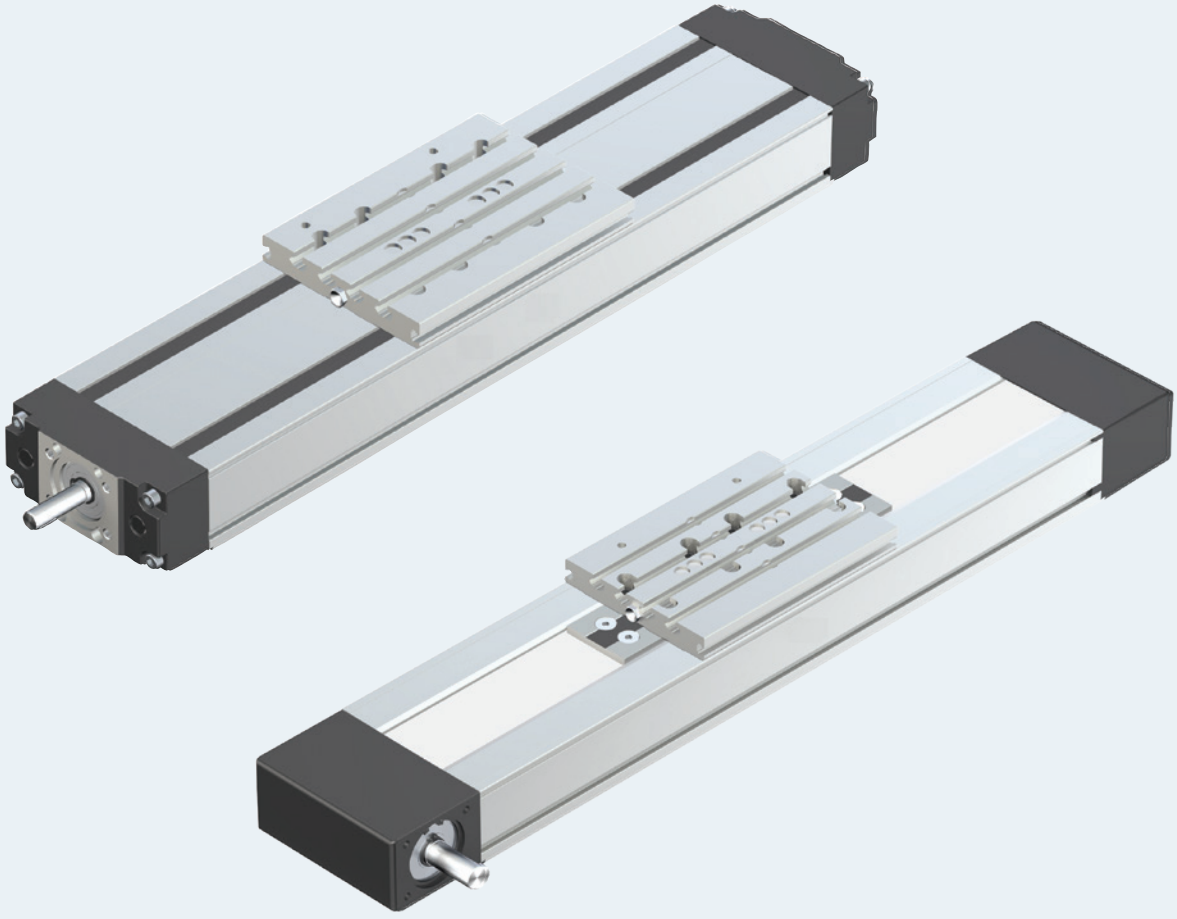
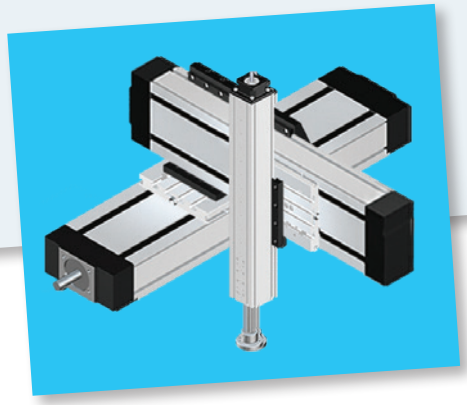
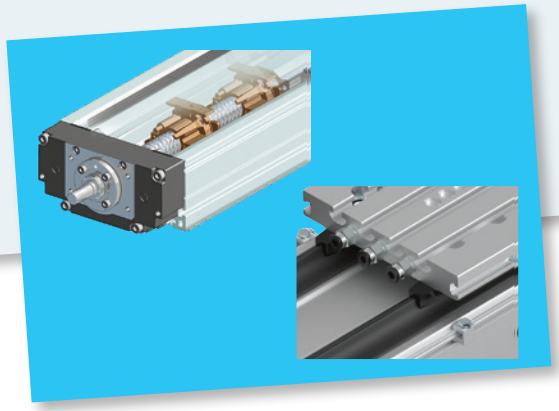
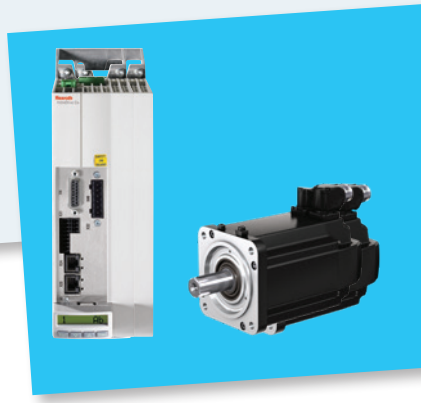
rexroth
A Bosch Company

Compact modules CKK/CKR









www.boschrexroth.com

Identification system for short product names

Compact modules are identified by the type designation and size.

Example		**C**	**K**	**K**	**-**	**110**	**-**	**NN**	**-**	**1**
System	=	Compact module (**C**)								
Guideway	=	Ball rail system (**K**)								
Drive	=	Ball screw assembly (**K**) Toothed belt drive (**R**)								
Size	=	070 / 090 / **110** / 145 / 200 / 280								
Version	=	Standard version (**N**)								
Generation	=	Product generation **1**								

Changes/additions at a glance

- CKR-280-DB-1 added

Contents

Product description

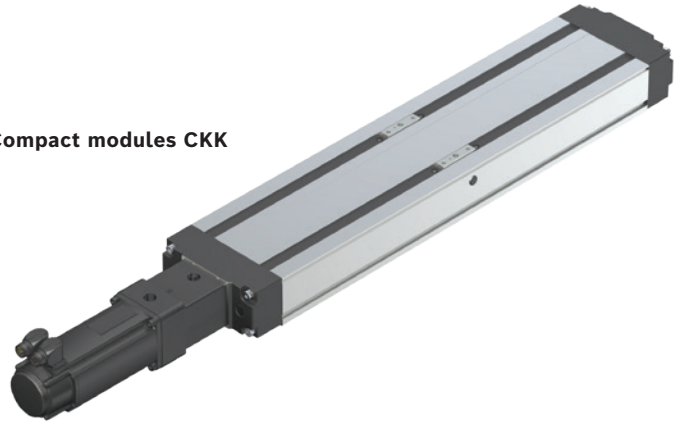
Characteristic features

- Six fine-tuned sizes based on a compact precision aluminum profile with two integrated preloaded ball rail systems
- Identical external dimensions between compact module types CKK and CKR.
- Four different lube versions (see the following pages and the chapter "Lubrication")
- Ready-to-install compact modules in any length up to L_{max}
- Aluminum carriages available in different versions depending on load

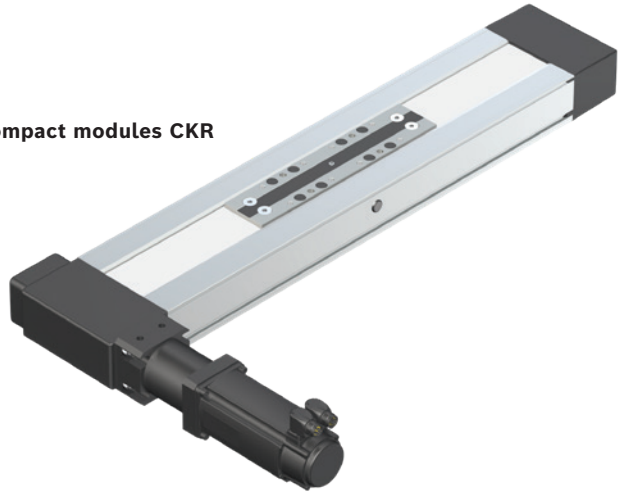
Further highlights

- Flexible thanks to options
- Ready-to-install with various attachment parts
- Centering holes for simple combination with other linear motion systems and connection elements
- Economical maintenance thanks to one-point lubrication feature (grease lubrication) from both sides or via the carriage or via a connection plate

Compact modules CKK



Compact modules CKR

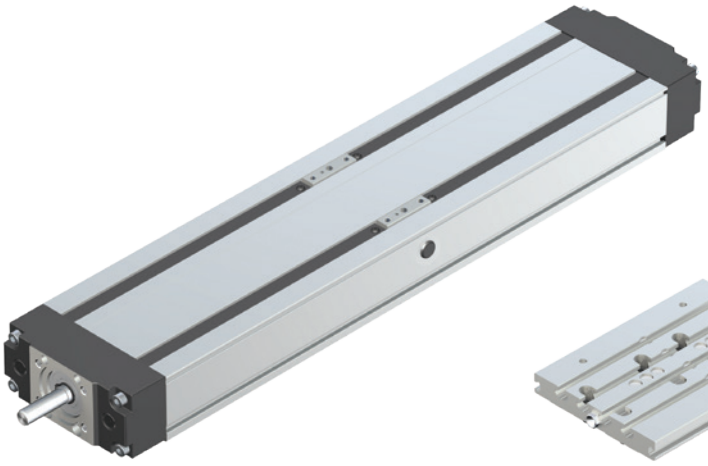


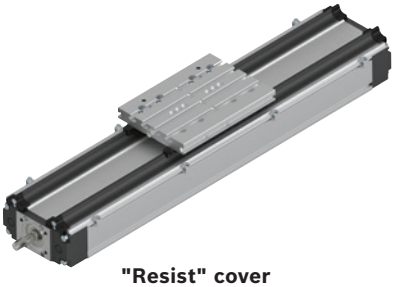
Compact modules are available as complete solutions with motor, controller, and control system. For more information, see the "Axis / drive / software" chapter.

Compact modules CKK

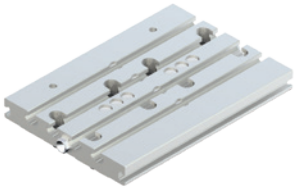
with ball rail system and ball screw assembly

- Drive via precision ball screw assembly
- Screw support for the realization of high speeds on long assembly lengths for CKK-200/-280
- Protection of installation elements through a cover plate and two cover strips;
  Optionally increased protection thanks to "Resist" cover
- Repeatability of up to ± 0.005 mm

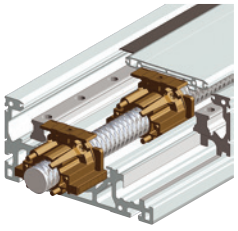




"Resist" cover



Connection plates

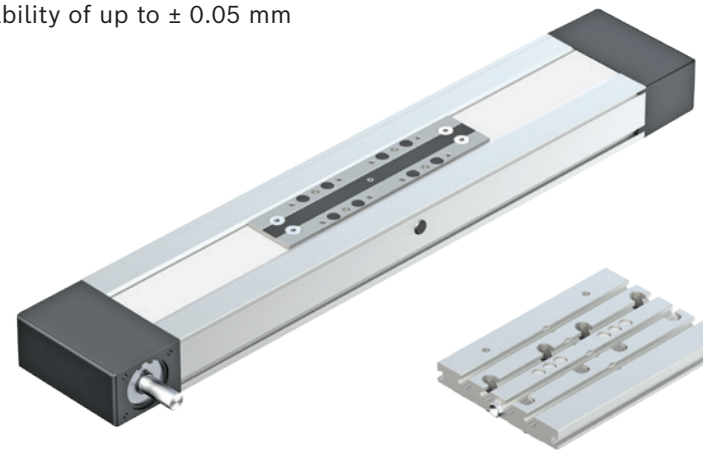


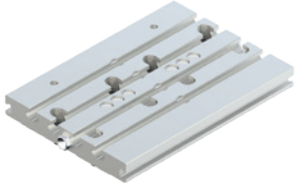
Screw support SPU for CKK-200/-280

Compact modules CKR

with ball rail system and toothed belt drive

- Realization of greater lengths of up to 10,000 mm
- Preloaded toothed belt
- Intelligent toothed belt guide protects inner components
- Repeatability of up to ± 0.05 mm





Connection plates

Axis / drive / software

SIMPLY SAVE TIME AND MONEY: EVERYTHING FROM A SINGLE SOURCE. WITH A SINGLE MATERIAL NUMBER.

So that you can realize fully automated movements with single axes faster, all components are now available in one package.

With just a few clicks, you can design and configure motor, drive controller, mains filter and cable online.

Ordered with just one material number, your solution will be available to you in now time – and immediately ready for operation thanks to the axis parameters stored in the motor. If necessary, the proven Rexroth service is allways available to assist you.

Really everything from a single source. Can it be easier?

Faster automation: single axis + drive + software in one package.

2 ORDERING OPTIONS, ALL FREEDOMS:

1. **Single axis**
2. **Single axis + drive**
   (incl. mains filter/cable)

▶ For further information see chapter "Configuration and ordering" and chapter "Automation package".

Mehrachssysteme/Smart Function Kits

Further information on multi-axis systems

Product overview

NEARLY UNLIMITED FIELDS OF APPLICATION FOR MULTI-AXIS SYSTEMS

Pick & place | Positioning | Palletizing | Feeding | Mov

New standard for ready-to-install sub-systems: easier to select and configure, faster to install and get started

MULTI-AXIS SYSTEMS MADE EASY.
EVERYTHING FROM A SINGLE SOURCE

Bosch Rexroth now makes the path to a ready-to-install sub-system unbeatably simple. More than 30 years of linear axis expertise have gone into the new multi-axis modular system and the completely revised LinSelect selection tool. There is no easier or faster way to select, configure and commission Cartesian multi-axis systems from standardized best-in-class components. You'll benefit from the latest generation of multi-axis systems from Bosch Rexroth: You'll receive ready-to-install, scalable positioning, handling and dispensing solutions made of proven and perfectly matched components, including all attachments, cable systems, motors and drive controllers – all from a single source, all from one company.

And if your fully assembled, fully integrable sub-system needs to be able to do even more, then take a look at the next step: Smart MechatroniX (see Smart Function Kits chapter) expands the components to include sensors, electronics and software – with completely new solution approaches and business models.
WE MOVE. YOU WIN.

Lubrication versions

Two drive versions:
- Compact modules CKK with ball rail system and ball screw assembly
- Compact modules CKR with ball rail system and toothed belt drive

Four different lube versions (depending on size)
- Standard lubrication (LSS)
- Preserved (LPG)
- Carriage with connection plate prepared for connection to central lubrication systems for liquid grease (LCF)
- Carriage with connection plate prepared for connection to central lubrication systems for oil (LCO)

Versions for oil and liquid grease lubrication prepared for connection to central lubrication systems
- High operational reliability through automated relubrication
- Need-based maintenance reduces consumption of lubricant, while ensuring high availability
- More degrees of freedom as lubrication is not dependent on position and installation location
- Low-cost unmanned maintenance

Notes:

LSS:
- Initial lubrication by Bosch Rexroth
- Relubrication using manual grease gun

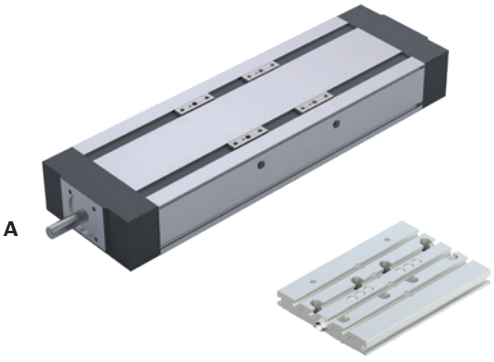
LPG:
- Ball rail system and ball screw assembly only with corrosion prevention
- Relubrication using manual grease gun
- Basic lubrication required

LCF:
- Prepared for connection to central lubrication systems for liquid grease (grade NLGI 00 in accordance with DIN 51818)
- Lubrication with liquid grease only via single-line piston distributor system
- Basic lubrication required

LCO:
- Prepared for connection to central lubrication systems for oil
- Oil lubrication only via single-line piston distributor system
- Runner block and ball screw assembly nut with integrated non-return valves
- Basic lubrication required

Compact modules CKK
Lubrication version LSS, LPG

- Grease lubrication with manual grease gun via frame, carriage or via connection plate



Connection plates

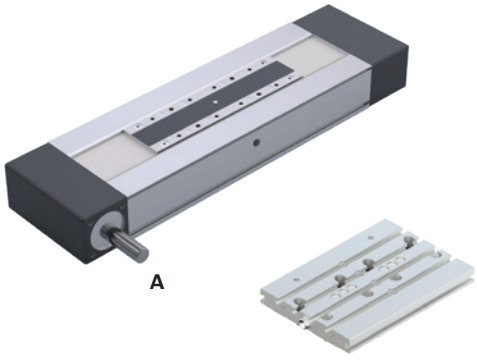
Lubrication version LCF, LCO

- 3 lube fittings
- Prepared for connection to central lubrication systems

A Drive side
1 Lube connection, runner block left
2 Lube connection, runner block right
3 Lube connection, ball screw assembly

Compact modules CKR
Lubrication version LSS, LPG

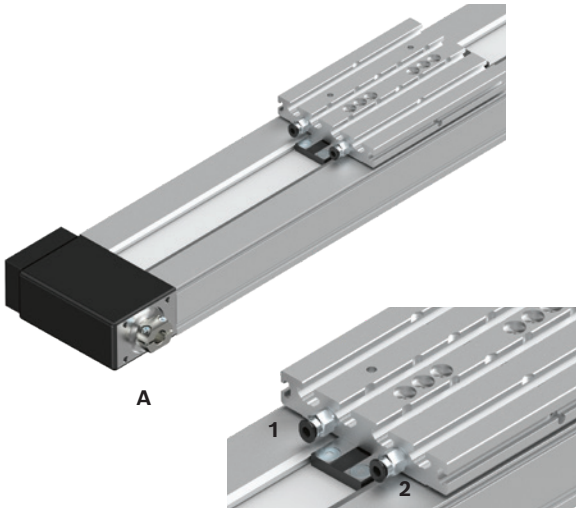
- Grease lubrication with manual grease gun via frame, carriage or via connection plate



Connection plates

Lubrication version LCF, LCO

- 2 lube fittings
- Prepared for connection to central lubrication systems



A Drive side
1 Lube connection, runner block left
2 Lube connection, runner block right

Form of delivery

Compact modules with ball rail system and ball screw or toothed belt drive are delivered completely assembled.

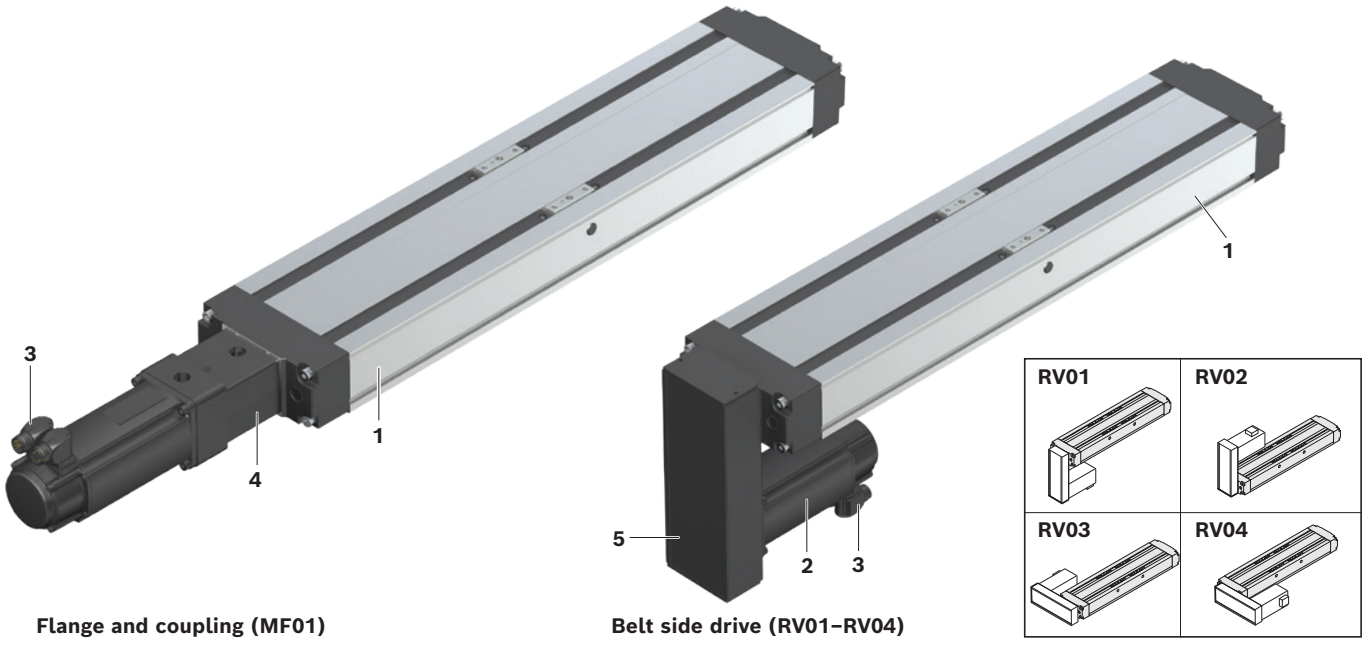
Motor attachment
If a combination of motor and motor attachment has been selected, then the components are attached as shown in the figure, which also shows the location of the motor connector.
When ordering motor attachments without motor, not all parts can be mounted.
Final assembly must then be carried out by the customer.
All necessary instructions and parameters for professional assembly are included.

Available options
Cable duct, mounting duct, switch, switching cam and socket with connector are included as loose parts.

Lubrication
Compact modules are delivered with initial greasing, depending on the lubricant used.
For more information on lubricants, see Chapter "Lubrication".
Documentation
Each compact module is supplied with the accompanying documentation.

All CKK and CKR versions that have been configured with "Carriage with connection plate" are supplied without the lube ports in the frame. All configured compact modules with carriages without connection plate are still supplied with lube ports in the frame.

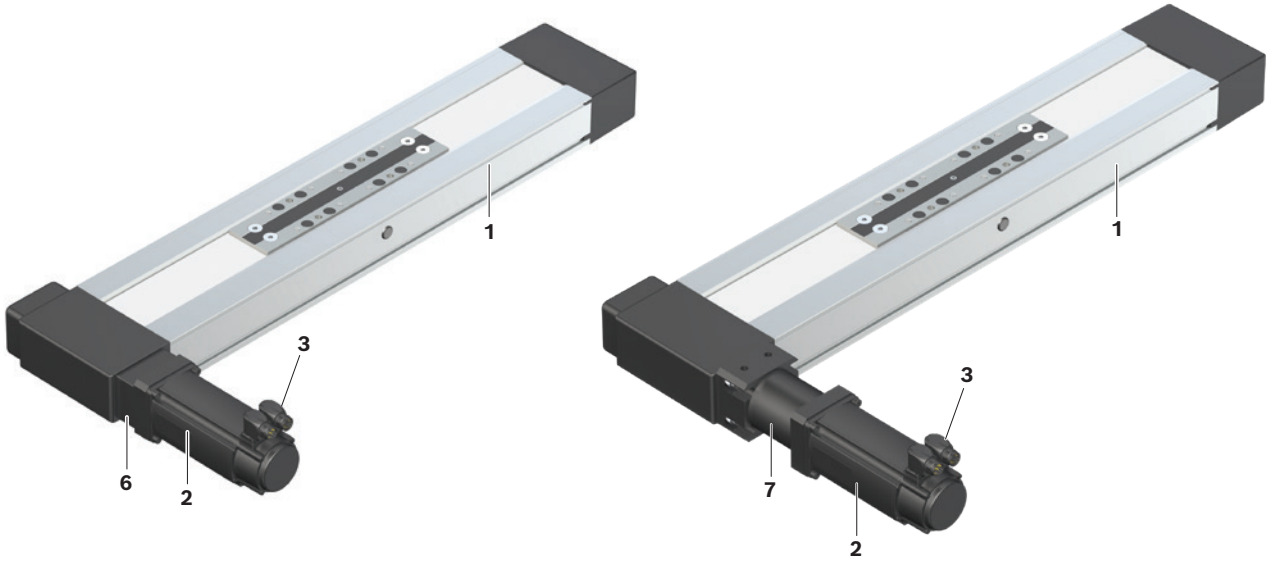
CKK



Flange and coupling (MF01)

Belt side drive (RV01–RV04)

CKR

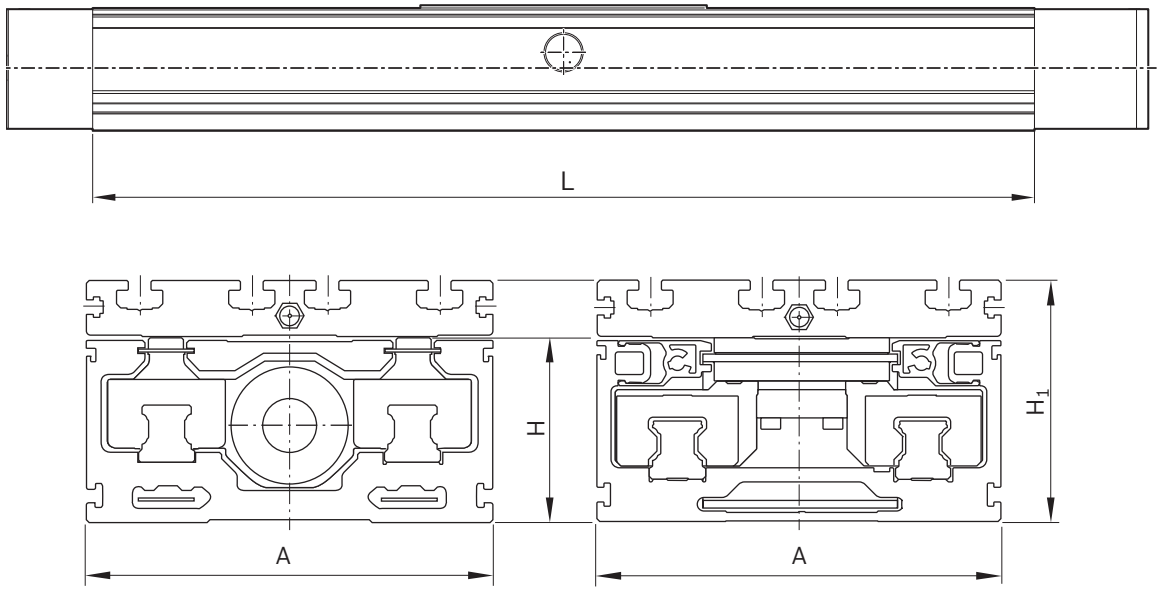


Direct attachment (depending on size)

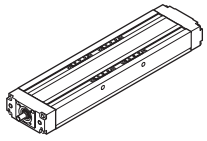
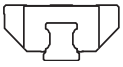
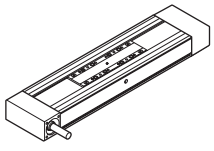
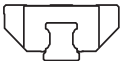
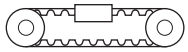
Planetary gears (depending on size)

1 Linear motion system
2 Motor
3 Motor connector
4 Flange and coupling
5 Belt side drive
6 Direct attachment (flange)
7 Gearing

Overview of types with load capacities



CKK **CKR**

Compact modules	Type	Guideway	Drive	
	CKK	 Ball rail system	 Ball screw assembly	
	CKR	 Ball rail system	 Toothed belt drive	

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 50,000 m of total travel are actually stipulated.
For comparison: Multiply values C, M_t and M_L by a factor of 1.26.

	Size	**070**			**090**			**110**			**145**			**200**			**280**		
	Dimensions (mm)	**A**	**H**	**H_1**	**A**	**H**	**H_1**	**A**	**H**	**H_1**	**A**	**H**	**H_1**	**A**	**H**	**H_1**	**A**	**H**	**H_1**
		70	32	44.5	90	40	56	110	50	66	145	65	85	200	100	127	280	160	190
	L_{max} (mm)	650			750			1,500			1,800			2,200[1)]			2,500[1)]		
	Dynamic load capacity C_{gw}[2)] (N)	3,830			7,505			32,035			76,025			121,185			216,700		
	L_{max} (mm)	1,500			5,500			5,500			5,500			10,000			5,500		
	Dynamic load capacity C_{gw}[2)] (N)	3,830			7,505			32,035			76,025			121,185			216,700		

1) Up to 5,500 mm are possible with screw support (SPU).
2) The maximum permitted dynamic values are specified here. They vary depending on the carriage length.

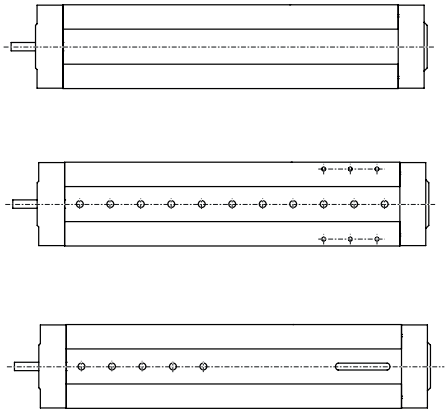
Compact modules with ball screw assembly (CKK)
Product overview

Features
- Six fine-tuned sizes based on a compact precision aluminum profile with two integrated preloaded ball rail systems
- Four different lube versions
- Ready-to-install compact modules in any length up to L_{max}
- Driven by precision ball screw assembly in rolled design tolerance grade T7 in accordance with DIN 69051 with single nut set to zero-clearance
- High travel speeds thanks to large leads with high precision over long lengths
- Aluminum carriages available in different lengths
- Protection of installation elements through a cover plate and two cover strips; optionally increased protection thanks to "Resist" cover
- Low-cost maintenance
- Repeatability of up to ± 0.005 mm

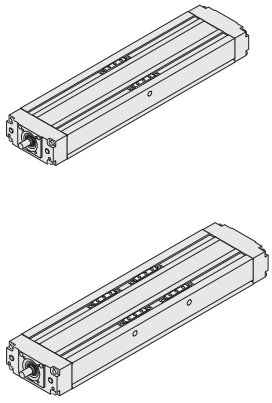
Further highlights
- Flexible thanks to selectable options
- Centering holes for simple combination with other linear motion systems and connection elements
- Extensive accessories for connection and clamping units
- Nameplate with parameters for easy commissioning

Attachments
- Motor attachments with flange and coupling or via a belt side drive
- Motor attachment kits according to customer specification
- Maintenance-free servo motors with selectable brake and attached feedback
- Magnetic sensors, switch activation without additional switching cam
- Socket and connector
- Cable duct made of aluminum for sensors

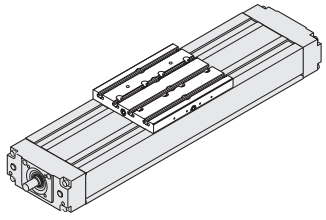
Design/options for guideway (frame), carriages, connection plates



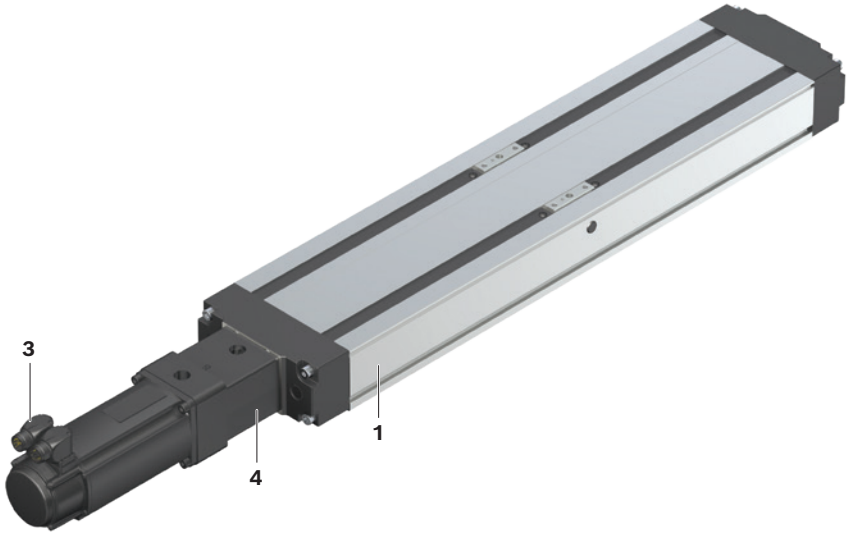
Guideway (frame)



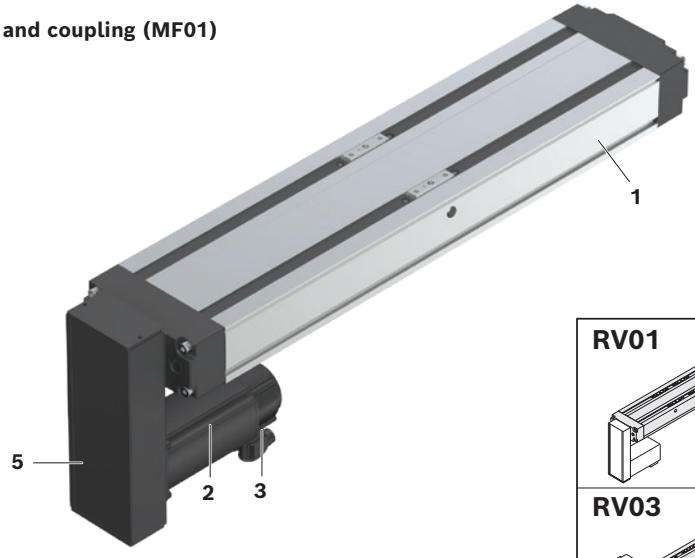
Carriages



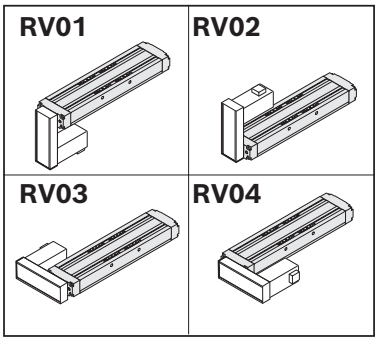
Connection plates



Flange and coupling (MF01)



Belt side drive (RV01–RV04)



1 Linear motion system
2 Motor
3 Motor connector
4 Flange and coupling
5 Belt side drive

Screw support for compact module CKK-200/-280

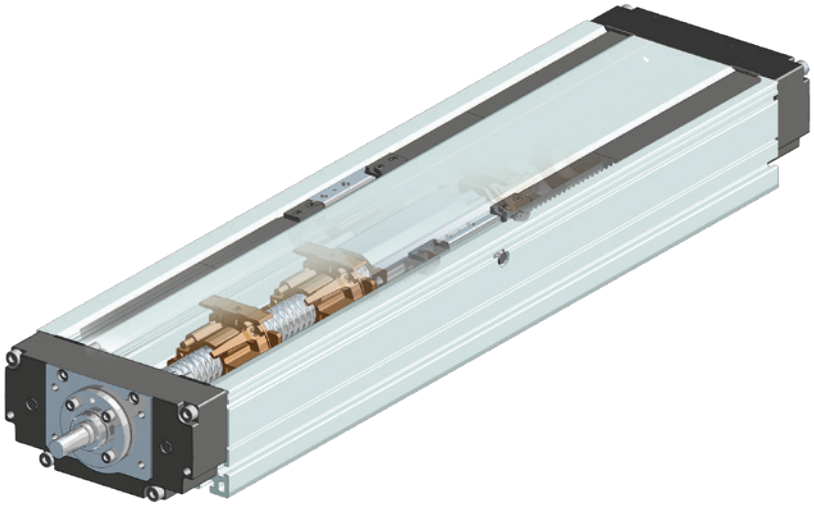
Structural design:

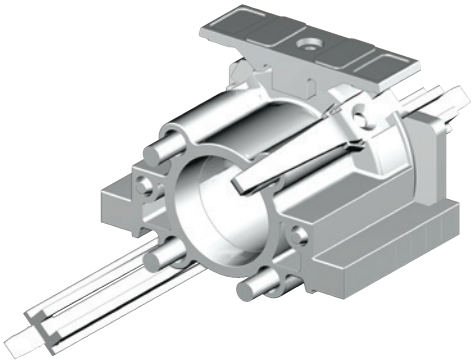
- Guidance of the screw supports in the frame.

