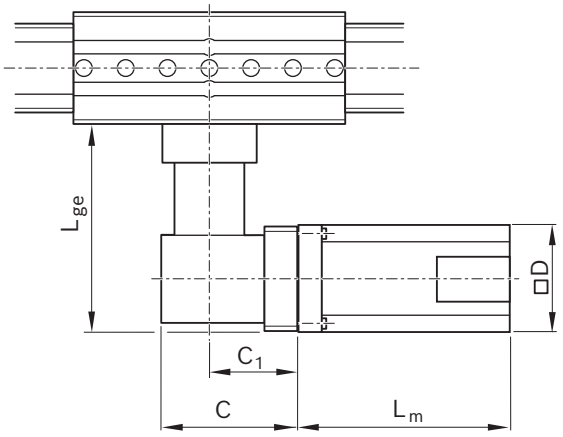


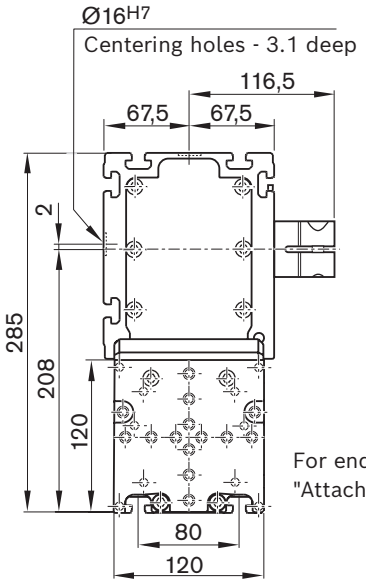
MA01



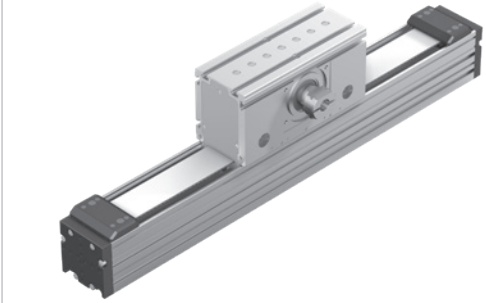
1) Hex socket head cap screw ISO 4762

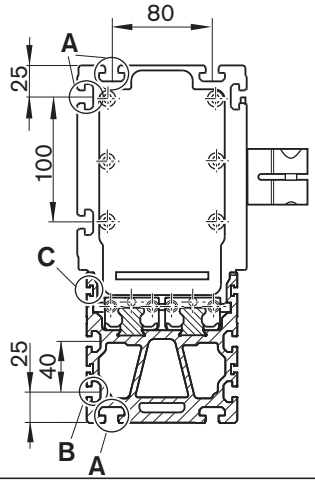
MG01, MG02, MG03, MG04

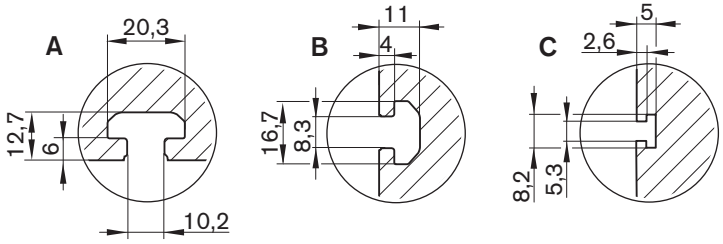




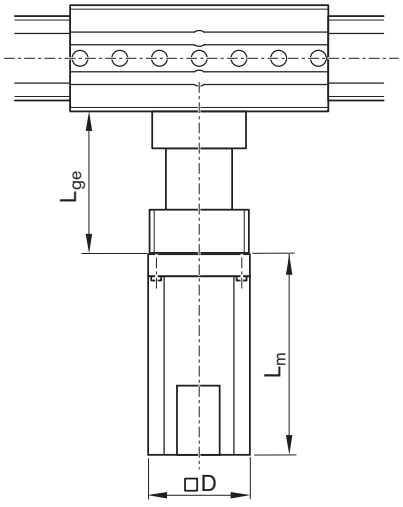
For end block dimensioning, see chapter "Attachment of additional devices"







MG10



(mm)

	MG 01/02/03/04			MG 10	
	L_{ge}	C	C_1	L_{ge}	
MS2N06	287.5	155.5	98	101.5	

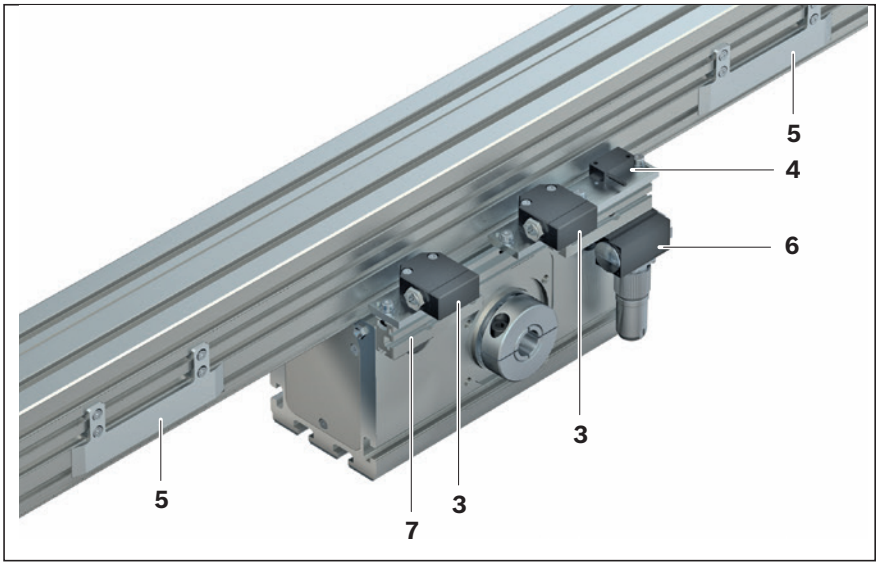
76

Switching system

Switch mounting – frame moves (carriage fastened)

Switching principle

- Proximity or mechanical switches on the carriage (TT)
- Switch activation via switch strip on the frame (HK)



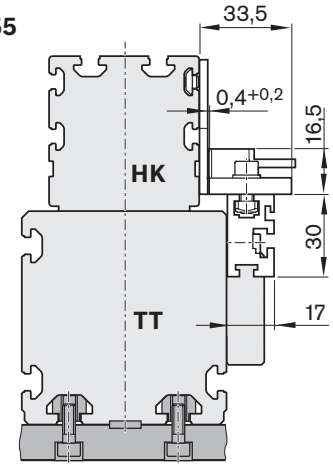
Switching system overview

3 Mechanical switch (with attachments)
4 Proximity switch (with attachments)
5 Control strip on the frame
6 Socket and connector
7 Switch mounting profile

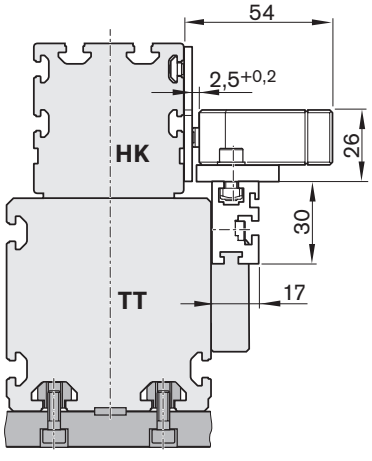
Item	Description	OBB-055 Material number included in (option[1])		OBB-085 Material number included in (option[1])		OBB-120 Material number included in (option[1])	
3	Mechanical switch with attachments	R1175 001 62	(65)	R1175 001 62	(65)	R1175 001 62	(65)
	Mechanical switch	R3453 040 16	(65)	R3453 040 16	(65)	R3453 040 16	(65)
4	Proximity switch PNP NC	R3453 040 01	(61)	R3453 040 01	(61)	R3453 040 01	(61)
	Proximity switch PNP NO	R3453 040 03	(63)	R3453 040 03	(63)	R3453 040 03	(63)
	Attachments for proximity switch	R1175 001 63	(61), (63)	R1175 001 63	(61), (63)	R1175 001 63	(61), (63)
5	2 control strips with attachments	R1175 001 59	(39)	R1175 001 60	(41)	R1175 001 61	(42)
6	Socket + connector	R1175 001 53	(17)	R117 5001 53	(17)	R1175 001 53	(17)
7	Switch mounting profile with attachments	R1175 001 64	(39)	R1175 001 64	(41)	R1175 001 64	(42)

1) Options, see "Configuration and ordering"

OBB-055

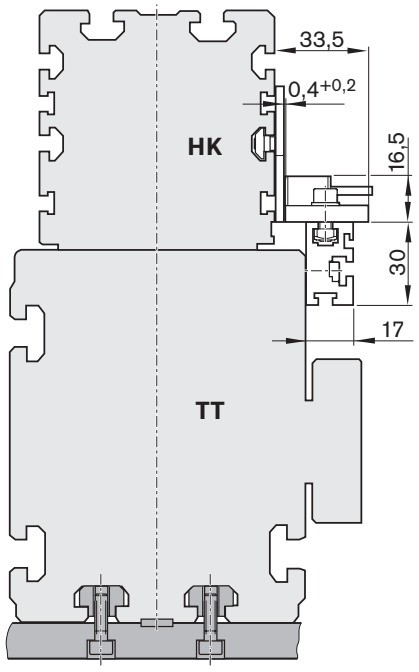


Proximity switches with attachments

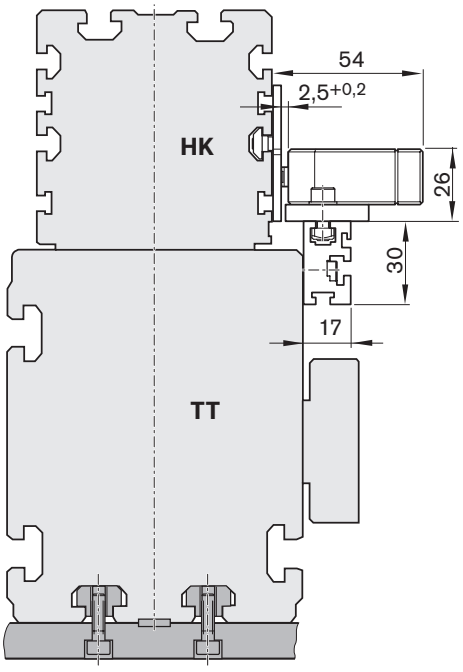


Mechanical switches with attachments

OBB-085

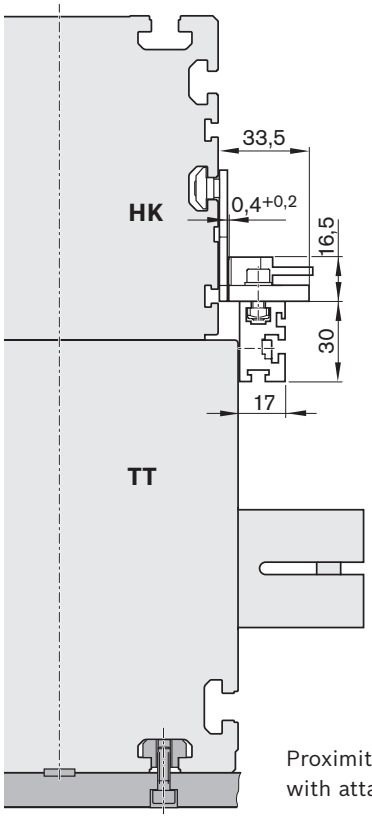


Proximity switches
with attachments

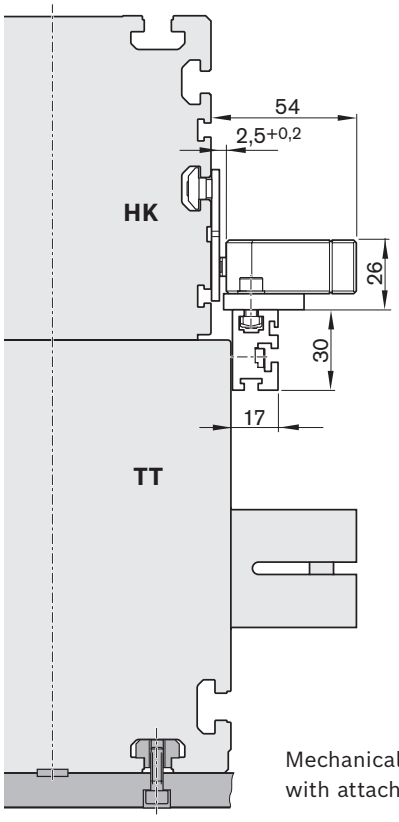


Mechanical switches
with attachments

OBB-120



Proximity switches
with attachments



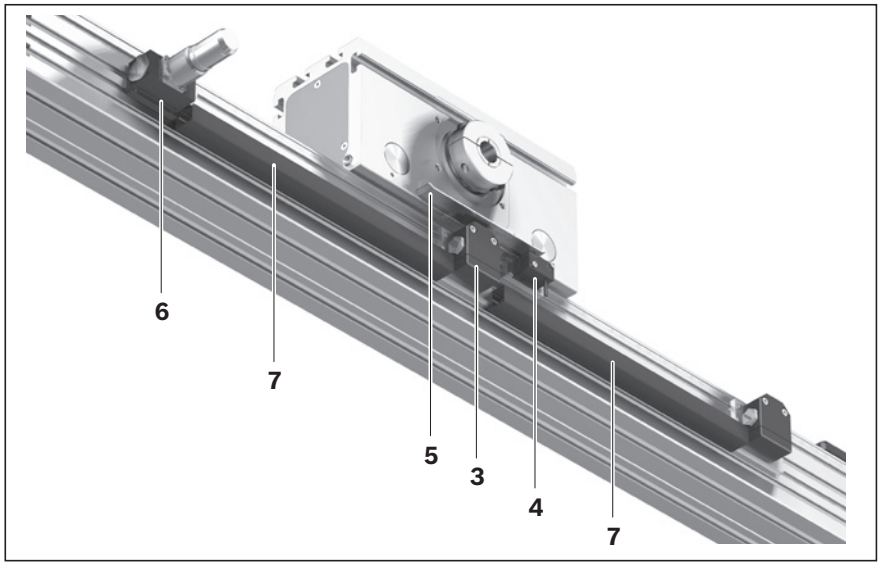
Mechanical switches
with attachments

Switching system

Switch mounting – carriage moves (frame fastened)

Switching principle

- Proximity or mechanical switches on the frame (HK)
- Switch activation via the switching cam at the carriage (TT)



Switching system overview

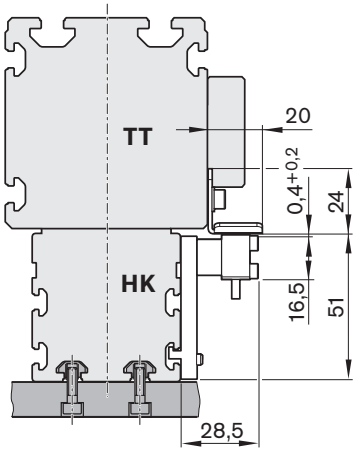
3 Mechanical switch (with attachments)
4 Proximity switch (with attachments)
5 Switching cam
6 Socket and connector
7 Cable duct

Item	Description	OBB-055 Material number	included in (option[1])	OBB-085 Material number	included in (option[1])	OBB-120 Material number	included in (option[1])
3	Mechanical switch with attachments	R1175 001 51	(75)	R1175 001 51	(75)	R1175 001 51	(75)
	Mechanical switch without attachments	R3453 040 16	(75)	R3453 040 16	(75)	R3453 040 16	(75)
4	Proximity switch PNP NC	R3453 040 01	(61)	R3453 040 01	(61)	R3453 040 01	(61)
	Proximity switch PNP NO	R3453 040 03	(63)	R3453 040 03	(63)	R3453 040 03	(63)
	Attachments for proximity switch	R1175 001 57	(71), (73)	R1175 001 58	(71), (73)	R1175 001 58	(71), (73)
5	Switching cam with attachments	R1175 001 56	(36)	R1175 001 56	(36)	R1175 001 56	(36)
6	Socket + connector	R1175 001 53	(7)	R1175 001 53	(17)	R1175 001 53	(17)
7	Cable duct, L_K =`	R0396 620 17 [2]	(20)	R0396 620 17 [2]	(20)	R0396 620 17 [2]	(20)

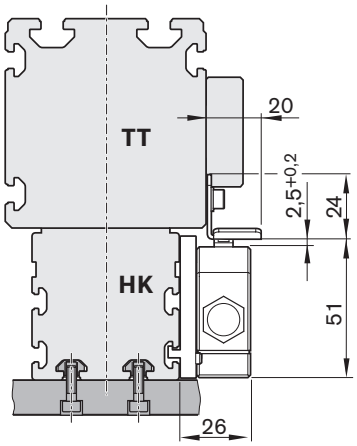
1) Options, see "Configuration and ordering"
2) When ordering cable ducts, a length specification is always required. For example "R0396 620 17, 285 mm".

L_K = Length of the cable duct(mm)

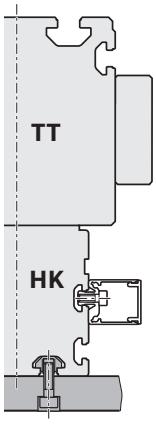
OBB-055



Proximity switches with attachments

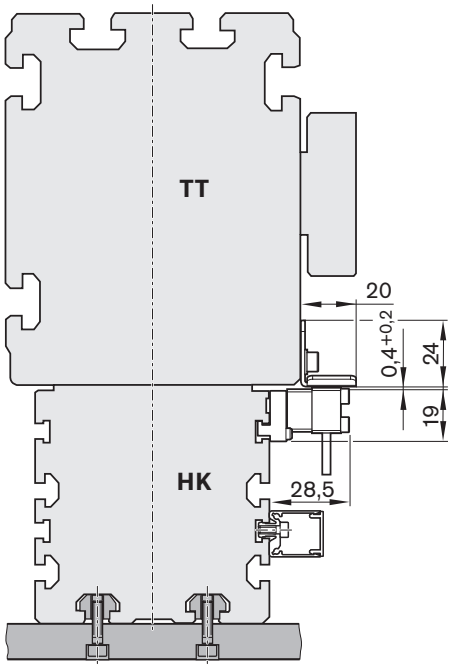


Mechanical switches with attachments

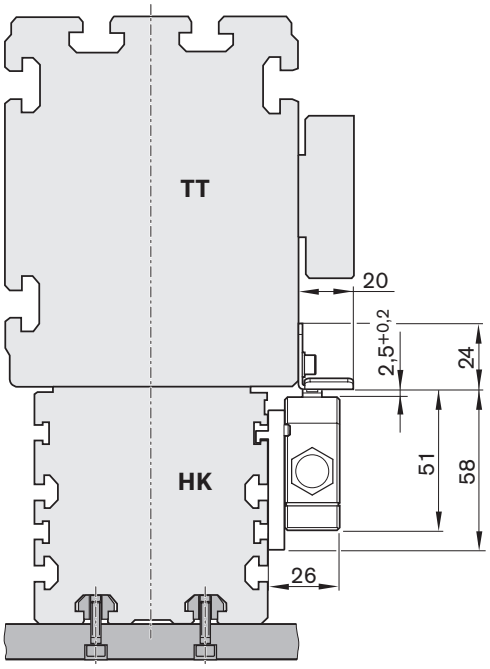


Cable duct

OBB-085

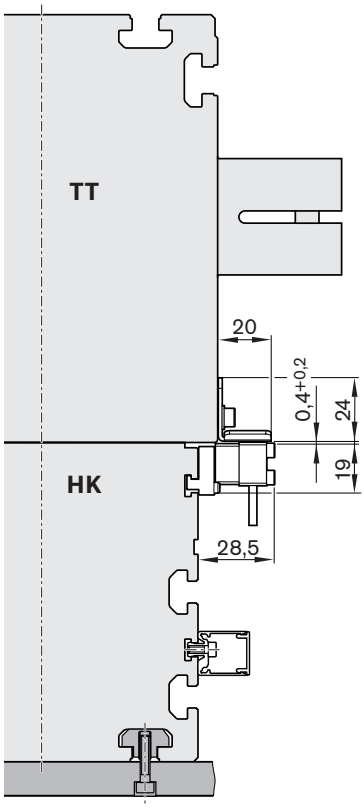


Proximity switches with attachments / cable duct

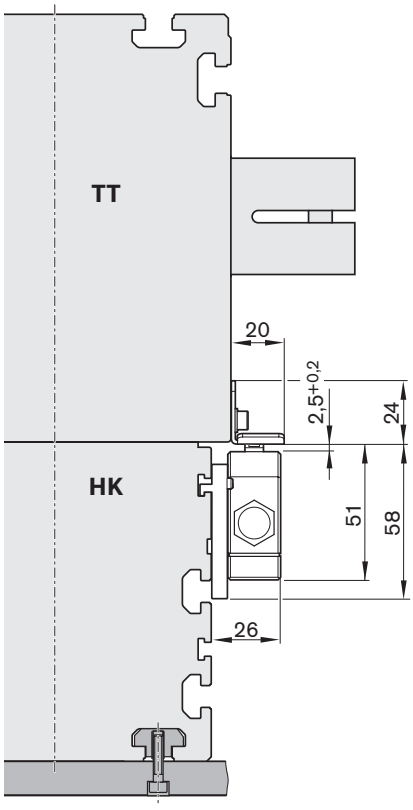


Mechanical switches with attachments

OBB-120



Proximity switches with attachments / cable duct



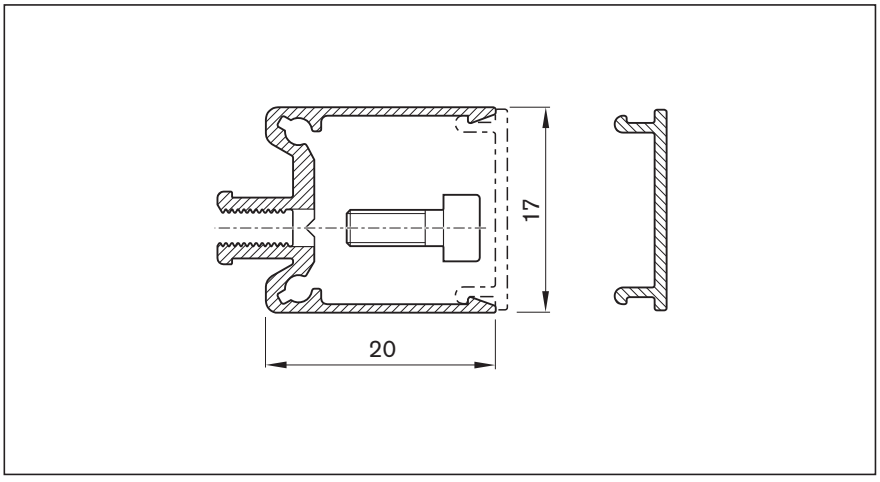
Mechanical switches with attachments

Switching system

Cable duct

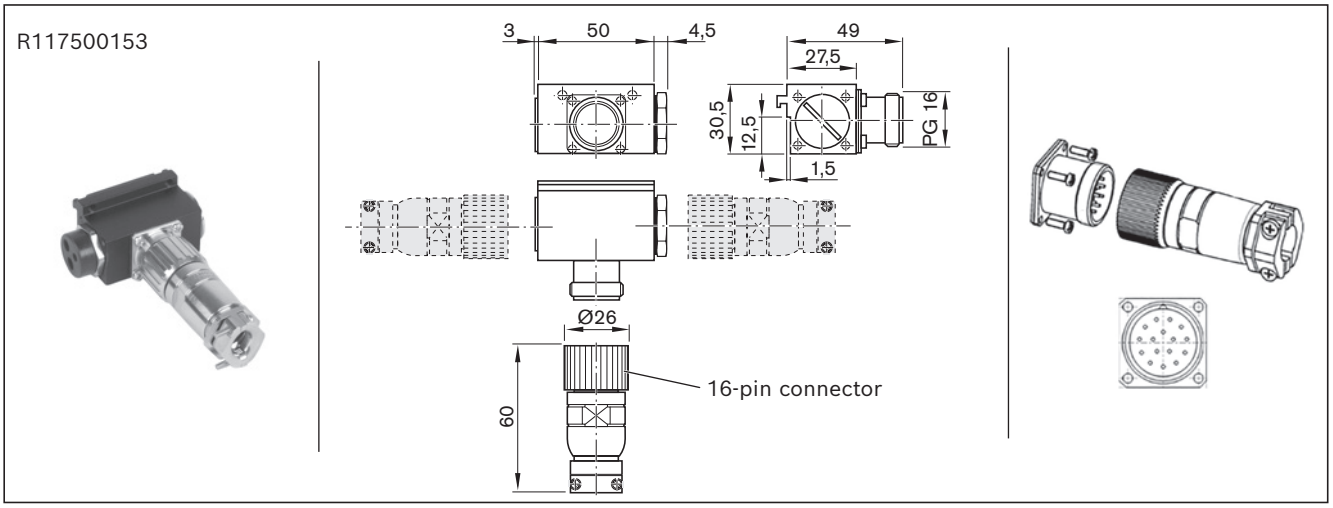
- The cable duct is fastened in the lateral slots of the frame. Fastening screws widen the profile and ensure that the cable duct is securely mounted.

For the slot position, see "Configuration and ordering data" tables and "Dimension drawings". The cable duct will accommodate up to two cables for mechanical switches and three cables for proximity switches.
Fastening screws and cable grommets are included.



Socket and connector

Attach the socket on the side with the sensors or switches. Socket and connector are not pre-wired. The variable sliding attachment allows switch activation points to be optimized during commissioning. The connector can be mounted in three directions.

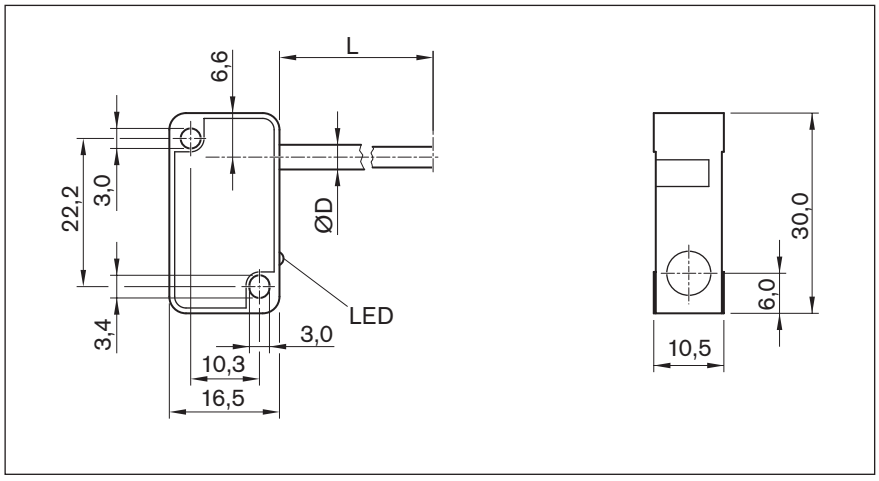


Use	Socket and connector
Material number	R117500153
Designation	for OBB-055, -085, -120
Version	angled, for suspension in the lateral slot of the OBB
Operating current per contact	max. 8 A
Operating voltage	150 V AC/DC
Connection type 1	Straight plug, 16-pin, soldered connection
Connection type 2	Coupling / flange socket, 16-pin, soldered connection
Housing cable bushing	1 seal with bore 2x5.5 mm, 1x3.5 mm 1 adaptable seal, max. 14 mm diameter incl. cap and dummy plug
Cable bushing, connector	Bolting with pull relief
Connection cross-section	0.14 ... 1 mm
Cable diameter	10 ... 14 mm
Ambient temperature	-20°C to +125°C
Protection class	–
Certifications and approvals	–

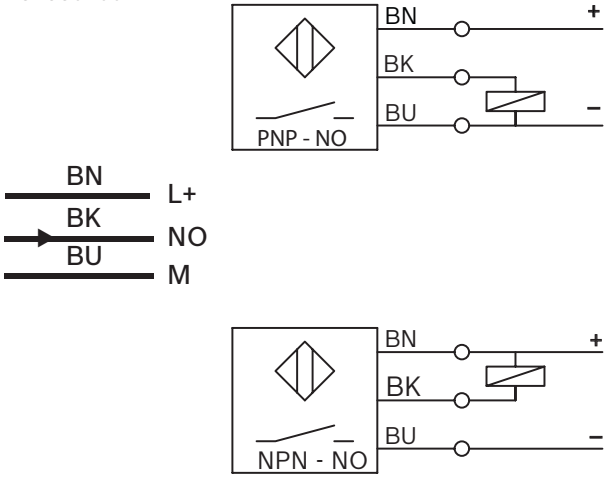
Switching system - Accessories

Sensors

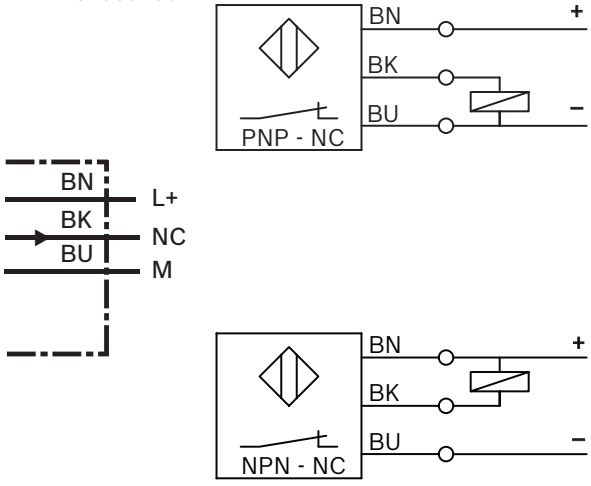
Proximity sensor with free line end



R345304003
R345304004



R345304001
R345304002



Material numbers/technical data

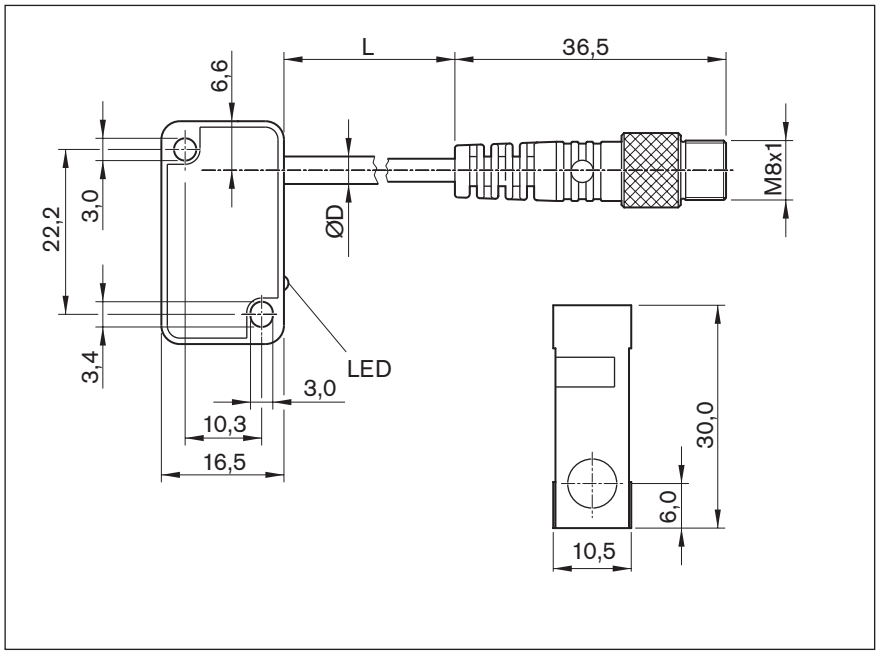
Use	Limit switch	Reference switch	Limit switch	Reference switch
Material number	R345304001	R345304003	R345304002	R345304004
Designation	BES 517-351-NO-C-03	BES 517-398-NO-C-03	BES 517-352-NO-C-03	BES 517-399-NO-C-03
Functional principle	Inductive			
Operating voltage	10–30 V DC			
Load current	≤ 200 mA			
Switching function	PNP NC	PNP/NO	NPN/NC	NPN/NO
Connection type	Cable 3 m, 3-pin, free line end			
Function indicator	✓			
Short-circuit protection	✓			
Reverse polarity protection	✓			
Switching frequency	2.5 kHz			
Max. perm. starting speed	Depending on the length of the switching cam			
Suitable for drag chains[1)]	–			
Torsion-resistant[1)]	–			
Weld spark-resistant[1)]	–			
Cable cross-section[1)]	3x0.14 mm^2			
Cable diameter D[1)]	3.5 $^{\pm 0.13}$ mm			
Static bending radius[1)]	12 mm			
Dynamic bending radius[1)]	12 mm			
Bending cycles[1)]	–			
Ambient temperature	-40°C to +70°C			
Protection class	IP65			
MTTFd (acc. to EN ISO 13849-1)	MTTFd = 830 years		MTTFd = 585 years	
Certifications and approvals[2)]	CE cULus LISTED RoHS			

1) Technical data only for the cast-on connection line at the proximity sensor.
The available extension cables offer even better performance, e.g. when using a cable drag chain (see following pages).
2) No CCC certificate is required to introduce these products to the Chinese market.