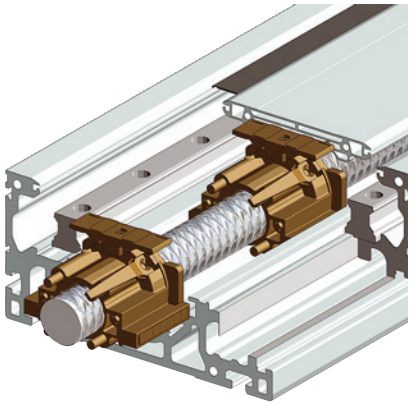
Features:

- High speed over longer lengths of up to 5,500 mm.
- Elastomer buffer provides cushioning between carriage and screw supports.
- Screw supports are maintenance-free.
- Screw supports are protected by the cover plate and two cover strips.
- The screw supports prevent the cover plate from sagging in all directions.

⚠ **Screw support suitable for horizontal operation only**







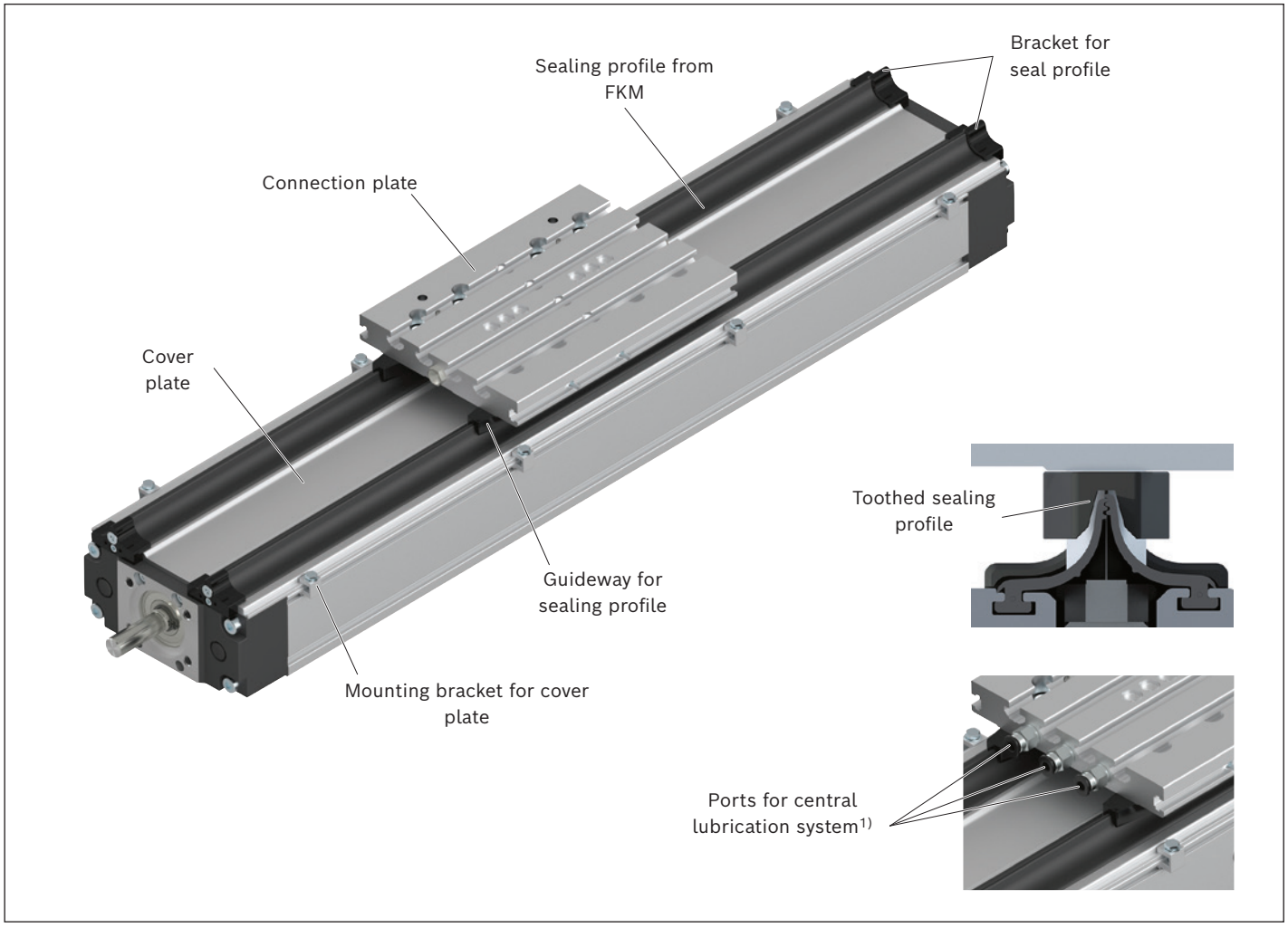
"Resist" cover

Structural design:

- Sizes: CKK-110/-145/-200
- Possible for version with connection plate

Features:

- Increased protection thanks to the toothed sealing profile
- The integrated guideway on the carriage ensures the sealing profile interlocks perfectly
- Sealing profile made of flexible FKM – material
- Free of LABS (substances harmful to paint structure)
- Replaceable sealing profile
- The sealing profile has a short-term temperature resistance of up to 300°C
- Suitable for exposure to dry chips with broken chips of aluminum and component handling during welding application
- Selectable with all lube versions



1) See chapter "Lubrication"

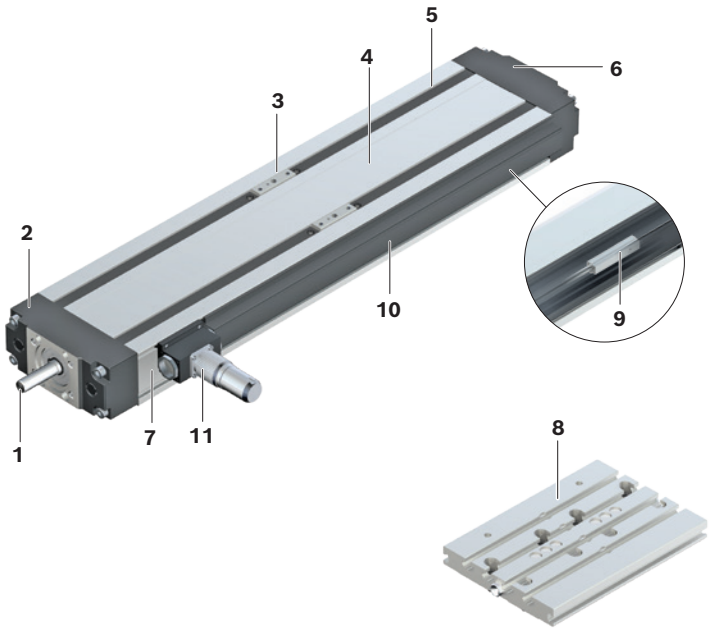
Structural design

Structural design CKK

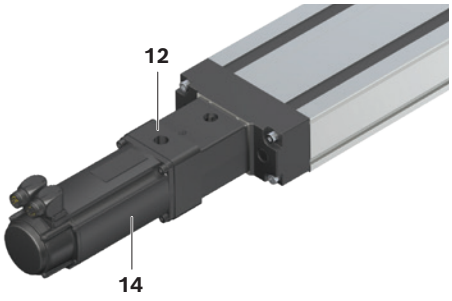
1 Ball screw assembly with zero-backlash single nut
2 Drive side cross tie
3 Carriage with integrated runner block
4 Cover plate
5 Cover strip made of reinforced strip PU
6 End block
7 Frame

Attachments:

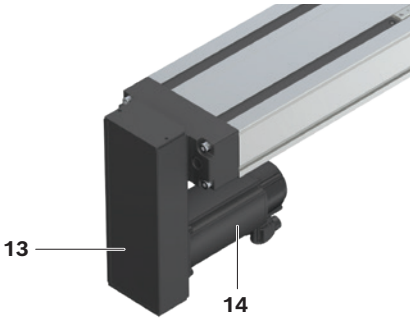
8 Connection plate
9 Magnetic sensor
10 Cable duct
11 Socket/connector
12 Flange and coupling
13 Belt side drive
14 Motor



Motor attachment – flange and coupling

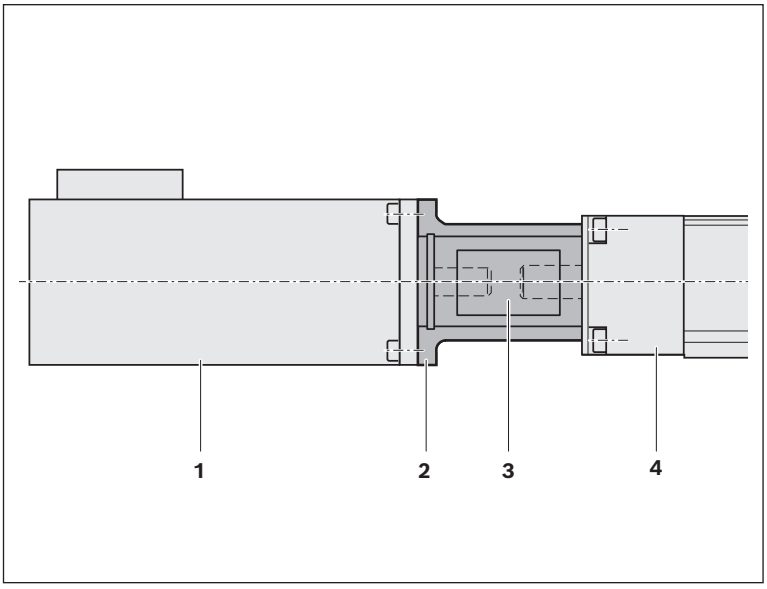


Motor attachment – belt side drive



Structure of flange and coupling

A motor can be attached to all compact modules with ball screw assembly by means of a flange and coupling.
The flange serves to fasten the motor to the compact module and acts as a closed housing for the coupling.
The motor's drive torque is transmitted stress-free through the coupling to the compact module's drive journal.
Our standard couplings compensate for the system's thermal expansion.



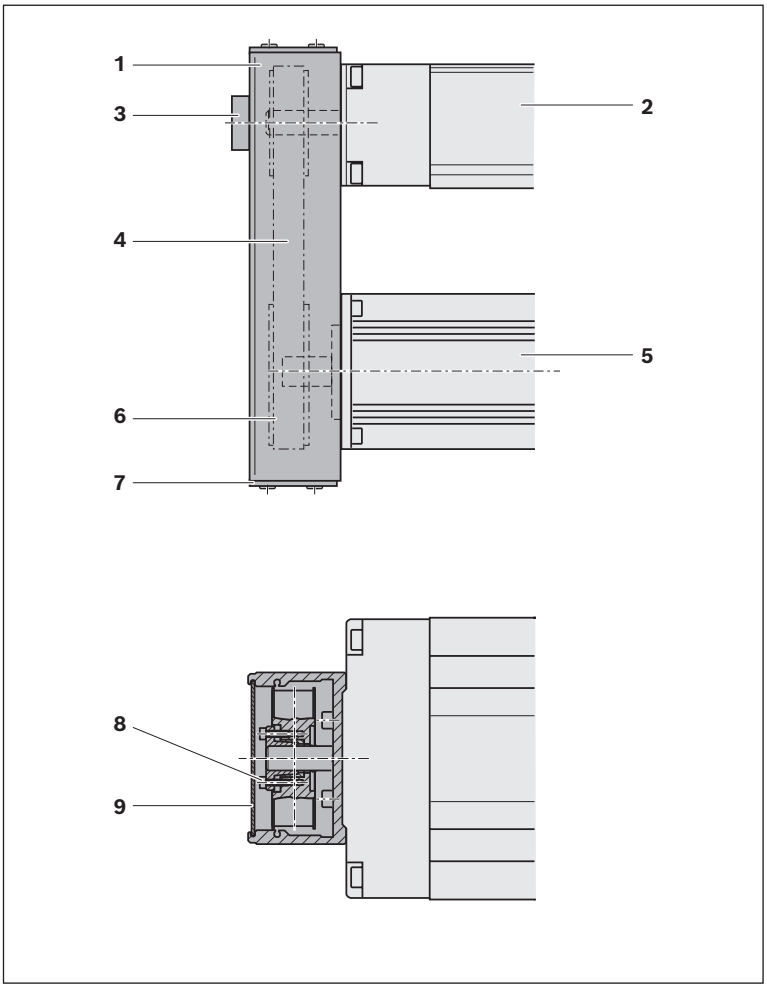
1 Motor
2 Flange
3 Coupling
4 Compact module

Structure of belt side drive

All compact modules with ball screw assembly offer the option of attaching the motor via a belt side drive. This makes the overall length shorter than when attaching the motor with flange and coupling.
The space-saving, closed pulley housing serves as protection for the belt and as a motor bracket.
In addition, various gear ratios are also available (depending on size).

The belt side drive can be mounted in four different directions:

- Below, above (RV01 and RV02)
- Left, right (RV03 and RV04)



1 Pulley housing made of anodized aluminum frame
2 Compact module
3 Support bearing at the screw journal in size CKK-070
4 Toothed belt drive
5 Motor
6 Toothed belt drive
7 Cover
8 Belt pulleys with tensioning units
9 Cover plate

Technical data

General technical data

Observe the "Project planning/calculation" chapter.

CKK	Carriage			Additional length		Min. travel range	Max. length	BASA	Dynamic characteristic values				
									Load capacities			Load moments	
	Connection plate without[1]	with[2]		without	with								
	L_{ca} (mm)	L_{ca} (mm)	L_W[3] (mm)	L_{ad} (mm)	L_{ad} (mm)	s_{min}[4] (mm)	L_{max} (mm)	d_0 x P (mm)	C_{gw} (N)	C_{bs} (N)	C_{fb} (N)	M_t (Nm)	M_l[5] (Nm)
-070	32	60	–	30	2	40	650	8 x 2.5	2,360	2 250	1 600	47	7
								8 x 5		2500			
	73	95			8			8 x 2.5	3,830	2 250		77	111
								8 x 5		2500			
-090	35	60	–	50	25	40	750	12 x 2	4,620	2,420	6,900	125	16
								12 x 5		4,100			
								12 x 10		2,700			
	100	125	–	50	25	40	750	12 x 2	7,505	2,420	6,900	203	244
								12 x 5		4,100			
								12 x 10		2,700			
	variable min. 101 max. 235	–	variable min. 66 max. 200	50	–	40	750	12 x 2	7,505	2,420	6,900	203	3.75 x L_W
								12 x 5		4,100			
								12 x 10		2,700			
-110	39	60	–	51	30	50	1,500	16 x 5	19,720	13,320	13,400	651	136
								16 x 10		10,350			
								16 x 16		6,800			
	124	155	85	51	20	50	1,500	16 x 5	32,035	13,320	13,400	1,057	1,361
								16 x 10		10,350			
								16 x 16		6,800			
	variable min. 125 max. 289	–	variable min. 86 max. 250	51	–	50	1,500	16 x 5	32,035	13,320	13,400	1,057	16.01 x L_W
								16 x 10		10,350			
								16 x 16		6,800			
-145	49	80	–	61	30	60	1,800	20 x 5	46,800	15,480	17,000	2,059	400
								20 x 20		9,810			
								20 x 40		12,600			
								25 x 10		16,920			
	149	190	100	61	20	60	1,800	20 x 5	76,025	15,480	17,000	3,345	3,801
								20 x 20		9,810			
								20 x 40		12,600			
								25 x 10		16,920			
	variable min. 150 max. 349	–	variable min. 101 max. 300	61	–	60	1,800	20 x 5	76,025	15,480	17,000	3,345	38.01 x L_W
								20 x 20		9,810			
								20 x 40		12,600			
								25 x 10		16,920			

Size -200/-280 ➠ next page

1) In the "without connection plate" version, carriage length L_{ca} corresponds to the dimension of the outer edge to outer edge of the fastening bridges. Dynamic characteristic values and maximum permissible loads are valid only when connecting the fastening bridges via customer-built attachment.
2) The connection plate is mounted on the "without connection plate" carriage version. In the "with connection plate" version, carriage length L_{ca} corresponds to the length of the connection plate.
3) A variable center-to-center distance L_W is only possible for the "without connection plate" carriage design. The variable center-to-center distance is freely selectable between minimum and maximum distance in millimeters steps.
4) Minimum required travel range to ensure a reliable lubrication distribution.
5) For the variable L_W, M_l, $M_{y\,max}$ and $M_{z\,max}$ must be determined according to the selected centerline-to-centerline distance L_W.
6) ➠ "Resist chapter".

	Maximum permissible loads						**Planar moments of inertia**		**Point of force application**	
	Moments			**Forces**					**Connection plate**	
									without Z_1	**with** Z_1
	$M_{x\ max}$ (Nm)	$M_{y\ max}$ [5] (Nm)	$M_{z\ max}$ [5] (Nm)	$F_{y\ max}$ (N)	$F_{z1\ max}$ (N)	$F_{z2\ max}$ (N)	I_y (cm^4)	I_z (cm^4)	(mm)	(mm)
	47	7	7	1,270	2,360	2,360	5,72	50,0	19.20	31.7
	77	111	60	2070	3830	3830				
	112	16	16	2,490	4,620	4,140	14,90	140,40	23.20	39.2
	203	244	132	4,050	7,505	7,505				
	203	3.75 x L_W	2.03 x L_W	4,050	7,505	7,505				
	198	32	32	3,480	6,000	6,000	40,90	373,70	26.70	42.7 (60.7) [6]
	396	510	240	5,650	12,000	12,000				
	396	6 x L_W	2.82 x L_W	5,650	12,000	12,000				
	634	100	100	8,410	14,400	14,400	125,40	1,150.00	31.60	51.6 (71.6) [6]
	1,267	1,440	683	13,660	28,800	28,800				
	1,267	14.4 x L_W	6.83 x L_W	13,660	28,800	28,800				

CKK	Carriage			Additional length		Min. travel range	Max. length	BASA	Dynamic characteristic values				
	Connection plate			Connection plate					Load capacities			Load moments	
	without[1] L_{ca} (mm)	with[2] L_{ca} (mm)	L_W[3] (mm)	without L_{ad} (mm)	with L_{ad} (mm)	s_{min}[4] (mm)	L_{max} (mm)	d_0 x P (mm)	C_{gw} (N)	C_{bs} (N)	C_{fb} (N)	M_t (Nm)	M_l[5] (Nm)
-200	79.5	190	–	120.5	10	80	2,200	32 x 5	74,600	23,310	26,000	4,849	1,053
								32 x 10		34,200			
								32 x 20		21,240			
								32 x 32		21,060			
	254.5	305	175	120.5	70	80	2,200	32 x 5	121,185	23,310	26,000	7,877	10,604
								32 x 10		34,200			
								32 x 20		21,240			
								32 x 32		21,060			
	variable min. 255.5 max. 429.5	–	variable min. 176 max. 350	120.5	–	80	2,200	32 x 5	121,185	23,310	26,000	7,877	60.59 x L_W
								32 x 10		34,200			
								32 x 20		21,240			
								32 x 32		21,060			
-280	330	375	200	120	75	105	2,500	40 x 5	216,700	31,410	54,000	19,500	21,670
								40 x 10		54,000			
								40 x 20		40,950			
								40 x 40		39,960			
	variable min. 331 max. 505	-	variable- min. 201 max. 375"	120	-	105	2,500	40 x 5	216,700	31,410	54,000	19,500	108.35 x L_W
								40 x 10		54,000			
								40 x 20		40,950			
								40 x 40		39,960			

1) In the "without connection plate" version, carriage length L_{ca} corresponds to the dimension of the outer edge to outer edge of the fastening bridges.
Dynamic characteristic values and maximum permissible loads are valid only when connecting the fastening bridges via customer-built attachment.
2) The connection plate is mounted on the "without connection plate" carriage version.
In the "with connection plate" version, carriage length L_{ca} corresponds to the length of the connection plate.
3) A variable center-to-center distance L_W is only possible for the "without connection plate" carriage design.
The variable center-to-center distance is freely selectable between minimum and maximum distance in millimeters steps.
4) Minimum required travel range to ensure a reliable lubrication distribution.
5) For the variable L_W, M_L, $M_{y\,max}$ and $M_{z\,max}$ must be determined according to the selected centerline-to-centerline distance L_W.
6) ➠ "Resist chapter".

	Maximum permissible loads						**Planar moments of inertia**		**Point of force application**	
	Moments			**Forces**					**Connection plate** **without**	**with**
	$M_{x\ max}$ (Nm)	$M_{y\ max}$ [5] (Nm)	$M_{z\ max}$ [5] (Nm)	$F_{y\ max}$ (N)	$F_{z1\ max}$ (N)	$F_{z2\ max}$ (N)	I_y (cm^4)	I_z (cm^4)	Z_1 (mm)	Z_1 (mm)
	1,375	299	299	12,265	21,150	21,150				
	2,750	3,701	1,744	19,925	42,300	42,300	550.50	3,897.00	36.0	63.0 (86.4) [6]
	2,750	21.14 x L_W	9.97 x L_W	19,925	42,300	42,300				
	5,400	6,000	5,517	55,170	86,685	60,000				
	5,400	30 x L_W	27.58 x L_W	55,170	86,685	60,000	2,683.00	15,638.00	71.5	101.5

Drive data

Observe the "Project planning/calculation" chapter.

CKK	BASA	Carriage		Constant weight calculation		Moved mass of system	
		Connection plate				Connection plate	
		without	with			without[1)]	with
	d_0 x P (mm)	L_{ca} (mm)	L_{ca} (mm)	$k_{g\ fix}$ (kg)	$k_{g\ var}$ (kg/mm)	m_{ca} (kg)	m_{ca} (kg)
-070	8 x 2.5	32	60	0.29	0.0038	0.15	0.26
		73	95			0.25	0.42
	8 x 5	32	60			0.15	0.26
		73	95			0.25	0.42
-090	12 x 2	35	60	0.50	0.0054	0.36	0.54
		100	125			0.59	0.96
	12 x 5	35	60			0.36	0.54
		100	125			0.59	0.96
	12 x 10	35	60			0.36	0.54
		100	125			0.59	0.96
-110	16 x 5	39	60	0.91	0.0094	0.52	0.75
		124	155			0.86	1.45
	16 x 10	39	60			0.52	0.75
		124	155			0.86	1.45
	16 x 16	39	60			0.52	0.75
		124	155			0.86	1.45
-145	20 x 5	49	80	1.91	0.0179	1.21	1.71
		149	190			2.06	3.26
	20 x 20	49	80			1.21	1.71
		149	190			2.06	3.26
	20 x 40	49	80			1.21	1.71
		149	190			2.06	3.26
	25 x 10	49	80			1.21	1.71
		149	190			2.06	3.26
-200	32 x 5	79.5	190	4.06	0.0296	3.20	5.50
		254.5	305			5.20	8.90
	32 x 10	79.5	190			3.20	5.50
		254.5	305			5.20	8.90
	32 x 20	79.5	190			3.20	5.50
		254.5	305			5.20	8.90
	32 x 32	79.5	190			3.20	5.50
		254.5	305			5.20	8.90
-280	40 x 5	330	375	20.75	0.0497	14.77	22.04
	40 x 10					15.04	22.31
	40 x 20					15.02	22.29
	40 x 40					15.74	23.01

[1)] To the carriage version with variable center-to-center distance L_W, the larger value applies

Constant mass moment of inertia				Friction torque[1]	Max. acceleration	Max. speed	Max. drive torque
Connection plate without[1] $k_{J\,fix}$ (kg/mm²)	with $k_{J\,fix}$ (kg/mm²)	$k_{J\,var}$ (kg/mm)	$k_{J\,m}$ (mm²)	M_{Rs} (Nm)	a_{max} (m/s²)	v_{max} (m/s)	M_P (Nm)
0.769	0.786	0.004	0.158	0.07	50.0	See "Diagrams" chapter	See "Diagrams" chapter
0.785	0.812						
0.840	0.910		0.633				
0.903	1.011						
1.279	1.298	0.013	0.101	0.13	48.4		
1.303	1.340			0.14			
1.454	1.568	0.011	0.633	0.15	50.0		
1.599	1.834			0.16			
2.138	2.594	0.011	2.533	0.18	50.0		
2.720	3.658			0.20			
5.088	5.234	0.031	0.633	0.37	50.0		
5.303	5.677			0.40			
6.076	6.658	0.031	2.533	0.40	50.0		
6.937	8.432			0.43			
8.161	9.652	0.034	6.485	0.42	50.0		
10.365	14.191			0.48			
22.564	22.880	0.084	0.633	0.48	39.8		
23.102	23.862			0.52			
34.029	39.950	0.081	10.132	0.60	50.0		
42.641	54.800			0.68			
70.856	91.120	0.086	40.528	0.70	50.0		
105.305	153.939			0.86			
26.335	27.601	0.239	2.533	0.60	50.0		
28.488	31.528			0.65			
71.348	72.867	0.605	0.633	1.10	17.9		
72.741	75.147			1.20			
76.612	82.691	0.640	2.533	1.10	30.7		
82.185	91.810			1.20			
93.299	117.676	0.639	10.132	1.15	50.0		
115.590	154.092			1.25			
127.391	189.642	0.617	25.938	1.25	50.0		
184.455	283.020			1.35			
247.114	252.259	1.564	0.633	2.20	12.2		
271.987	292.566	1.355	2.533	2.70	16.8		
386.004	466.119	1.352	10.132	2.50	33.8		
871.492	1166.296	1.342	40.528	2.90	50.0		

Drive data for CKK with Resist cover

Observe the "Project planning/calculation" chapter.

CKK	BASA	Carriage with Connection plate	Constant weight calculation		Moved mass of system	
	d_0 x P (mm)	L_{ca} (mm)	$k_{g\ fix}$ (kg)	$k_{g\ var}$ (kg/mm)	m_{ca} (kg)	
-110	16 x 5	155	1.02	0.0111	1.59	
	16 x 10					
	16 x 16					
-145	20 x 5	190	2.06	0.0202	3.49	
	20 x 20					
	20 x 40					
	25 x 10					
-200	32 x 5	305	4.23	0.0334	9.46	
	32 x 10					
	32 x 20					
	32 x 32					

	Constant mass moment of inertia			**Friction torque**	**Max. acceleration**	**Max. speed**	**Max. drive torque**
	$k_{J\ fix}$ (kgmm²)	$k_{J\ var}$ (kgmm)	$k_{J\ m}$ (mm²)	M_{Rs} (Nm)	a_{max} (m/s²)	v_{max} (m/s)	M_P (Nm)
	5.835	0.031	0.633	0.40	50.0	See "Diagrams" chapter	See "Diagrams" chapter
	9.065	0.031	2.533	0.43	50.0		
	15.812	0.034	6.485	0.48	50.0		
	24.099	0.084	0.633	0.52	39.8		
	55.749	0.081	10.132	0.68	50.0		
	157.738	0.086	40.528	0.86	50.0		
	32.479	0.239	2.533	0.65	50.0		
	75.610	0.605	0.633	1.20	17.9		
	93.660	0.640	2.533	1.20	30.7		
	161.490	0.639	10.132	1.25	50.0		
	301.930	0.617	25.983	1.35	50.0		

Technical data for CKK with screw support

General technical data

Observe the "Project planning/calculation" chapter.

CKK	Carriage		BASA	SPU	Max. length	Additional length		Dynamic characteristic values				
	Connection plate without[1]	with[2]				Connection plate without	with	Load capacities			Load moments	
	L_{ca} (mm)	L_{ca} (mm)	d_0 x P (mm)		L_{max} (mm)	L_{ad} (mm)	L_{ad} (mm)	C_{gw} (N)	C_{bs} (N)	C_{fb} (N)	M_t (Nm)	M_L (Nm)
-200	79.5	–	32 x 5	1	1,500 < L ≤ 3,500	235.5	–	74,600	23,310	26,000	4,849	1,053
				2	2,000 < L ≤ 4,600	360.5						
				3	2,600 < L ≤ 5,500	485.5						
			32 x 10	1	1,500 < L ≤ 3,500	235.5			34,200			
				2	2,000 < L ≤ 4,600	360.5						
				3	2,600 < L ≤ 5,500	485.5						
			32 x 20	1	1,500 < L ≤ 3,500	235.5			21,240			
				2	2,000 < L ≤ 4,600	360.5						
				3	2,600 < L ≤ 5,500	485.5						
			32 x 32	1	1,500 < L ≤ 3,500	235.5			21,060			
				2	2,000 < L ≤ 4,600	360.5						
				3	2,600 < L ≤ 5,500	485.5						
	254.5	305	32 x 5	1	1,500 < L ≤ 3,600	235.5	185	121,185	23,310	26,000	7,877	10,604
				2	2,000 < L ≤ 4,700	360.5	310					
				3	2,600 < L ≤ 5,500	485.5	435					
			32 x 10	1	1,500 < L ≤ 3,600	235.5	185		34,200			
				2	2,000 < L ≤ 4,700	360.5	310					
				3	2,600 < L ≤ 5,500	485.5	435					
			32 x 20	1	1,500 < L ≤ 3,600	235.5	185		21,240			
				2	2,000 < L ≤ 4,700	360.5	310					
				3	2,600 < L ≤ 5,500	485.5	435					
			32 x 32	1	1,500 < L ≤ 3,600	235.5	185		21,060			
				2	2,000 < L ≤ 4,700	360.5	310					
				3	2,600 < L ≤ 5,500	485.5	435					
-280	330.0	375	40 x 5	1	1,500 < L ≤ 3,900	329.0	284	216,700	31,410	54,000	19,500	21,670
				2	2,000 < L ≤ 5,100	454.0	409					
				3	2,600 < L ≤ 5,500	579.0	534					
			40 x 10	1	1,500 < L ≤ 3,900	329.0	284		54,000			
				2	2,000 < L ≤ 5,100	454.0	409					
				3	2,600 < L ≤ 5,500	579.0	534					
			40 x 20	1	1,500 < L ≤ 3,900	329.0	284		40,950			
				2	2,000 < L ≤ 5,100	454.0	409					
				3	2,600 < L ≤ 5,500	579.0	534					
			40 x 40	1	1,500 < L ≤ 3,900	329.0	284		39,960			
				2	2,000 < L ≤ 5,100	454.0	409					
				3	2,600 < L ≤ 5,500	579.0	534					

[1] In the "without connection plate" version, carriage length L_{ca} corresponds to the dimension of the outer edge to outer edge of the fastening bridges.
Dynamic characteristic values and maximum permissible loads are valid only when connecting the fastening bridges via customer-built attachment.

[2] The connection plate is mounted on the "without connection plate" carriage version.
In the "with connection plate" version, carriage length L_{ca} corresponds to the length of the connection plate.

	Maximum permissible loads						**Constants**		**Planar moments of inertia**		**Point of force application**	
	Moments			**Forces**			**Mass calculation**				**Connection plate**	
	$M_{x\ max}$ (Nm)	$M_{y\ max}$ (Nm)	$M_{z\ max}$ (Nm)	$F_{y\ max}$ (N)	$F_{z1\ max}$ (N)	$F_{z2\ max}$ (N)	$k_{g\ fix}$ (kg)	$k_{g\ var}$ (kg/mm)	I_y (cm^4)	I_z (cm^4)	without Z_1 (mm)	with Z_1 (mm)
	1,375	299	299	12,265	21,150	21,150	4.06	0.0296	550.5	3,897	36.0	63.0
	2,750	3,701	1,744	19,925	42,300	42,300	4.06	0.0296	550.5	3,897	36.0	63.0
	5,400	6,000	5,517	55,170	86,685	60,000	20.75	0.0497	2,683	15,638	71.5	101.5

Drive data

Observe the "Project planning/calculation" chapter.