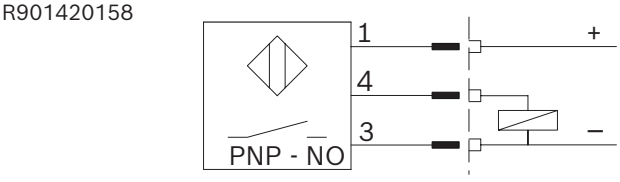
Switching system - Accessories

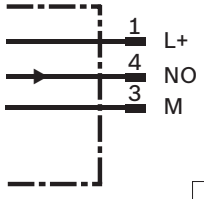
Sensors

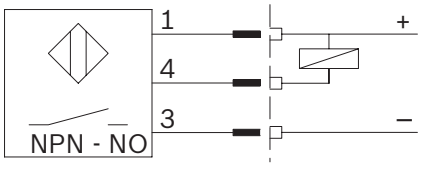
Proximity sensor with M8x1 connector



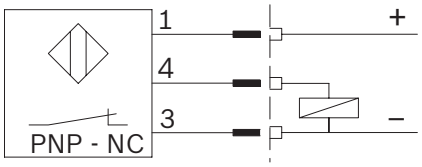
R901420156
R901420158

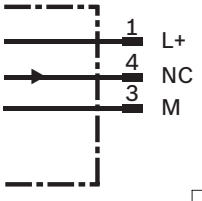


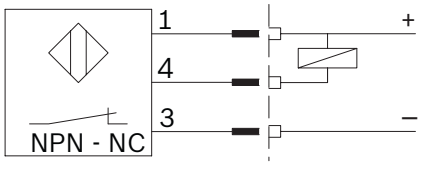




R901420149
R901420152







Material numbers/technical data

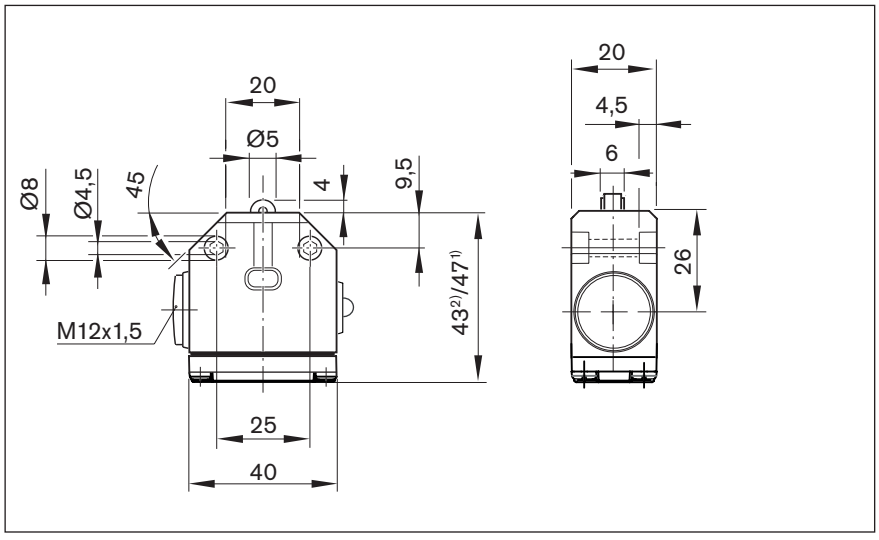
Use	Limit switch	Reference switch	Limit switch	Reference switch
Material number	R901420149	R901420156	R901420152	R901420158
Designation	BES 517-351-NO-C-S49-00.2	BES 517-398-NO-C-S49-00.2	BES 517-352-NO-C-S49-00.2	BES 517-399-NO-C-S49-00.2
Functional principle	Inductive			
Operating voltage	10–30 V DC			
Load current	≤ 200 mA			
Switching function	PNP NC	PNP/NO	NPN/NC	NPN/NO
Connection type	Cable 0.2 m and connector M8 x 1, 3-pin with knurled screw			
Function indicator	✓			
Short-circuit protection	✓			
Reverse polarity protection	✓			
Switching frequency	2.5 kHz			
Max. permissible starting speed	Depending on the length of the switching cam			
Suitable for drag chains[1)]	–			
Torsion-resistant[1)]	–			
Weld spark-resistant[1)]	–			
Cable cross-section[1)]	3x0.14 mm^2			
Cable diameter D[1)]	3.5 $^{\pm 0.15}$ mm			
Static bending radius[1)]	12 mm			
Dynamic bending radius[1)]	12 mm			
Bending cycles[1)]	–			
Ambient temperature	-40°C to +70°C			
Protection class	IP65			
MTTFd (per EN ISO 13849-1)	MTTFd = 830 years		MTTFd = 585 years	
Certifications and approvals[2)]	CE cULus LISTED RoHS			

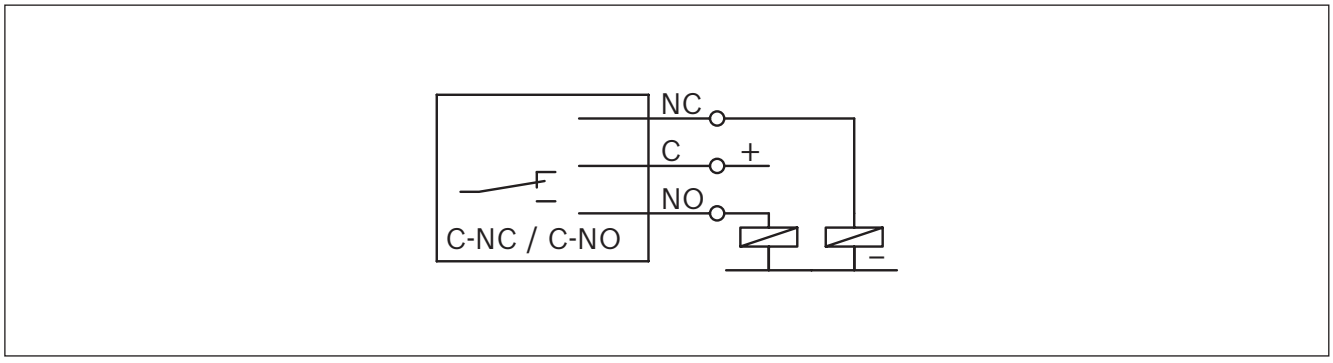
1) Technical data only for the cast-on connection line at the proximity sensor.
The available extension cables offer even better performance, e.g. when using a cable drag chain (see following pages).
2) No CCC certificate is required to introduce these products to the Chinese market.

Switching system - Accessories

Switches

Mechanical switch



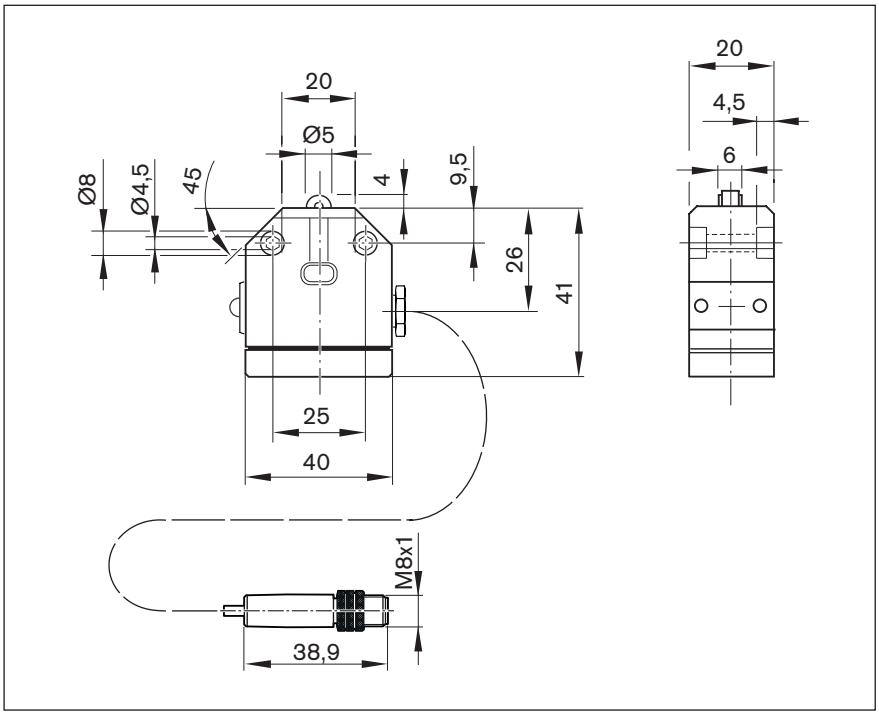


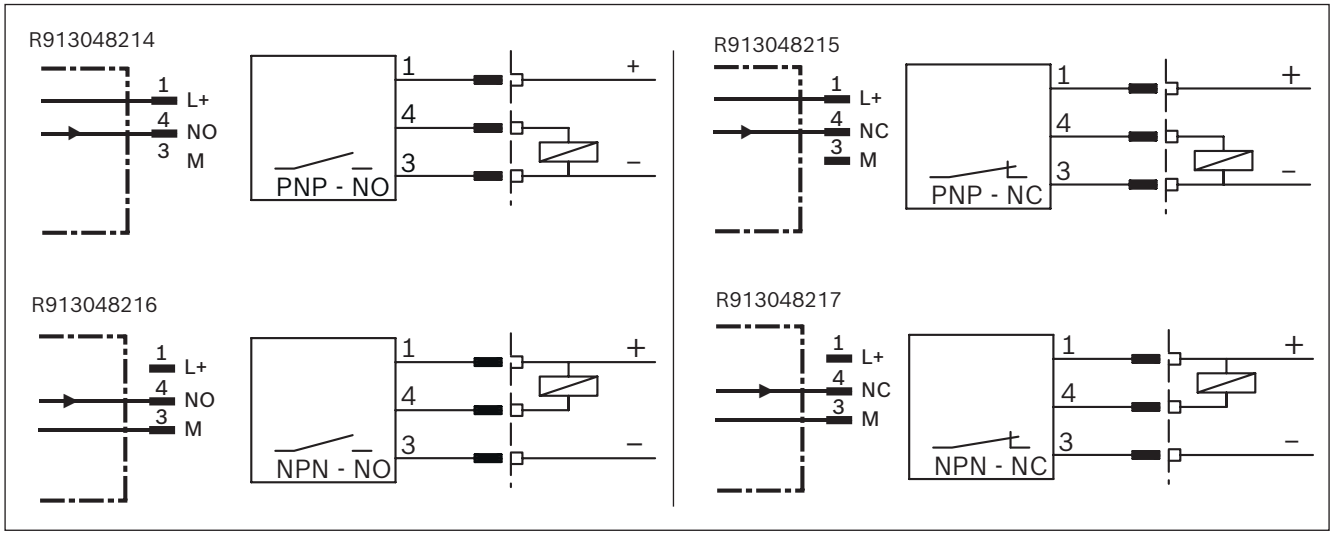
Material numbers/technical data		
Use	Limit switch	
Material number	R345304016[1)]	R347600305[2)]
Designation	BNS 819-X496-99-R-11	BNS 819-X510-99-R-10
Functional principle	Mechanical, roller	
Operating voltage	250 V AC	
Load current	≤ 5 A	
Switching function	Single-pole changeover/ (NC: C+NC, NO: C+NO)	
Connection type	Screw connection, without line	
Function indicator	–	
Switching frequency	3.3 Hz	
Max. permissible starting speed	1 m/s	
Ambient temperature	-5°C to +85°C	
Protection class	IP67	
B10d value	$5x10^6$ (wet area); $10x10^6$ (dependent on current load (dry area))	
Certifications and approvals, housing	CE CCC RoHS	
Certifications and approvals, switching element	CE CCC CSA RoHS	

Switching system - Accessories

Switches

Mechanical switch with M8x1 connector





Material numbers/technical data

Use	Limit switch	Reference switch	Limit switch	Reference switch
Material number	R913048215	R913048214	R913048217	R913048216
Designation	BNS 819-X1002-99-R-10	BNS 819-X1001-99-R-10	BNS 819-X1004-99-R-10	BNS 819-X1003-99-R-10
Functional principle	Mechanical, roller			
Operating voltage	10 - 30 VDC			
Load current	≤ 200 mA			
Switching function	PNP NC	PNP/NO	NPN/NC	NPN/NO
Connection type	Cable 0.2 m and connector M8 x 1, 3-pin with knurled screw			
Function indicator	–			
Short-circuit protection	–			
Reverse polarity protection	–			
Switching frequency	3.3 Hz			
Max. permissible starting speed	1 m/s			
Suitable for drag chains[1)]	–			
Torsion-resistant[1)]	–			
Weld spark-resistant[1)]	–			
Cable cross-section[1)]	3x0.14 mm^2			
Cable diameter D[1)]	4.3 $^{\pm 0.2}$ mm			
Static bending radius[1)]	12 mm			
Dynamic bending radius[1)]	12 mm			
Bending cycles[1)]	–			
Ambient temperature	-5°C to +70°C			
Protection class	IP65			
B10d value	5x10^6 (wet area); 10x10^6 (dependent on current load (dry area))			
Certifications and approvals[2)]	CE SA RoHS			

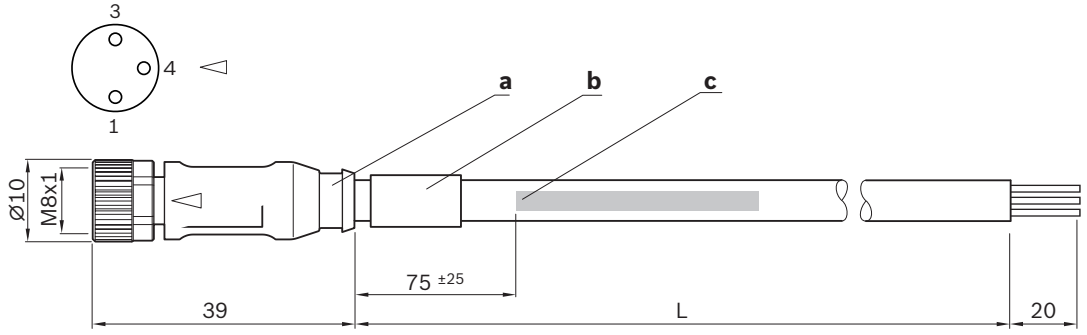
1) Technical data only for the cast-on connection line at the mechanical switch.
The available extension cables offer even better performance, e.g. when using a cable drag chain (see following pages).
2) No CCC certificate is required to introduce these products to the Chinese market.

Switching system - Accessories

Extensions

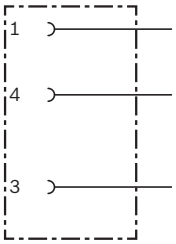
Assembled on one end

Dimensional drawing



Connection diagram

1 brown (BN) (+)
3 blue (BU) (–)
4 black (BK) (signal)



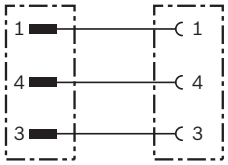
Material numbers

Use	Extension cable		
Material number	R911344602	R911344619	R911344620
Designation	7000-08041-6500500	7000-08041-6501000	7000-08041-6501500
Length (L)	5.0 m	10.0 m	15.0 m
Connection type 1	M8x1 3-pin straight female connector		
Connection type 2	Unassembled cable end		

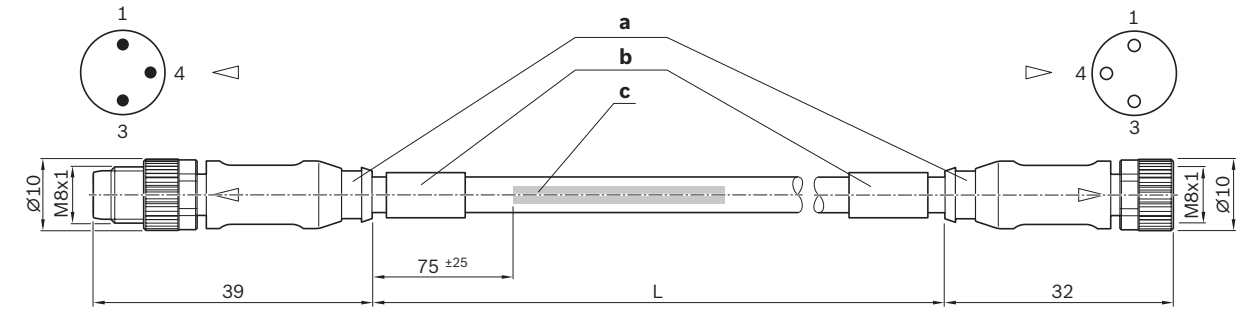
Assembled on two sides

Connection diagram

1 brown (BN) (+)
3 blue (BU) (–)
4 black (BK) (signal)



Dimensional drawing



Material numbers

Use	Extension cable				
Material number	R911344621	R911344622	R911344623	R911344624	R911344625
Designation	7000-88001-6500050	7000-88001-6500100	7000-88001-6500200	7000-88001-6500500	7000-88001-6501000
Length (L)	0.5 m	1.0 m	2.0 m	5.0 m	10.0 m
Connection type 1	Female connector, straight, M8x1, 3-pin				
Connection type 2	Male connector, straight, M8x1, 3-pin				