CKK	BASA	SPU	Carriage		Constant mass calculation		Moved mass of system	
			Connection plate				Connection plate	
			without	with			without	with
	d_0 x P		L_{ca}	L_{ca}	$k_{g\ fix}$	$k_{g\ var}$	m_{ca}	m_{ca}
	(mm)		(mm)	(mm)	(kg)	(kg/mm)	(kg)	(kg)
-200	32 x 5	1	79.5	–	4.06	0.0296	3.40	
		2					3.60	–
		3					3.80	
		1	254.5	305			5.40	9.10
		2					5.60	9.30
		3					5.80	9.50
	32 x 10	1	79.5	–			3.40	
		2					3.60	–
		3					3.80	
		1	254.5	305			5.40	9.10
		2					5.60	9.30
		3					5.80	9.50
	32 x 20	1	79.5	–			3.40	
		2					3.60	–
		3					3.80	
		1	254.5	305			5.40	9.10
		2					5.60	9.30
		3					5.80	9.50
	32 x 32	1	79.5	–			3.40	
		2					3.60	–
		3					3.80	
		1	254.5	305			5.40	9.10
		2					5.60	9.30
		3					5.80	9.50
-280	40 x 5	1	330.0	375	20.75	0.0497	15.93	23.20
		2					16.45	23.73
		3					16.98	24.26
	40 x 10	1					16.20	23.47
		2					16.72	24.00
		3					17.25	24.53
	40 x 20	1					16.18	23.45
		2					16.70	23.98
		3					17.23	24.51
	40 x 40	1					16.90	24.17
		2					17.42	24.70
		3					17.95	25.23

	Constant mass moment of inertia				**Friction torque**[1]	**Max. acceleration**	**Max. speed**	**Max. drive torque**
	Connection plate							
	without	**with**						
	$k_{J\ fix}$ (kgmm²)	$k_{J\ fix}$ (kgmm²)	$k_{J\ var}$ (kgmm)	$k_{J\ m}$ (mm²)	M_{Rs} (Nm)	a_{max} (m/s²)	v_{max} (m/s)	M_P (Nm)
	71.474	–	0.605	0.633	1.20	17.9	siehe Kapitel „Diagramme“	siehe Kapitel „Diagramme“
	71.601	–			1.20			
	71.728	–			1.40			
	72.867	75.274	0.605	0.633	1.30			
	72.994	75.400			1.30			
	73.121	75.527			1.50			
	77.119	–	0.640	2.533	1.20	30.7		
	77.625	–			1.40			
	78.132	–			1.50			
	82.691	92.317	0.640	2.533	1.30			
	83.198	92.823			1.50			
	83.705	93.330			1.60			
	95.326	–	0.639	10.132	1.30	50.0		
	97.352	–			1.50			
	99.378	–			1.70			
	117.676	156.118	0.639	10.132	1.40			
	119.643	158.145			1.60			
	121.669	160.171			1.80			
	132.578	–	0.617	25.938	1.40	50.0		
	137.766	–			1.70			
	142.953	–			1.90			
	189.642	288.207	0.617	25.938	1.50			
	194.830	293.395			1.80			
	200.018	298.583			2.00			
	247.847	252.454	1.564	0.633	2.4	12.2		
	248.182	252.788			2.5			
	248.516	253.122			2.5			
	274.921	293.346	1.355	2.533	3.0	16.8		
	276.258	294.683			3.0			
	277.595	296.021			3.1			
	397.737	471.439	1.352	10.132	2.8	33.8		
	403.087	476.788			2.9			
	408.437	482.138			3.0			
	918.424	1 213.228	1.342	40.528	3.3	50.0		
	939.823	1 234.627			3.5			
	961.222	1 256.030			3.7			

Technical data

Drive data for motor attachment via belt side drive

Observe the "Project planning/calculation" chapter.

CKK	Motor	BASA (mm) d_0 x P	up to L[1] (mm)	M_{sd}[2] (Nm) i = 1	M_{sd}[2] (Nm) i = 1.5	J_{sd} (10^{-6} kgm²) i = 1	J_{sd} (10^{-6} kgm²) i = 1.5	M_{Rsd} (Nm)	m_{sd} (kg) i = 1	m_{sd} (kg) i = 1.5	B_t i = 1	B_t i = 1.5
-070	MSM019B	8 x 2.5	450	0.71	0.47	10.70	4.10	0.06	0.28	0.26	6 AT3	6 AT3
	MS2N03-B MSM031B	8 x 2.5	450	0.71	0.47	34.77	13.05	0.15	0.66	0.63	10 AT3	10 AT3
	MSM019B	8 x 5	450	1.31	0.87	10.70	4.10	0.06	0.28	0.26	6 AT3	6 AT3
	MS2N03-B MSM031B	8 x 5	450	1.41	0.94	34.77	13.05	0.15	0.66	0.63	10 AT3	10 AT3
-090	MS2N03-B MSM031C	12 x 2	750	0.79	0.53	38.00	14.00	0.15	0.53	0.48	10 AT3	10 AT3
		12 x 5	750	2.39	1.59							
		12 x 10	750	2.73	1.82							
-110	MS2N03-B MSM031C	16 x 5	1,250	3.17	2.11	41.00	16.00	0.15	0.53	0.48	10 AT3	10 AT3
		16 x 10	1,500	3.17	2.11							
		16 x 16	1,500	3.17	2.11							
	MS2N04 MSM041B	16 x 5	850	6.76	4.51	240.00	82.00	0.40	1.34	1.24	16 AT5	16 AT5
		16 x 10	1,150	7.66	5.11							
		16 x 16	1,450	7.66	5.11							
-145	MS2N04 MSM041B	20 x 5	1,350	8.22	5.48	250.00	85.00	0.40	1.42	1.31	16 AT5	16 AT5
		20 x 20	1,800	8.22	5.48							
		20 x 40	1,800	8.22	5.48							
		25 x 10	1,800	8.22	5.48							

CKK	Motor	BASA (mm) d_0 x P	up to L[1] (mm)	M_{sd}[2] (Nm) i = 1	M_{sd}[2] (Nm) i = 2	J_{sd} (10^{-6} kgm²) i = 1	J_{sd} (10^{-6} kgm²) i = 2	M_{Rsd} (Nm)	m_{sd} (kg) i = 1	m_{sd} (kg) i = 2	B_t i = 1	B_t i = 2
-145	MS2N05	20 x 5	1,150	11.00	5.50	1,310	217	0.45	3.50	3.10	25 AT5	25 AT5
		20 x 20	1,800	17.73	8.87							
		20 x 40	1,800	17.73	8.87							
		25 x 10	1,800	17.73	8.87							
-200	MS2N06	32 x 5	2,200	19.00	9.50	1,400	260	0.50	3.80	3.50	25 AT5	32 AT5
		32 x 10	2,200	19.21	12.30							
		32 x 20	2,200	19.21	12.30							
		32 x 32	2,200	19.21	12.30							
-280	MS2N07	40 x 5	2,500	27.70	13.85	7,780	1,260	0.60	8.90	7.60	50 AT10	50 AT10
		40 x 10	2,500	72.20	36.10							
		40 x 20	2,500	96.90	48.45							
		40 x 40	2,500	101.50	50.75							

[1] For greater lengths, the permissible drive torque is determined from the length-variable value M_p of the linear motion system in accordance with the graph
➠ Chapter "Project planning/calculation"

[2] Values for M_{sd} do not factor in motor torque.

Drive data for motor attachment via flange and coupling

CKK	Motor	Coupling		Flange and coupling
		M_{cN} (Nm)	J_c (10^{-6} kgm²)	m_{fc} (kg)
-070	MS2N03-B	3.7	7.00	0.30
	MSM019B	1.9	2.10	0.15
	MSM031B	3.7	7.00	0.30
-090	MS2N03-B	13.0	12.20	0.30
	MSM031C	13.0	12.20	0.35
-110	MS2N03-B	13.0	12.20	0.45
	MS2N03-D	14.0	12.20	0.45
	MS2N04	14.0	12.20	0.60
	MSM031C	14.0	12.20	0.45
	MSM041B	29.4	42.29	0.65
-145	MS2N04	26.1	42.29	0.80
	MS2N05	26.1	42.29	1.00
	MSM041B	26.1	42.29	0.80
-200	MS2N06	50.0	210.00	1.80
	MS2N07	98.0	390.00	2.25
-280	MS2N07	115.0	390.00	2.80

Diagrams

Permissible drive torque

The values shown for M_p apply under the following conditions:

- Screw journal without keyway
- No radial loads on screw journal

⚠ **Keep in mind the rated torque of the coupling being used! Keep in mind the minimum travel range s_{min}!**

⚠ **Screw journal with keyway**

For reasons of stress concentration and a reduction of the effective diameter, observe the maximum values for drive torque!

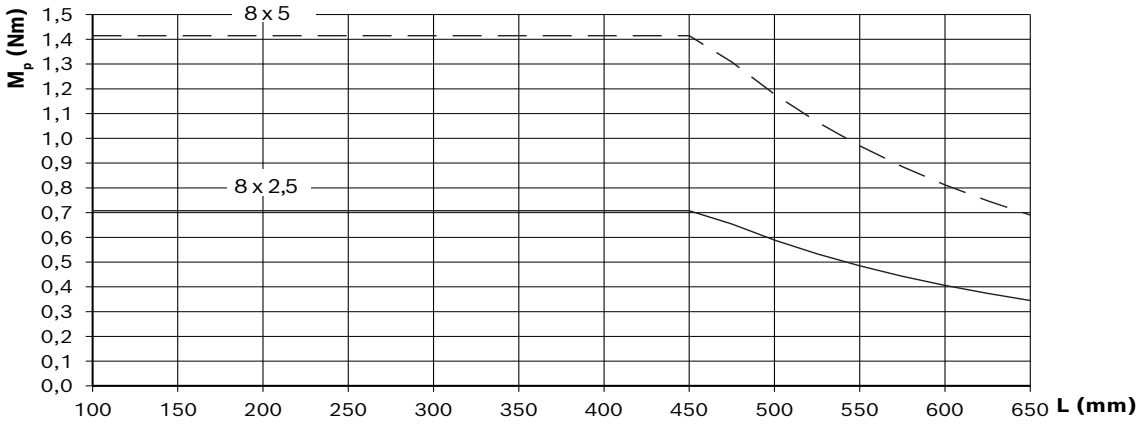
CKK	M_p (Nm)
-110 / -145	No reduction
-200	48.6

⚠ **For ball screw assemblies with keyway, the smallest value from the diagrams and the table is valid.**

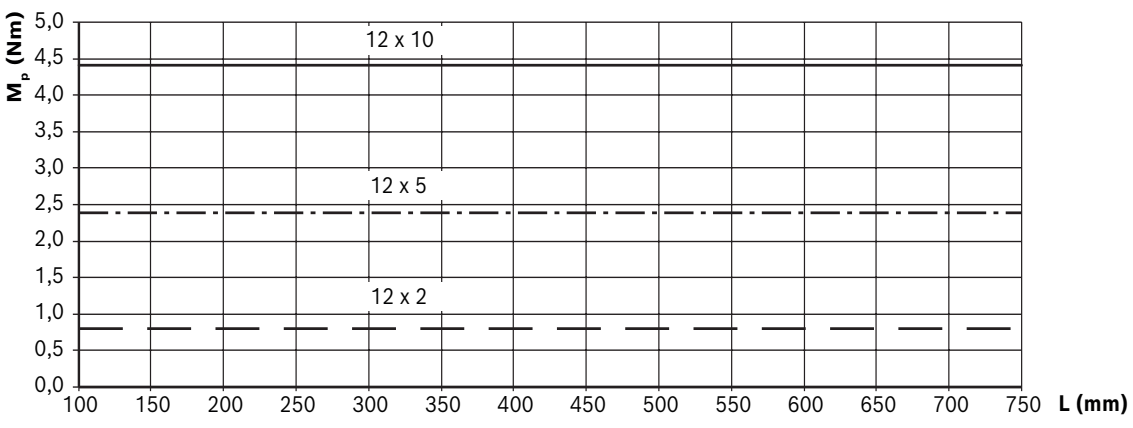
Example:

CKK-200	(d_0 x P)	
	32 x 32	32 x 10
Length (mm)	1,500	1,500
M_p from diagram (Nm)	58.5	39.0
M_p maximum (Nm)	48.6	48.6
Value for sizing	48.6	39.0

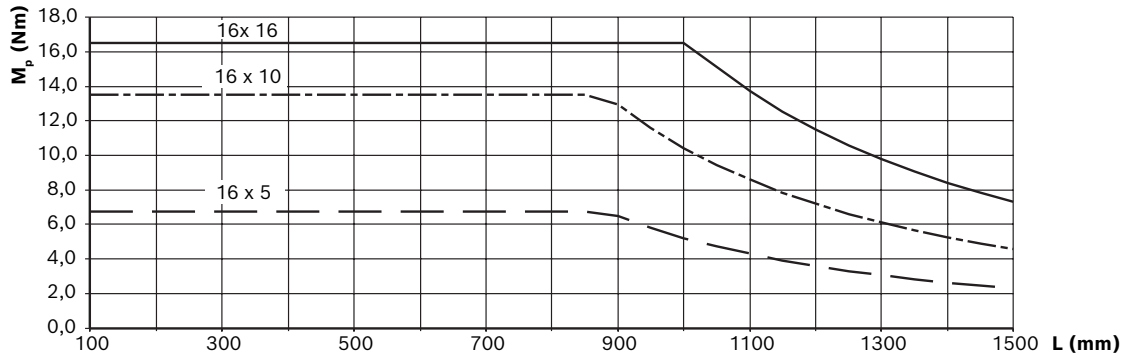
CKK-070



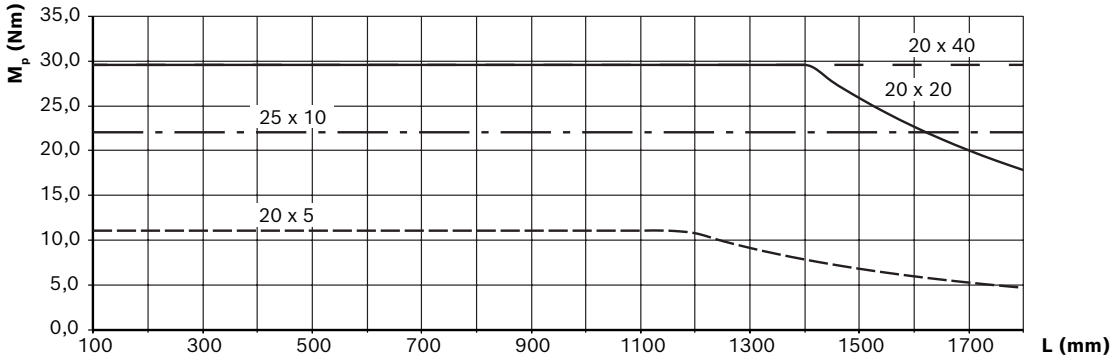
CKK-090



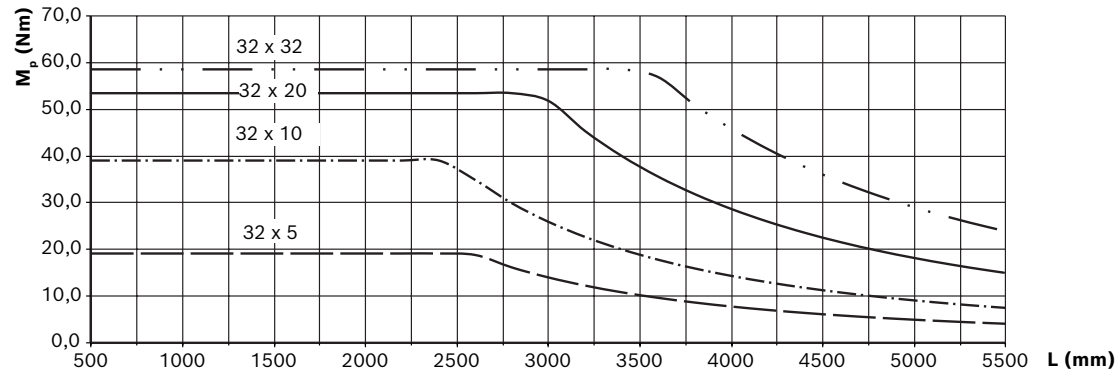
CKK-110



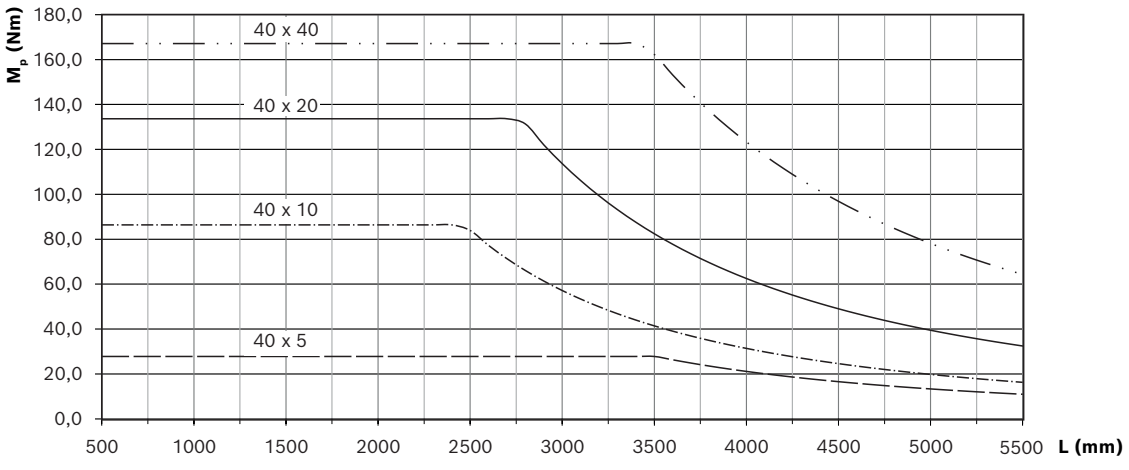
CKK-145



CKK-200



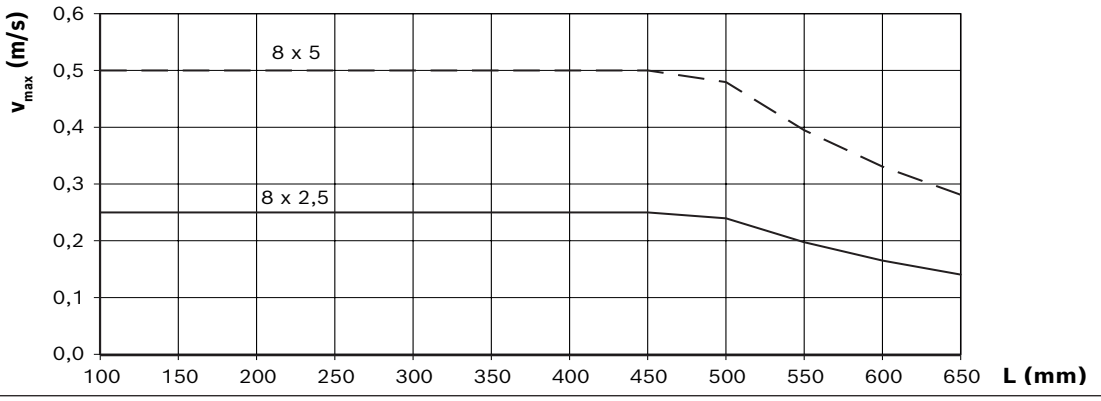
CKK-280



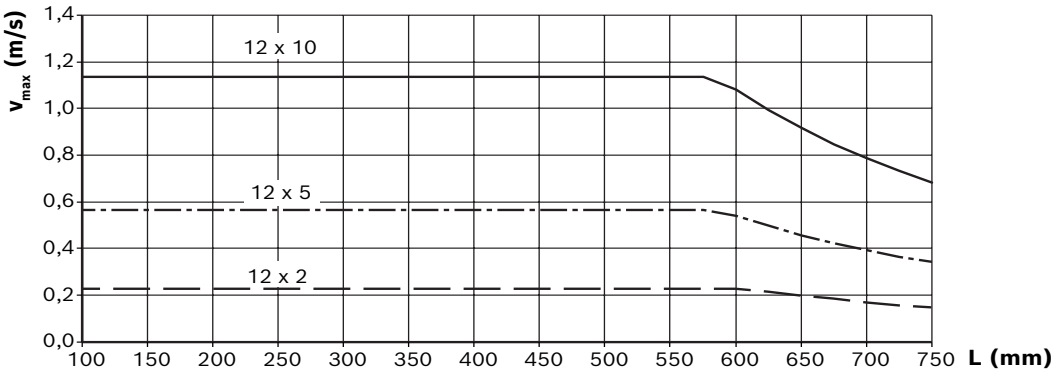
Permissible speed

Observe motor speed! Keep in mind the minimum travel range s_{min}!

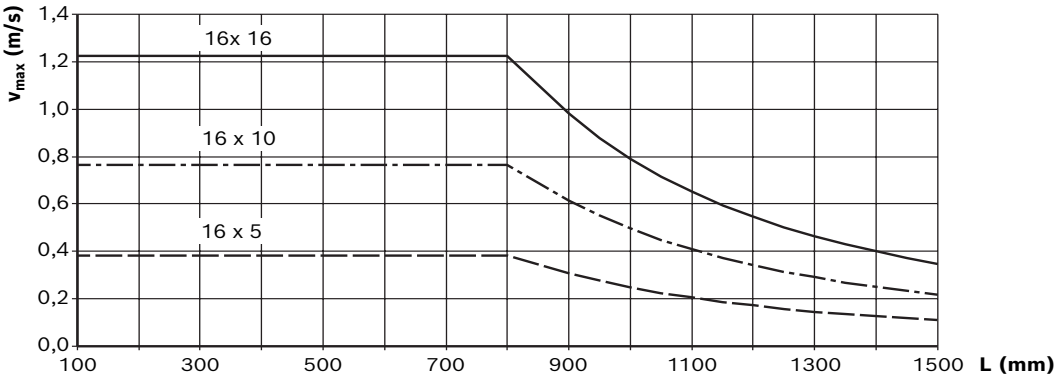
CKK-070



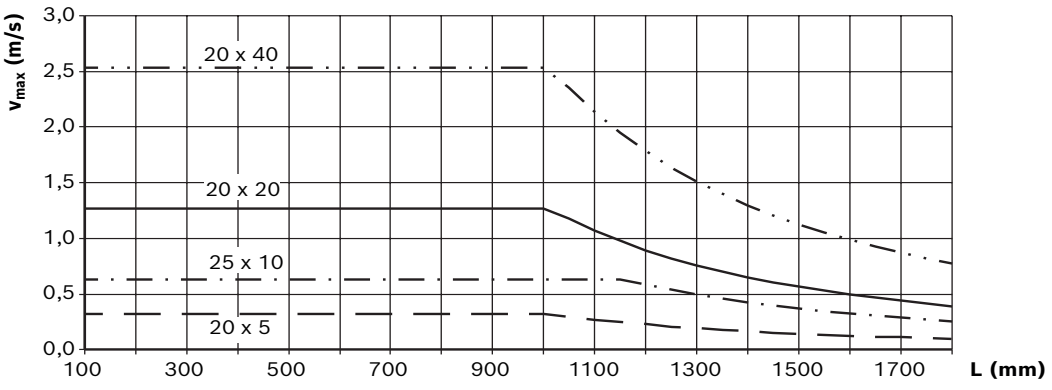
CKK-090



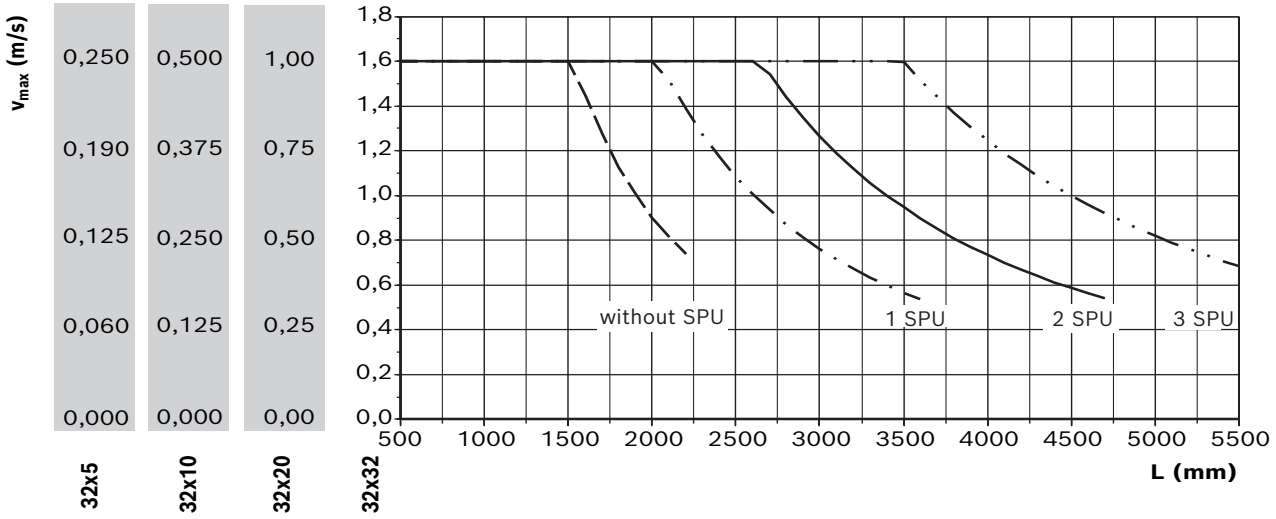
CKK-110



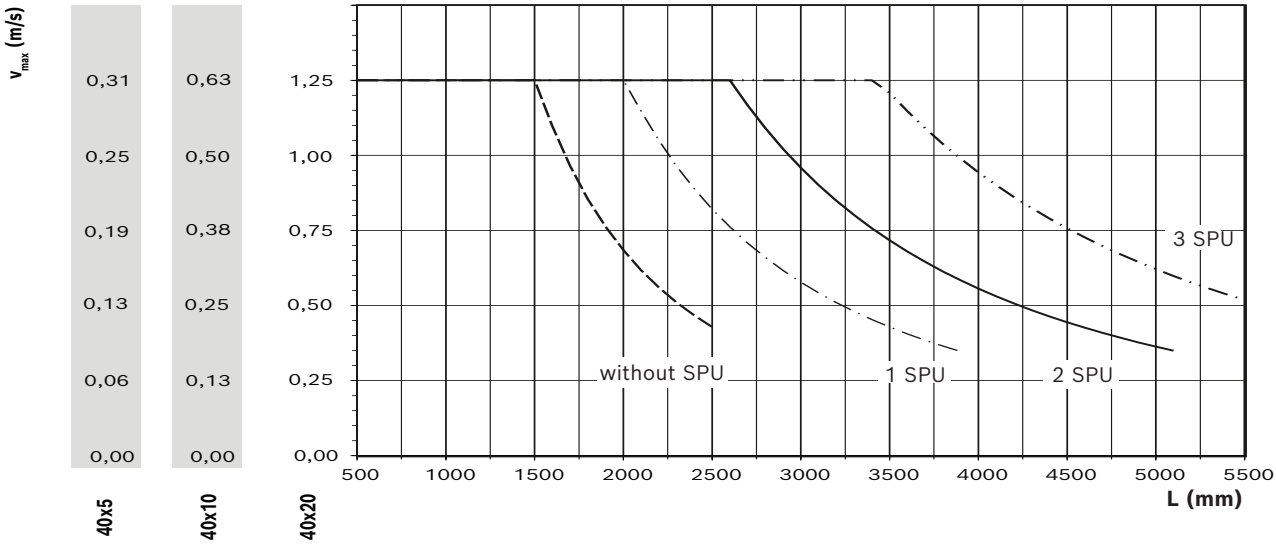
CKK-145



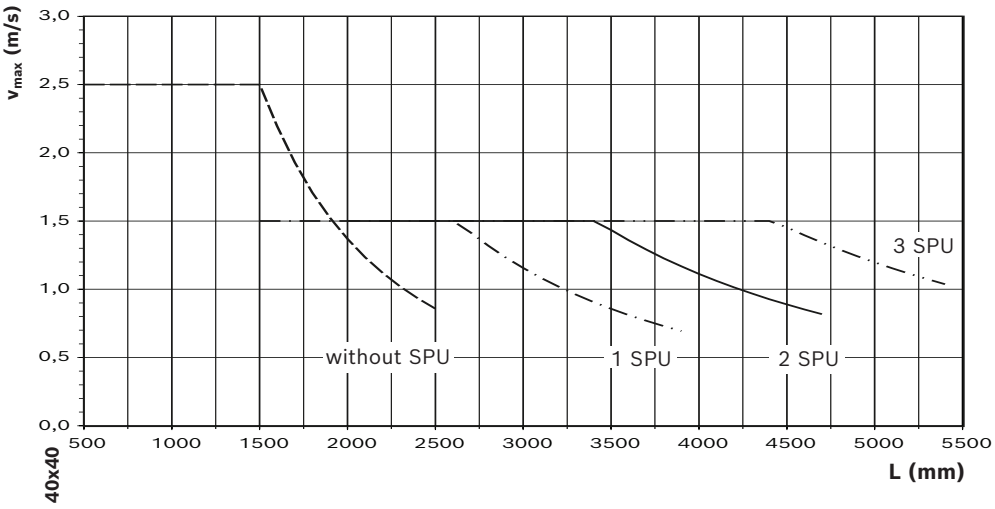
CKK-200



CKK-280

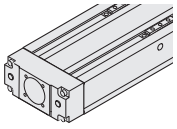
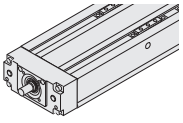
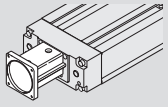
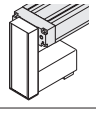
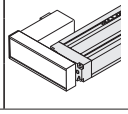
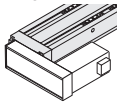


CKK-280



Configuration, order

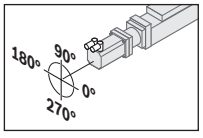
CKK-070

Short product name, length[1] CKK-070-NN-1, ... mm		Guideway			Lubrication[3]		Drive			Carriage				
								BASA d_0 x P (mm)		Connection plate without L_{ca} (mm)		with L_{ca} = (mm)		
Version		Standard	Centering holes[2]				Screw journal (mm)	8 x 2.5	8 x 5	32	73	60	95	
Without drive	OA01 	001	003	004	LSS		–	050	050	001	002	040	041	
					LPG					–	302	–	341	
Without attachment	OF01 				LSS		Ø6	001	002	01	002	040	041	
Flange/ coupling	MF01 													
Belt side drive	RV01  RV02  RV03  RV04 				LPG		Ø6	031	032	–	302	–	341	

[1] Length calculation of the linear motion system ➠ "Project planning/calculation" chapter.
[2] Centering holes for simple combination with other linear motion systems and connection elements (see dimension drawings).
Option 003: with centering holes and fastening threads in the ground area of the frame
Option 004: with centering holes and long hole in the ground area of the frame; selectable starting from length L ≥ 300 mm up to length L_{max}
[3] Lubrication ➠ Chapter "Lubrication".
[4] Attachment kit also available without motor. When ordering, enter the motor type "000"!
Attachment kits according to customer specifications ➠ Chapter "Attachment Kits for Motors according to Customer Specifications"
[5] Recommended motor, motor data and type designations ➠ Chapter "Motors"
[6] More information ➠ Chapter "Switching system"
[7] Assembly contains 1 x sensor, 1 x switch mounting plate including set screws and square nuts as well as 3 x cable holders including set screws
[8] Measurement report: 001 = standard report; 002 = Measurement of frictional torque; 003 = Lead deviation (see also "Documentation" chapter)

Motor attachment			Motor[5]						Cover		Switching system[6]	Automation package		Doc.[8]
				2 cables		1 cable			Cover strip					
	i =	Attachment kit[4]	Motor code	without brake	with brake	without brake	with brake	Motor connector position	without	with		Controller	Cable	
OA01 / OF01	–	000	–	000				–	001	002	Without: - Switch - Cable duct - Socket-connector: 000 Magnetic sensor: REED, changeover (NC: C+NC, NO: C+NO): 021; Hall, PNP normally closed (NC): 022; Hall, PNP normally open (NO): 023; Cable duct: 025; Socket-connector: 028 Magnetic sensor with connector[7]: REED, changeover (NC: C+NC, NO: C+NO): 058; Hall, PNP normally closed (NC): 059	➠ "Automation package" chapter		001
MF01	–	001	MS2N03-B0BYN	–	–	203	204	000						002
		003	MSM031B-0300	136	137	–	–							
		005	MSM019B-0300	134	135	–	–							
RV01 - RV04	1	017	MS2N03-B0BYN	–	–	203	204	090						003
		019	MSM031B-0300	136	137	–	–							
		015	MSM019B-0300	134	135	–	–	180						
	1.5	018	MS2N03-B0BYN	–	–	203	204							
		020	MSM031B-0300	136	137	–	–	270						
		016	MSM019B-0300	134	135	–	–							

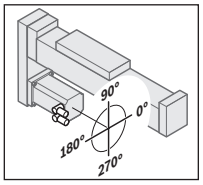
Flange	Motor connector position			
	0°	90°	180°	270°
MF01	000	090 ★	180	270



Example:
Flange MF01
Motor connector position 90°

Belt side drive	Motor connector position			
	0°	90°	180°	270°
RV01	000	–	180	270 ★
RV02	000	090 ★	180	–
RV03	000 ★	090	–	270
RV04	–	090	180 ★	270

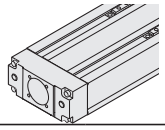
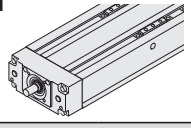
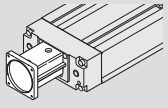
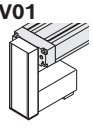
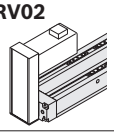
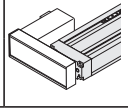
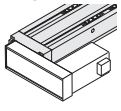
★ Standard delivery



Example:
Belt side drive RV01
Motor connector position 180°

Explanation of the order parameters and ordering example ➠ Chapter "Ordering example".

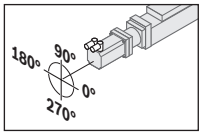
CKK-090

Short product name, length[1] CKK-090-NN-1, ... mm			Guideway			Lubrication[3]		Drive				Carriage				
									BASA d_0 x P (mm)			Connection plate without L_{ca} = (mm)			with L_{ca} = (mm)	
Version			Standard	Centering holes[2]				Screw journal (mm)	12 x 2	12 x 5	12 x 10	35	100	variable[3]	60	125
Without drive	OA01		001	003	004	LSS		–	050			001	002	005	040	041
						LPG						–	302	305	–	341
Without attachment	OF01					LSS		Ø8	003	001	002	001	002	005	040	041
Flange/ coupling	MF01					LPG		Ø8	031	032	033	–	302	305	–	341
Belt side drive	RV01					LCF		Ø8	003	001	002	–				141
	RV02															
	RV03					LCO		Ø8	021	022	023	–				241
	RV04															

1) Length calculation of the linear motion system ➠ "Project planning/calculation" chapter.
2) Centering holes for simple combination with other linear motion systems and connection elements (see dimension drawings).
Option 003: with centering holes and fastening threads in the ground area of the frame
Option 004: with centering holes and long hole in the ground area of the frame; selectable starting from length L ≥ 300 mm up to length L_{max}
3) Lubrication ➠ Chapter "Lubrication".
4) Attachment kit also available without motor. When ordering, enter the motor type "000"!
Attachment kits according to customer specifications ➠ Chapter "Attachment Kits for Motors according to Customer Specifications"
5) Recommended motor, motor data and type designations ➠ Chapter "Motors"
6) More information ➠ Chapter "Switching system"
7) Assembly contains 1 x sensor, 1 x switch mounting plate including set screws and square nuts as well as 3 x cable holders including set screws
8) Measurement report: 001 = standard report; 002 = Measurement of frictional torque; 003 = Lead deviation (see also "Documentation" chapter)

Motor attachment			Motor[5]						Motor connector position	Cover		Switching system[6]	Automation package		Doc.[8]
	i =	Attachment kit[4]	Motor code	2 cables without brake	2 cables with brake	1 cable without brake	1 cable with brake		Cover strip without	Cover strip with		Controller	Cable	
OA01 / OF01	–	000	–	000				–	001	002	Without: - Switch - Cable duct - Socket-connector: 000 Magnetic sensor: REED, changeover (NC: C+NC, NO: C+NO): 021; Hall, PNP normally closed (NC): 022; Hall, PNP normally open (NO): 023; Cable duct: 025; Socket-connector: 017 Magnetic sensor with connector[7]: REED, changeover (NC: C+NC, NO: C+NO): 058; Hall, PNP normally closed (NC): 059	➠ "Automation package" chapter		001
MF01	–	001	MS2N03-B0BYN	–	–	203	204	000						
		005	MSM031C-0300	138	139	–	–							002
RV01 - RV04	1	011	MS2N03-B0BYN	–	–	203	204	090						
		013	MSM031C-0300	138	139	–	–	180						
	1.5	021	MS2N03-B0BYN	–	–	203	204	270						003
		23	MSM031C-0300	138	139	–	–							

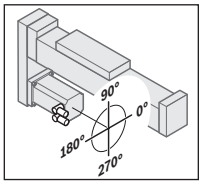
Flange	Motor connector position			
	0°	90°	180°	270°
MF01	000	090 ★	180	270



Example:
Flange MF01
Motor connector position 90°

Belt side drive	Motor connector position			
	0°	90°	180°	270°
RV01	000	–	180	270 ★
RV02	000	090 ★	180	–
RV03	000 ★	090	–	270
RV04	–	090	180 ★	270

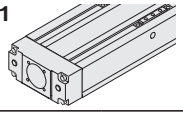
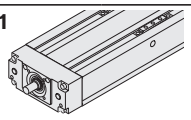
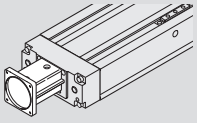
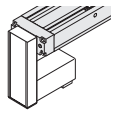
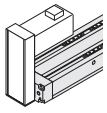
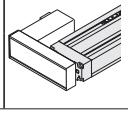
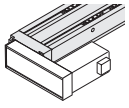
★ Standard delivery



Example:
Belt side drive RV01
Motor connector position 180°

Explanation of the order parameters and ordering example ➠ Chapter "Ordering example".

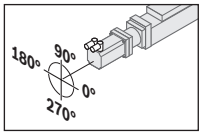
CKK-110

Short product name, length[1] CKK-110-NN-1, ... mm			Guideway			Lubrication[3]	Drive				Carriage				
								BASA d_0 x P (mm)			Connection plate without L_{ca} = (mm)			with L_{ca} = (mm)	
Version			Standard	Centering holes[2]			Screw journal (mm)	16 x 5	16 x 10	16 x 16	39	124	variable[3]	60	155
Without drive	OA01		001	003	004	LSS	–	050			001	002	005	040	041
						LPG					–	302	305	–	341
Without attachment	OF01					LSS	Ø11 with keyway (OF01)	011	012	013	001	002	005	040	041
Flange/ coupling	MF01					LSS	Ø11	001	002	003	001	002	005	040	041
						LPG	Ø11	031	032	033	–	302	305	–	341
Belt side drive	RV01					LCF	Ø11	001	002	003	–				141
	RV02					LCO	Ø11	001	002	003	–				241
	RV03														
	RV04														

1) Length calculation of the linear motion system ➠ "Project planning/calculation" chapter.
2) Centering holes for simple combination with other linear motion systems and connection elements (➠ Dimension drawings).
Option 003: with centering holes and fastening threads in the ground area of the frame
Option 004: with centering holes and long hole in the ground area of the frame; selectable starting from length L ≥ 300 mm up to length L_{max}
3) Lubrication ➠ Chapter "Lubrication".
4) Attachment kit also available without motor. When ordering, enter the motor type "000"!
Attachment kits according to customer specifications ➠ Chapter "Attachment Kits for Motors according to Customer Specifications"
5) Recommended motor, motor data and type designations ➠ Chapter "Motors"
6) Only possible with version Carriage with connection plate L_{ca} = 155 mm;
Switch mounting only possible with magnetic sensor with connector. (It may be necessary to move the mounting brackets for Resist cover)
7) More information ➠ Chapter "Switching system"
8) Assembly contains 1 x sensor, 1 x switch mounting plate including set screws and square nuts as well as 3 x cable holders including set screws
9) Measurement report: 001 = Standard report; 002 = Measurement of frictional torque; 003 = Lead deviation (➠ Chapter "Documentation")

	Motor attachment		Motor[5]						Motor connector position	Cover		Resist[6]	Switching system[7]	Automation package		Doc.[9]
					2 cables		1 cable			Cover strip						
	i =	Attachment kit[4]	Motor code		without brake	with brake	without brake	with brake		without	with			Controller	Cable	
OA01 / OF01	–	000	–		000				–	001	002	012	Without: - Switch - Cable duct - Socket-connector: 000	"Automation package" chapter		001
MF01	–	001	MS2N03-B0BYN		–	–	203	204	000				Magnetic sensor: REED, changeover (NC: C+NC, NO: C+NO): 021			
		007	MS2N03-D0BYN		–	–	207	208					Hall, PNP normally closed (NC): 022			
		003	MS2N04-C0BTN		–	–	215	216					Hall, PNP normally open (NO): 023			002
			MS2N04-D0BQN		–	–	219	220					Cable duct: 025			
		005	MSM031C-0300		138	139	–	–					Socket-connector: 017			
		006	MSM041B-0300		140	141	–	–					Magnetic sensor with connector[8]: REED, changeover (NC: C+NC, NO: C+NO): 058			
RV01 - RV04	1	011	MS2N03-B0BYN		–	–	203	204	090				Hall, PNP normally closed (NC): 059			
		013	MS2N04-C0BTN		–	–	215	216								
		015	MSM031C-0300		138	139	–	–	180							
		017	MSM041B-0300		140	141	–	–								
	1.5	021	MS2N03-B0BYN		–	–	203	204	270							003
		023	MS2N04-B0BTN		–	–	211	212								
		025	MSM031C-0300		138	139	–	–								
		027	MSM041B-0300		140	141	–	–								

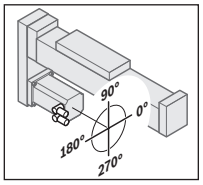
Flange	Motor connector position			
	0°	90°	180°	270°
MF01	000	090 ★	180	270



Example:
Flange MF01
Motor connector position 90°

Belt side drive	Motor connector position			
	0°	90°	180°	270°
RV01	000	–	180	270 ★
RV02	000	090 ★	180	–
RV03	000 ★	090	–	270
RV04	–	090	180 ★	270

★ Standard delivery



Example:
Belt side drive RV01
Motor connector position 180°

Explanation of the order parameters and ordering example ➠ Chapter "Ordering example".

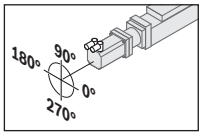
CKK-145

Short product name, length[1] CKK-145-NN-1, ... mm		Guideway			Lubrication[3]		Drive					Carriage				
								BASA d_0 x P (mm)				Connection plate without L_{ca} = (mm)			with L_{ca} = (mm)	
Version		Standard	Centering holes[2]				Screw journal (mm)	20 x 5	20 x 20	25 x 10	20 x 40	49	149	variable[1]	80	190
Without drive	OA01	001	003	004	LSS		–	050				001	002	005	040	041
					LPG							–	302	305	–	341
Without attachment	OF01				LSS		Ø14 with keyway (OF01)	014	015	016	–	001	002	005	040	041
								–			017	006	007	010	008	009
Flange/ coupling	MF01				LSS		Ø14	021	022	023	–	001	002	005	040	041
								–			024	006	007	010	008	009
					LPG		Ø14	031	032	033	–	–	302	305	–	341
								–			034	–	307	310	–	309
Belt side drive	RV01				LCF		Ø14	021	022	023	–	–				141
								–			024	–				109
	RV02															
	RV03				LCO		Ø14	021	022	023	–	–				241
								–			024	–				209
	RV04															

1) Length calculation of the linear motion system ➠ "Project planning/calculation" chapter.
2) Centering holes for simple combination with other linear motion systems and connection elements (➠ Dimension drawings).
Option 003: with centering holes and fastening threads in the ground area of the frame
Option 004: with centering holes and long hole in the ground area of the frame; selectable starting from length L ≥ 300 mm up to length L_{max}
3) Lubrication ➠ Chapter "Lubrication".
4) Attachment kit also available without motor. When ordering, enter the motor type "000"!
Attachment kits according to customer specifications ➠ Chapter "Attachment Kits for Motors according to Customer Specifications"
5) Recommended motor, motor data and type designations ➠ Chapter "Motors"
6) Only possible with version Carriage with connection plate L_{ca} = 190 mm;
Switch mounting only possible with magnetic sensor with connector. (It may be necessary to move the mounting brackets for Resist cover)
7) More information ➠ Chapter "Switching system"
8) Assembly contains 1 x sensor, 1 x switch mounting plate including set screws and square nuts as well as 3 x cable holders including set screws
9) Measurement report: 001 = Standard report; 002 = Measurement of frictional torque; 003 = Lead deviation (➠ Chapter "Documentation")

Motor attachment			Motor[5]						Motor connector position	Cover		Resist[6]	Switching system[7]	Auto-mation package		Doc.[9]
				2 cables		1 cable				Cover strip						
	i =	Attachment kit[4]	Motor code	without brake	with brake	without brake	with brake			without	with			Controller	Cable	
OA01 / OF01	–	000	–	000					–	001	002	012	Without - Switch - Cable duct - Socket-connector: 000 Magnetic sensor REED, changeover (NC: C+NC, NO: C+NO): 021 Hall, PNP normally closed (NC): 022 Hall, PNP normally open (NO): 023 Cable duct: 025 Socket-connector: 017 Magnetic sensor with connector[8] REED, changeover (NC: C+NC, NO: C+NO): 058 Hall, PNP normally closed (NC): 059	"Automation package" chapter		001
MF01	–	030	MS2N04-C0BTN	–	–	215	216		000							002
			MS2N04-D0BQN	–	–	219	220									
		032	MSM041B-0300	140	141	–	–									
		033	MS2N05-B0BTN	–	–	223	224									
			MS2N05-C0BTN	–	–	227	228									
			MS2N05-D0BRN	–	–	231	232		090							
RV01 - RV04	1	011	MS2N04-C0BTN	–	–	215	216									
			MS2N04-D0BQN	–	–	219	220									
		035	MS2N05-D0BRN	–	–	231	232		180							003
		017	MSM041B-0300	140	141	–	–									
	1.5	021	MS2N04-B0BTN	–	–	211	212									
			MS2N04-C0BTN	–	–	215	216		270							
			MS2N04-D0BQN	–	–	219	220									
		027	MSM041B-0300	140	141	–	–									
	2	036	MS2N05-B0BTN	–	–	223	224									

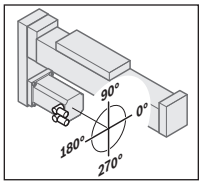
Flange	Motor connector position			
	0°	90°	180°	270°
MF01	000	090 ★	180	270



Example:
Flange MF01
Motor connector position 90°

Belt side drive	Motor connector position			
	0°	90°	180°	270°
RV01	000	–	180	270 ★
RV02	000	090 ★	180	–
RV03	000 ★	090	–	270
RV04	–	090	180 ★	270

★ Standard delivery



Example:
Belt side drive RV01
Motor connector position 180°

Explanation of the order parameters and ordering example ➠ Chapter "Ordering example".

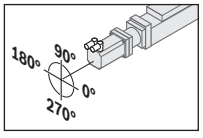
CKK-200

Short product name, length[1] CKK-200-NN-1, ... mm		Guideway			Lubrication[3]	Drive					Carriage						
							BASA d_0 x P (mm)					Connection plate without L_{ca} = (mm)			with L_{ca} = (mm)		
Version		Standard	Centering holes[2]			Screw journal (mm)	32 x 5	32 x 10	32 x 20	32 x 32	SPU number	79.5	254.5	variable[1]	190	305	
Without drive	OA01	001	003	004	LSS	–	050				–	001	011	018	040	041	
					LPG						–	–	311	318	–	341	
Without attachment	OF01				LSS	Ø16 with keyway	011	012	013	014	0	001	011	018	040	041	
											1	002	012	–	–	026	
						Ø16	001	002	003	004	2	003	013	–	–	027	
											3	004	014	–	–	028	
Flange/ coupling	MF01				LPG	Ø16	031	032	033	034	0	–	311	318	–	341	
											1		312			326	
											2	–	313	–	–	327	
											3		314			328	
Belt side drive	RV01				LCF	Ø16	001	002	003	004	0	–	–	–	–	141	
											1					126	
											2					127	
											3					128	
	RV02				LCO	Ø16	001	002	003	004	0	–	–	–	–	241	
											1					226	
											2					227	
											3					228	
	RV03																
	RV04																

1) Length calculation of the linear motion system ➠ "Project planning/calculation" chapter.
2) Centering holes for simple combination with other linear motion systems and connection elements (➠ Dimension drawings).
Option 003: with centering holes and fastening threads in the ground area of the frame; selectable up to length L ≤ 2000 mm
Option 004: with centering holes and long hole in the ground area of the frame; selectable starting from length L ≥ 300 mm up to length L_{max}
3) Lubrication ➠ Chapter "Lubrication".
4) Attachment kit also available without motor. When ordering, enter the motor type "000"!
Attachment kits according to customer specifications ➠ Chapter "Attachment Kits for Motors according to Customer Specifications"
5) Recommended motor, motor data and type designations ➠ Chapter "Motors"
6) Only possible with version Carriage with connection plate L_{ca} = 305 mm;
Switch mounting only possible with magnetic sensor with connector. (It may be necessary to move the mounting brackets for Resist cover)
7) More information ➠ Chapter "Switching system"
8) Assembly contains 1 x sensor, 1 x switch mounting plate including set screws and square nuts as well as 3 x cable holders including set screws
9) Switch configuration with magnetic sensor and mechanical/proximity switch together on one side is not possible.
Assembly contains 1 x sensor, 1 x switch mounting plate including mounting material
10) Switching cam can be attached only in conjunction with connection plate
11) Measurement report: 001 = Standard report; 002 = Measurement of frictional torque; 003 = Lead deviation (➠ Chapter "Documentation")

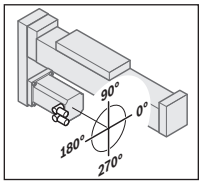
Motor attachment			Motor[5]						Motor connector position	Cover		Resist[6]	Switching system[7]		Automation package		Doc.[11]
				2 cables		1 cable				Cover strip							
		Attachment kit[4]	Motor code	without brake	with brake	without brake	with brake			without	with				Controller	Cable	
OA01 / OF01	-	000	–	000					–	001	002	012	Without		"Automation package" chapter		001
													- Switch - Cable duct - Socket-connector	000			
													Magnetic sensor				
													REED, changeover (NC: C+NC, NO: C+NO)	021			
													Hall, PNP normally closed (NC)	022			
													Hall, PNP normally open (NO)	023			
													Cable duct	025			
													Socket-connector	017			
MF01	–	003	MS2N06-D0BRN	–	–	243	244		000				Magnetic sensor with connector[8]				002
			MS2N06-E0BRN	–	–	251	252										
		004	MS2N07-C0BQN	–	–	259	260						REED, changeover (NC: C+NC, NO: C+NO)	058			
RV01 - RV04	1	027	MS2N06-B1BNN	–	–	235	236		090				Hall, PNP normally closed (NC)	059			
			MS2N06-D1BNN	–	–	247	248		180				Proximity / mechanical switches[9]				
	2	028	MS2N06-C0BTN	–	–	239	240		270				Mechanical	015			003
													Proximity – PNP NC contact	011			
													Proximity – PNP NO contact	013			
													Cable duct	020			
													Switching cam[10] 1	016			
													Switching cam[10] 2	026			
													Socket-connector	017			

Flange	Motor connector position			
	0°	90°	180°	270°
MF01	000	090 ★	180	270



Example:
Flange MF01
Motor connector position 90°

Belt side drive	Motor connector position			
	0°	90°	180°	270°
RV01	000	–	180	270 ★
RV02	000	090 ★	180	–
RV03	000 ★	090	–	270
RV04	–	090	180 ★	270

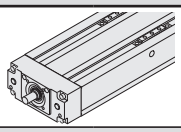
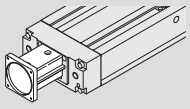
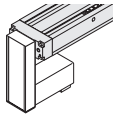
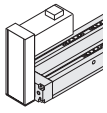
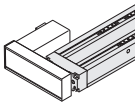
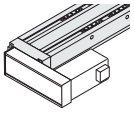


Example:
Belt side drive RV01
Motor connector position 180°

★ Standard delivery

Explanation of the order parameters and ordering example ➠ Chapter "Ordering example".

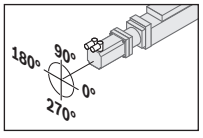
CKK-280

Short product name, length[1] CKK-280-NN-1, ... mm		Guideway			Lubrication[3]	Drive					Carriage						
							BASA d_0 x P (mm)					Connection plate without L_{ca} = 330 mm			with L_{ca} = 375 mm		
													BASA				
Version		Standard	Centering holes[2]			Screw journal (mm)	40 x 5	40 x 10	40 x 20	40 x 40	SPU number	variabel[1]	40 x 5	40 x 10 40 x 20 40 x 40	40 x 5	40 x 10 40 x 20 40 x 40	
Without drive	OF01 	001	003	004	LSS	Ø25	001	002	003	004	0	018	011	011	041	041	
Flange/ coupling	MF01 										1	–	012	032	026	046	
											2	–	013	033	027	047	
											3	–	014	034	028	048	
Belt side drive	RV01 				LPG	Ø25	031	032	033	034	0	318	311	311	341	341	
	RV02 										1	–	312	332	326	346	
	RV03 										2	–	313	333	327	347	
	RV04 										3	–	314	334	328	348	

[1] Length calculation of the linear motion system ➠ "Project planning/calculation" chapter.
[2] Centering holes for simple combination with other linear motion systems and connection elements (➠ Dimension drawings).
Option 003: with centering holes and fastening threads in the ground area of the frame. Selectable up to a length of L ≤ 2000 mm
Option 004: with centering holes and long hole in the ground area of the frame. Selectable up to length L_{max}
[3] Lubrication ➠ Chapter "Lubrication".
[4] Attachment kit also available without motor. When ordering, enter the motor type "000"!
Attachment kits according to customer specifications ➠ Chapter "Attachment Kits for Motors according to Customer Specifications"
[5] Recommended motor, motor data and type designations ➠ Chapter "Motors"
[6] More information ➠ Chapter "Switching system"
[7] Measurement report: 001 = Standard report; 002 = Measurement of frictional torque; 003 = Lead deviation (➠ Chapter "Documentation")

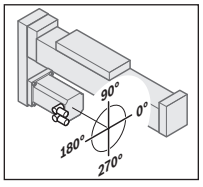
Motor attachment			Motor[5]						Cover		Switching system[6]	Automation package		Doc.[7]
	i =	Attachment kit[4]	Motor code	2 cables: without brake	2 cables: with brake	1 cable: without brake	1 cable: with brake	Motor connector position	Cover strip: without	Cover strip: with		Controller	Cable	
OF01	–	000	–	000				–	001	002	Without: - Switch - Cable duct: 000 Magnetic sensor: Hall, PNP-normally closed (NC): 120; Hall, NPN-normally closed (NC): 121; Hall, PNP-normally open (NO): 122; Hall, NPN-normally open (NO): 123; Cable duct: 020	➠ "Automation package" chapter		001
MF01	–	004	MS2N07-B1BNN	–	–	255	256	000						002
			MS2N07-C1BRN	–	–	263	264							
			MS2N07-D1BNN	–	–	269	270							
RV01 - RV04	1	026	MS2N07-B1BNN	–	–	255	256	090						
			MS2N07-C1BRN	–	–	263	264							
			MS2N07-D1BNN	–	–	269	270	180						
	2	029	MS2N07-B1BNN	–	–	255	256	270						003
			MS2N07-C1BRN	–	–	263	264							
			MS2N07-D1BNN	–	–	269	270							

Flange	Motor connector position			
	0°	90°	180°	270°
MF01	000	090 ★	180	270



Example:
Flange MF01
Motor connector position 90°

Belt side drive	Motor connector position			
	0°	90°	180°	270°
RV01	000	–	180	270 ★
RV02	000	090 ★	180	–
RV03	000 ★	090	–	270
RV04	–	090	180 ★	270



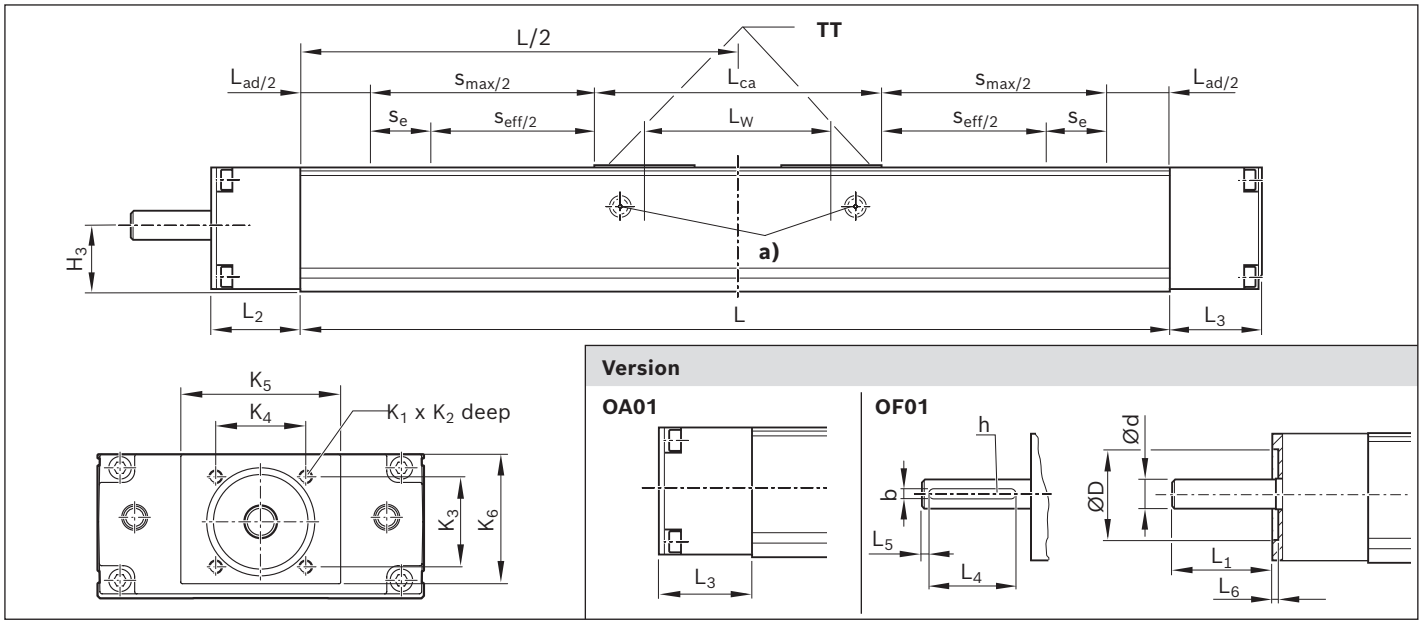
Example:
Belt side drive RV01
Motor connector position 180°

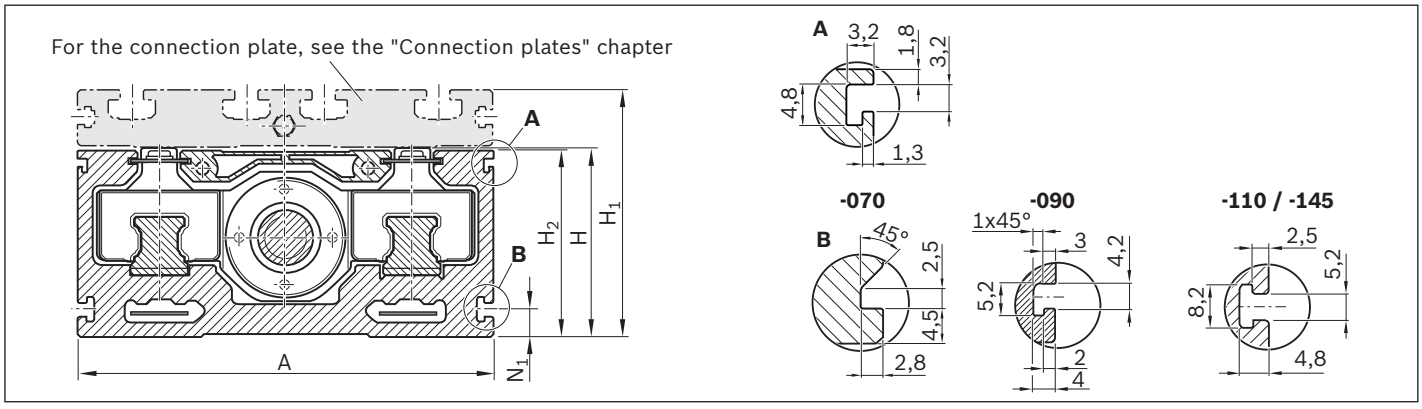
★ Standard delivery

Explanation of the order parameters and ordering example ➠ Chapter "Ordering example".

Dimension drawings

Frame CKK-070/-090/-110/-145



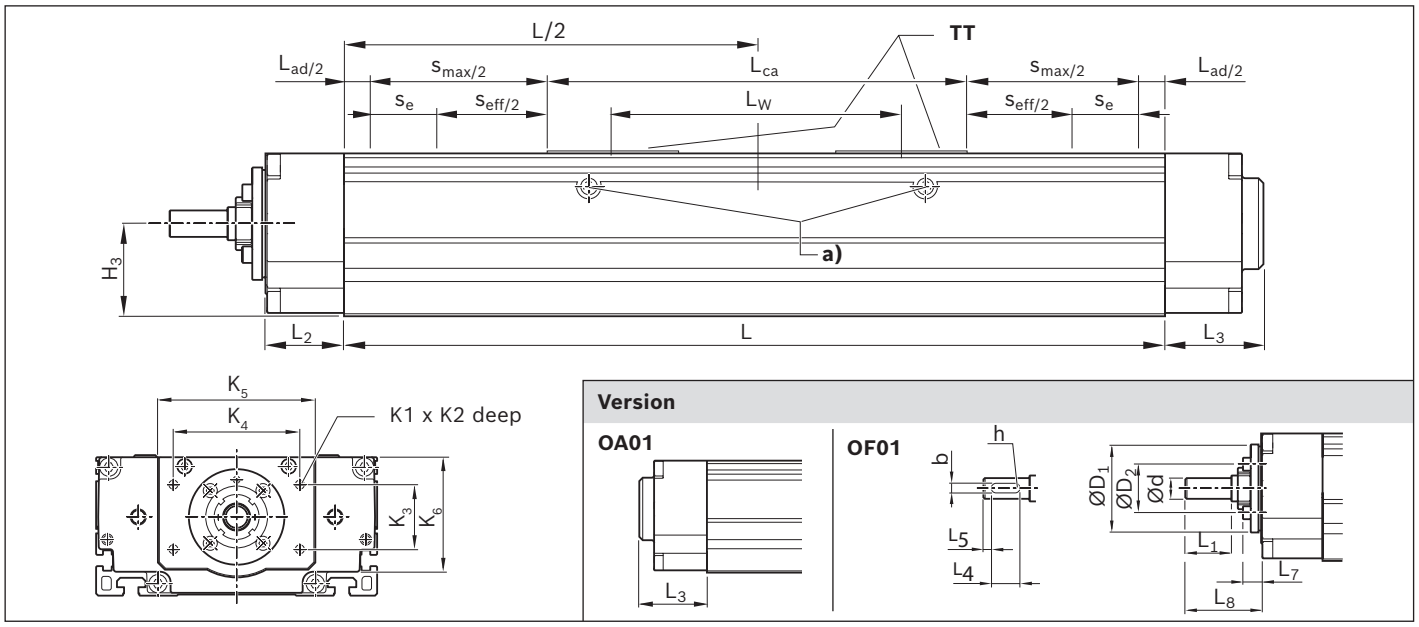


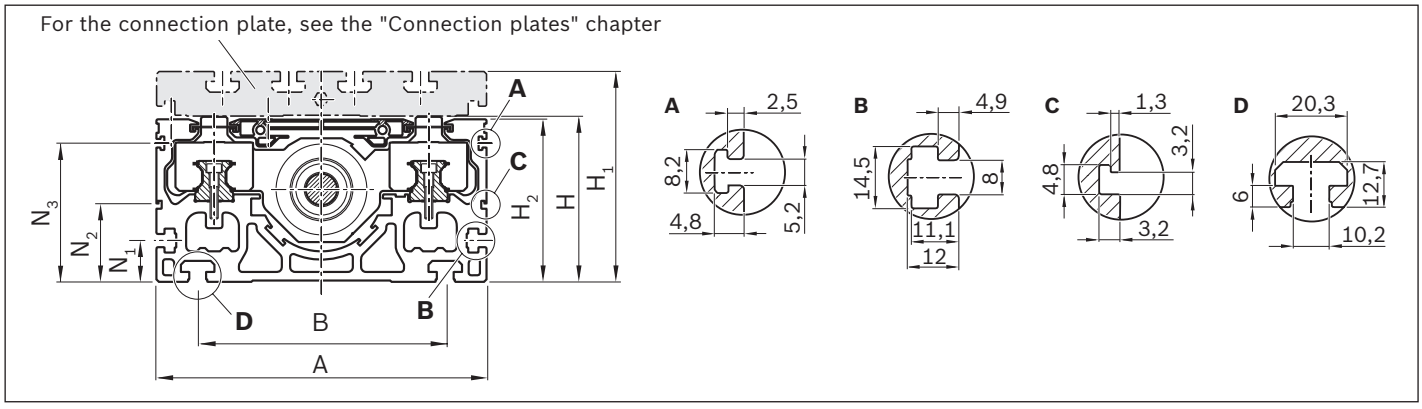
CKK	**Dimensions** (mm)											
	A	**B**	**b^{P9}**	**H**	**H_1**	**H_2**	**H_3**	**h**	**$ØD^{H7}$**	**$ØD_1$ -0.01**	**$ØD_2$**	**$Ød_{h7}$**
-070	70	–	–	32	44.5	31.3	16.0	–	28	–	–	6
-090	90	–	–	40	56.0	39.0	21.0	–	28	–	–	8
-110	110	–	4	50	66.0	49.0	25.5	2.5	40	–	–	11
-145	145	–	5	65	85.0	64.0	34.0	3.0	48	–	–	14
-200	200	150	5	100	127.0	98.5	56.0	3.0	–	68	32	16

a) Lube port on both sides (grease lubrication). ➠ Chapter "Lubrication".

Straightness and flatness tolerance in accordance with DIN EN 12020-2.
Note: all dimensions in mm. Drawings not schematically to scale.
Exact contours and dimensions can be found in the CAD model.
CAD configurator available on the Internet at www.boschrexroth.com "Product configurators".
See following pages for dimension drawings for frames, carriages and motor attachment.
Length calculation of the linear motion system ➠ Chapters "Technical data" and "Project planning/calculation".