Technical data for extensions pre-assembled on one or two sides

Function indicator	–
Operating voltage indicator	–
Operating voltage	10–30 V DC
Type of cable	PUR black
Suitable for drag chains	✓
Torsion-resistant	✓
Weld spark-resistant	✓
Cable cross-section	3x0.25 mm^2
Cable diameter D	4.1 $^{\pm 0.2}$ mm
Static bending radius	5xD
Dynamic bending radius	10xD
Bending cycles	> 10 mil.
Max. permissible travel speed	3.3 m/s for 5 m travel range (typ.), up to 5 m/s for 0.9 m travel range
Max. permissible acceleration	30 m/s^2
Ambient temperature fixed ext.	-40°C to +85°C
Ambient temperature flexible ext.	-25°C to +85°C
Protection class	IP68
Certifications and approvals	CE cULus LISTED CSA US PG RoHS

a) Contour for 6.5 mm corrugated tube (inner diameter)
b) Cable grommet
c) Cable printing per printing specification

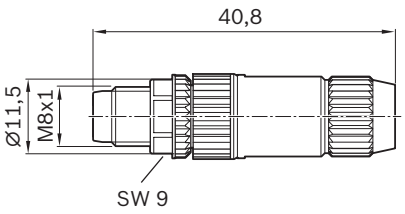
Switching system - Accessories

Extensions

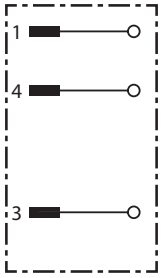
Connectors

R901388333

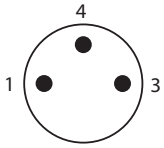
Dimensional drawing



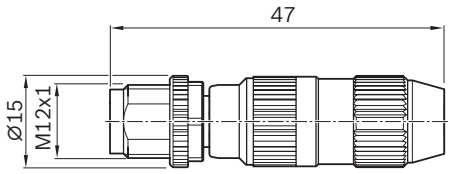
Connection diagram

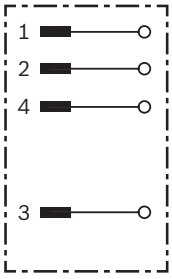


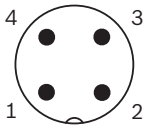
Connector side view



R901388352



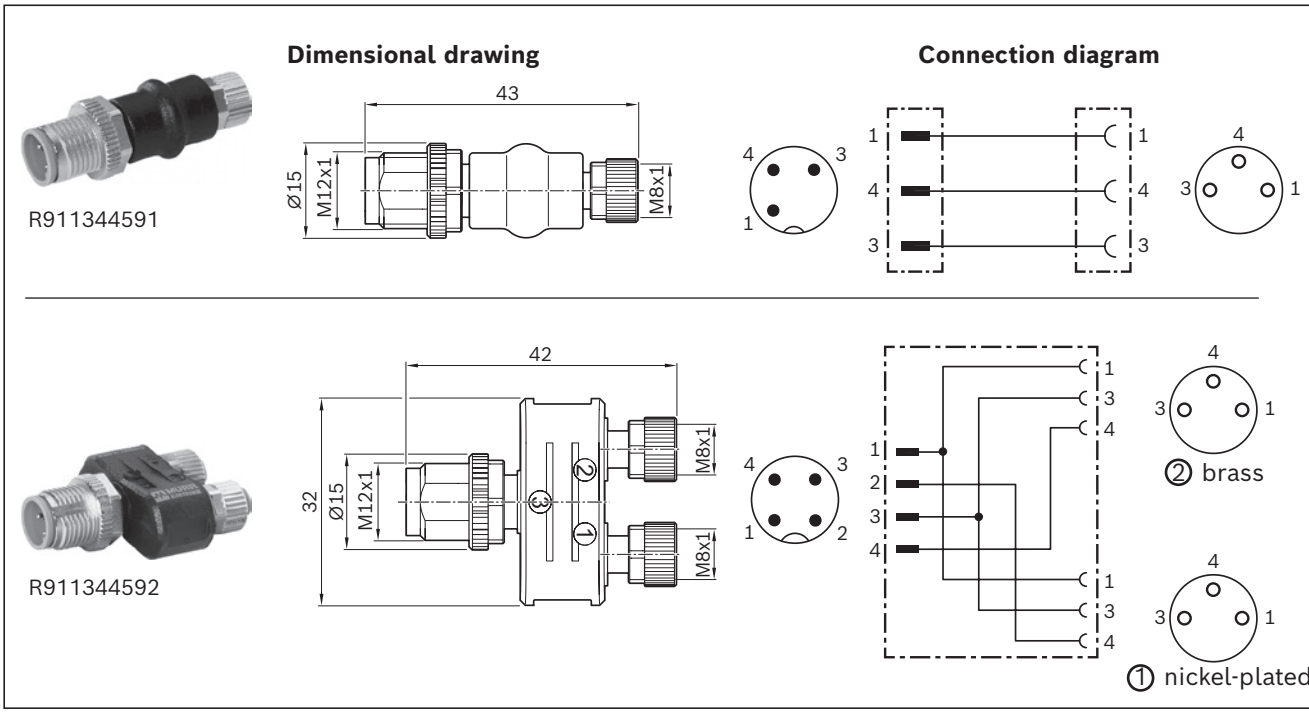




Material numbers/technical data

Use	Connector, single	
Material number	R901388333	R901388352
Designation	7000-08331-0000000	7000-12491-0000000
Version	Straight	
Operating current per contact	max. 4 A	
Operating voltage	max. 32 V AC/DC	
Connection type	Connector, straight, M8x1, 3-pin, IDC, self-locking screw	Connector, straight, M12x1, 4-pin, IDC, self-locking screw
Function indicator	-	
Operating voltage indicator	-	
Connection cross-section	0.14 ... 0.34 mm^2	
Ambient temperature	-25°C to +85°C	
Protection class	IP67 (inserted and screwed down)	
Certifications and approvals		

Adapters



Material numbers/technical data

Use	Adapters	Adapter or distributor
Material number	R911344591	R911344592
Designation	7000-42201-0000000	7000-41211-0000000
Version	Straight for 1 sensor	Straight, for 1 - 2 sensors
Operating current per contact	max. 4 A	
Operating voltage	max. 32 V AC/DC	
Connection type 1	Straight female connector, M8x1, 3-pin, self-locking screw thread	2 X female connectors, straight, M8x1, 3-pin, self-locking screw thread
Connection type 2	Connector, straight, M12x1, 3-pin, self-locking screw thread	Connector, straight, M12x1, 4-pin, self-locking screw thread
Function indicator	–	
Operating voltage indicator	–	
Connection cross-section	–	
Ambient temperature	-25°C to +85°C	
Protection class	IP67 (inserted and screwed down)	
Certifications and approvals	RoHS	c UL us LISTED, RoHS

Switching system - Accessories

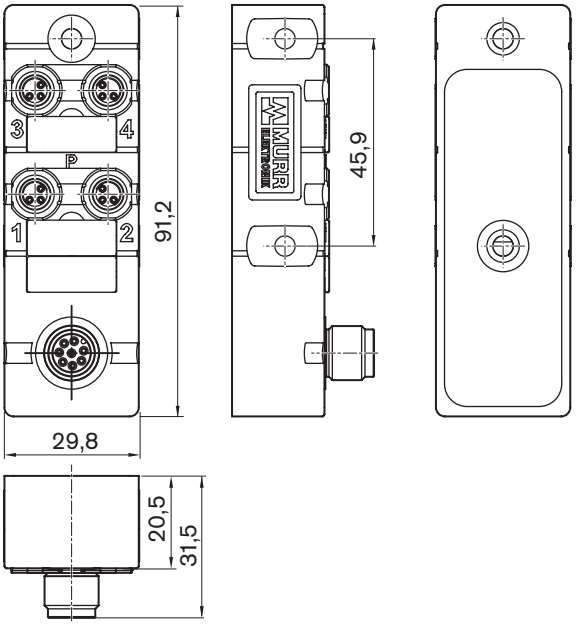
Distributors

Passive distributor

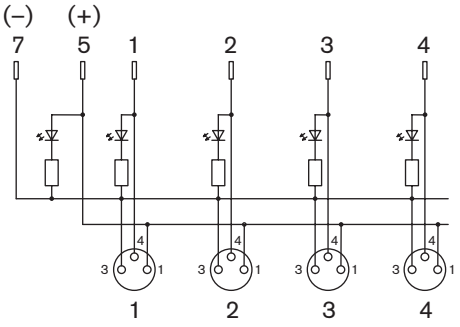
R901425737

R901429917

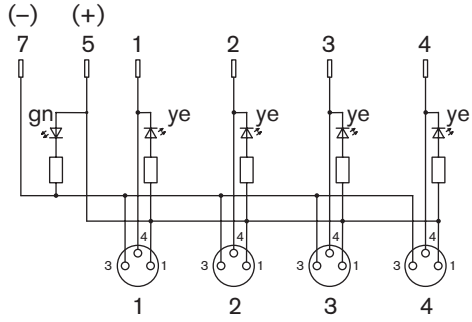
R911344592



R901425737



R901429917



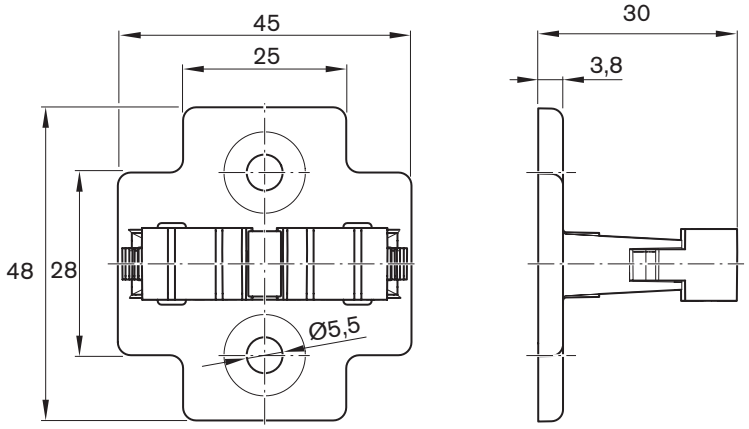
Material numbers/technical data

Use	Passive distributor		
Material number	R901425737	R901429917	R911344592
Designation	8000-84070-0000000	8000-84071-0000000	For technical data and dimensional drawings, see adapter
Version	Straight, for 1 - 4 sensors		
Operating current per contact	max. 2 A		
Operating voltage	24 V DC		
Switching logic	PNP	NPN	
Connection type 1	4x female connectors, straight, M8x1, 3-pin, self-locking screw thread		
Connection type 2	Straight connector, M12x1, 8-pin, IDC, self-locking screw thread		
Function indicator	✓		
Operating voltage indicator	✓		
Connection cross-section	-		
Ambient temperature	-20 °C to +70 °C		
Protection class	IP67 (plugged in and screwed down)		
Certifications and approvals			

Accessories for passive distributors

Retainer plate

Screw plug



Material numbers/technical data

Use	For passive distributor R911344592	For passive distributors R901425737/ R901429917
Retainer plate	R913047341	–
Designation	7000-99061-0000000	–
Set	1 unit	–
Screw plug	–	R913047322
Designation	–	3858627
Set	–	10 units

Switching system - Accessories

Extensions for passive distributor

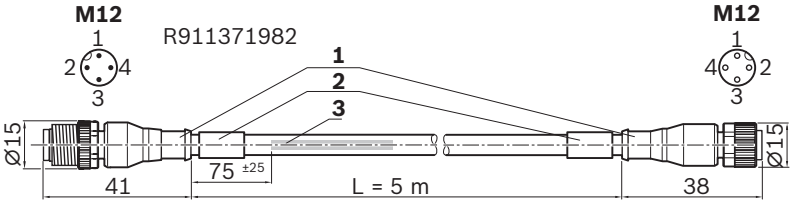
Extensions for passive connectors

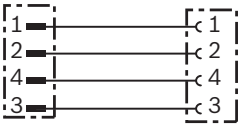
R911371982

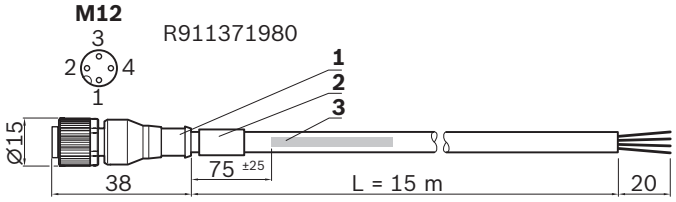
R911371981

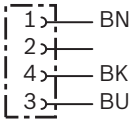
R911371980

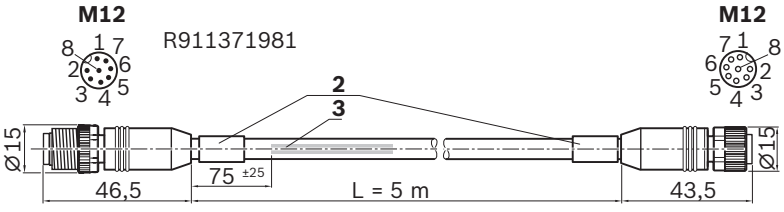
R911371983

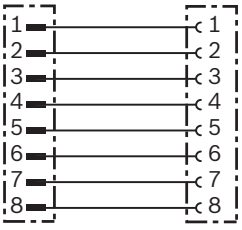


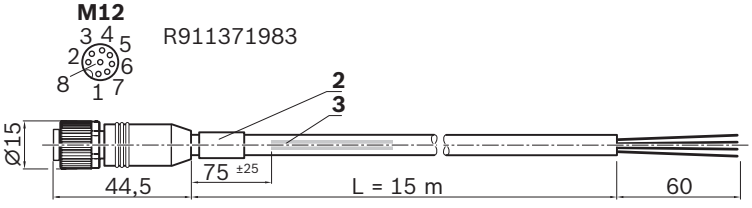


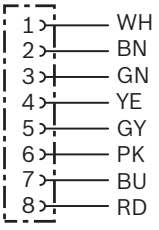












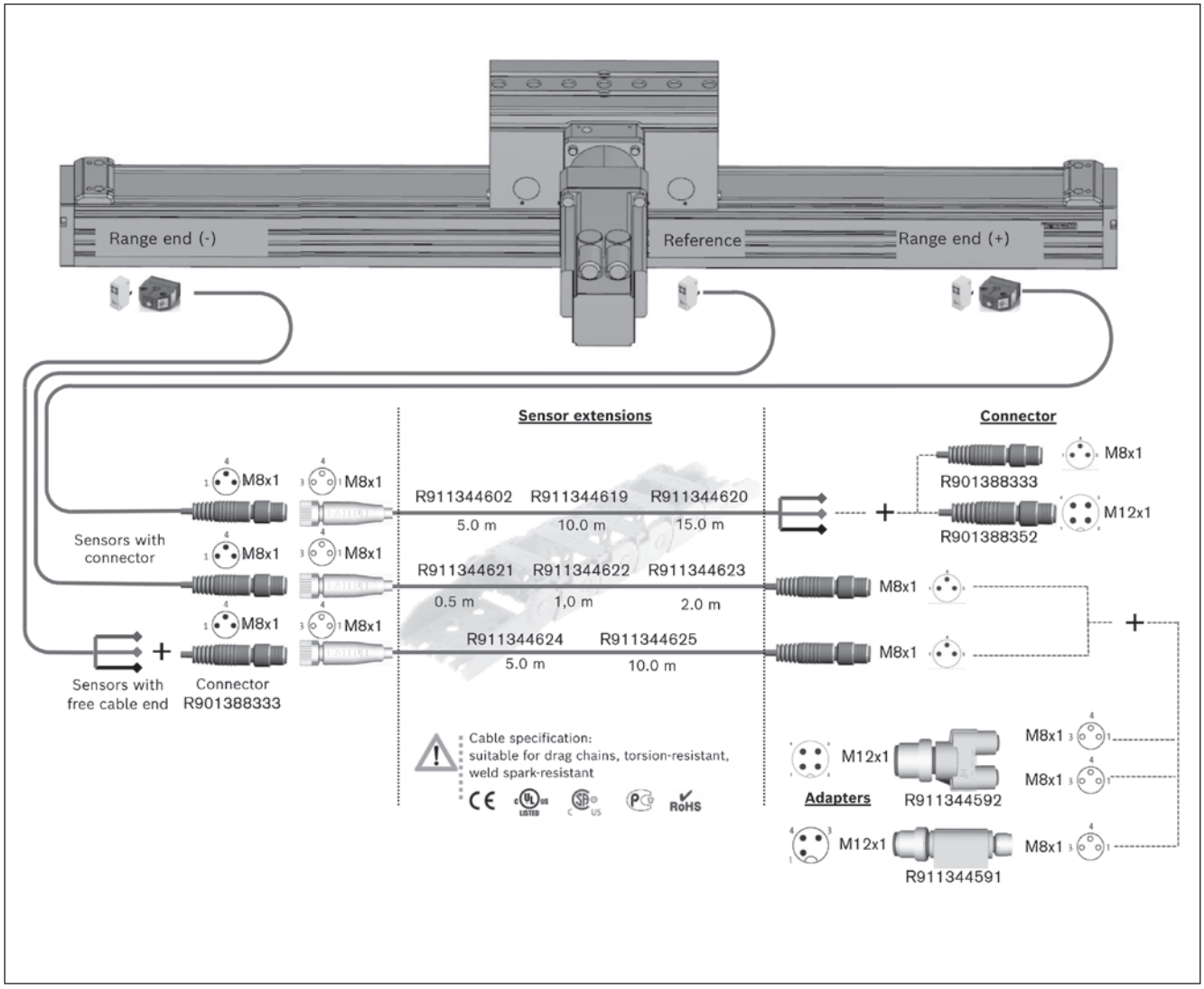
1) Contour for conduit pipe with inner diameter of 10
2) Cable grommet
3) Cable print per ordering specification 7000-08001