Frame CKK-200

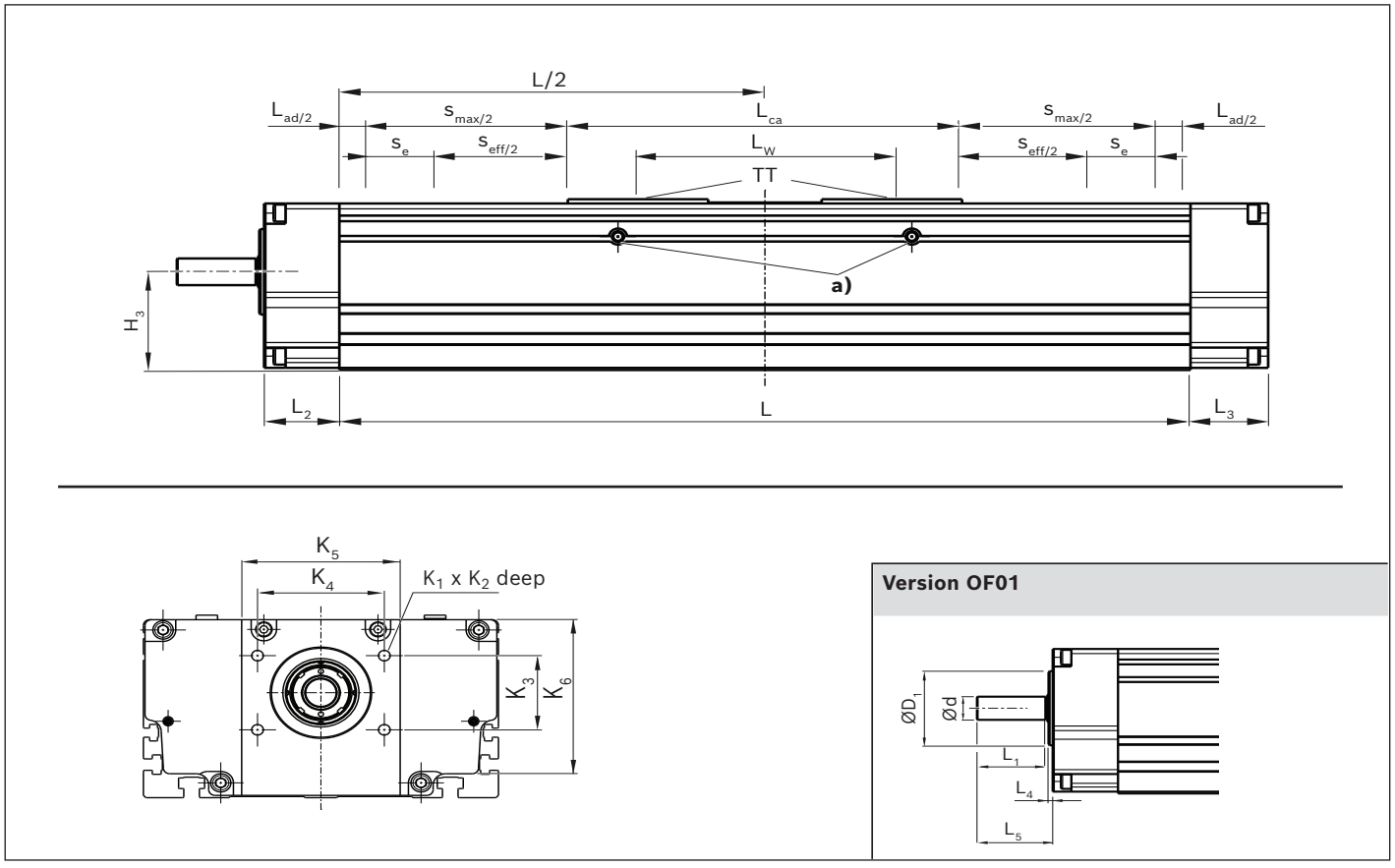




K_1	K_2	K_3	K_4	K_5	K_6	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	N_1	N_2	N_3
M4	8	23	33	44	31.3	18	22.0	29.0	–	–	2.5	–	–	–	–	–
M4	9	29	41	50	39.0	20	32.0	33.5	–	–	2.5	–	–	7.6	–	–
M6	12	28	40	56	49.0	32	36.0	38.0	20	3.0	2.5	–	–	9.5	–	–
M6	12	40	40	71	57.5	44	43.5	45.0	25	10.0	2.5	–	–	9.5	–	–
M8	12	46	90	112	85.5	35	47.5	59.5	28	3.5	–	14	58	25.0	47.5	84

A For switch mounting arrangements
B For mounting with clamping fixtures
C For cable duct
D For fastening with sliding blocks
TT = Carriage

Frame CKK-280

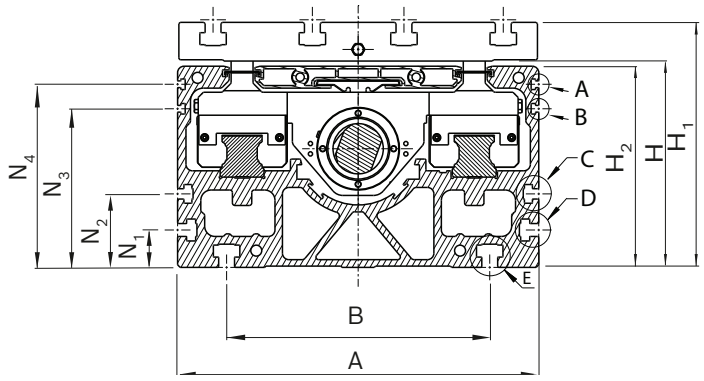


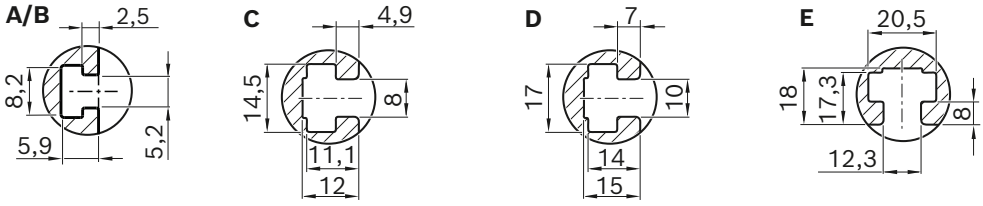
CKK	**Dimensions** (mm)							
	A	**B**	**H**	**H_1**	**H_2**	**H_3**	**$ØD_1$ -0,01**	**$Ød_{h7}$**
-280	280	204	160	190	156	92	80	25

a) Lube port on both sides (grease lubrication). ➠ Chapter "Lubrication".

Straightness and flatness tolerance in accordance with DIN EN 12020-2.
Note: all dimensions in mm. Drawings not schematically to scale.
Exact contours and dimensions can be found in the CAD model.
CAD configurator available on the Internet at www.boschrexroth.com "Product configurators".
See following pages for dimension drawings for frames, carriages and motor attachment.
Length calculation of the linear motion system ➠ Chapters "Technical data" and "Project planning/calculation".

For the connection plate, see the "Connection plates" chapter



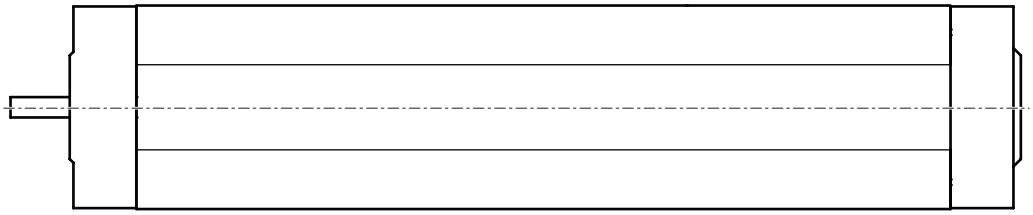


	K_1	K_2	K_3	K_4	K_5	K_6	L_1	L_2	L_3	L_4	L_5	N_1	N_2	N_3	N_4
	M10	20	65	100	125	154.0	68	63	65.0	4	73	29.0	57.0	123	142

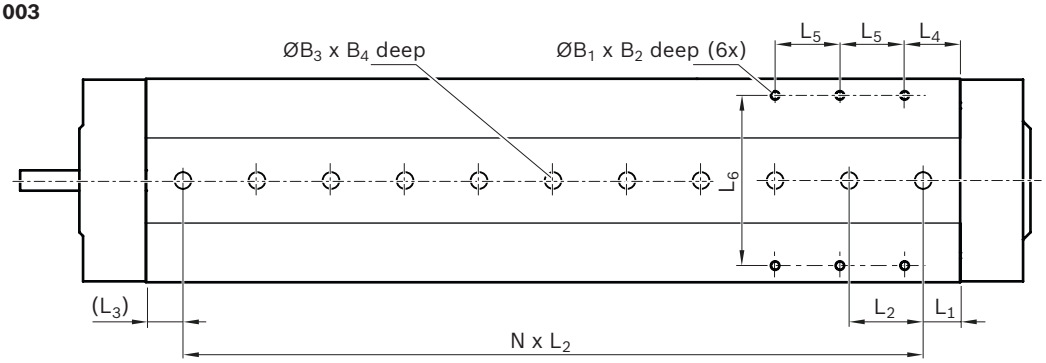
A Usable by customers
B For switch mounting arrangements / cable duct
C Usable by customers
D For mounting with clamping fixtures
E For fastening with sliding blocks
TT = Carriage

Frame CKK-070/-090/-110/-145

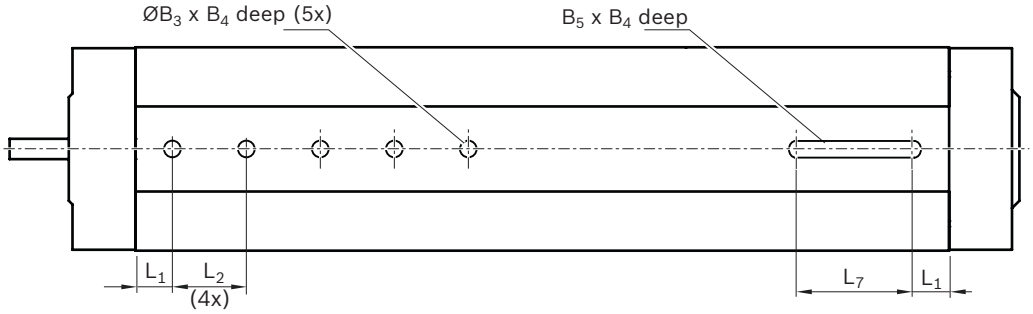
Option 001



Option 003



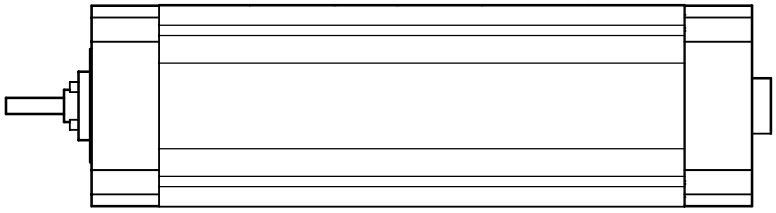
Option 004



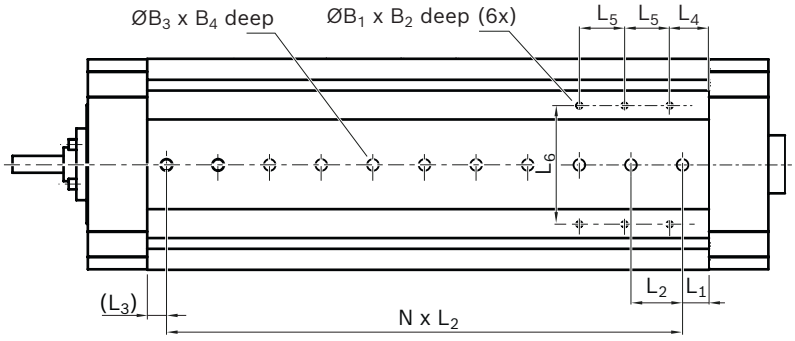
CKK	Option	Dimensions (mm)											
		B_1	B_2	$ØB_3^{H7}$	B_4	$B5^{H8}$	L_1	L_2 ±0.01	L_3 (min)	L_4	L_5	L_6	L_7
-070	003	M3	6	7	1.6	–	20	40	10	15	25	59	–
	004	–	–			7			–	–	–	–	60
-090	003	M4	7.5	9	2.1	–			10	30	35	76	–
	004	–	–			9			–	–	–	–	60
-110	003	M5	9	9	2.1	–			10	30	35	92	–
	004	–	–			9			–	–	–	–	60
-145	003	M6	13	12	2.1	–			10	30	35	124	–
	004	–	–			12			–	–	–	–	60
-200	003	M8	12	16	3.1	–			10	35	40	119	–
	004	–	–			16			–	–	–	–	60
-280	003	M10	15	16	3,1	–			10	35	40	242	–
	004	–	–			16			–	–	–	–	60

Frame CKK-200/-280

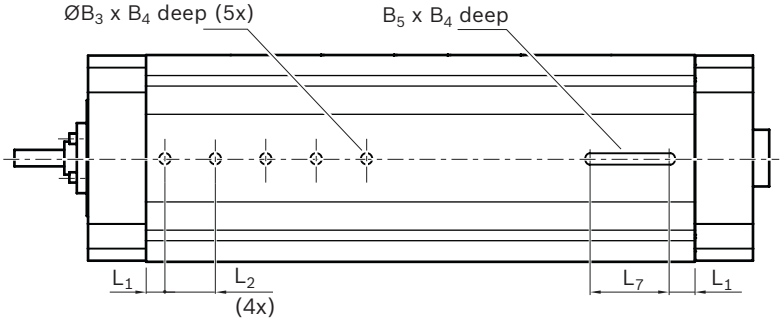
Option 001



Option 003



Option 004



Views from below (ground area)
Option 001 / standard
Option 003 / with centring holes
Option 004 / with centring holes and long hole

Carriages CKK-070/-090/-110/-145/-200/-280

Carriage without connection plate

Fig. 1:
CKK-070/-090/-110/-145/-200

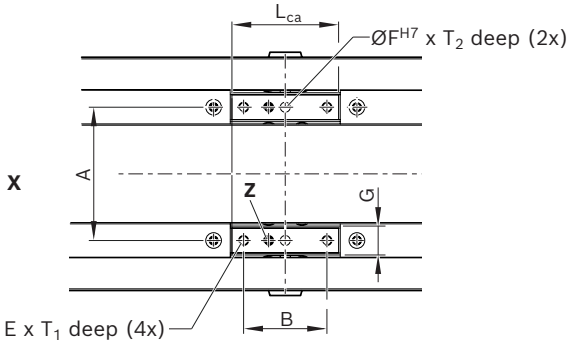


Fig. 2:
CKK-070/-090

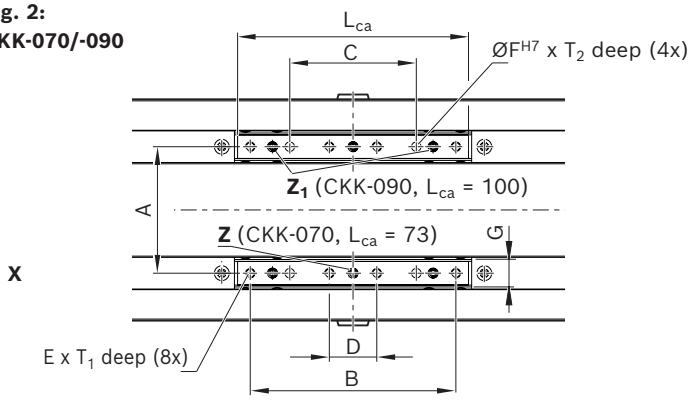
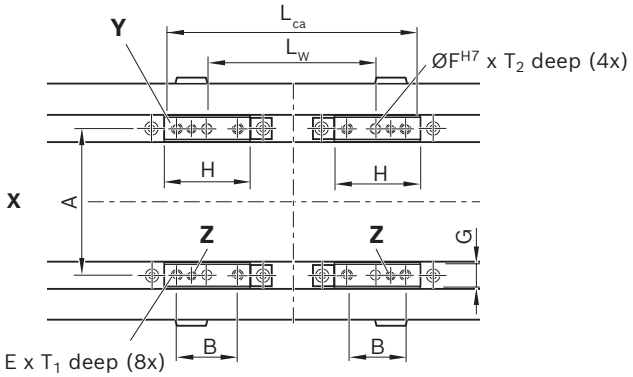
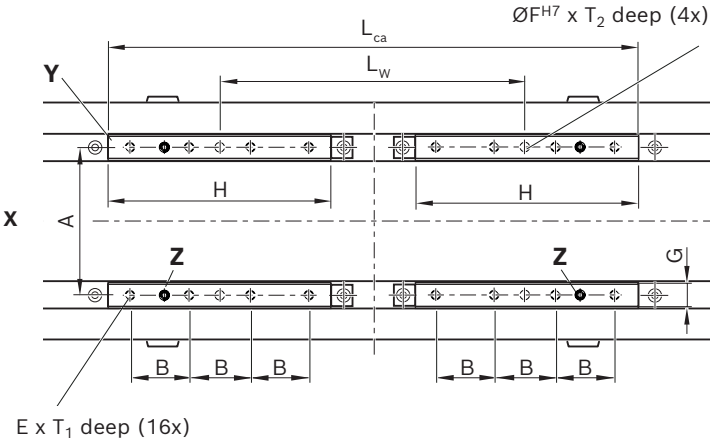


Fig. 3:
CKK-090/-110/-145/-200



CKK-280



X Drive side

Y Drive carriage

Z/Z_1 Lubrication point for grease; sealed with set screw.
Supplementary information for lubrication
➠ Chapter "Lubrication".

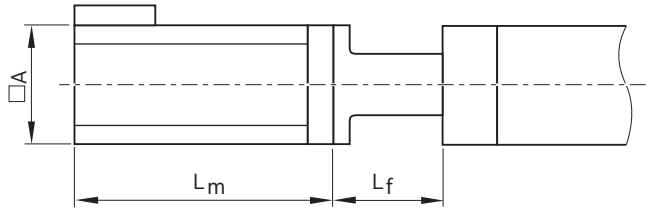
CKK	Figure	**Dimensions** (mm)											
		L_{ca}	L_W	A	B	C	D	E	ØF^{H7}	G	H	T_1	T_2
-070	1	32	–	40	25	–	–	M3	3	7.5	–	5	5
	2	73			65	40	15						
-090	1	35	–	54	27	–	–	M4	4	8.0	35	7	6
	2	100			92	65	38						
	3	variable min. 101 max. 235	min. 66 max. 200		27	–	–						
-110	1	39	–	66	30	–	–	M5	5	10.0	39	10	8
	3	124	85										
	3	variable min. 125 max. 289	min. 86 max. 250										
-145	1	49	–	88	36	–	–	M6	6	12.0	49	12	10
	3	149	100										
	3	variable min. 150 max. 349	min. 101 max. 300										
-200	1	79.5	–	130	60	–	–	M8	8	16.0	79.5	16	12
	3	254.5	175										
	3	variable min. 255.5 max. 429.5	min. 176 max. 350										
-280	3	330	200	180	28	-	-	M8	8	17.0	117,5	16	13
	3	variable min. 331 max. 505	variable min. 201 max. 375										

Carriage with connection plate[1)]

[1)] Dimension drawings ➠ Chapter "Connection plates"

Motor attachment with flange and coupling

Type
MF01

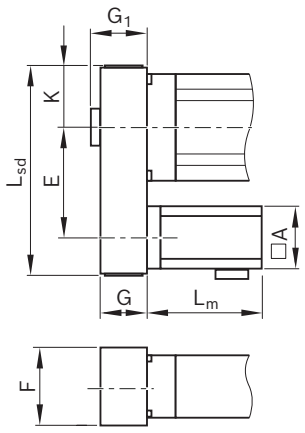


CKK	Motor code	Dimensions (mm) L_f	L_m	□A
-070	MS2N03-B0BYN	50.0		
	MSM031B-0300			
	MSM019B-0300	45.0		
-090	MS2N03-B0BYN	70.0		
	MSM031C-0300	71.5		
-110	MS2N03-B0BYN	75.0		
	MS2N03-D0BYN			
	MS2N04-C0BTN	77.5		
	MS2N04-D0BQN			
	MSM031C-0300	72.0		
	MSM041B-0300	83.0		
-145	MS2N04-C0BTN	85.0	➠ Chapter "Motors"	
	MS2N04-D0BQN			
	MSM041B-0300	90.0		
	MS2N05-B0BTN	95.0		
	MS2N05-C0BTN			
	MS2N05-D0BRN			
-200	MS2N06-D0BRN	125.0		
	MS2N06-E0BRN			
	MS2N07-C0BQN	133.0		
	MS2N07-D0BRN			
-280	MS2N07-B1BNN	140.0		
	MS2N07-C1BRN			
	MS2N07-D1BNN			

Motor attachment with belt side drive

Versions
RV01 – RV04

Example RV04



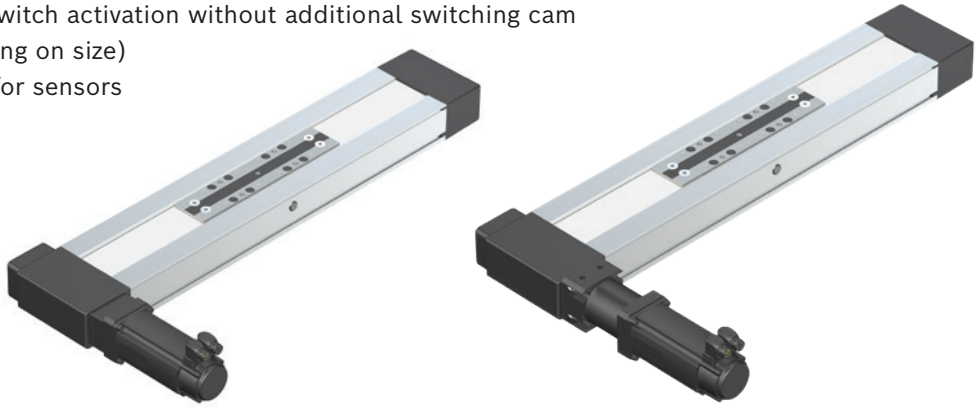
CKK	Motor code	Dimensions (mm)											
				E	F	G	G_1	K			L_{sd}	L_m	□A
		i=1	i=1.5	i=2					i=1	i=1.5	i= 2		
-070	MS2N03-B0BYN	103.5	89.5	–	64.5	37.0	44.0	33.5	179	165	–	➡Chapter "Motors"	
	MSM031B-0300								182	168			
	MSM019B-0300	76.5	76.5	–	48.0	27.5	28.0	27.5	139				
-090	MS2N03-B0BYN	103.5	89.5	–	64.5	37.0	–	33.0	179	165	–		
	MSM031C-0300												
-110	MS2N03-B0BYN	103.5	115.0	–	64.5	37.0	–	33.0	179	191	–		
	MS2N04-B0BTN	–	139.5		88.0	51.0		43.5	–	250			
	MS2N04-C0BTN	145.0	–		88.0	51.0		43.5	250	–			
	MSM031C-0300	103.5	115.0		64.5	37.0		33.0	179	191			
	MSM041B-0300	145.0	139.5		88.0	51.0		43.5	250	250			
-145	MS2N04-B0BTN	–	162.0	–	88.0	51.0	–	43.5	–	267	–		
	MS2N04-C0BTN	157.5	162.0	–	88.0	51.0	–	43.5	267	267	–		
	MS2N04-D0BQN												
	MS2N05-B0BTN	165.0	–	162	116.0	66.0	–	56.0	297	–	297		
	MS2N05-D0BRN												
	MSM041B-0300	157.5	162.0	–	88.0	51.0	–	43.5	267	267	–		
-200	MS2N06-B1BNN	267.5	–	–	116.0	66.0	–	59.0	403	–	–		
	MS2N06-D1BNN												
	MS2N06-C0BTN	–	–	265	116.0	66.0	–	59.0	–	–	403		
-280	MS2N07-B1BNN	260.0	–	253	160.0	90.0	–	77.0	430	–	430		
	MS2N07-C1BRN												
	MS2N07-D1BNN												

Compact modules with toothed belt drive (CKR-070 up to CKR-280)
Product overview

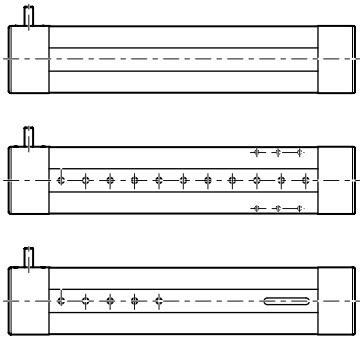
Features
- Six fine-tuned sizes based on a compact precision aluminum profile with two integrated preloaded ball rail systems
- Four different lube versions
- Ready-to-install compact modules in any length up to L_{max}.
- Realization of greater lengths of up to 10,000 mm
- Preloaded toothed belt
- Aluminum carriages available in different lengths
- Intelligent toothed belt guide protects inner components
- Low-cost maintenance
- Repeatability of up to ± 0.05 mm

Further highlights
- Flexible thanks to selectable options
- Centering holes for simple combination with other linear motion systems and connection elements
- Extensive accessories for connection and clamping units
- Nameplate with parameters for easy commissioning

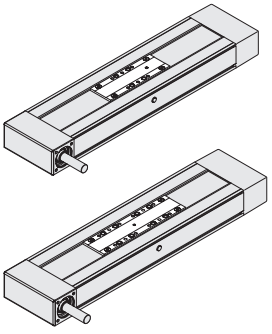
Attachments
- Planetary gear with various gear ratios
- Maintenance-free servo motors with selectable brake and attached feedback
- Switches (magnetic sensors), switch activation without additional switching cam
- Socket and connector (depending on size)
- Cable duct made of aluminum for sensors



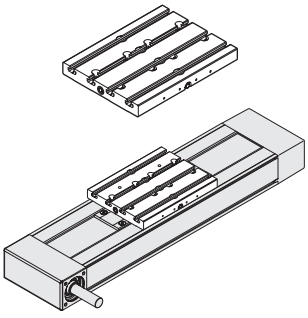
Design/options for guideway (frame), carriages, connection plates



Guideway (frame)



Carriages



Connection plates

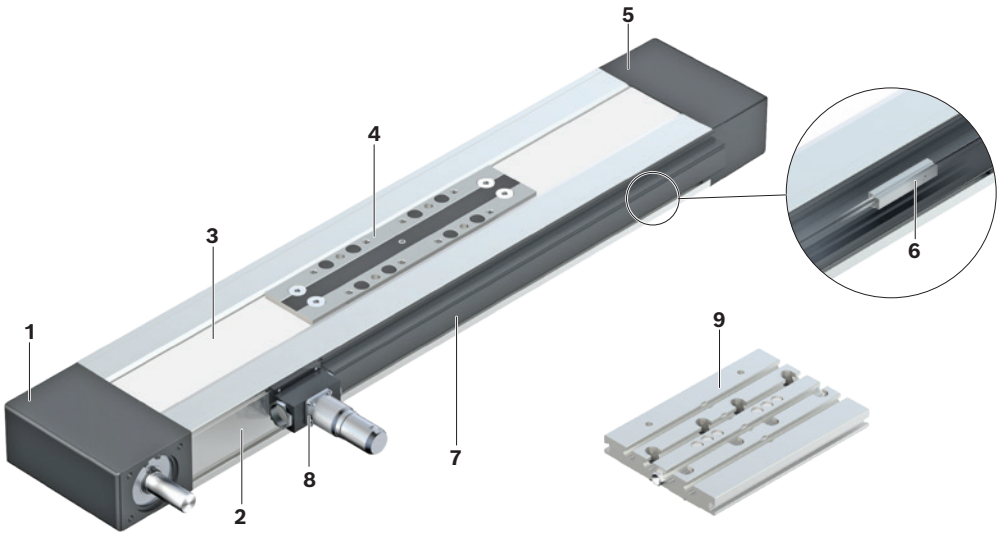
Structural design

Structural design CKR

1 Drive end enclosure
2 Frame
3 Toothed belt drive
4 Carriage
5 Idler end enclosure

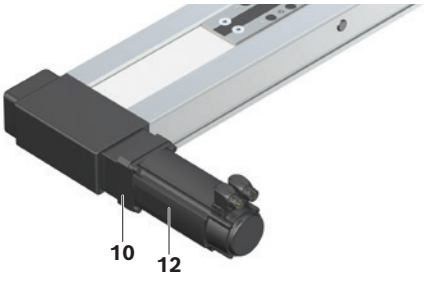
Attachments:

6 Magnetic sensor
7 Cable duct
8 Socket/connector
9 Connection plate
10 Flange
11 Planetary gear
12 Motor



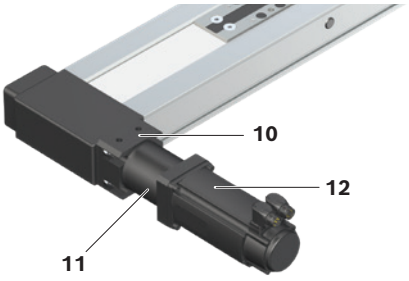
Motor attachment – direct attachment with i = 1 (depending on size)

The motor is attached directly to the compact module's drive end enclosure via a flange.



Motor attachment – with gear (depending on size)

The planetary gear is attached by means of a flange.
The flange serves to fasten the gearbox to the CRK and as a closed housing.
Due to the connection without coupling, the drive torque is transferred to the drive shaft of the compact module in a torsionally stiff manner.
Available gear ratios ➟ "cofiguration, orderring".



Technical data

General technical data

Observe the "Project planning/calculation" chapter.

CKR	Carriage		Additional length		Min. travel range	Max. length	Dynamic characteristic values		
	Connection plate		Connection plate				Load capacities	Load moments	
	without[1]	with[2]	without	with					
	L_{ca} (mm)	L_{ca} (mm)	L_{ad} (mm)	L_{ad} (mm)	s_{min}[3] (mm)	L_{max} (mm)	C_{gw} (N)	M_t (Nm)	M_L (Nm)
-070	80	60	10	30	40	1,500	2,360	47	7
	108	95	10	23			3,830	77	94
-090	102	60	25	67	40	5,500	4,620	125	16
	156	125	25	56			7,505	203	244
-110	170	110	25	85	50	5,500	19,720	651	136
	215	155	25	85			32,035	1,057	1,361
-145	180	125	25	80	60	5,500	46,800	2,059	400
	240	190	25	75			76,025	3,345	3,801
-200	265	190	25	100	80	10,000	74,600	4,849	1,053
	405	305	25	125			121,185	7,877	10,604
-280	485	375	25	135	195	5, 500	216,700	19,500	21,670

Drive data

Observe the "Project planning/calculation" chapter.

CKR	Gearing	Gear ratio	Max. drive torque	Feed constant	Max. speed		Carriage		Moved mass of system	
							Connection plate		Connection plate	
							without	with	without	with
		i (–)	M_P (Nm)	u (mm/rev)	v_{max} (m/s)		L_{ca} (mm)	L_{ca} (mm)	m_{ca} (kg)	m_{ca} (kg)
-070	–	1	3.00	72.00	3.00		80	60	0.12	0.23
	PG040	5	0.62	14.40	1.92					
		10	0.31	7.20	0.96		108	95	0.28	0.45
-090	–	1	8.00	90.00	3.00		102	60	0.32	0.50
	PG050	5	1.65	18.00	3.00					
		10	0.82	9.00	1.50		156	125	0.55	0.92
-110	–	1	13.50	120.00	5.00		170	60	0.52	0.90
	PG050	5	2.72	24.00	4.40					
		10	1.26	12.00	2.20		215	155	0.87	1.45
-145	–	1	32.50	165.00	5.00		180	125	0.99	1.80
	PG070	3	11.00	55.00	5.00					
		5	6.70	33.00	5.00					
		10	3.35	16.50	2.92		240	190	1.67	2.82
-200	–	1	112.70 99.80[6]	250.00	5.00		265	190	2.40	4.60
	PG090	3	38.73	83.33	5.00					
		5	20.62	50.00	5.00					
		10	9.28	25.00	2.92					
	PG120	3	38.73	83.33	5.00		405	305	4.30	7.90
		5	23.24	50.00	5.00					
		10	11.62	25.00	2.50					
-280	ohne	1	300.00	390.00	5.00		485	375	19.48	26.75
	PG115	9	33.00	43.33	3.97					
		12	25.00	32.50	2.98					
		16	18.00	24.38	2.23					

[1] In the "without connection plate" carriage version, carriage length L_{ca} corresponds to the length of the clamping surface.
[2] The connection plate is mounted on the "without connection plate" carriage version.
In the "with connection plate" carriage version, the carriage length corresponds to the length of the connection plate.
[3] Minimum required travel range to ensure a reliable lubrication distribution.
[4] Maximum force that can be transmitted via the teeth meshing with the belt pulley.

Maximum permissible loads						Planar moments of inertia		Point of force application	
Moments			Forces					Connection plate without	with
$M_{x\,max}$ (Nm)	$M_{y\,max}$ (Nm)	$M_{z\,max}$ (Nm)	$F_{y\,max}$ (N)	$F_{z1\,max}$ (N)	$F_{z2\,max}$ (N)	I_y (cm^4)	I_z (cm^4)	Z_1 (mm)	Z_1 (mm)
47	7	7	1,270	2,360	2,360	5.62	51.6	20.0	32.5
77	94	51	2,070	3,830	3,830				
112	16	16	2,490	4,620	4,620	13.49	139.7	24.0	40.0
203	244	132	4,050	7,505	7,505				
198	32	32	3,480	6,000	6,000	36.17	361.0	28.7	44.7
396	510	240	5,650	12,000	12,000				
634	100	100	8,410	14,400	14,400	91.28	1049.0	37.5	57.5
1,267	1,440	683	13,660	28,800	28,800				
1,375	299	299	12,265	21,150	21,150	500.80	4,022.0	45.5	72.5
2,750	3,701	1,744	19,925	42,300	42,300				
5,400	6,000	5,517	55,170	86,685	60,000	2,242.00	15,802.0	78.5	108.5

Constant mass calculation		Constant mass moment of inertia				Friction torque	Belt pulley diameter	Belt type	Max. belt drive transmission force	Belt elasticity limit	Max. acceleration
		Connection plate without	with								
$k_{g\,fix}$ (kg)	$k_{g\,var}$ (kg/mm)	$k_{J\,fix}$ (kg/mm^2)	$k_{J\,fix}$ (kg/mm^2)	$k_{J\,var}$ (kg/mm)	$k_{J\,m}$ (mm^2)	M_{Rs} (Nm)	d_3 (mm)	B_t	F_{bp}[4] (N)	$F_{t\,perm}$[5] (N)	a_{max} (m/s^2)
0.50	0.00284	22.32	36.77	0.0142	131.11	0.23	22.92	25 AT3	260	1,100	50
		43.14	65.46			0.25					
0.70	0.00440	92.45	129.38	0.0320	205.21	0.57	28.65	35 AT3	560	1,600	
		139.64	215.57			0.58					
1.27	0.00739	266.45	405.08	0.1364	364.81	1.04	38.20	50 AT5	705	4,200	
		391.07	602.66			1.42					
2.54	0.01222	1,024.28	1,582.85	0.3172	689.59	1.46	52.52	70 AT5	1,235	4,800	
		1,621.61	2,276.71			2.04					
7.83	0.02328	6,140.67	9,623.81	1.8397	1,583.24	4.55	79.58	100 AT10	2,830	17,000	
		9,020.05	14,719.73			5.69					
30.55	0.04568	97,687.84	125,816.29	6.4648	3,852.68	12.97	124.14	150 AT10	4,867	22,000	

[5] 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 may not be used to calculate the maximum permissible drive torque.
[6] Version with keyway

Gear data

Observe the "Project planning/calculation" chapter.