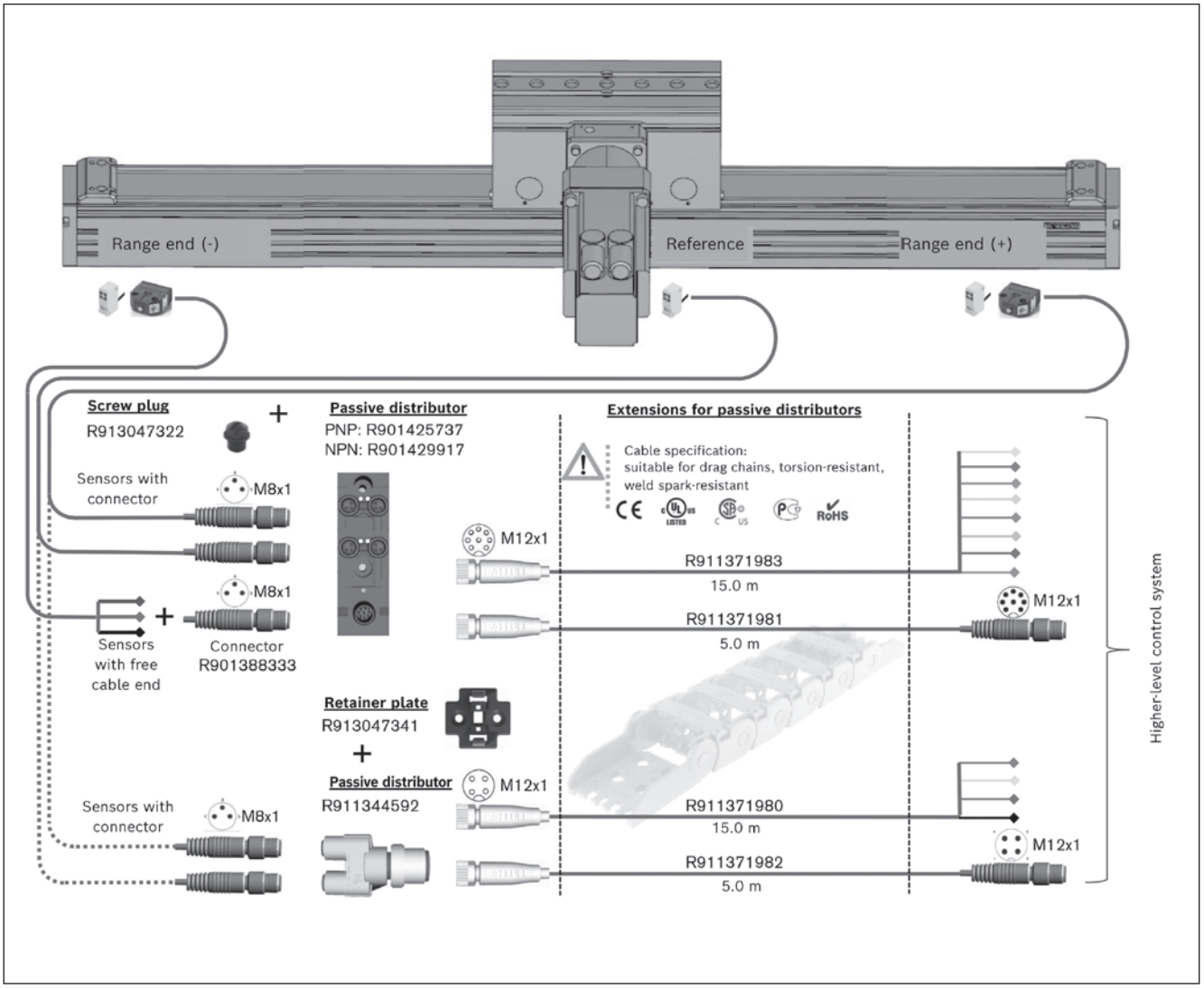
Material numbers/technical data

Use	Extension cable for passive distributor R911344592		Extension cable for passive distributors R901425737 / R901429917	
Material number	R911371982	R911371980	R911371981	R911371983
Designation	7000-40021-6540500	7000-12221-6541500	7000-48001-3770500	7000-17041-3771500
Length	5.0 m	15.0 m	5.0 m	15.0 m
Connection type 1	Female connector, straight, M12x1, 4-pin		Female connector, straight, M12x1, 8-pin	
Connection type 2	Connector, straight, M12x1, 4-pin	Unassembled cable end	Connector, straight, M12x1, 8-pin	Unassembled cable end
Function indicator	–			
Operating voltage indicator	–			
Type of cable	PUR black		PUR gray	
Operating voltage	30 V AC/DC			
Operating current per contact	max. 4 A per contact		max. 2 A per contact	
Suitable for drag chains	✓			
Torsion-resistant	✓			
Weld spark-resistant	✓			
Cable cross-section	4x0.34 mm^2		8x0.34 mm^2	
Cable diameter D	4.7 $^{\pm 0.2}$ mm		6.2 $^{\pm 0.3}$ mm	
Static bending radius	≥ 5 x D			
Dynamic bending radius	≥ 10 x D			
Bending cycles	> 10 mil.			
Max. permissible travel speed	3.3 m/s for 5 m travel range (typ.), up to 5 m/s for 0.9 m travel range			
Max. permissible acceleration	≤ 30 m/s^2			
Ambient temperature fixed ext.	–40 °C to +80 °C (90 °C max. 10 000 h)			
Ambient temperature flexible ext.	–25 °C to +80 °C (90 °C max. 10 000 h)			
Protection class	IP67 (inserted and screwed down)			
Certifications and approvals	CE cULus LISTED CSA US PG RoHS			

Switching system - Accessories

Combination examples




Range end (-)
Reference
Range end (+)
Screw plug
R913047322
Sensors with connector
M8x1
M8x1
Sensors with free cable end
Connector
R901388333
Passive distributor
PNP: R901425737
NPN: R901429917
M12x1
Retainer plate
R913047341
Passive distributor
R911344592
Sensors with connector
M8x1
M12x1
Extensions for passive distributors
Cable specification:
suitable for drag chains, torsion-resistant,
weld spark-resistant
RoHS
R911371983
15.0 m
M12x1
R911371981
5.0 m
R911371980
15.0 m
M12x1
R911371982
5.0 m
Higher-level control system

Attachments and accessories

Fastening

General notes

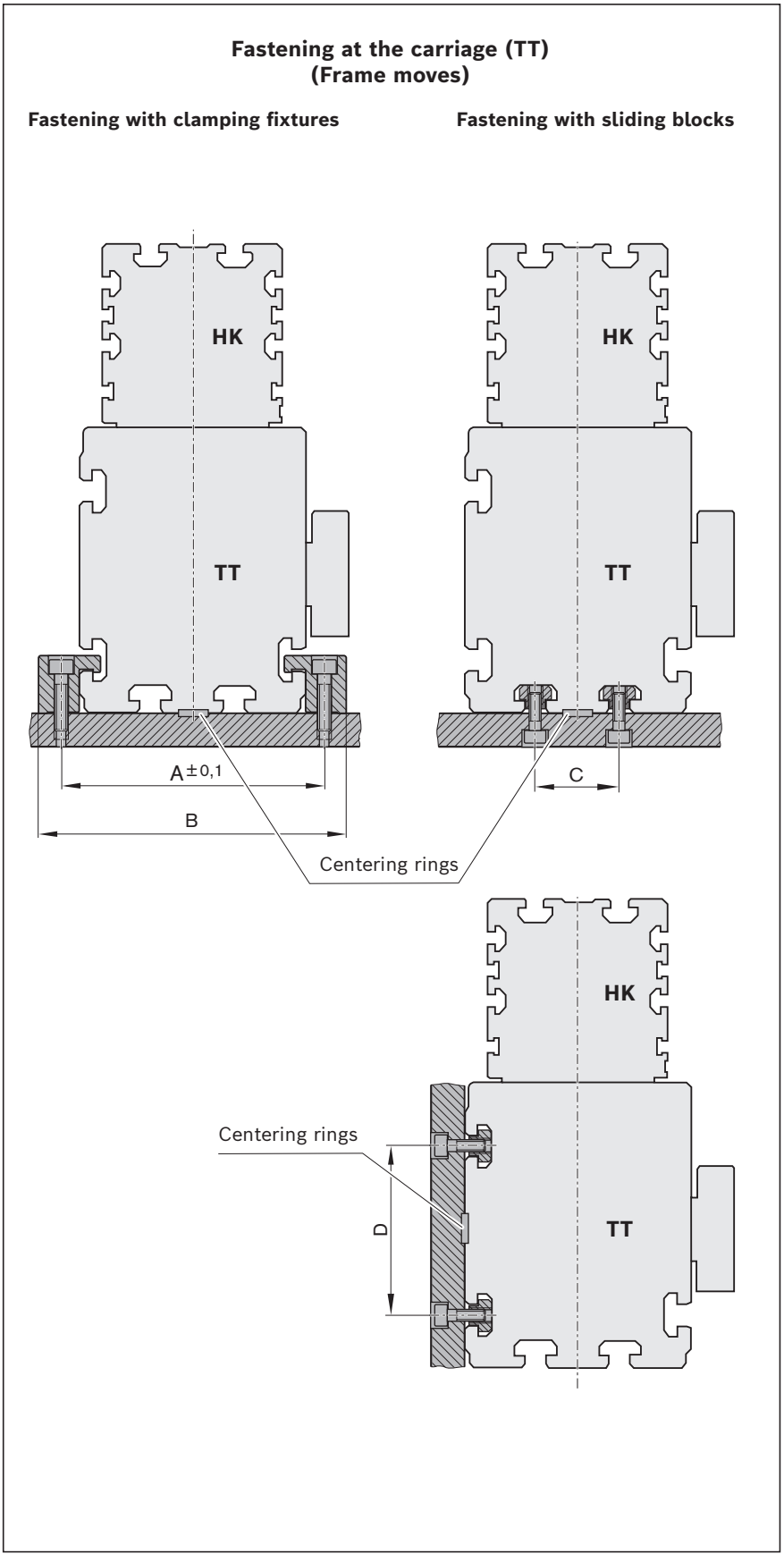
The fastening of the Omega modules is done with different fastening elements:
- Clamping fixtures
- Sliding blocks
- Square nuts
- Screws for T-slots as per DIN 787 (no figure).
- Centering rings on the carriage as positioning aid

Length depends on mounting base.

Fastening at carriage (frame moves)

OBB	A (mm)	B (mm)	C (mm)	D (mm)
55	91	105	40	50
85	130	148	40	80
120	157	175	80	100

Fastening at the carriage (TT) (Frame moves)



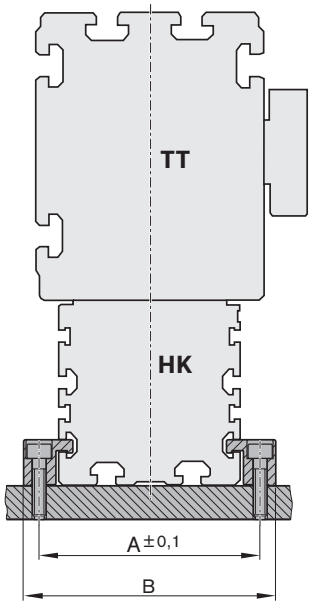
Fastening at the frame (HK) (carriage moves)

⚠ Do not support the Omega module at the end blocks! The frame is the load-bearing part!

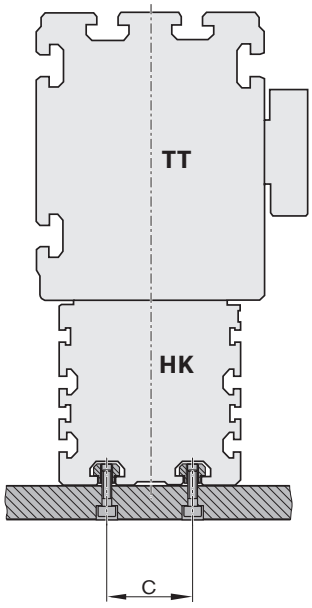
OBB	A (mm)	B (mm)	C (mm)
55	71	85	25
85	101	115	40
120	144	162	80

Fastening at the frame (Carriage moves)

Fastening with clamping fixtures



Fastening with sliding blocks



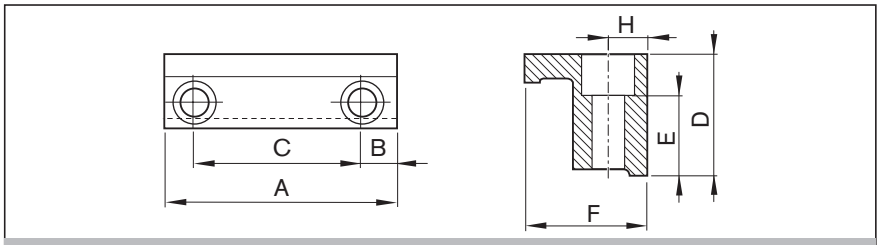
Attachments and accessories

Fastening

Clamping fixtures

Recommended number of clamping fixtures for frame moves installation (carriage fastened):
- 3 pieces opposite motor
- 2 pieces on motor side

Recommended number of clamping fixtures for carriage moves installation (frame fastened):
- 4 pieces per side/m

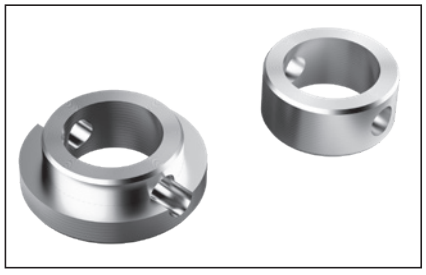


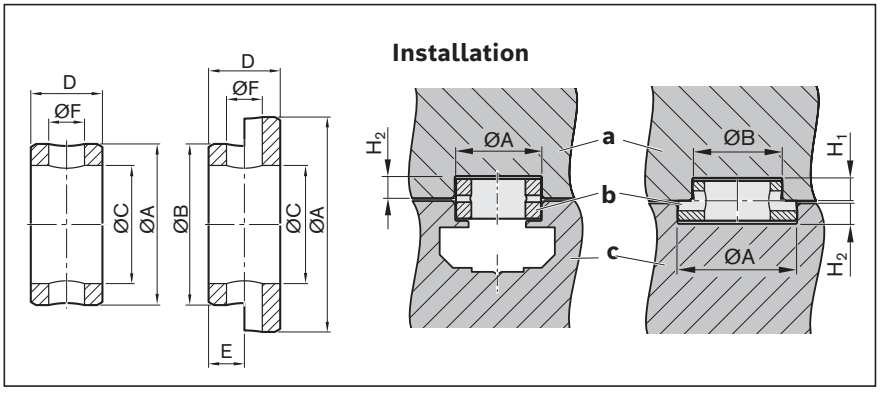
Type 2

Size	Fastening at the...	Countersink ISO 4762 for	Number of bores N	Dimensions (mm) A	B	C	D	E	F	H	Material number
OBB-055	Carriage	M6	2	65	12.5	40	17.0	10.2	21.0	7	R1175 192 04
	Frame	M6	2	72	11.0	50	11.5	5.3	19.3	7	R0375 510 33
OBB-085	Carriage	M8	2	68	15.0	38	27.5	18.0	30.0	9	R0375 410 52
	Frame	M6	2	78	14.0	50	20.0	11.3	21.0	7	R1175 390 30
OBB-120	Carriage	M8	2	88	19.0	50	27.5	18.0	30.0	9	R0375 410 50
	Frame	M8	2	108	19.0	70	27.5	16.3	29.0	9	R1175 290 26

Centering rings

The centering ring serves as a positioning aid and for positive locking when mounting customer-built attachments on the carriage. It creates a positive-locking connection with good reproducibility.
Material: Steel (corrosion-resistant)



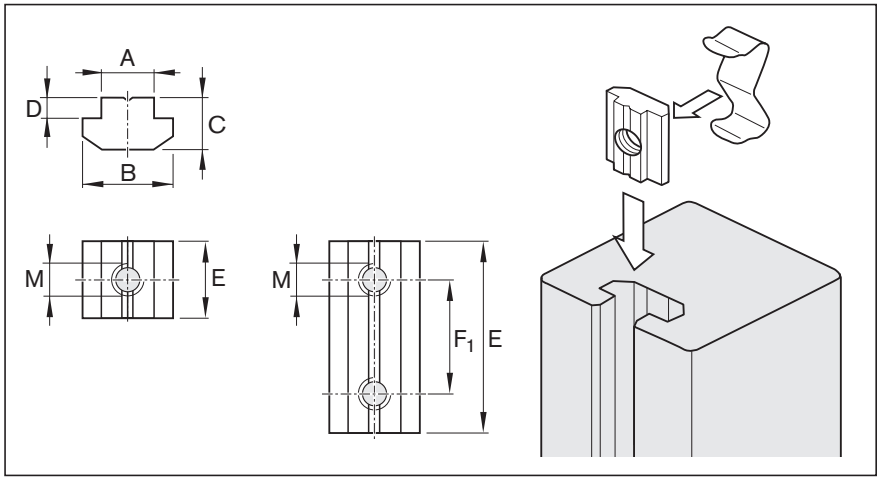


a) Customer-built attachment
b) Centering ring
c) Carriage

	OBB	Size Ø (mm)	Dimensions (mm) ØA H7/k6	ØB H7/k6	C ±0.1	D −0.2	E +0.2	ØF	H_1 +0.2	H_2 +0.2	Material number
Carriage	**055**	**12**	12	–	9.0	4.0	–	2.0	–	2.1	R0396 605 45
		12 - 7	12	7	5.5	3.5	1.5	1.6	1.6	2.1	R0396 605 77
		12 - 9	12	9	6.6	4.0	2.0	2.0	2.1	2.1	R0396 605 50
	085, 120	**16**	16	–	11.0	6.0	–	3.0	–	3.1	R0396 605 46
		16 - 12	16	12	9.0	5.0	2.0	2.0	2.1	3.1	R0396 605 51
End block	**055, 085**	**9**	9	–	6.6	4.0	–	2.0	–	2.1	R0396 605 44
		9 - 5	9	5	3.4	3.5	1.5	1.6	1.6	2.1	R0396 605 48
		9 - 7	9	7	5.5	3.5	1.5	1.6	1.6	2.1	R0396 605 49
	120	**12**	12	–	9.0	4.0	–	2.0	–	2.1	R0396 605 45
		12 - 7	12	7	5.5	3.5	1.5	1.6	1.6	2.1	R0396 605 77
		12 - 9	12	9	6.6	4.0	2.0	2.0	2.1	2.1	R0396 605 50

Sliding blocks and springs

The spring serves as assembly and positioning aid.
(only for OBB-085 and OBB-120)

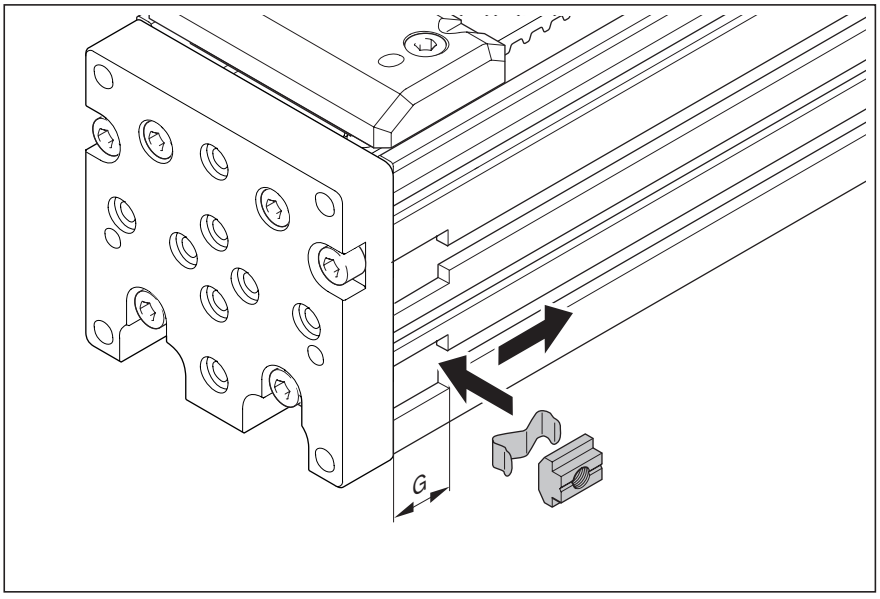


Overview, sliding blocks

Dimensions (mm)						For thread	Sliding block material number	Spring material number
A	B	C	D	E	F_1			
5	9.2	4.0	1.7	10	–	M4	R0391 710 38	–
6	11.5	4.0	1.0	12	–	M4	R3447 014 01	R3412 010 02
				12	–	M5	R3447 015 01	R3412 010 02
				45	30	M5	R0391 710 09	–
8	16.0	6.0	2.0	16	–	M4	R3447 017 01	R3412 011 02
				16	–	M5	R3447 018 01	R3412 011 02
				16	–	M6	R3447 019 01	R3412 011 02
				16	–	M8	R3447 020 01	R3412 011 02
				50	36	M6	R0391 710 08	–
10	19.5	10.5	5.0	20	–	M4	R3447 012 01	R3412 009 02
				20	–	M5	R3447 011 01	R3412 009 02
				20	–	M6	R3447 010 01	R3412 009 02
				20	–	M8	R3447 009 01	R3412 009 02
				90	70	M8	R0391 710 07	–

Sliding blocks for lateral fastening at the frame

Size	A (mm)	E (mm)	G (mm)
OBB-055	5	10	12
OBB-085	6	12	14
OBB-120	8	16	18



Attachments and accessories

Carriage with clamping unit

Carriage

On carriages with an integrated clamping unit, a standard air connection (1) is located opposite the lube nipples on both end faces of the carriage. Connection to an air connection is sufficient.

Clamping unit (LKPS)

The clamping unit is used exclusively for clamping linear axes (static holding)

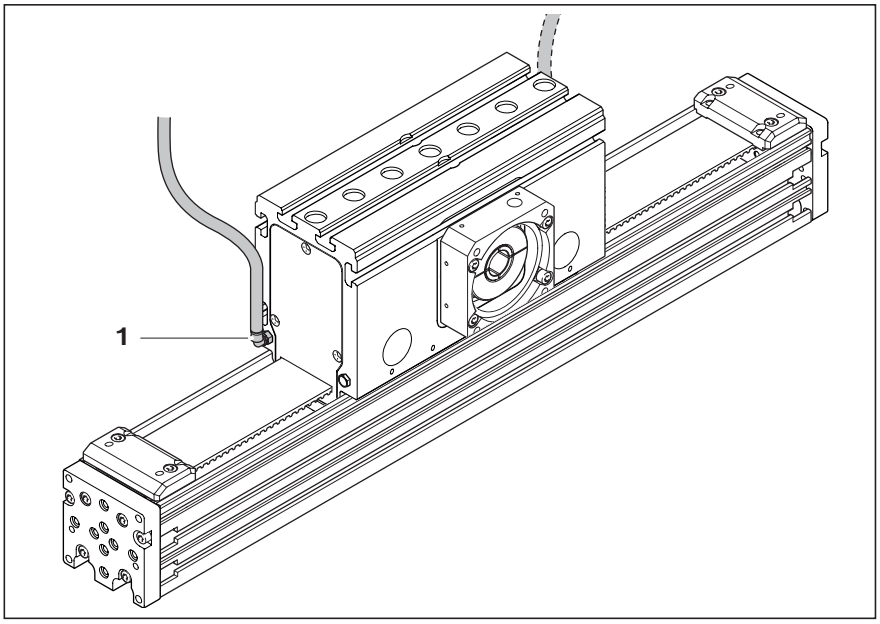
Owing to the spring energy accumulator, it is closed in the de-energized condition (NC).

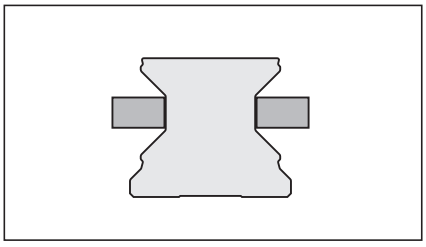
The clamping unit is usable as a proven component in connection with a suitable function test and in category 1 controls as per DIN EN ISO 13849-1:2006.

If the user risk assessment determines a Performance Level (see Appendix A, DIN EN ISO 13849-1:2006) requiring a higher category, further technical control measures are necessary for safe holding or for preventing startup from the immobile position.

For further instructions and information, please refer to the documentation for this product.

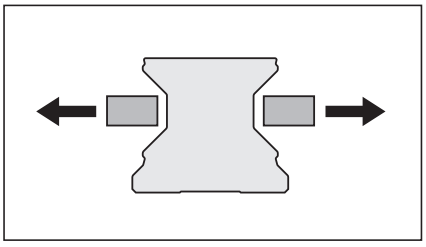
⚠ The clamping unit must only be used when the axis is at a standstill.
The clamping unit may not be used as a braking unit!
Use for the emergency braking of a moving mass is not permissible.
Clamping during movement may lead to the destruction of the clamping unit as well as the linear guide!





Air pressure: 0 bar

Clamps with spring force
In the event of pressure drop, the clamping profiles are pressed onto the guide rail by a spring energy accumulator.A quick-release valve for short reaction times is required.



Air pressure: 5.5 - 8 bar

Decompression with air pressure
The clamping profiles are held apart by the compressed air.
– Free movement is possible

Size	OBB-055	OBB-085	OBB-120
Holding force [1]	400 N	750 N	1300 N
Min. pressure (Release pressure)	5.5 bar		
Max. pressure	8.0 bar		
Spring energy accumulator	✓		
Clamping cycles	up to 5 mill. (B10d value)[2]		
Braking cycles	not allowed		
Push-in fitting for tubing	Ø 4 mm		
Actuation	pneumatic		
Theor. air consumption per cycle at 6 bar	23 cm^3	54 cm^3	74 cm^3
Air quality	lubricated air in accordance with ISO 8573-1 class 4, filter mesh size 25 µm		

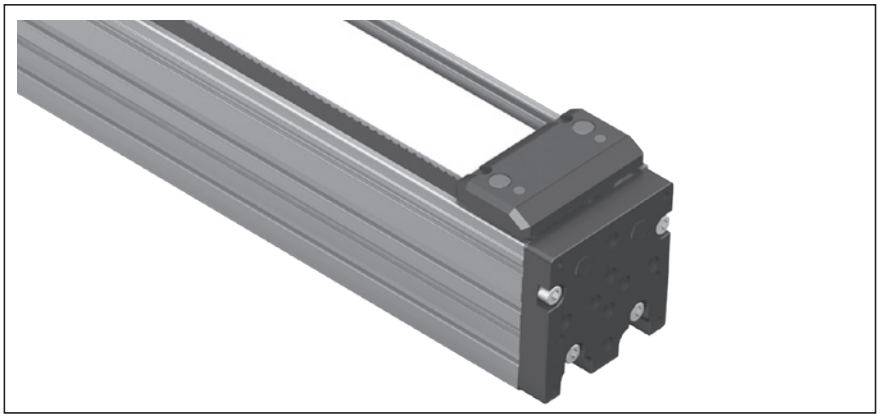
1) Static holding of the Omega module carriage and/or frame with axial forces up to each specified value.
2) The B10d value specifies the number of switching cycles until 10% of components fail dangerously.

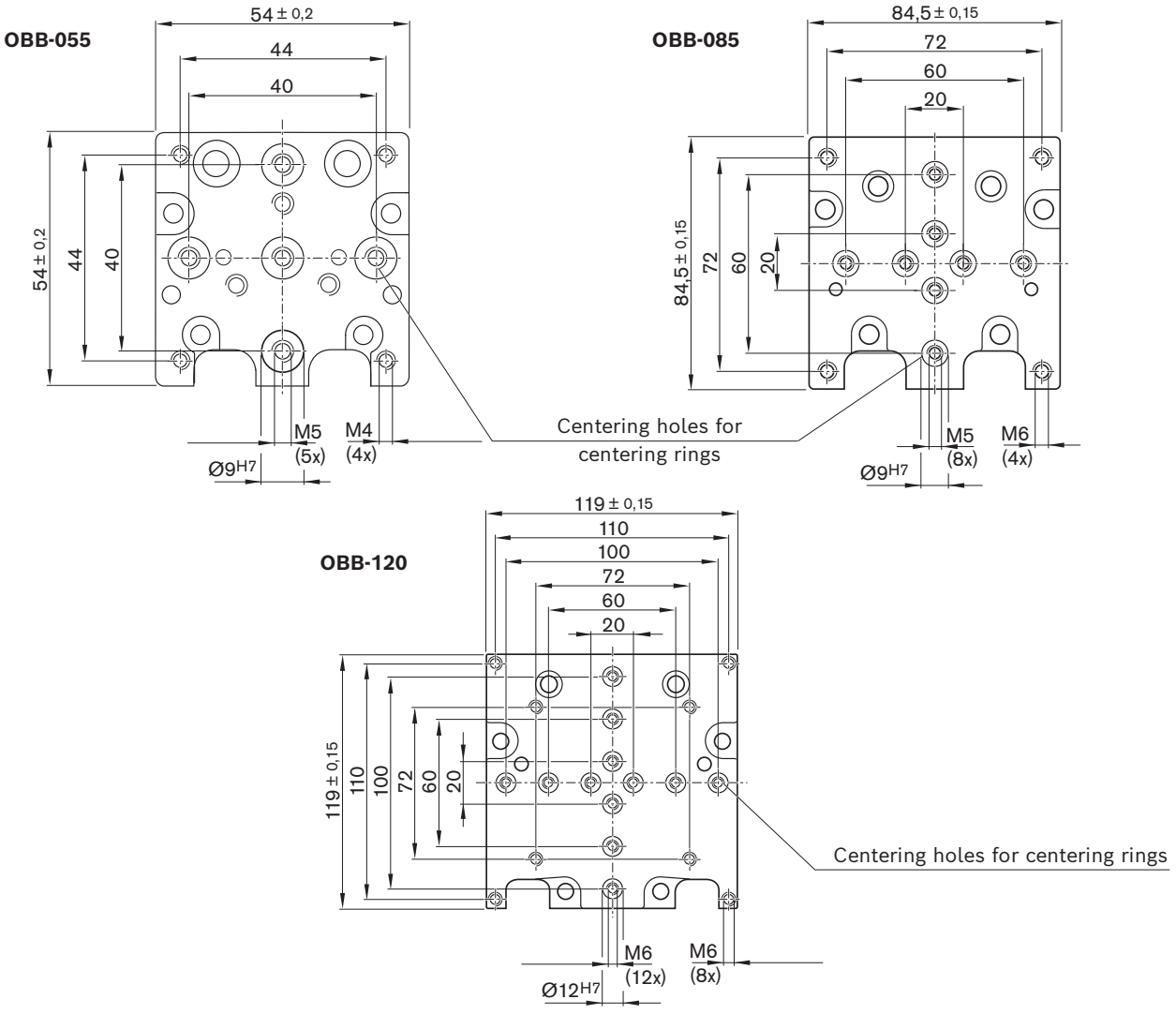
Attachment of additional devices

End block for attachment

The end blocks of the Omega module are equipped with fastening bores, threads and centering holes for attachment of additional devices.

You will find further information about possible combinations with the Omega module OBB in the "Linear motion systems connection technology" catalog.

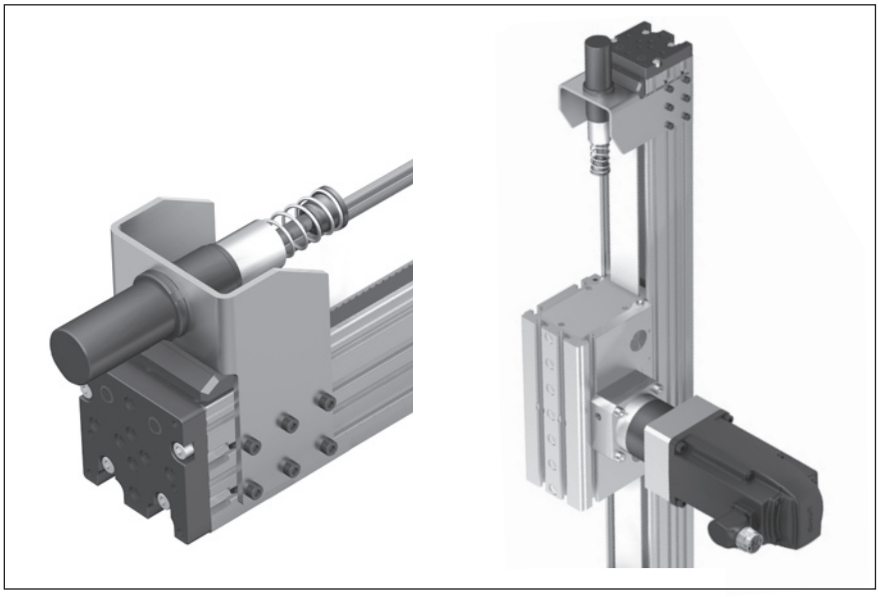




Attachments and accessories

Shock absorbers

Shock absorbers that are suitable for end position cushioning are available for the Omega module. The damper is used only for preventing damage during uncontrolled movement. It is not suited for continuous operation.