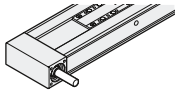
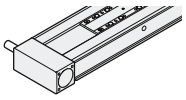
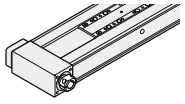
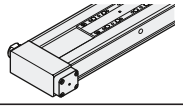
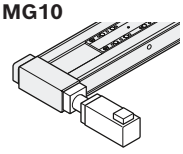
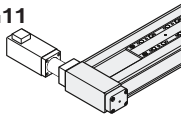
CKR	Gearing Type	Gear ratio i (–)	Max. acceleration torque[1] (at the gear output) M_{ge} (Nm)	Base frictional torque M_{Rge} (Nm)	Max. drive speed n_{ge} (min^{-1})
-070	PG040	5	14	0.06	9.000
		10	13	0.05	9.000
-090	PG050	5	14	0.09	10.000
		10	13	0.08	10.000
-110	PG050	5	14	0.09	10.000
		10	13	0.08	10.000
-145	PG070	3	32	0.24	8.000
		5	40	0.17	8.000
		10	35	0.12	8.000
-200	PG090	3	125	0.38	7.000
		5	100	0.26	
		10	90	0.17	
	PG120	3	200	1.00	6.000
		5	250	0.76	
		10	220	0.58	
-280	PG115	9	305	1.30	5.500
		12		1.10	
		16		0.98	

[1] The limits of the linear motion system must not be exceeded ➠ "Drive data / project planning/calculation".

	Motor	**Mass moment of inertia**	**Weight**
		J_{ge} (kgm²)	m_{ge} (kg)
	MS2N03-B	0.0000040	0.50
	MSM019-B		
	MS2N03-B	0.0000030	
	MSM019-B		
	MS2N03-B	0.0000030	0.70
	MS2N03-D	0.0000050	0.70
	MSM031-C	0.0000130	1.20
	MS2N03-B	0.0000020	0.70
	MS2N03-D	0.0000040	0.70
	MSM031-C	0.0000130	1.20
	MS2N03-B	0.0000030	0.70
	MS2N03-D	0.0000050	0.70
	MS2N04	0.0000130	1.20
	MSM031-C	0.0000130	1.20
	MS2N03-B	0.0000020	0.70
	MS2N03-D	0.0000040	0.70
	MS2N04	0.0000130	1.20
	MSM031-C	0.0000130	1.20
	MS2N04	0.0000320	1.90
	MS2N05	0.0000530	3.00
	MSM041-B	0.0000530	3.00
	MS2N04	0.0000270	1.90
	MS2N05	0.0000460	3.00
	MSM041-B	0.0000460	3.00
	MS2N04	0.0000220	1.90
	MS2N05	0.0000430	3.00
	MSM041-B	0.0000430	3.00
	MS2N06	0.0001800	4.70
		0.0001600	
		0.0001500	
	MS2N07	0.0007200	9.40
		0.0005900	
		0.0005400	
	MS2N07	0.0008000	9.60
		0.0007800	
		0.0007900	

Configuration, order

CKR-070

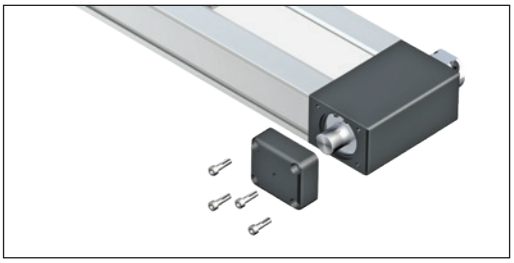
Short product name, length[1] CKR-070-NN-1, ... mm		Guideway			Drive		Lubrication[3]	Carriage				
								Connection plate				
								without		with		
								L_{ca} = (mm)		L_{ca} = (mm)		
Version		Standard	Centering holes[2]		i = 1 without keyway	for gear unit[4]		80	108	60	95	
Drive journal	MA01 	001	003	004	001	–	LSS	001	002	040	041	
Drive journal	MA02 				002							
Clamping hub	MA05 				006							
Clamping hub	MA06 				007							
Gear attachment	MG10 				–	008	LPG	–	302	–	341	
Gear attachment	MG11 				–	009						

[1] Length calculation of the linear motion system ➠ "Project planning/calculation" chapter.
[2] Centering holes for simple combination with other linear motion systems and connection elements (➠ Dimension drawings).
Option 003: with centering holes and fastening threads in the ground area of the frame.
Option 004: with centering holes and long hole in the ground area of the frame. Selectable starting from length L ≥ 300 mm up to length L_{max}
[3] Lubrication ➠ Chapter "Lubrication".
[4] Attachment kit for gear attachment
[5] 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 position of motor connector).
[6] Recommended motor, motor data and type designations ➠ Chapter "Motors"
[7] More information ➠ Chapter "Switching system".
[8] Assembly contains 1 x sensor, 1 x switch mounting plate including set screws and square nuts as well as 3 x cable holders including set screws
[9] Measurement report: 001 = Standard report; 002 = Measurement of frictional torque; (➠ Chapter "Documentation")
[10] Motor attachment consisting of: Adapter flange for gear unit, however "without gear unit". No motor connector position selectable.

	Motor attachment[5]			Motor[6]						Switching system[7]	Automation package		Doc.[9]
	Direct drive	Gear unit			2 cables		1 cable				Controller	Cable	
	i = 1	i = 5	i = 10	Motor code	without brake	with brake	without brake	with brake	Motor connector position				
MA01 / MA02 / MA05 / MA06	000			000						Without - Switch - Cable duct - Socket-connector: 000 Magnetic sensor REED, changeover (NC: C+NC, NO: C+NO): 021 Hall, PNP normally closed (NC): 022 Hall, PNP normally open (NO): 023 Cable duct: 025 Socket-connector: 017 Magnetic sensor with connector[8] REED, changeover (NC: C+NC, NO: C+NO): 058 Hall, PNP normally closed (NC): 059	➠ "Automation package" chapter		001
MG10 / MG11	–	000[10]		000									002
		011	012	MS2N03-B0BYN	–	–	203	204	000 090 180 270				
		023	024	MSM019B-0300	134	135	–	–					

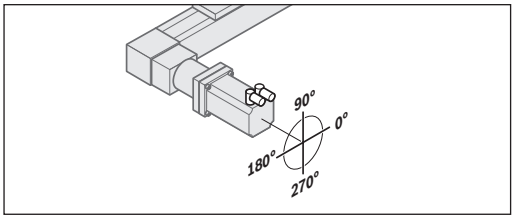
Drive end enclosure with additional drive journal

In the versions MA05, MA06, MG10 and MG11, a second drive journal can be made available by removing the screws and cover.



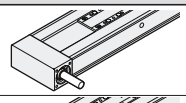
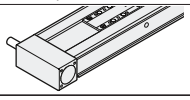
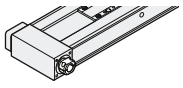
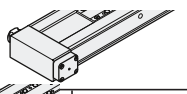
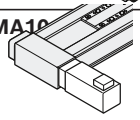
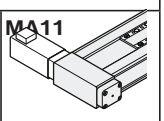
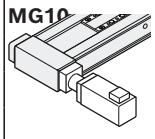
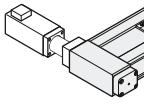
Version	Motor connector position			
	0°	90°	180°	270°
MG10 / MG11	000	090 ★	180	270

★ Standard delivery



Explanation of the order parameters and ordering example ➠ Chapter "Ordering example".

CKR-090

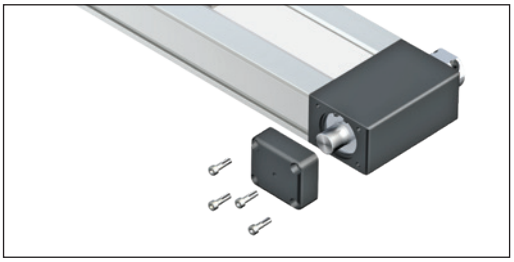
Short product name, length[1] CKR-090-NN-1, ... mm		Guideway			Drive			Lubrication[3]	Carriage				
									Connection plate without		with		
									L_{ca} = (mm)		L_{ca} = (mm)		
Version		Standard	Centering holes[2]		without keyway i = 1	with keyway i = 1	for gear unit[4]		102	156	60	125	
Drive journal	MA01 	001	003	004	001	003	–	LSS	001	002	040	041	
	MA02 												
Clamping hub	MA05 				006	–		LPG	–	302	–	341	
	MA06 												
Direct attachment	MA10  MA11 				006	–	–	LCF	–			141	
Gear attachment	MG10  MG11 				–	–	008	LCO	–			241	

[1] Length calculation of the linear motion system ➠ "Project planning/calculation" chapter.
[2] Centering holes for simple combination with other linear motion systems and connection elements (➠ Dimension drawings).
Option 003: with centering holes and fastening threads in the ground area of the frame. Selectable up to a length of L ≤ 2000 mm
Option 004: with centering holes and long hole in the ground area of the frame. Selectable starting from length L ≥ 300 mm up to length L_{max}
[3] Lubrication ➠ Chapter "Lubrication".
[4] Attachment kit for gear attachment
[5] 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 position of motor connector).
[6] Recommended motor, motor data and type designations ➠ Chapter "Motors"
[7] More information ➠ Chapter "Switching system".
[8] Assembly contains 1 x sensor, 1 x switch mounting plate including set screws and square nuts as well as 3 x cable holders including set screws
[9] Measurement report: 001 = Standard report; 002 = Measurement of frictional torque; (➠ Chapter "Documentation")
[10] Motor attachment consisting of: Adapter flange for gear unit, however "without gear unit". No motor connector position selectable.

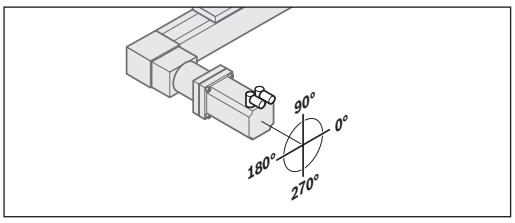
	Motor attachment[5]			Motor[6]						Switching system[7]	Automation package		Doc.[9]
		Direct drive	Gear unit		2 cables		1 cable				Controller	Cable	
		i = 1	i = 5	i = 10	Motor code	without brake	with brake	without brake	with brake	Motor connector position			
	MA01 / MA02 / MA05 / MA06	000			000						Without - Switch - Cable duct - Socket-connector: 000 Magnetic sensor REED, changeover (NC: C+NC, NO: C+NO): 021 Hall, PNP normally closed (NC): 022 Hall, PNP normally open (NO): 023 Cable duct: 025 Socket-connector: 017 Magnetic sensor with connector[8] REED, changeover (NC: C+NC, NO: C+NO): 058 Hall, PNP normally closed (NC): 059	"Automation package" chapter		001
	MA10 / MA11	001	–		MS2N04-D0BQN	–	–	219	220	000 090			002
	MG10 / MG11	–	000[10]		000								
			015	016	MS2N03-B0BYN	–	–	203	204	180			
			013	014	MS2N03-D0BYN	–	–	207	208				
			033	034	MSM031C-0300	138	139	–	–	270			

Drive end enclosure with additional drive journal

In the versions MA05, MA06, MA10, MA11, MG10 and MG11, a second drive journal can be made available by removing the screws and cover.



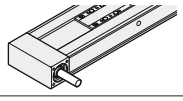
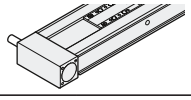
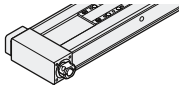
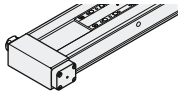
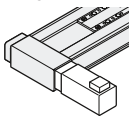
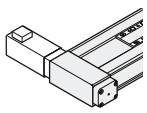
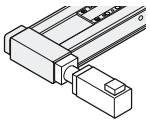
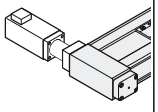
Version	Motor connector position			
	0°	90°	180°	270°
MA10 / MA11 MG10 / MG11	000	090 ★	180	270



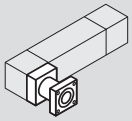
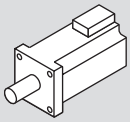
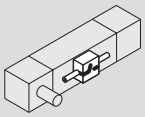
★ Standard delivery

Explanation of the order parameters and ordering example ➠ Chapter "Ordering example".

CKR-110

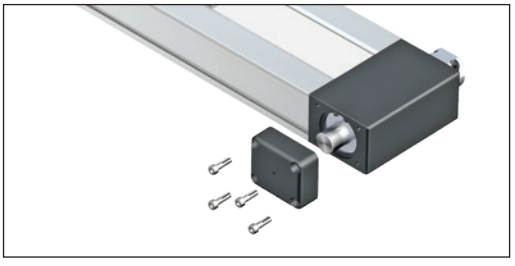
Short product name, length[1] CKR-110-NN-1, ... mm		Guideway			Drive			Lubrication[3]	Carriage				
									Connection plate without L_{ca} = (mm)		with L_{ca} = (mm)		
Version		Standard	Centering holes[2]		without keyway i = 1	with keyway i = 1	for gear unit[4]		170	215	110	155	
Drive journal	MA01 	001	003	004	001	003	–	LSS	001	002	040	041	
	MA02 												
Clamping hub	MA05 				006	–		LPG	–	302	–	341	
	MA06 												
Direct attachment	MA10 				006	–	–	LCF	–			141	
	MA11 												
Gear attachment	MG10 				–	–	008	LCO	–			241	
	MG11 												

[1] Length calculation of the linear motion system ➠ "Project planning/calculation" chapter.
[2] Centering holes for simple combination with other linear motion systems and connection elements (➠ Dimension drawings).
Option 003: with centering holes and fastening threads in the ground area of the frame. Selectable up to a length of L ≤ 2000 mm
Option 004: with centering holes and long hole in the ground area of the frame. Selectable starting from length L ≥ 300 mm up to length L_{max}
[3] Lubrication ➠ Chapter "Lubrication".
[4] Attachment kit for gear attachment
[5] 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 position of motor connector).
[6] Recommended motor, motor data and type designations ➠ Chapter "Motors"
[7] More information ➠ Chapter "Switching system".
[8] Assembly contains 1 x sensor, 1 x switch mounting plate including set screws and square nuts as well as 3 x cable holders including set screws
[9] Measurement report: 001 = Standard report; 002 = Measurement of frictional torque; (➠ Chapter "Documentation")
[10] Motor attachment consisting of: Adapter flange for gear unit, however "without gear unit". No motor connector position selectable.

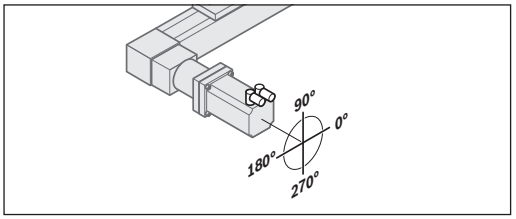
	Motor attachment[5]			Motor[6]						Switching system[7]	Automation package		Doc.[9]
													
	Direct drive	Gear unit			2 cables		1 cable				Controller	Cable	
	i = 1	i = 5	i = 10	Motor code	without brake	with brake	without brake	with brake	Motor connector position				
MA01 / MA02 / MA05 / MA06	000			000						Without - Switch - Cable duct - Socket-connector: 000 Magnetic sensor REED, changeover (NC: C+NC, NO: C+NO): 021 Hall, PNP normally closed (NC): 022 Hall, PNP normally open (NO): 023 Cable duct: 025 Socket-connector: 017 Magnetic sensor with connector[8] REED, changeover (NC: C+NC, NO: C+NO): 058 Hall, PNP normally closed (NC): 059	"Automation package" chapter		001
MA10 / MA11	001	–		MS2N05-D0BRN	–	–	231	232	000 090 180 270				002
MG10 / MG11	–	000[10]		000									
		015	016	MS2N03-B0BYN	–	–	203	204					
		013	014	MS2N03-D0BYN	–	–	207	208					
		023	024	MS2N04-B0BTN	–	–	211	212					
				MS2N04-C0BTN	–	–	215	216					
		033	34	MSM031C-0300	138	139	–	–					

Drive end enclosure with additional drive journal

In the versions MA05, MA06, MA10, MA11, MG10 and MG11, a second drive journal can be made available by removing the screws and cover.



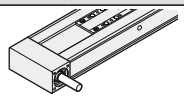
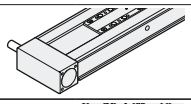
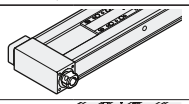
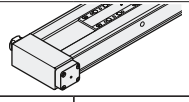
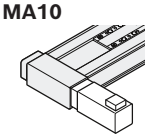
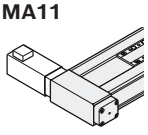
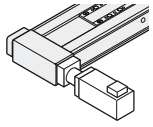
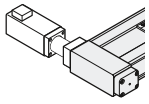
Version	Motor connector position			
	0°	90°	180°	270°
MA10 / MA11 MG10 / MG11	000	090 ★	180	270



★ Standard delivery

Explanation of the order parameters and ordering example ➠ Chapter "Ordering example".

CKR-145

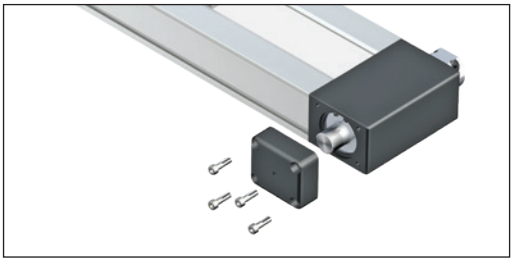
Short product name, length[1] CKR-145-NN-1, ... mm			Guideway			Drive			Lubrication[3]		Carriage				
											Connection plate without L_{ca} = (mm)		with L_{ca} = (mm)		
Version			Standard	Centering holes[2]		without keyway i = 1	with keyway i = 1	for gear unit[4]			180	240	125	190	
Drive journal	MA01		001	003	004	001	003	–		LSS	001	002	040	041	
	MA02														
Clamping hub	MA05					006	–	–		LPG	–	302	–	341	
	MA06														
Direct attachment	MA10					006	–	–		LCF	–			141	
	MA11														
Gear attachment	MG10					–	–	008		LCO	–			241	
	MG11														

[1] Length calculation of the linear motion system ➠ "Project planning/calculation" chapter.
[2] Centering holes for simple combination with other linear motion systems and connection elements (➠ Dimension drawings).
Option 003: with centering holes and fastening threads in the ground area of the frame. Selectable up to a length of L ≤ 2000 mm
Option 004: with centering holes and long hole in the ground area of the frame. Selectable starting from length L ≥ 300 mm up to length L_{max}
[3] Lubrication ➠ Chapter "Lubrication".
[4] Attachment kit for gear attachment
[5] 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 position of motor connector).
[6] Recommended motor, motor data and type designations ➠ Chapter "Motors"
[7] More information ➠ Chapter "Switching system".
[8] Assembly contains 1 x sensor, 1 x switch mounting plate including set screws and square nuts as well as 3 x cable holders including set screws
[9] Measurement report: 001 = Standard report; 002 = Measurement of frictional torque; (➠ Chapter "Documentation")
[10] Motor attachment consisting of: Adapter flange for gear unit, however "without gear unit". No motor connector position selectable.

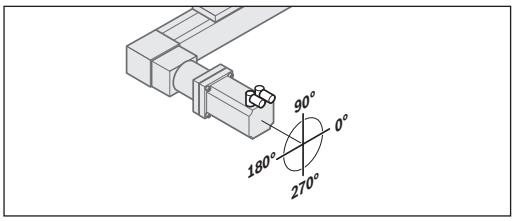
	Motor attachment[5]				Motor[6]						Switching system[7]	Auto-mation package	Doc.[9]
		Direct drive i = 1	Gear unit i = 3	Gear unit i = 5	Gear unit i = 10	Motor code	2 cables without brake	2 cables with brake	1 cable without brake	1 cable with brake	Motor connector position		Controller / Cable	
	MA01 / MA02 / MA05 / MA06	000				000						Without - Switch - Cable duct - Socket-connector: 000 Magnetic sensor REED, changeover (NC: C+NC, NO: C+NO): 021 Hall, PNP normally closed (NC): 022 Hall, PNP normally open (NO): 023 Cable duct: 025 Socket-connector: 017 Magnetic sensor with connector[8] REED, changeover (NC: C+NC, NO: C+NO): 058 Hall, PNP normally closed (NC): 059	➠ "Automation package" chapter	001
	MA10 / MA11	001	–	–	–	MS2N06-D1BNN	–	–	247	248	000			002
											090			
	MG10 / MG11	–	000[10]			000								
			013	014	015	MS2N04-C0BTN	–	–	215	216	180			
						MS2N04-D0BQN	–	–	219	220				
			043	044	045	MS2N05-B0BTN	–	–	223	224				
						MS2N05-C0BTN	–	–	227	228	270			
						MS2N05-D0BRN	–	–	231	232				
			033	034	035	MSM041B-0300	140	141	–	–				

Drive end enclosure with additional drive journal

In the versions MA05, MA06, MA10, MA11, MG10 and MG11, a second drive journal can be made available by removing the screws and cover.



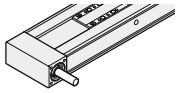
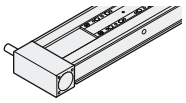
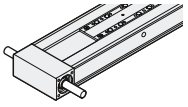
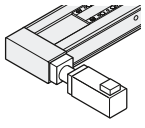
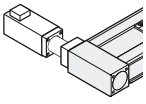
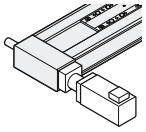
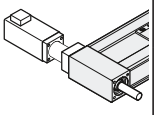
Version	Motor connector position			
	0°	90°	180°	270°
MA10 / MA11 MG10 / MG11	000	090 ★	180	270



★ Standard delivery

Explanation of the order parameters and ordering example ➠ Chapter "Ordering example".

CKR-200

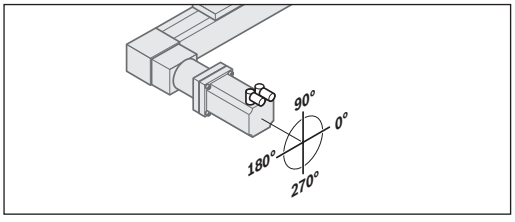
Short product name, length[1] CKR-200-NN-1, ... mm			Guideway			Drive			Lubrication[3]	Carriage				
				Centering holes[2]						Connection plate without		with		
										L_{ca} = (mm)		L_{ca} = (mm)		
Version			Standard			without keyway i = 1	with keyway i = 1	for gear unit[4]		265	405	190	305	
Drive journal	MA01		001	003	004	001	003	–	LSS	001	002	040	041	
	MA02													
	MA03					002	004		LPG	–	302	–	341	
Gear attachment	MG01					–	–	PG090 010	LCF	–			141	
	MG02							PG120 012						
	MG03					–	–	PG090 011	LCO	–			241	
	MG04							PG120 013						

[1] Length calculation of the linear motion system ➠ "Project planning/calculation" chapter.
[2] Centering holes for simple combination with other linear motion systems and connection elements (➠ Dimension drawings).
Option 003: with centering holes and fastening threads in the ground area of the frame. Selectable up to a length of L ≤ 2000 mm
Option 004: with centering holes and long hole in the ground area of the frame. Selectable up to a length of L ≤ 5500 mm
[3] Lubrication ➠ Chapter "Lubrication".
[4] Attachment kit for gear attachment
[5] 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 position of motor connector).
[6] Recommended motor, motor data and type designations ➠ Chapter "Motors"
[7] More information ➠ Chapter "Switching system".
[8] Assembly contains 1 x sensor, 1 x switch mounting plate including set screws and square nuts as well as 3 x cable holders including set screws
[9] Switch configuration with magnetic sensor and mechanical/proximity switch together on one side is not possible.
Assembly contains 1 x sensor, 1 x switch mounting plate including mounting material
[10] Switching cam can be attached only in conjunction with connection plate
[11] Measurement report: 001 = Standard report; 002 = Measurement of frictional torque; (➠ Chapter "Documentation")
[12] Motor attachment consisting of: Adapter flange for gear unit, however "without gear unit". No motor connector position selectable.

	Motor attachment[5]				Motor[6]						Switching system[7]	Auto-mation package	Doc.[11]
			Gear unit			2 cables		1 cable					
			i = 3	i = 5	i = 10	Motor code	without brake	with brake	without brake	with brake	Motor connector position		Controller / Cable	
	MA01 / MA02 / MA03		000			000						Without - Switch - Cable duct - Socket-connector: 000 Magnetic sensor REED, changeover (NC: C+NC, NO: C+NO): 021 Hall, PNP normally closed (NC): 022 Hall, PNP normally open (NO): 023 Cable duct: 025 Socket-connector: 017	"Automation package" chapter	001
	MG01 / MG02 / MG03 / MG04	–	000[12]			000						Magnetic sensor with connector[8] REED, changeover (NC: C+NC, NO: C+NO): 058 Hall, PNP normally closed (NC): 059 Proximity / mechanical switches[9] Mechanical: 015 Proximity – PNP NC contact: 011 Proximity – PNP NO contact: 013 Cable duct: 020 Switching cam[10] 1: 016 Switching cam[10] 2: 026 Socket-connector: 017	"Automation package" chapter	001
		PG090	043	044	045	MS2N06-D1BNN	–	–	247	248	000			
		PG120	033	034	035	MS2N07-B1BNN	–	–	255	256	090			002
						MS2N07-C1BRN	–	–	263	264	180			
						MS2N07-D1BNN	–	–	269	270	270			

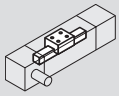
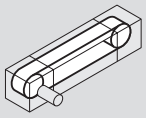
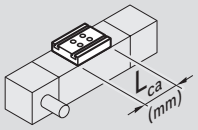
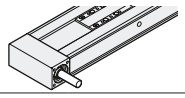
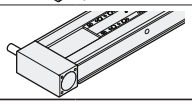
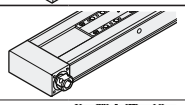
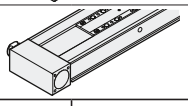
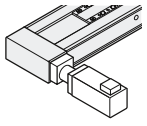
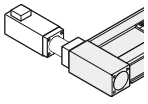
Version	Motor connector position			
	0°	90°	180°	270°
MG01-MG04	000	090 ★	180	270

★ Standard delivery



Explanation of the order parameters and ordering example ➠ Chapter "Ordering example".

CKR-280

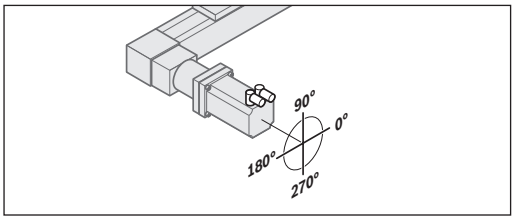
Short product name, length[1] CKR-280-NN-1, ... mm			Guideway			Drive		Lubrication[3]	Carriage	
										
									Connection plate without	with
Version			Standard	Centering holes[2]		i = 1 without keyway	for gear unit[4]		L_{ca} = (mm)	L_{ca} = (mm)
									485	375
Drive journal	MA01		001	003	004	001	–	LSS	002	041
	MA02									
Clamping hub	MA07					007	–			
	MA08									
Gear attachment	MG01					–	010	LPG	302	341
	MG02									

[1] Length calculation of the linear motion system ➠ "Project planning/calculation" chapter.
[2] Centering holes for simple combination with other linear motion systems and connection elements (➠ Dimension drawings).
Option 003: with centering holes and fastening threads in the ground area of the frame. Selectable up to a length of L ≤ 2000 mm
Option 004: with centering holes and long hole in the ground area of the frame. Selectable up to length L_{max}
[3] Lubrication ➠ Chapter "Lubrication".
[4] Attachment kit for gear attachment
[5] 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 position of motor connector).
[6] Recommended motor, motor data and type designations ➠ Chapter "Motors"
[7] More information ➠ Chapter "Switching system".
[8] Measurement report: 001 = Standard report; 002 = Measurement of frictional torque; (➠ Chapter "Documentation")
[9] Motor attachment consisting of: Adapter flange for gear unit, however "without gear unit". No motor connector position selectable.

	Motor attachment[5]			Motor[6]						Switching system[7]	Auto-mation package	Doc.[8]
	Gear unit				2 cables		1 cable		Motor connector position		Controller	
	i = 9	i = 12	i = 16	Motor code	without brake	with brake	without brake	with brake			Cable	
MA01 / MA02 / MA07 / MA08	000			000						Without - Switch - Cable duct: 000 Magnetic sensor Hall, PNP-normally closed (NC): 120 Hall, NPN-normally closed (NC): 121 Hall, PNP-normally open (NO): 122 Hall, NPN-normally open (NO): 123 Cable duct: 020	➠ "Automation package" chapter	001
MG02 / MG01	000[9]			000					000			002
	013	014	015	MS2N07-B1BNN	–	–	255	256	090			
				MS2N07-C1BRN	–	–	263	264	180			
				MS2N07-D1BNN	–	–	269	270	270			

Version	Motor connector position			
	0°	90°	180°	270°
MG01-MG02	000	090 ★	180	270

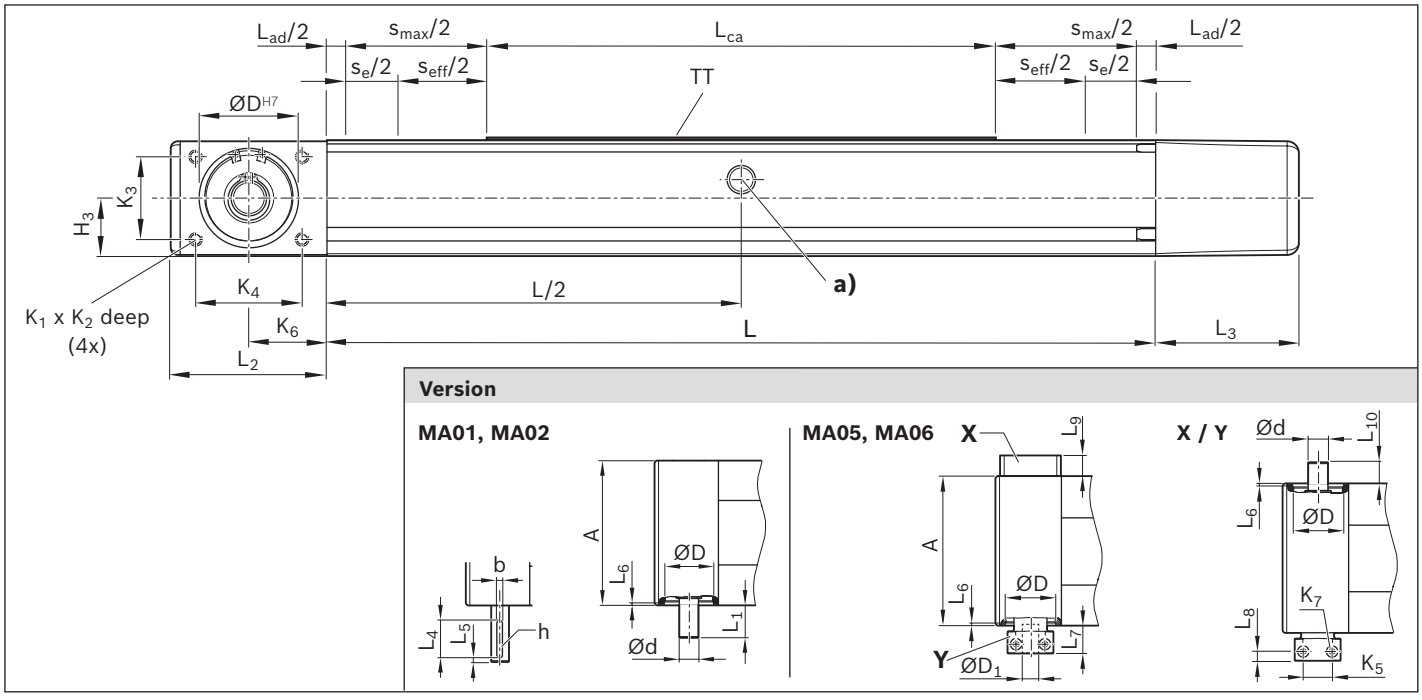
★ Standard delivery

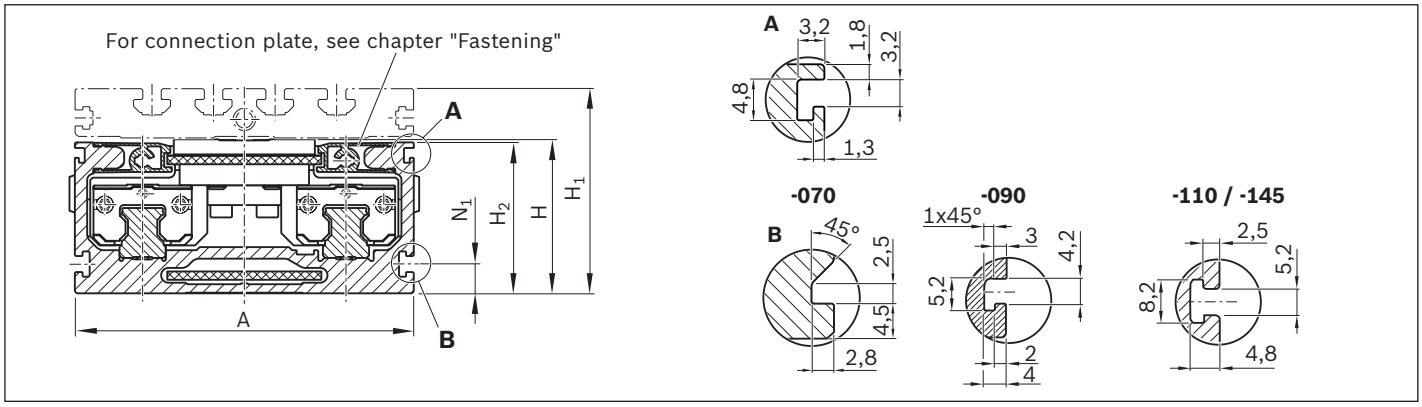


Explanation of the order parameters and ordering example ➠ Chapter "Ordering example".

Dimension drawings

Frame CKR-070/-090/-110/-145





CKR	Dimensions (mm)														
	A	B	b^{P9}	H	H_1	H_2	H_3	h	ØD H7	$ØD_1$ [1] H7	deep	h7	Ød h6	K_1	K_2
-070	70	–	–	32	44.5	31.3	16.30	–	26.5	10	12	8	–	M3	6
-090	90	–	3	40	56.0	39.0	19.50	1.8	34.0	14	20	10	–	M4	8
-110	110	–	5	50	66.0	49.0	24.50	3.0	42.0	19	20	14	–	M5	10
-145	145	–	6	65	85.0	64.0	32.00	3.5	49.0	24	26	19	–	M6	12
-200	200	150	8	100	127.0	98.5	49.25	4.0	68.0	–	–	–	24	M8	15

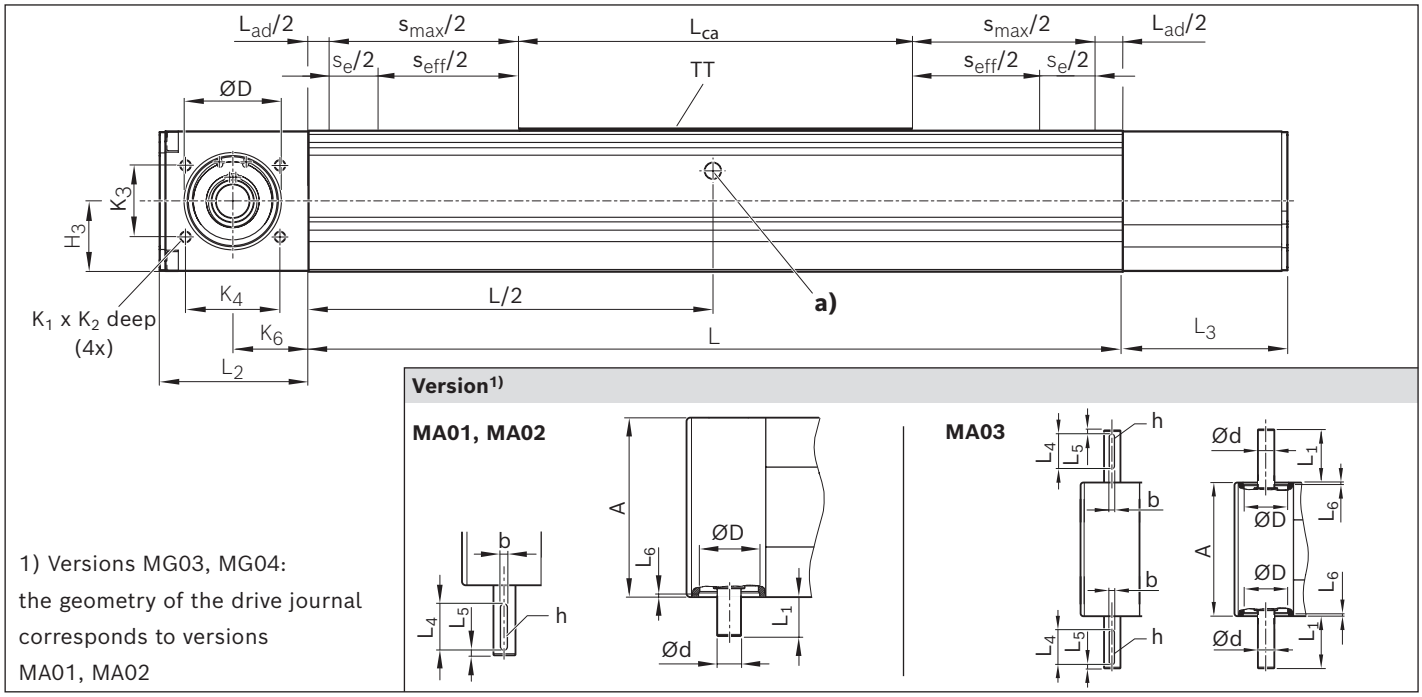
[1] Recommended shaft fitting k6

b) Lube port on both sides (grease lubrication). ➠ Chapter "Lubrication".

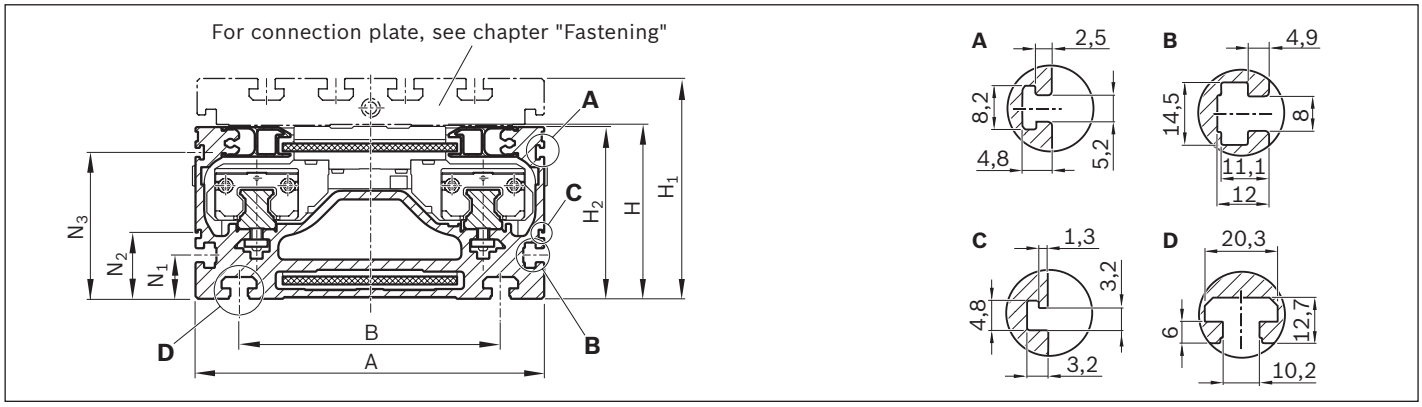
Straightness and flatness tolerance in accordance with DIN EN 12020-2.

Note: all dimensions in mm. Drawings not schematically to scale. Exact contours and dimensions can be found in the CAD model. CAD configurator available on the Internet at www.boschrexroth.com "Product configurators".

Frame CKR-200



1) Versions MG03, MG04: the geometry of the drive journal corresponds to versions MA01, MA02

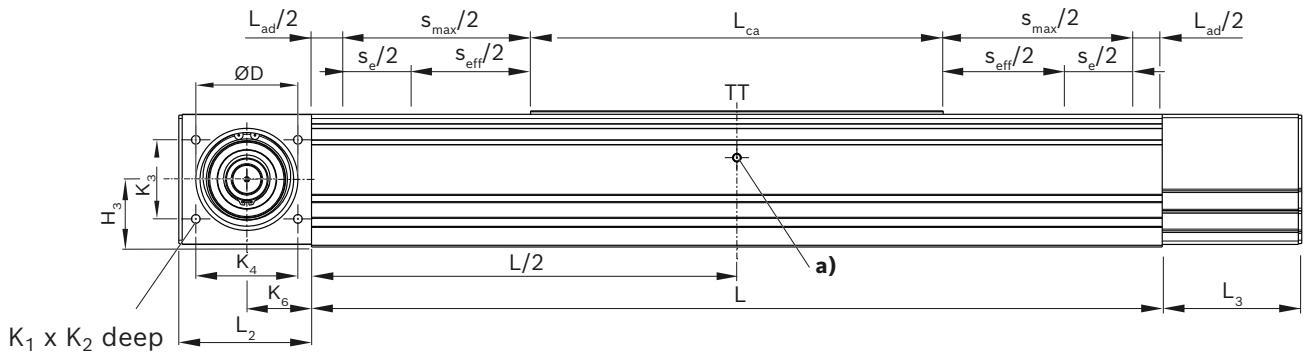


	K_3	K_4	K_5 ± 0.1	K_6	K_7	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	L_9	L_{10}	N_1	N_2	N_3
	12	29	14.4	18	M2.5 (ISO 4762)	14.5	36	42.0	–	–	3.0	14.5	5 ±0.2	15	12.0	–	–	–
	28	40	20.0	28	M4 (DIN 6912)	31.5	59	49.5	25	2	1.8	20.5	8 ±0.2	15	12.5	7.6	–	–
	35	45	25.0	33	M4 (ISO 4762)	31.5	66	60.5	25	2	2.0	22.0	8 ±0.2	20	17.5	9.5	–	–
	45	45	30.5	30	M5 (ISO 4762)	61.0	64	71.5	40	2	2.5	27.5	9 ±0.1	20	17.5	9.5	–	–
	50	66	–	53	–	61.0	104	115.0	40	3	2.5	–	–	–	–	25.0	38	84

See following pages for dimension drawings for frames, carriages and motor attachment.
Length calculation of the linear motion system ➠ Chapters "Technical data" and "Project planning/calculation".

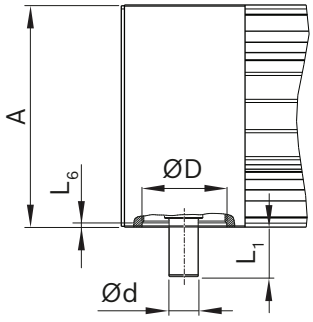
A For switch mounting arrangements
B For mounting with clamping fixtures
C For cable duct
D For fastening with sliding blocks
TT = Carriage

Frame CKR-280

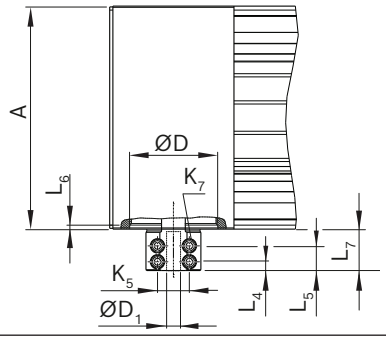


Version

MA01, MA02



MA07, MA08



CKR	**Dimensions** (mm)														
	A	**B**	**H**	**H_1**	**H_2**	**H_3**	**ØD** H7	**$ØD_1$** H7	deep	**Ød** h6	**K_1**	**K_2**	**K_3**	**K_4**	**K_5** ± 0,1
-280	280	204	160	190	156	79,5	120	25	50	35	M12	28	93	120	40

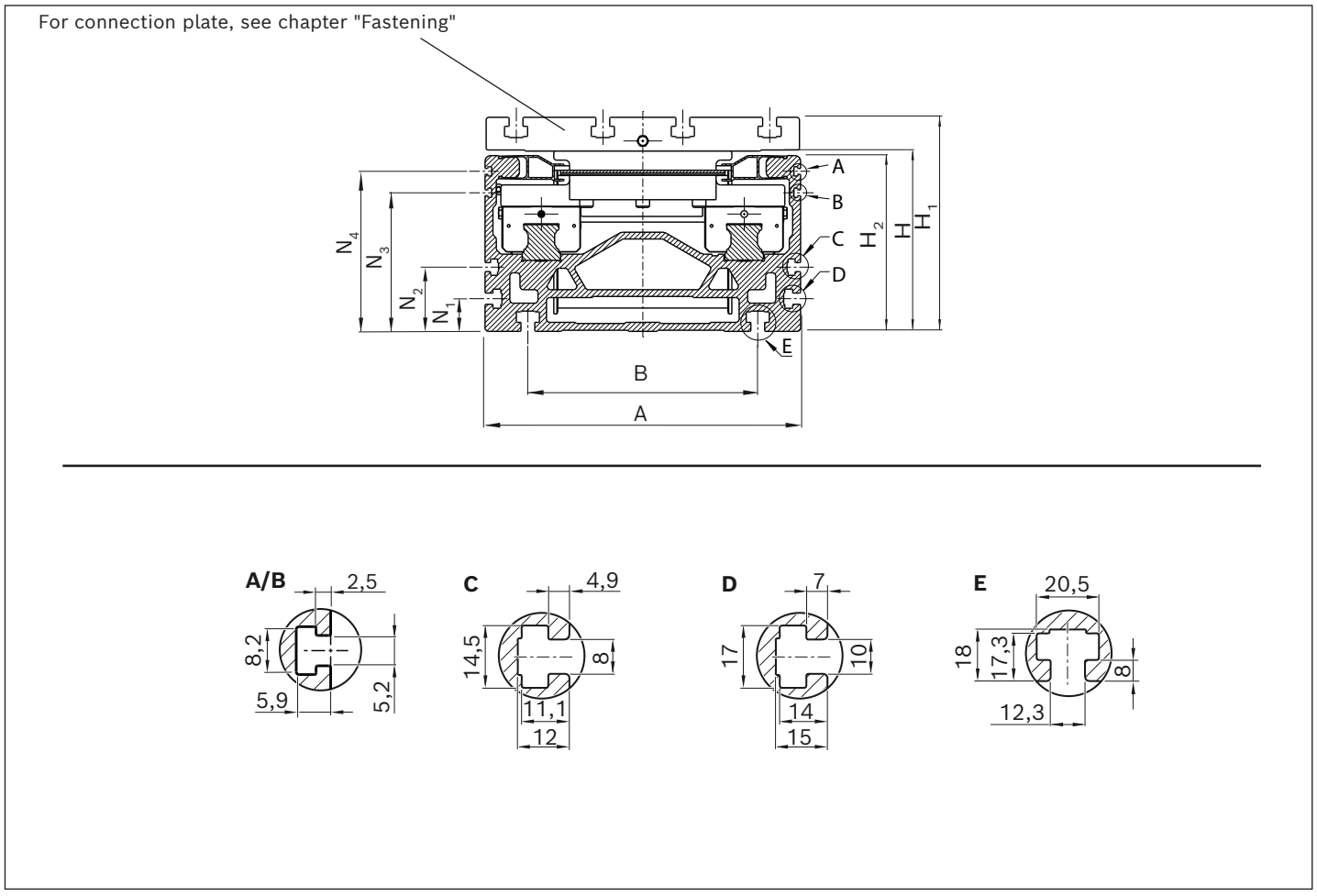
a) Lube port on both sides (grease lubrication). ➠ Chapter "Lubrication".

Straightness and flatness tolerance in accordance with DIN EN 12020-2.

Note: all dimensions in mm. Drawings not schematically to scale. Exact contours and dimensions can be found in the CAD model. CAD configurator available on the Internet at www.boschrexroth.com "Product configurators".

See following pages for dimension drawings for frames, carriages and motor attachment.

Length calculation of the linear motion system ➠ Chapters "Technical data" and "Project planning/calculation".

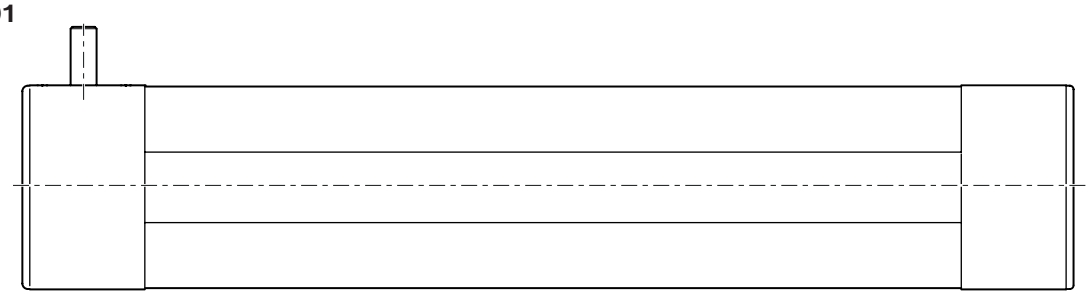


	K_6	K_7	L_1	L_2	L_3	L_4	L_5	L_6	L_7	N_1	N_2	N_3	N_4
	76	M10 (ISO 4762)	72	156	164	11	20	4	52	29	57	123	142

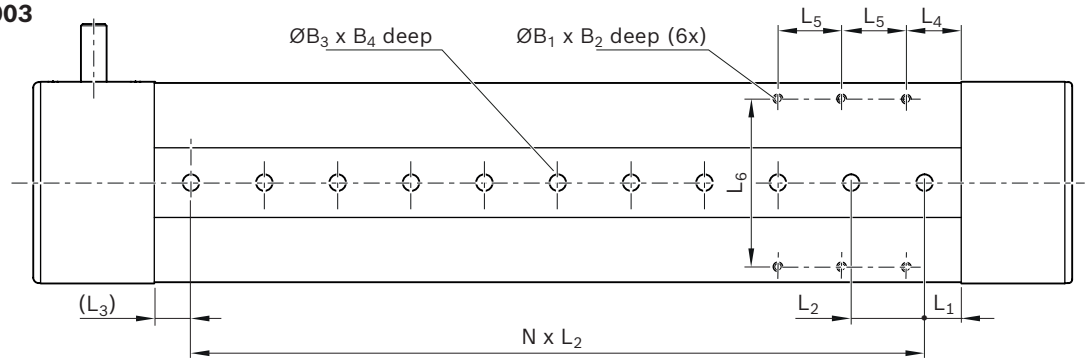
A Usable by customer
B For switch mounting arrangements / cable duct
C Usable by customer
D For mounting with clamping fixtures
E For fastening with sliding blocks
TT = Carriage

Frame CKR-070/-090/-110/-145

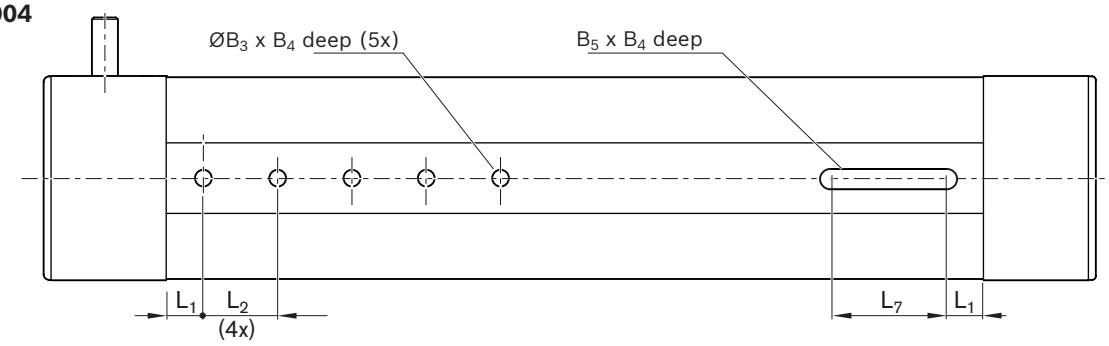
Option 001



Option 003

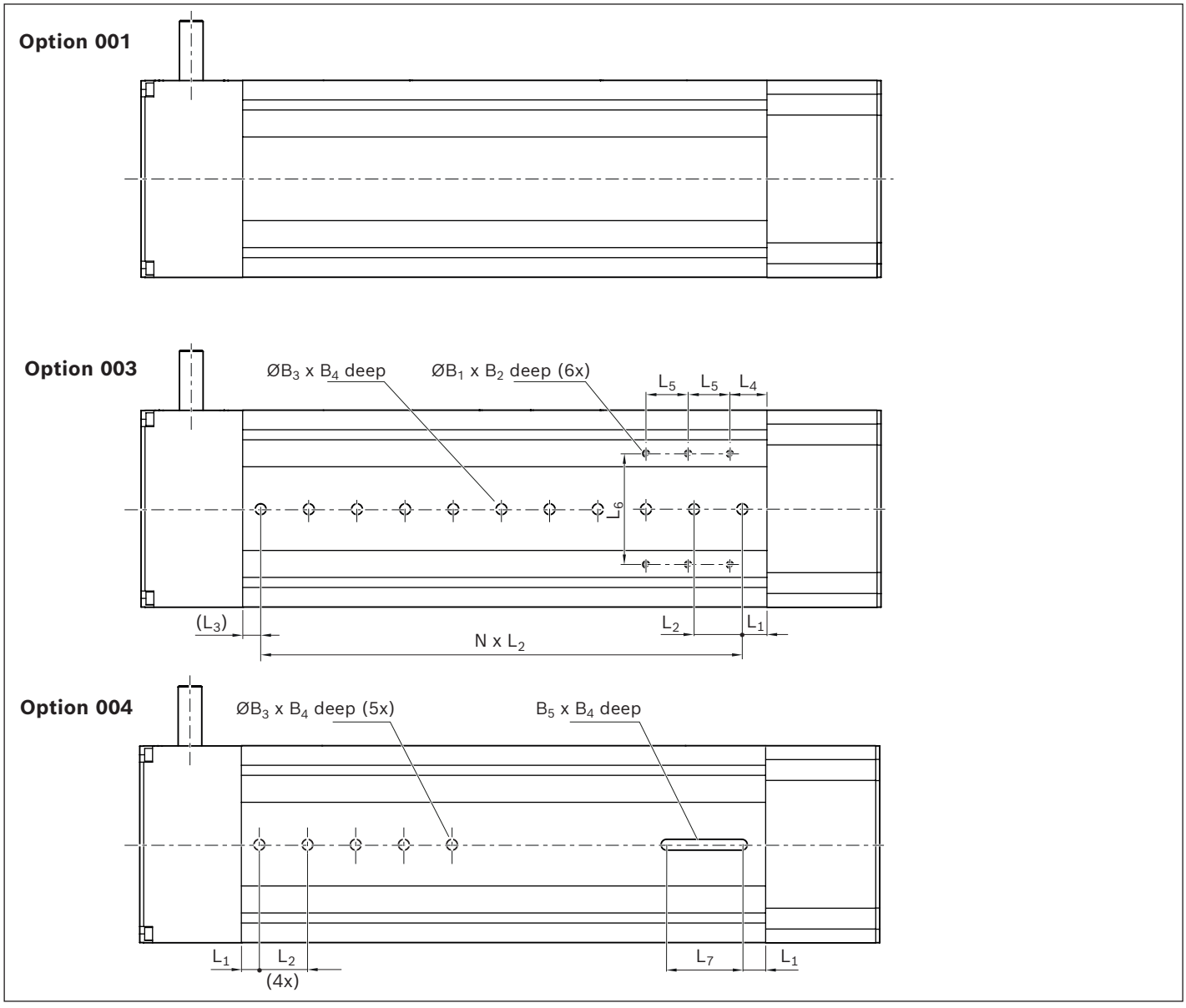


Option 004



CKR	Option	Dimensions (mm)											
		B_1	B_2	$ØB_3^{H7}$	B_4	B_5^{H8}	L_1	L_2 ± 0.01	L_3 (min)	L_4	L_5	L_6	L_7
-070	003	M3	6.0	7	1.6	–	20	40	10	15	25	59	–
	004	–	–			7			–	–	–	–	60
-090	003	M4	7.5	9	2.1	–			10	30	35	76	–
	004	–	–			9			–	–	–	–	60
-110	003	M5	9.0	9	2.1	–			10	30	35	92	–
	004	–	–			9			–	–	–	–	60
-145	003	M6	13.0	12	2.1	–			10	30	35	124	–
	004	–	–			12			–	–	–	–	60
-200	003	M8	12.0	16	3.1	–			10	35	40	119	–
	004	–	–			16			–	–	–	–	60
-280	003	M10	15,0	16	3,1	–			10	35	40	242	–
	004	–	–			16			–	–	–	–	60

Frame CKR-200/-280



Views from below (ground area)
Option 001 / standard
Option 003 / with centering holes
Option 004 / with centering holes and long hole

Carriages CKR-070/-090/-110/-145/-200

Carriages without connection plate

Fig. 1

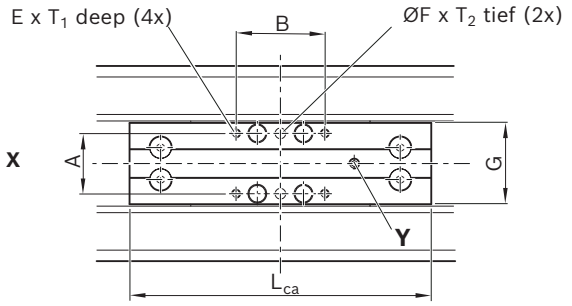


Fig. 2

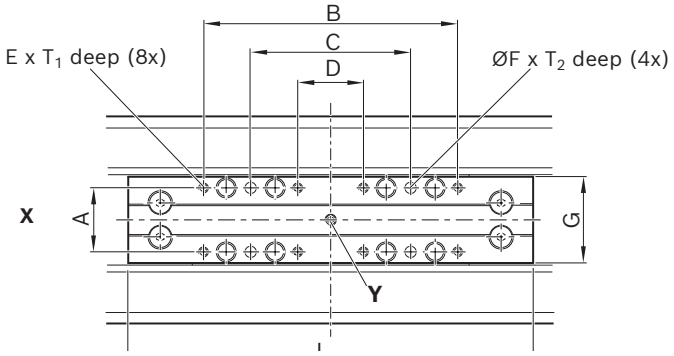


Fig. 3

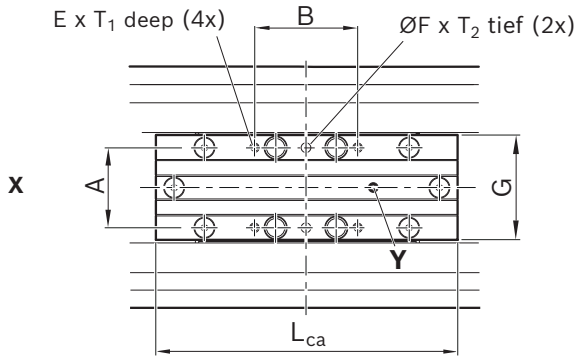


Fig. 4

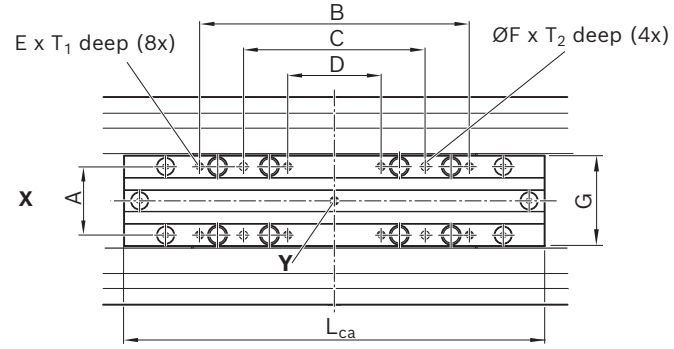
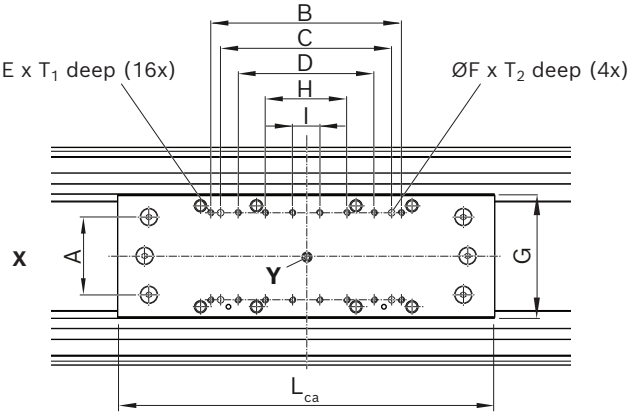


Fig. 5

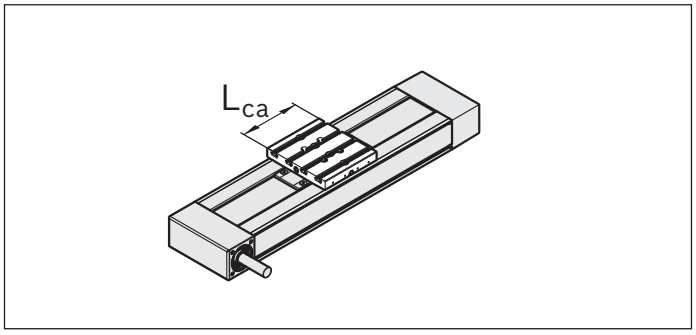


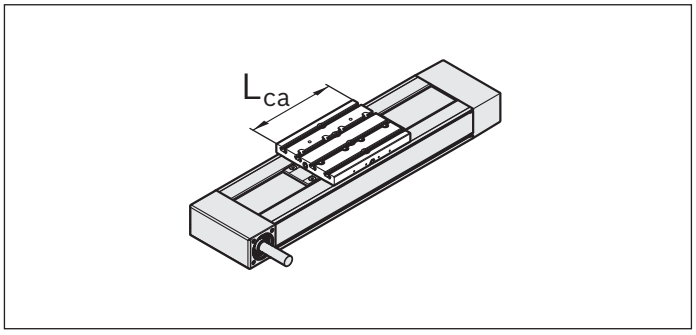
X Drive side

Y Lubrication point for grease; sealed with set screw.
Supplementary information for lubrication
➠ Chapter "Lubrication".

CKR	Figure	**Dimensions** (mm)											
		L_{ca}	A	B	C	D	E	ØF^{H7}	G	H	I	T_1	T_2
-070	1	80	13,5	25	–	–	M3	3	21	–	–	6	6,0
	2	108		65	40	15							
-090	1	102	20	27	–	–	M4	4	27	–	–	8	6.5
	2	156		92	65	38							
-110	1	170	34	50	–	–	M5	6	46	–	–	10	6.5
	2	215		135	85	35							
-145	1	180	48	60	–	–	M6	6	62	–	–	12	7.5
	2	240		160	100	40							
-200	3	265	66	85	–	–	M8	8	87	–	–	16	10,0
	4	405		260	175	90							
-280	5	485	112	245	220	175	M8	8	158	105	35	16	10,0

Carriages with connection plate[1)]



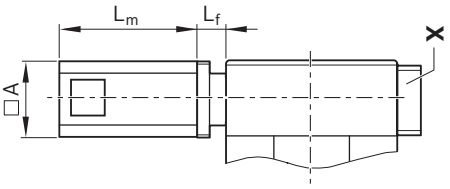


[1)] Dimension drawings ➠ Chapter "Connection plates"

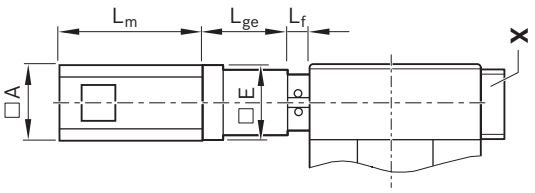
Motor attachment CKR-070/-090/-110/-145

Version

MA10, MA11

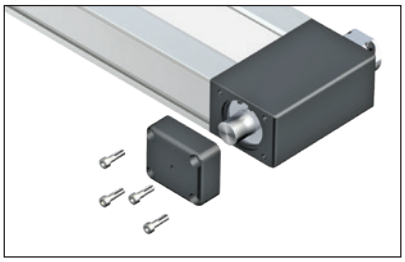


MG10, MG11



X: Drive end enclosure with additional drive journal

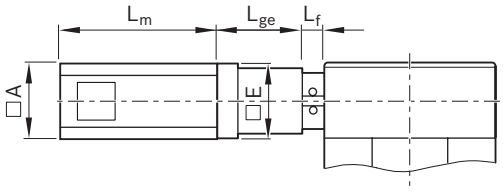
In the versions MA10, MA11, MG10 and MG11, a second drive journal can be made available by removing the screws and cover.