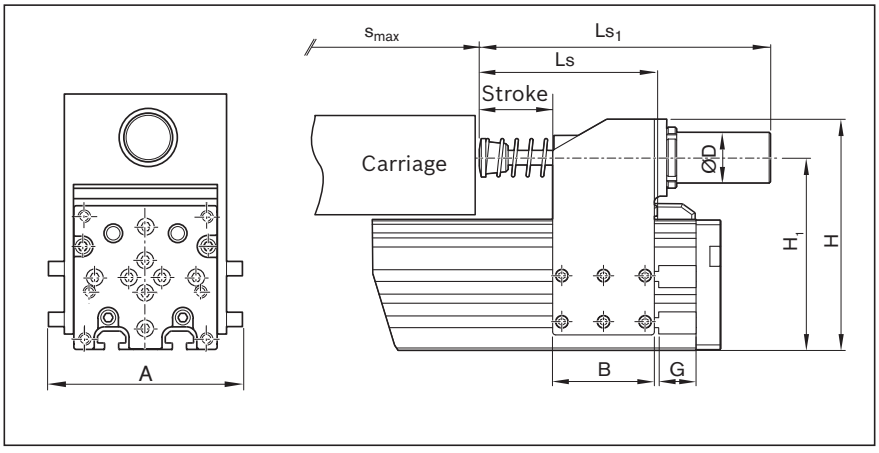


Notes
Observe the mounting instructions

Stroke shortening

⚠ The installation of a shock absorber reduces the maximum travel range.

Note:
When a shock absorber is used, for structural design reasons, there is a reduction of the max. travel range (s_{max}). For this reason, the maximum travel range must be reduced by the value s_{red} in the calculation per side and/or per shock absorber. When the carriage is located at the end of the max. travel range, the end face of the carriage is at the damper head.



Mounting bracket

Size	Material number[1]	Dimensions (mm) A	B	H	H_1	L_S	L_S[2]	L_{S1}	Stroke	Ø D	G
OBB-055	R1175 101 17	70	56.5	113	90.5	115	133	189	49	M33 x 1.5	12
OBB-085	R1175 301 17	104	68.0	150	125.0	131	149	209	50	M33 x 1.5	14
OBB-120	R1175 601 17	145	99.0	210	210.0	188	206	246	74	M45 x 1.5	16

1) Scope of delivery: Holder, shock absorber and mounting accessories
2) Carriage with clamping unit

Shock absorbers

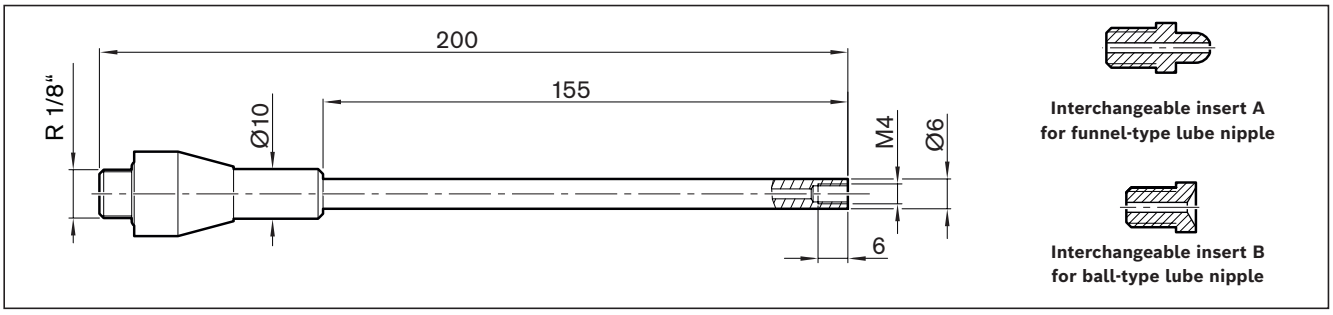
Size	Max. braking mass (kg)	Energy consumption (Nm/stroke)	s_{red}[1] (mm)	Weight (Mounting bracket and shock absorbers) (kg)
OBB-055	20	620	62	0.95
OBB-085	43	1,100	85	1.62
OBB-120	90	2 040	121	4.00

1) Reduction of the max. travel range of the Omega module (minimum value per side or damper)

Nozzle pipe

For manual grease guns. For the lubrication of funnel-type and ball-type lube nipples.

Scope of delivery:
Nozzle pipe, interchangeable insert A for funnel-type lube nipple, interchangeable insert B for ball-type lube nipple.



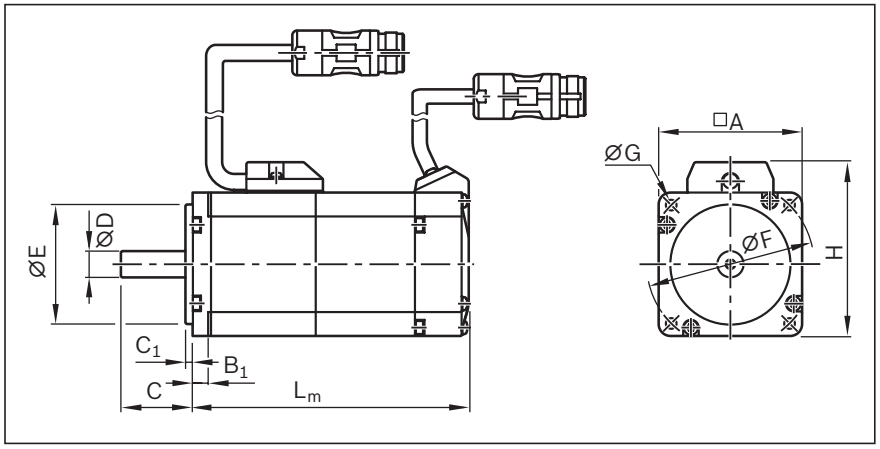
Material number	Mass (g)
R345503106	158

Frequency meter

For checking the toothed belt pretension on linear axes with a toothed belt drive, as well as for setting the toothed belt pretension in the case of a drive over the belt side drive.

Motors

IndraDyn S - Servo motors MSM



Motor schematic

Motor code	Dimensions (mm)											
	□ A	B_1	C	C_1	ø D h6	ø E h7	ø F	ø G	H	L_m Brake without	L_m Brake with	
MSM 031C-0300	60	6.5	30	3	14	50	70	4.5	73	98.5	135.0	
MSM 041B-0300	80	8.0	35	3	19	70	90	6.0	93	112.0	149.0	

Version:

- Plain shaft without shaft seal
- M5 multi-turn absolute encoder (20-bit, absolute encoder function only available with backup battery)
- Cooling system: natural convection
- IP54 protection class (shaft IP40)
- With or without holding brake
- M17 metal round connector

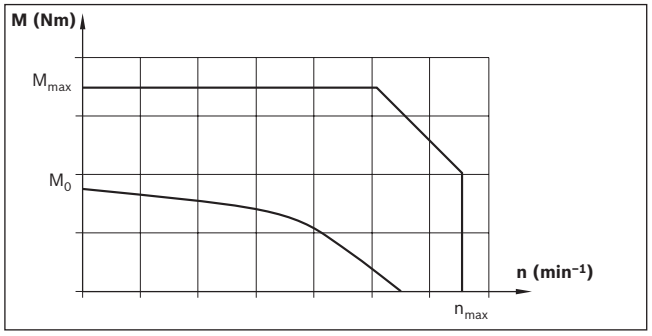
Note

Motors are available with control units and controllers. You can find more information on motors and controllers in the Rexroth catalogs on drive technology at www.boschrexroth.com/mediadirectory.

Motor data										Type code	Material number
n_{max} (min^{-1})	M_0 (Nm)	M_{max} (Nm)	M_{br} (Nm)	J_m (kg/m^2)	J_{br} (kg/m^2)	m_m (kg)	m_{br} (kg)	Motor connection 1/2 cable(s)	Holding brake		
5,000	1.30	3.80	1.27	0.0000260	0.0000018	1.20	0.50	2	N	MSM 031C-0300-NN-M5-MH0	R911344215
									Y	MSM 031C-0300-NN-M5-MH1	R911344216
4,500	2.40	7.10	2.45	0.0000870	0.0000075	2.30	0.80	2	N	MSM 041B-0300-NN-M5-MH0	R911344217
									Y	MSM 041B-0300-NN-M5-MH1	R911344218

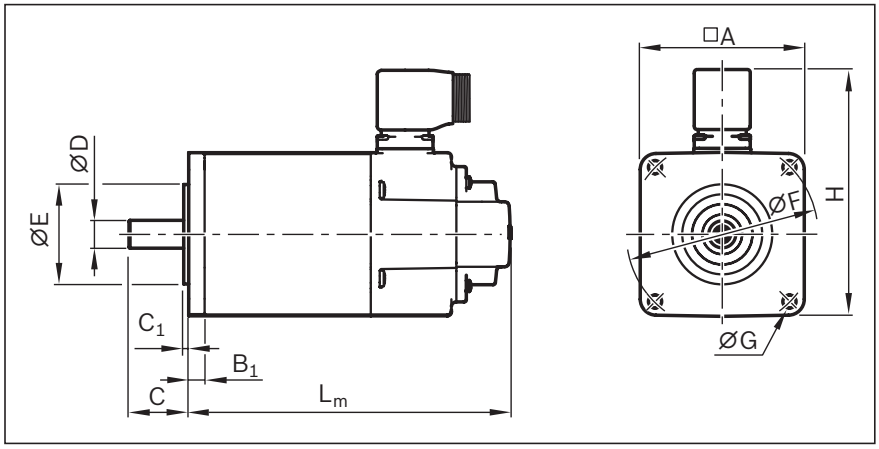
Motor characteristic

(Schematic)



Motors

IndraDyn S - Servo motors MS2N



Motor schematic

Motor code	Dimensions (mm)												
	□ A	B_1	C	C_1	ø Dk6	ø Ej7	ø F	ø G	H Cables 2	H Cables 1	Brake without	Brake with	L_m
MS2N04-C0BTN	82	8	30	2.5	14	50	95	6.6	108	123	194	226.5	
MS2N04-D0BQN	82	8	30	2.5	14	50	95	6.6	108	123	226	258.5	
MS2N05-C0BTN	98	9	40	3	19	95	115	9	124	139	224	254	
MS2N05-D0BRN	98	9	40	3	19	95	115	9	124	139	260	290	
MS2N06-D0BRN	116	14	50	3	24	95	130	9	156	156	224	261	
MS2N06-D1BNN	116	14	50	3	24	95	130	9	156	156	224	261	

Version

- Plain shaft without shaft seal ring
- Multi-turn encoder
- Standard encoder (B) in conjunction with 2-cable connection (Hiperface interface)
- Advanced encoder (C) in conjunction with 1-cable connection (AcuroLink interface)
- IP64 protection class
- With or without holding brake
- Special ground connection terminal near motor flange (used as needed)

Notes:

Motors are available with control units and controllers. You can find more information on motors and controllers in the Rexroth catalogs on drive technology at www.boschrexroth.com/mediadirectory.

Motor data								Motor connection 1/2 cable(s)	Holding brake	Type code	Material number
n_{max} (min^{-1})	M_0 (Nm)	M_{max} (Nm)	M_{br} (Nm)	J_m (kg/m^2)	J_{br} (kg/m^2)	m_m (kg)	m_{br} (kg)				
6000	2.80	12.0	5.0	0.000110	0.000050	3.7	0.7	2	N	MS2N04-C0BTN-BMDH0-NNNNE-NN	R911384529
								2	Y	MS2N04-C0BTN-BMDH1-NNNNE-NN	R911384530
								1	N	MS2N04-C0BTN-CMSH0-NNNNE-NN	R911384531
								1	Y	MS2N04-C0BTN-CMSH1-NNNNE-NN	R911384532
6000	3.85	18.1	5.0	0.000160	0.000040	4.7	0.7	2	N	MS2N04-D0BQN-BMDH0-NNNNE-NN	R911384533
								2	Y	MS2N04-D0BQN-BMDH1-NNNNE-NN	R911384534
								1	N	MS2N04-D0BQN-CMSH0-NNNNE-NN	R911384535
								1	Y	MS2N04-D0BQN-CMSH1-NNNNE-NN	R911384536
6000	6.10	20.8	10.0	0.000290	0.000110	5.9	1.1	2	N	MS2N05-C0BTN-BMDH0-NNNNE-NN	R911384544
								2	Y	MS2N05-C0BTN-BMDH1-NNNNE-NN	R911384545
								1	N	MS2N05-C0BTN-CMSH0-NNNNE-NN	R911384546
								1	Y	MS2N05-C0BTN-CMSH1-NNNNE-NN	R911384547
6000	7.90	31.3	10.0	0.000400	0.000110	7.3	1.1	2	N	MS2N05-D0BRN-BMDH0-NNNNE-NN	R911384548
								2	Y	MS2N05-D0BRN-BMDH1-NNNNE-NN	R911384549
								1	N	MS2N05-D0BRN-CMSH0-NNNNE-NN	R911384550
								1	Y	MS2N05-D0BRN-CMSH1-NNNNE-NN	R911384551
6000	9.70	32.0	15.0	0.000650	0.000140	9.0	1.5	2	N	MS2N06-D0BRN-BMUH0-NNNNE-NN	R911384935
								2	Y	MS2N06-D0BRN-BMUH2-NNNNE-NN	R911384936
								1	N	MS2N06-D0BRN-CMSH0-NNNNE-NN	R911384937
								1	Y	MS2N06-D0BRN-CMSH2-NNNNE-NN	R911384938
6000	9.00	38.4	15.0	0.001400	0.000140	9.0	1.5	2	N	MS2N06-D1BNN-BMUH0-NNNNE-NN	R911384939
								2	Y	MS2N06-D1BNN-BMUH2-NNNNE-NN	R911384940
								1	N	MS2N06-D1BNN-CMSH0-NNNNE-NN	R911384941
								1	Y	MS2N06-D1BNN-CMSH2-NNNNE-NN	R911384942

Service and information

Operating conditions

Normal operating conditions

Ambient temperature with Bosch Rexroth servo motor	0 °C ... 40 °C, loss of performance above 40 °C
Ambient temperature for mechanical system (no undershooting the dew point)	-10 °C ... 60 °C
Travel range s_{min} [1)]	See "Technical data" tables
Soiling	Not permissible

1) Minimum travel range to ensure a reliable lubrication distribution.

Required and supplementary documentation

For further instructions and information, please refer to the documentation for this product.

You can find PDF files of these documents on the Internet at www.boschrexroth.com/mediadirectory.

We would also be happy to send you the desired documents.

If you are unsure about using this product, please contact Bosch Rexroth.

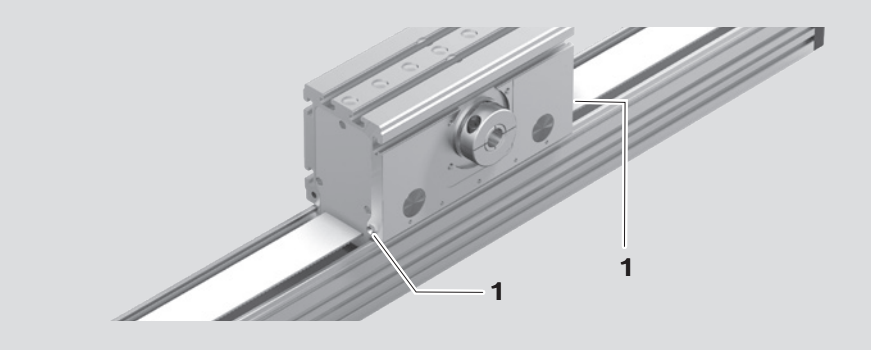
Lubrication

Note on lubrication
Omega modules come with initial Dynalub 510 greasing and are only designed for grease lubrication using a manual grease gun. Maintenance is limited to the maintenance lubrication of the integrated ball rail system via one of the two funnel-type lube nipple (**1**).

Lubrication point
1 Funnel-type lube nipple DIN 3405-D3

Recommended lubricants

For maintenance lubrication and maintenance lubrication intervals, see the Omega module instructions



Grease (DIN)	Consistency class DIN 51818	Recommended grease
KP2K-20 (DIN 51825)	NLGI 2	Dynalub 510

Grease
Consistency class NLGI 2 in accordance with DIN 51818
We recommend:
Dynalub 510 (Bosch Rexroth)
Cartridge (400 g) R341603700
Container (25 kg) R341603500
Can still be used
Elkalub GLS 135 / N2 (Chemie-Technik)
Tribol GR 100-2 PD (Castrol)

⚠ Do not use lubricants with solid particles (e.g. graphite or MoS_2 additives).

⚠ For lubrication with short stroke (travel range < s_{min}), please consult us.

Documentation

Standard report
Option 01

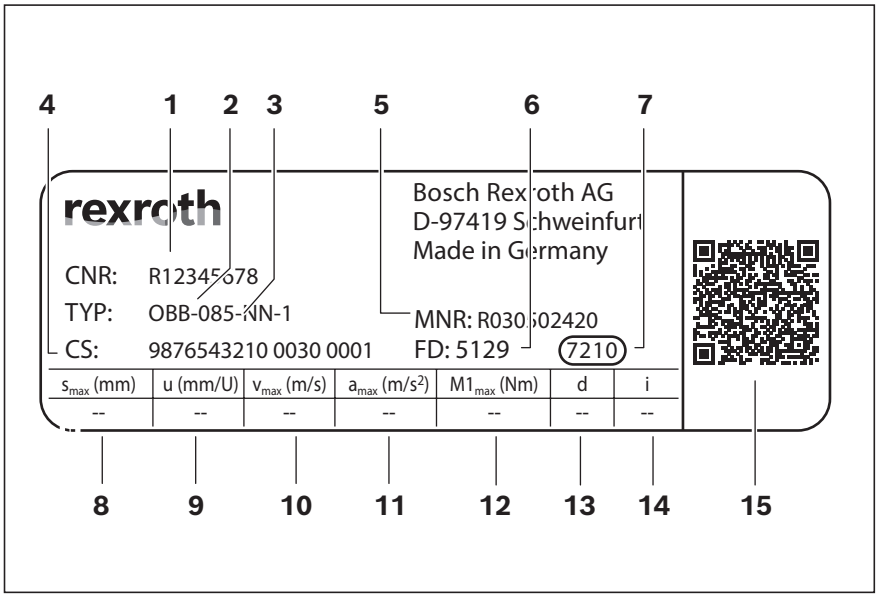
The standard report serves to confirm that the checks listed in the report have been carried out and that the measured values lie within the permissible tolerances.

Checks listed in the standard report:
- Functional checks of mechanical components
- Functional checks of electrical components
- Design as per order confirmation

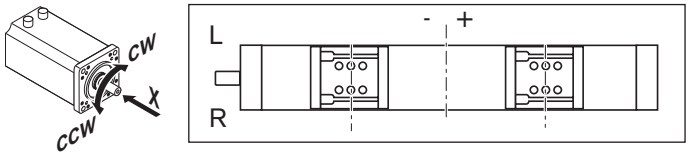
Service and information

Parameterization (commissioning)

In addition to references for linear motion system production, the name plate contains technical parameters for commissioning.

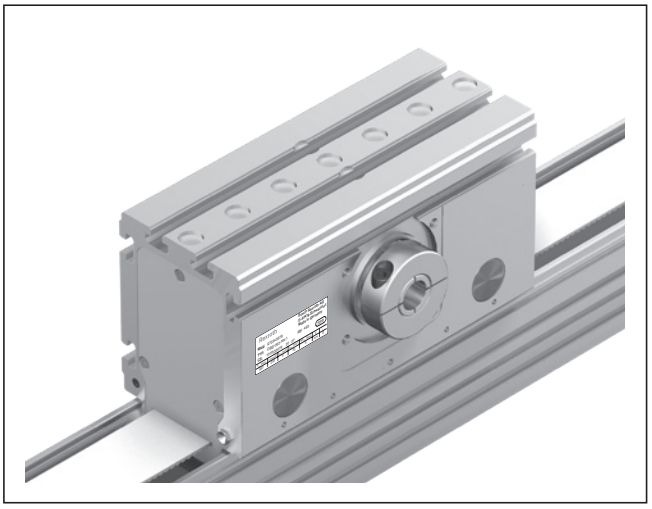


1	CNR	Customer's material number
2	TYP	Short product name
3	085	Size
4	CS	Customer information
5	MNR	Material number
6	FD	Date of manufacture
7	7210	Manufacturing location
8	s_{max}	Maximum travel range
9	u	Feed constant without motor attachment
10	v_{max}	Maximum speed
11	a_{max}	Maximum acceleration rate
12	$M1_{max}$	Maximum drive torque at motor journal
13	d	Direction of motor rotation to travel in positive (+) direction CW = Clockwise CCW = Counter Clockwise



14	i	Gear ratio
15		QR code

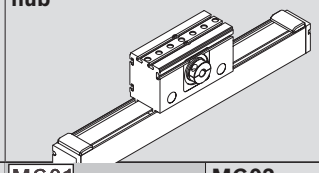
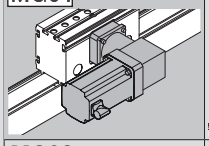
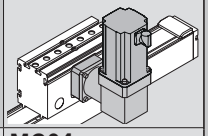
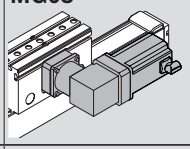
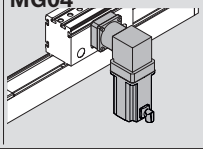
On Omega modules, the nameplate is fixed to the carriage on the drive side. (See fig.)



Service and information

Ordering example OBB-085

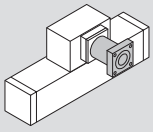
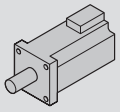
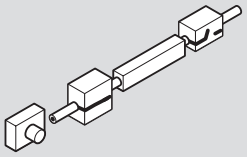
Configuration and ordering

Short product name, length OBB-085-NN-1, ... mm		Guideway	Drive		Carriage	
Version[2)]			Gear ratio		L_{ca} = 260 mm without	L_{ca} = 308 mm with
			i = 1	Gearing	Clamping unit	
with drive (MA), without gear unit i = 1	**MA01, hollow shaft with clamping hub** 	01	01	–	01	02
with gear unit (MG), angular planetary gear WPG	**MG01**  **MG02**  **MG03**  **MG04** 	01	–	10	01	02
	MG10					

= Selection area mark after version is chosen

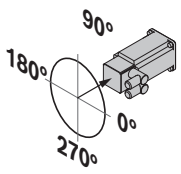
= Selected option to be entered under "Inquiry/order" in the order form at the end of the catalog

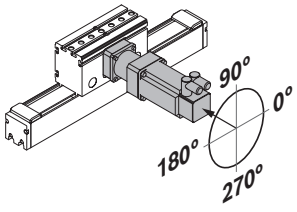
Ordering data	Option	Explanation
Omega module		
Short product name, length	OBB-085-NN-1, 910 mm	Length 910 mm
Version	MG01	Omega module with angular planetary gear, assembled according to figure MG01
Guideway	01	Ball rail system
Drive	10	Toothed belt drive
Carriage	01	Carriage with length L_{ca} = 260 mm (without clamping unit)
Motor attachment	33	with angular planetary gear, i = 5, for MS2N05
Motor	232	Motor MS2N05-D0BRN, 1 cable with brake
Motor connector position	000	0°
Switch 1	61	PNP NC (frame moves)
Switch 2	65	Mechanical switch (frame moves)
Socket-plug	17	Socket-plug on switch side (frame moves)
Control strip	41	Two control strips at the frame (frame moves)
Documentation	01	Standard report

Motor attachment				Motor					Motor connector position	Switching system[4]		Documentation
												
Gear ratio i =	Attachment kit[3] with gear unit MG01 MG03	MG02 MG04	MG10	Motor code	2 cables Brake without	with	1 cable Brake without	with				Standard report
–	00		–	00						**Without switch and without cable duct**	00	
										Carriage moves		
										Switches:		
i = 3	–	–	–	MS2N05-C0BTN	–	–	227	228		– PNP NC	71	
i = 5	33	43	–							– PNP NO	73	
i = 8	35	45	–	MS2N05-D0BRN	–	–	231	232	000	– Mechanical	75	
										Cable duct[1]	20	
i = 3	–	–	–							**Socket-plug**	17	
i = 5	–	–	–	MSM041B	140	141	–	–	090	**Switching cam**	36	01
i = 8	34	44	–									
										Frame moves		
i = 3	–	–	–	MS2N05-C0BTN	–	–	227	228		**Switches:**		
	–	–	30						180	– PNP NC	61	
										– PNP NO	63	
		–	32	MS2N05-D0BRN	–	–	231	232		– Mechanical	65	
			–							**1 switching cam**	40	
										2 switching cams	41	
			–	MSM041B	140	141	–	–	270	**Socket-plug**	17	
			31									

	0°	90°	180°	270°
MG01	000 ★	090	180	270
MG02	000	090	180	270 ★
MG03	000	090	180 ★	270
MG04	000	090 ★	180	270
MG10	000	090 ★	180	270

★ Standard delivery (connector position)





Example:
Version MG10
motor connector
position 90°

Abbreviations

Code/ index	Designation	Unit
a	Acceleration	(m/s^2)
a_{max}	Maximum acceleration rate	(m/s^2)
BASA	Ball screw assembly	(–)
B_t	Belt type	(–)
c_{spe}	Specific spring rate	(N)
C_{gw}	Dynamic load capacity, guideway	(N)
C_{bs}	Dynamic load capacity, ball screw assembly	(N)
C_{fb}	Dynamic load capacity, fixed bearing	(N)
d_0	Nominal diameter, ball screw assembly	(mm)
d_3	Belt pulley diameter	(mm)
f_w	Load factor	(–)
F_n	Axial load of the ball screw assembly	(N)
F_{eff}	Effective equivalent axial load	(N)
F_{bp}	Max. belt drive transmission force	(N)
F_{comb}	Combined equivalent bearing load	(N)
F_{mbs}	Dynamically equivalent load on bearing of the ball screw assembly	(N)
F_{mgw}	Dynamically equivalent load on bearing of the guideway	(N)
F_n	Axial load of the ball screw assembly	(N)
$F_{t\ perm}$	Belt elasticity limit	(N)
F_y	Load due to a resulting force in y-direction	(N)
$F_{y\ max}$	Maximum dynamic load in y-direction	(N)
F_z	Load due to a resulting force in the z-direction	(N)
$F_{z\ max}$	Maximum dynamic load in z-direction	(N)
g	Gravitational acceleration (= 9.81)	(m/s^2)
i	Gear ratio	(–)
I_y	Planar moment of inertia about the y-axis	(cm^4)
I_z	Planar moment of inertia about the z-axis	(cm^4)
J_{br}	Mass moment of inertia of the motor brake	(kg/m^2)
J_c	Mass moment of inertia of the coupling	(kg/m^2)
J_{dc}	Mass moment of inertia of the drive train	(kg/m^2)
J_{ex}	Mass moment of inertia of the mechanical system	(kg/m^2)
J_{ge}	Mass moment of inertia of the gear about the motor journal	(kg/m^2)
J_m	Mass moment of inertia of the motor	(kg/m^2)
J_s	Mass moment of inertia of the linear motion system	(kg/m^2)
J_{sd}	Mass moment of inertia of the belt side drive about the motor journal	(kg/m^2)
J_t	Translative mass moment of inertia of external load based on the linear motion system screw journal	(kg/m^2)
$k_{g\ fix}$	Constant for fixed portion of mass	(kg)
$k_{g\ var}$	Constant for variable-length portion of mass	(kg/mm)
$k_{J\ fix}$	Constant for fixed portion of mass moment of inertia	(kg/mm^2)
$k_{J\ m}$	Constant for mass-specific portion of mass moment of inertia	(mm^2)

Code/ index	Designation	Unit
$k_{J\ var}$	Constant for variable-length portion of mass moment of inertia	(kg/mm)
L	Length of the linear motion system	(mm)
L_{ad}	Additional length	(mm)
L_c	Length nut/length nut and housing	(mm)
L_{ca}	Carriage length	(mm)
L_{bs}	Nominal service life (ball screw assembly, fixed bearing)	(min^{-1})
L_{hbs}	Nominal service life (ball screw assembly, fixed bearing)	(h)
L_{gw}	Nominal service life of the guideway	(m)
L_{hgw}	Nominal service life of the guideway	(h)
L_W	Centerline-to-centerline distance between carriages	(mm)
m_{br}	Holding brake mass	(kg)
m_{ca}	Moved mass of system of carriage	(kg)
m_{ex}	Moved external load	(kg)
m_{fc}	Mass of flange and coupling	(kg)
m_m	Mass of the motor	(kg)
m_s	Mass of the linear system (without attachments)	(kg)
m_{sd}	Mass of the timing belt side drive	(kg)
M_0	Continuous motor torque	(Nm)
M_{cN}	Rated torque of coupling	(Nm)
M_g	Weight moment at motor journal	(Nm)
M_{ge}	Maximum permissible acceleration torque of the gear (at the output drive)	(Nm)
M_L	Dynamic longitudinal moment load capacity	(Nm)
M_m	Equivalent dynamic torque	(Nm)
M_{max}	Max. possible motor torque	(Nm)
M_{mech}	Maximum permissible drive torque for mechanical system	(Nm)
M_p	Maximum permissible drive torque (at drive journal)	(Nm)
M_R	Frictional torque at motor journal	(Nm)
M_{Rge}	Friction torque of the gear at the motor journal	(Nm)
M_{Rs}	Friction torque of the system	(Nm)
M_{Rsd}	Friction torque of the belt side drive at the motor journal	(Nm)
M_{sd}	Maximum permissible drive torque of the belt side drive	(Nm)
M_{stat}	Static load moment	(Nm)
M_t	Dynamic torsional moment load capacity	(Nm)
M_x	Dynamic torsional moment around the x-axis	(Nm)
$M_{x\ max}$	Maximum permissible torsional moment around the x-axis	(Nm)
M_y	Dynamic torsional moment around the y-axis	(Nm)
$M_{y\ max}$	Maximum permissible torsional moment around the y-axis	(Nm)

Code/ index	Designation	Unit
M_z	Dynamic torsional moment around the z-axis	(Nm)
$M_{z\ max}$	Maximum permissible torsional moment around the z-axis	(Nm)
n	Rotary speed of the ball screw assembly	(min^{-1})
$n_1, n_2, ... n_n$	Rotary speed in acceleration and braking phases	(min^{-1})
$n_{A1 ... n}$	Starting speed in phase 1 ... n	(min^{-1})
$n_{E1 ... n}$	Ending speed in phase 1 ... n	(min^{-1})
n_{ge}	Maximum permissible rotary speed of the gear	(min^{-1})
n_m	Average rotary speed of the ball screw assembly	(min^{-1})
n_{mech}	Maximum permissible rotary speed for mechanical system	(min^{-1})
n_{max}	Max. motor speed	(min^{-1})
n_p	Maximum permissible rotary speed of the linear motion system	(min^{-1})
P	Screw lead/ball screw assembly	(mm)
P_{app}	Effective power in application	(W)
Keyway	Keyway	(–)
$q_{t1..n}$	Time step of the phases	(%)
s_a	Acceleration travel	(mm)
s_e	Excess travel	(mm)
s_{eff}	Effective stroke	(mm)
s_{min}	Minimum travel range	(mm)
s_{max}	Maximum travel	(mm)
SPU	Screw support	(–)
TT	Carriage	(–)
t_a	Acceleration/braking time	(s)
$t_1, t_2, ... t_n$	Time for phase 1 ... n	(s)
t_{ges}	Sum of time steps	(s)
u	Feed constant	(mm/rev)
$v_1, v_2, ... v_n$	Speed in phase 1 ... n	(m/s)
v_{max}	Maximum permissible speed	(m/s)
v_{mech}	Maximum permissible speed of the mechanical system	(m/s)
v_{mgw}	Average speed of the guideway	(m/s)
V	Ratio of mass moments of inertia of drive chain and motor	(–)
z_1	Application point of the effective force	(mm)
π	Pi	(–)

Note:

This catalog may possibly not include all abbreviations listed here.

Service and information

Inquiry/order form

Find your local contact person here:
www.boschrexroth.com

Rexroth - Omega modules

Ordering example

Ordering data	Option	Explanation
Omega module OBB-085		
Short product name, length		OBB-085-NN-1, 910 mm
Version	MG01	Omega module with angular gear, assembled according to figure MG01
Guideway	01	Ball rail system
Drive	10	Toothed belt drive
Carriage	01	Carriage with length L_{ca} = 260 mm (without clamping unit)
Motor attachment	33	With angular planetary gear, i = 5, for motor MS2N05
Motor	232	MS2N05-D0BRN, 1 cable with brake
Motor connector position	000	0°
Switch 1	61	Proximity switch, PNP NC contact (frame moves)
Switch 2	65	Mechanical switch (frame moves)
Switch 3	65	Mechanical switch (frame moves)
Cable duct	00	Without cable duct
Socket-plug	17	Socket-plug (frame moves)
Control strip	41	Two control strips (frame moves)
Documentation	01	Standard report

To be completed by the customer: Inquiry☐/order ☐

Omega module

Short product name: _____,
Length _____mm

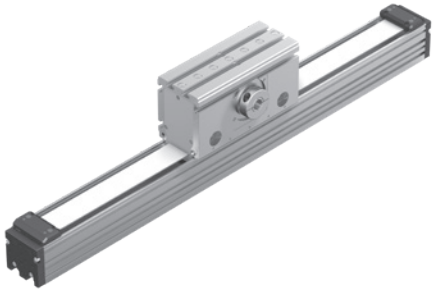
Version = ☐☐☐☐
Guideway = ☐☐
Drive = ☐☐
Carriage = ☐☐
Motor attachment = ☐☐
Motor = ☐☐
Motor connector position = ☐☐☐
Switch 1 = ☐☐
Switch 2 = ☐☐
Switch 3 = ☐☐
Cable duct = ☐☐
Socket-plug = ☐☐
Control strip = ☐☐
Documentation = ☐☐

Quantity Acceptance of: ____ pcs, _____ per month, _____ per year, per order, or _____
Comments:

Sender
Company:
Address:

Name:
Department:
Phone:
Fax:

Further information



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A Bosch Company

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