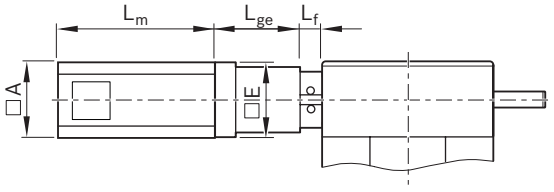
Motor attachment CKR-200/-280

Version

CKR -200/-280 **MG01, MG02**



CKR -200 **MG03, MG04**

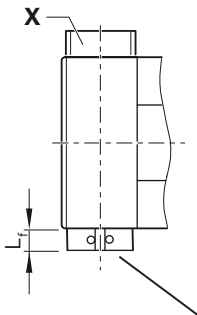


Motor attachment Option 000 (adapter flange for customer-side gear attachment)

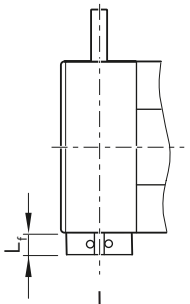
Version

CKR -070/-090/-110/-145 **CKR -200** **CKR -200/-280**

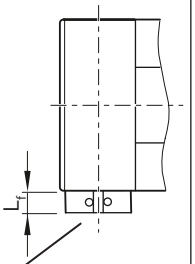
MG10, MG11

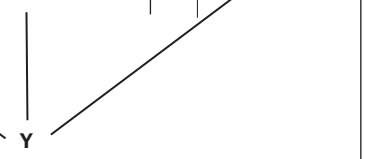


MG03, MG04

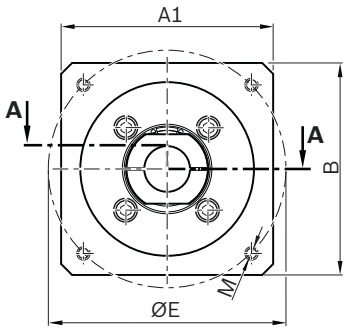


MG01, MG02

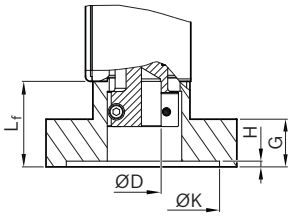




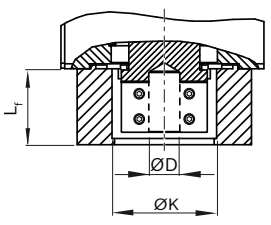
Y



Section A-A

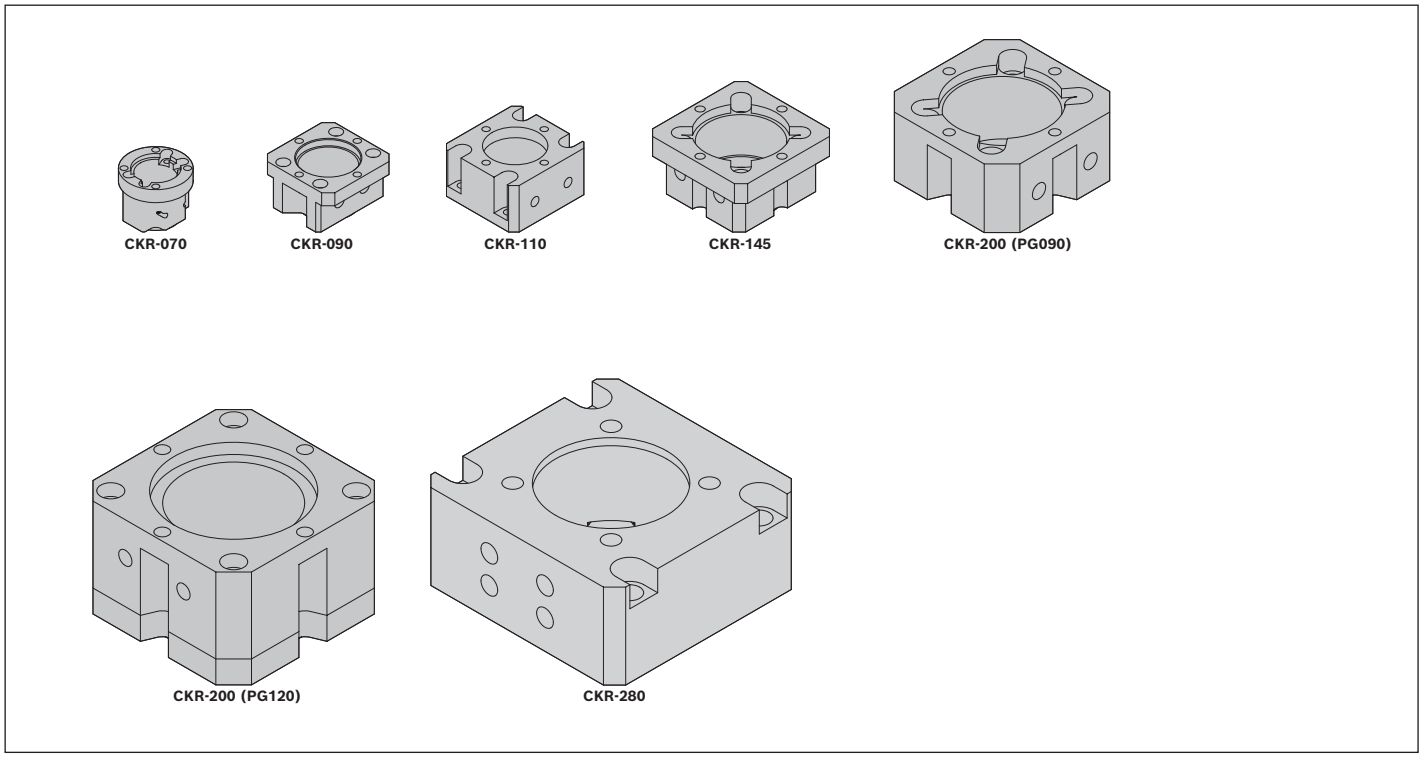


CKR-280



CKR	Version	Motor code	Dimensions (mm)											
			□ E	L_f	L_{ge}	L_m □ A	A1	B	Ø E	G	H	Ø D	Ø K	Ø M
-070	**MG10, MG11**	MS2N03-B0BYN	55	29.5	60.7	See chapter "Motors"		Ø 40	34	8.5	2.5	10^{H7}	$27^{+0.2}$	4.3
		MSM019B-0300	40											
-090	**MA10, MA11**	MS2N04-D0BQN	–	34.5	–		51	51	44	8.5	4.5	14^{H7}	$35.1^{+0.3}$	4.5
	MG10, MG11	MS2N03-B0BYN	55	28.0	68.0									
		MS2N03-D0BYN												
		MSM031C-0300	70		75.0									
-110	**MA10, MA11**	MS2N05-D0BRN	55	46.0	–		57	55	44	–	$7^{+0.4}$	19^{H7}	35^{H7}	4.5
	MG10, MG11	MS2N03-B0BYN	55	30.5	68.0									
		MS2N03-D0BYN												
		MS2N04-B0BTN	80		75.0									
		MS2N04-C0BTN												
		MSM031C-0300	70		75.0									
-145	**MA10, MA11**	MS2N06-D1BNN	55	52.0	–		72	72	62	13	$5.5^{+0.3}$	24^{H7}	$53^{+0.4}$	5.5
	MG10, MG11	MS2N04-C0BTN	80	37.0	92.0									
		MS2N04-D0BQN												
		MS2N05-B0BTN	100		101.0									
		MS2N05-C0BTN												
		MS2N05-D0BRN												
		MSM041B-0300	90		97.0									
-200	**MG01, MG02, MG03, MG04**	MS2N06-D1BNN	120	45.0	124.5		95	95	80	–	6	22^{F7}	$68.3^{+0.2}$	6.6
		MS2N07-B1BNN	150	75.0	154.0		120	120	108	–	8	32^{F7}	$90.3^{+0.2}$	9.0
		MS2N07-C1BRN												
		MS2N07-D1BNN												
		MS2N07-E1BNN												
-280	**MG01, MG02**	MS2N07-B1BNN	150	61,0	171,7		140	135	100	–	5	25^{H7}	80^{H7}	11.0
		MS2N07-C1BRN												
		MS2N07-D1BNN												

Adapter flange



CKR-280-DB

Product overview

Features

- 2 drives: 2 independently movable carriages with connecting plates made of aluminum through separate and pre-tensioned toothed belt drives
- Precision aluminum profile with two integrated preloaded ball rail systems
- Two different lube versions
- Ready-to-install compact modules in any length up to Lmax.
- Realization of greater lengths of up to 5,000 mm
- Low-cost maintenance
- Repeatability of up to ± 0.05 mm

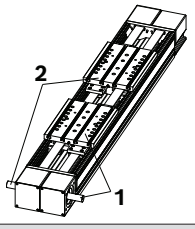
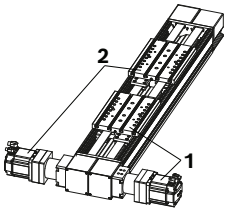
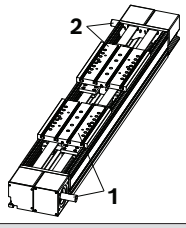
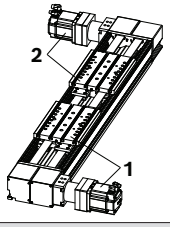
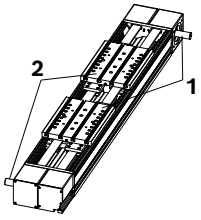
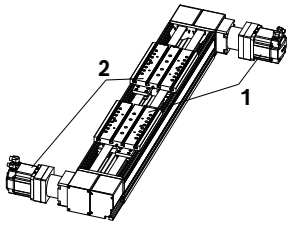
Further highlights

- Flexible thanks to selectable options
- Centering holes for simple combination with other linear motion systems and connection elements
- Extensive accessories for connection and clamping units
- Nameplate with parameters for easy commissioning

Attachments

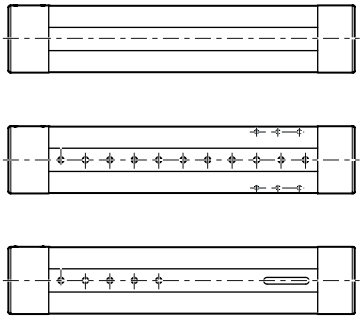
- Planetary gear with various gear ratios
- Maintenance-free servo motors with selectable brake and attached feedback
- Switches (magnetic sensors), switch activation without additional switching cam
- Cable duct made of aluminum for sensors

Version/options drive

MA21	MG21
	
MA23	**MG23**
	
MA24	**MG24**
	

1/2: Related components

Version/options guide (frame)



Motor attachment – with gear: (MG21 / MG23 / MG24)
The planetary gear is attached by means of a flange. The flange serves to fasten the gearbox to the CRK and as a closed housing. Due to the connection without coupling, the drive torque is transferred to the drive shaft of the compact module in a torsionally stiff manner.
Available gear ratios ➠ "cofiguration, orderring".

Structural design

Structural design CKR

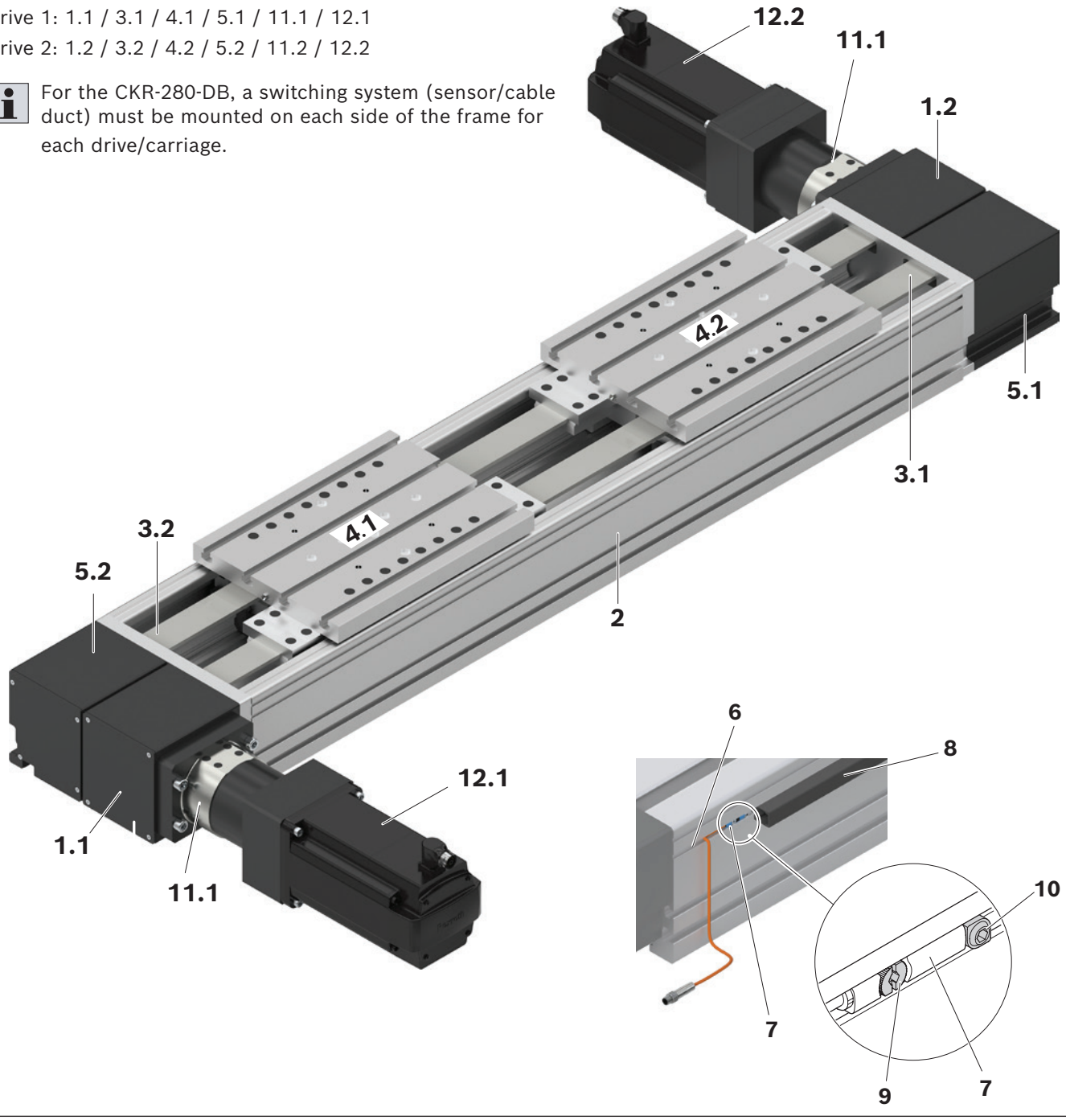
1 Drive end enclosure (1.1/1.2)
2 Frame
3 Toothed belt drive (3.1/3.2)
4 Carriages with conneting plates (4.1/4.2)
5 Idler end enclosure (5.1/5.2)
6 Sensor slot

Attachments:

7 Magnetic sensor
8 Cable duct
9 Clamping screw
10 Sliding block (only required for repeatable mounting of the sensor)
11 Flange with planetary gear
12 Motor (12.1/12.2)

Related components (MG23):
Drive 1: 1.1 / 3.1 / 4.1 / 5.1 / 11.1 / 12.1
Drive 2: 1.2 / 3.2 / 4.2 / 5.2 / 11.2 / 12.2

For the CKR-280-DB, a switching system (sensor/cable duct) must be mounted on each side of the frame for each drive/carriage.



Technical data

General technical data*)

CKR	Carriage		Additional length		Min. travel range	Max. length	Dynamic characteristic values	
	with Connection plate					Load capacities	Load moments	
	L_{ca} (mm)	L_w (mm)	L_{ad} (mm)	s_{min} [1] (mm)	L_{max} (mm)	C_{gw} (N)	M_t (Nm)	M_L (Nm)
-280-DB	375	min. 485	135	195	5,500	216,700	19,500	21,670

Drive data*)

CKR	Gearing	Gear ratio	Max. drive torque	Feed constant	Max. speed		Carriage	Moved mass of system
							with Connection plate	
		i (–)	M_P (Nm)	u (mm/U)	v_{max} (m/s)		L_{ca} (mm)	m_{ca} (kg)
-280-DB	ohne	1	250.00	390.00	5.00		375	27.20
	PG115	5	50.00	78.00	4.55			
		12	20.83	32.05	1.90			
		16	15.63	24.38	1.42			

Gear data*)

CKR	Gearing		Max. acceleration torque[4] (at the gear output)	Base frictional torque	Max. drive speed
	Type	Gear ratio			
		i (–)	M_{ge} (Nm)	M_{Rge} (Nm)	n_{ge} (min^{-1})
-280-DB	PG115	5	195	0.90	5 500
		12	260	0.95	
		16			

*) Observe the "Project planning/calculation" chapter.

1) Minimum required travel range to ensure a reliable lubrication distribution.
2) Maximum force that can be transmitted via the teeth meshing with the belt pulley.
3) 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 may not be used to calculate the maximum permissible drive torque.
4) The limits of the linear motion system must not be exceeded ➠ "Drive data / project planning/calculation".

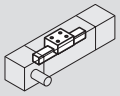
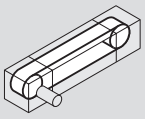
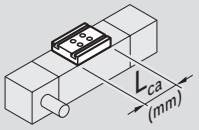
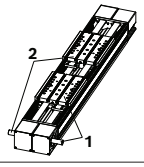
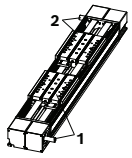
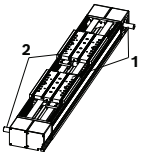
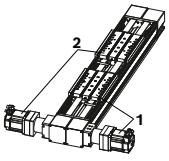
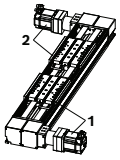
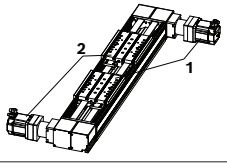
Maximum permissible loads							Planar moments of inertia		Point of force application
Moments			Forces						
$M_{x\ max}$ (Nm)	$M_{y\ max}$ (Nm)	$M_{z\ max}$ (Nm)	$F_{y\ max}$ (N)	$F_{z1\ max}$ (N)	$F_{z2\ max}$ (N)		I_y (cm^4)	I_z (cm^4)	Z_1 (mm)
5,400	6,000	5,517	55,170	86,685	60,000		2,242.00	15,802.0	108.5

Constant mass calculation		Constant mass moment of inertia			Friction torque	Belt pulley diameter	Belt type	Max. belt drive transmission force	Belt elasticity limit	Max. acceleration
$k_{g\ fix}$ (kg)	$k_{g\ var}$ (kg/mm)	$k_{J\ fix}$ ($kgmm^2$)	$k_{J\ var}$ (kgmm)	$k_{J\ m}$ (mm^2)	M_{Rs} (Nm)	d_3 (mm)	B_t	F_{bp} [2] (N)	$F_{t\ zul}$ [3] (N)	a_{max} (m/s^2)
14.95	0.0448	107,812.77	3.375	3,852.68	12.25	124.14	50ATS15	4,046	13,530	50

Motor	Mass moment of inertia	Weight
	J_{ge} (kgm^2)	m_{ge} (kg)
MS2N07	0.0003995	7.4
	0.0004586	9.6
	0.0004108	

Configuration, order

CKR-280-DB

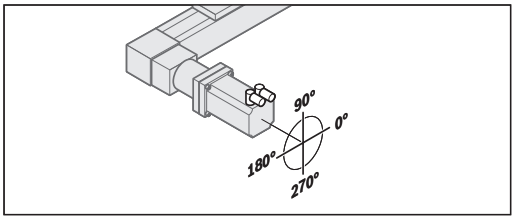
Short product name, length[1] CKR-280-DB-1, ... mm			Guideway			Drive		Carriage	
								 with connection plate L_{ca} =375 mm	
Version			Standard	Centering holes[2]		i = 1 without keyway	for gear unit[4]	Lubrication[3] LSS	LPG
Drive journal		MA21	001	003	004	021	–	041	341
		MA23							
		MA24							
Gear attachment		MG21				–	026	041	341
		MG23							
		MG24							

1) Length calculation of the linear motion system ➠ "Project planning/calculation" chapter.
2) Centering holes for simple combination with other linear motion systems and connection elements (➠ Dimension drawings).
Option 003: with centering holes and fastening threads in the ground area of the frame. Selectable up to a length of L ≤ 2000 mm
Option 004: with centering holes and long hole in the ground area of the frame. Selectable up to length L_{max}
3) Lubrication ➠ Chapter "Lubrication".
4) Attachment kit for gear attachment
5) 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 position of motor connector).
6) Recommended motor, motor data and type designations ➠ Chapter "Motors"
7) Switching system (sensors/cable duct) will be delivered in double quantity. More information ➠ Chapter "Switching system".
8) Measurement report: 001 = Standard report; 002 = Measurement of frictional torque; (➠ Chapter "Documentation")
9) Motor attachment consisting of: Adapter flange for gear unit, however "without gear unit". No motor connector position selectable.

	Motor attachment[5]			Motor[6]						Switching system[7]	Automation package		Doc.[8]
	Gear unit				2 cables		1 cable		Motor connector position		Controller	Cable	
	i = 5	i = 12	i = 16	Motorcode	without brake	with brake	without brake	with brake					
MA21	000			000						Without	"Automation package" chapter		001
MA23										- Switch - Cable duct: 000			
MA24										Magnetic sensor			
										Hall, PNP-normally closed (NC): 120			
										Hall, NPN-normally closed (NC): 121			
										Hall, PNP-normally open (NO): 122			
										Hall, NPN-normally open (NO): 123			
										Cable duct: 020			
MG21	000[9]			000									002
	023	024	025	MS2N07-B1BNN	–	–	255	256	000				
MG23				MS2N07-C1BRN	–	–	263	264	090 180				
MG24				MS2N07-D1BNN	–	–	269	270	270				

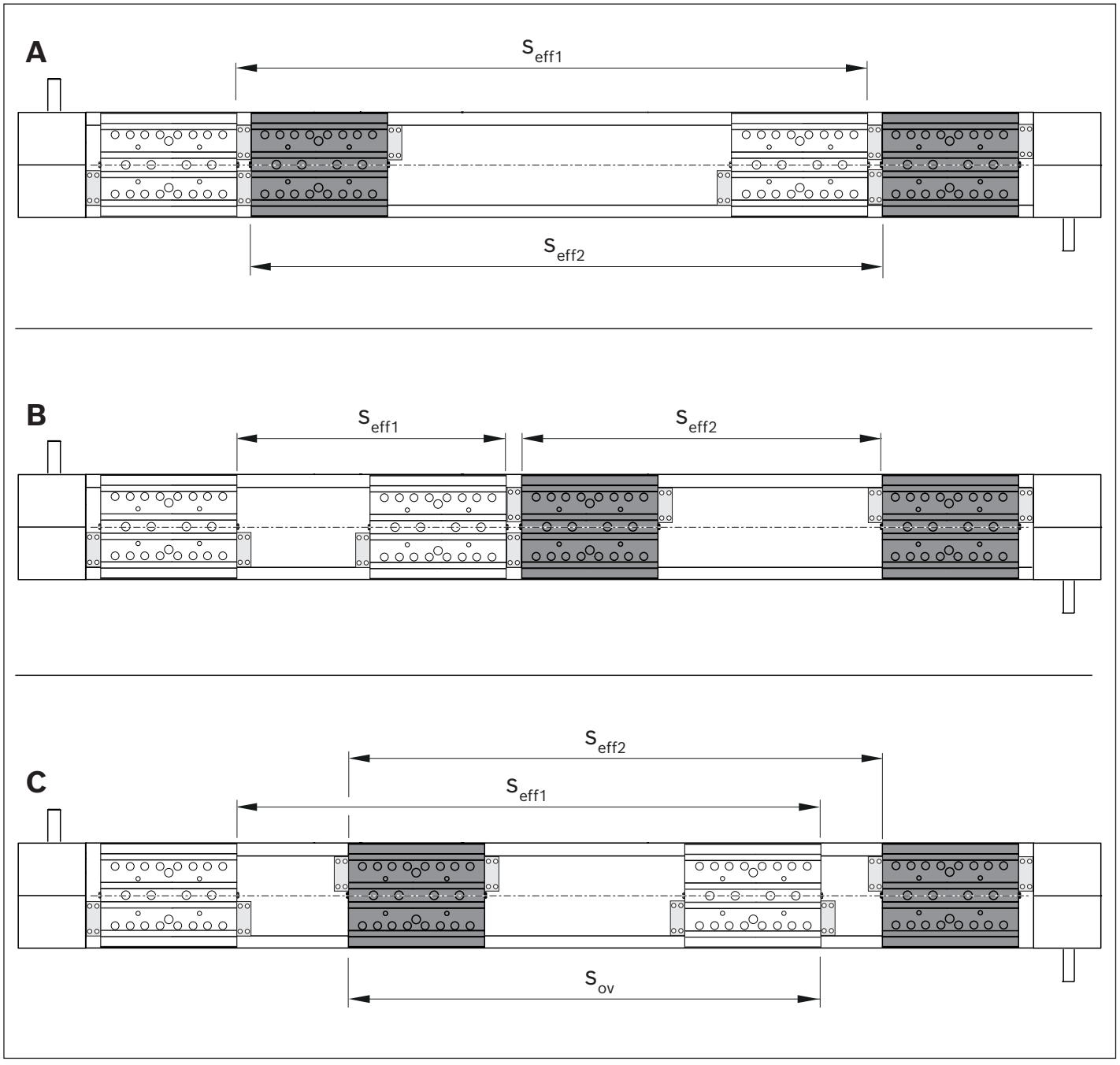
Version	Motor connector position			
	0°	90°	180°	270°
MG21/23/24	000	090 ★	180	270

★ Standard delivery



Explanation of the order parameters and ordering example ➠ Chapter "Ordering example“.

Definition of “Travel ranges CKR-280-DB”



For S_{max}, see name plate. Graphic representation of S_{eff} without stroke reserve S_e

Further information ➠ See the chapters "Dimension Drawings", "Design/Calculation", and "Abbreviations"

A

Both carriages can alternately move to the end position and each use the maximum available travel distance

$$S_{max} = S_{eff1} + S_e = S_{eff2} + S_e$$

B

Both carriages have the same or different travel distance and share the maximum available travel distance **without** overlap (S_{ov}).

$$S_{max} = S_{eff1} + S_{eff2} + S_e$$

C

Both carriages have the same or different travel distance and share the maximum available travel distance **with** overlap (S_{ov}).

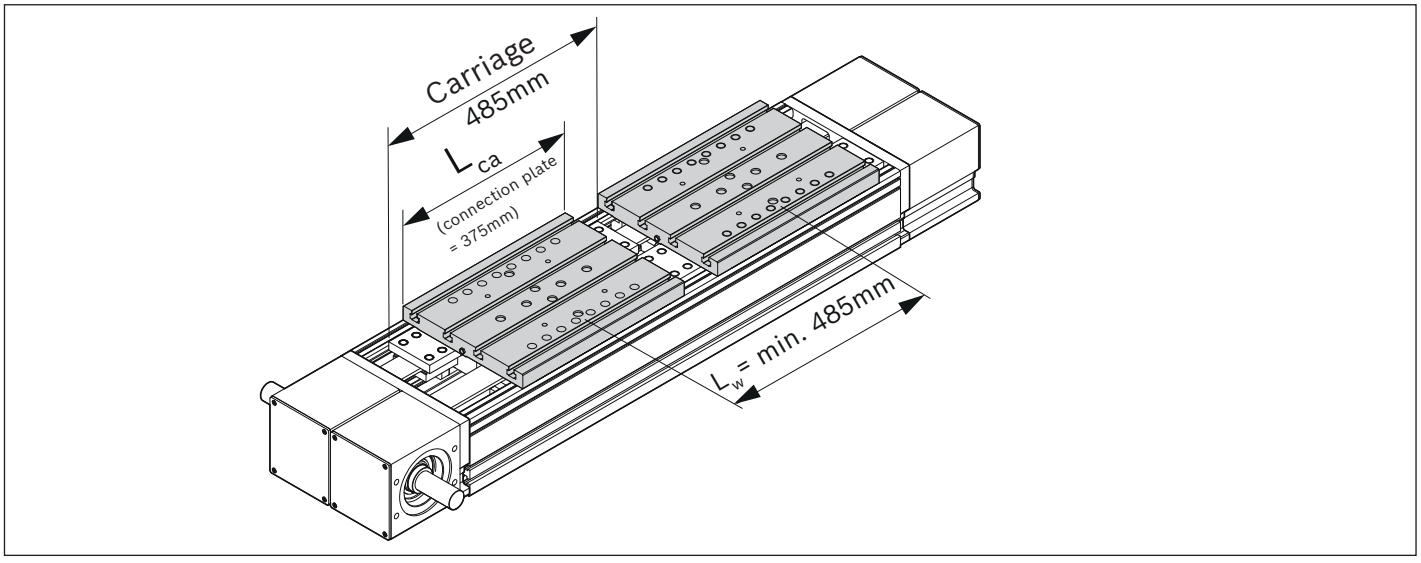
$$S_{max} = S_{eff1} + S_{eff2} - S_{ov} + S_e$$

Further information:

The stroke reserve (S_e) is required, for example, for overruns, lubrication strokes, tool changes, maintenance, interference contours, compensation of assembly tolerances, etc.
The final verification/determination of the stroke reserve must be carried out by the user.
The following stroke reserves are recommended:

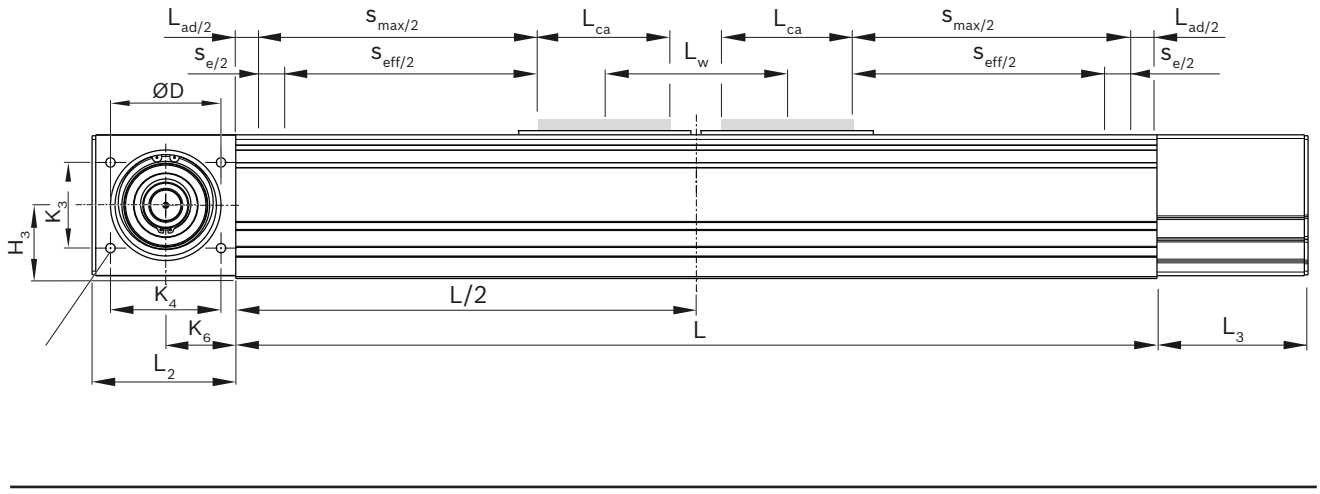
Linear systems:	S_e = 20 mm
Multi-axis systems:	S_e = 20 mm
Electromechanical cylinders:	S_e = 10 mm

⚠ If no stroke reserve (S_e = 0 mm) is specified, the effective stroke (S_{eff}) corresponds to the maximum travel distance (S_{max}) of the system. There is no clearance to the mechanical end position, thus creating a risk of mechanical damage.

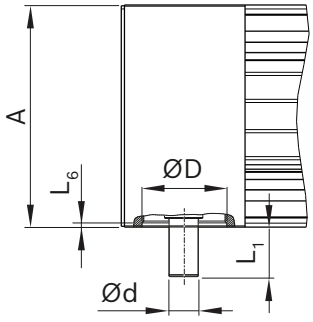


Dimension drawings

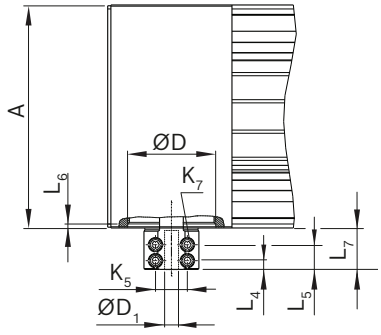
Frame CKR-280-DB



Version MA21/23/24

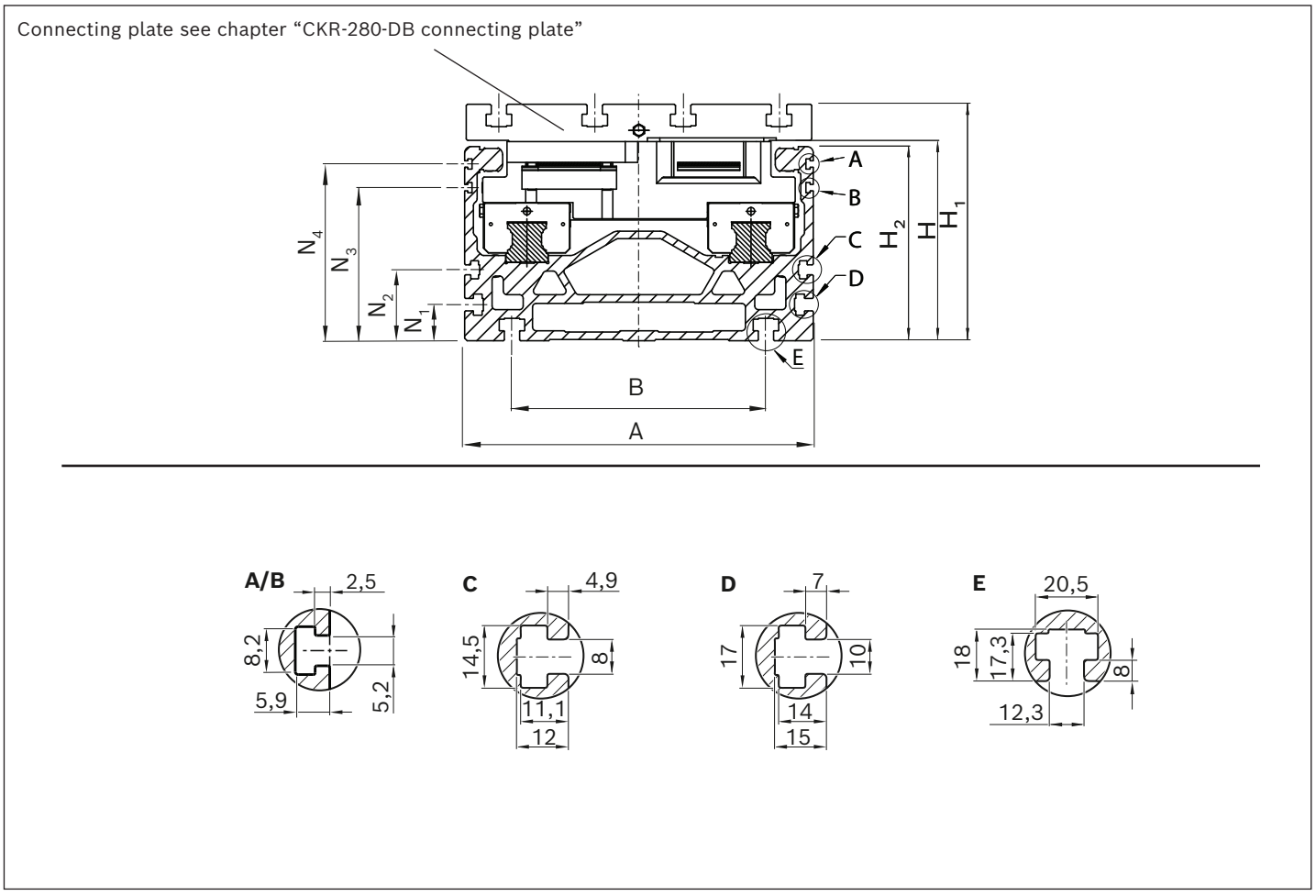


Version MG21/23/24



CKR	**Dimensions** (mm)														
	A	**B**	**H**	**H_1**	**H_2**	**H_3**	**ØD** H7	**$ØD_1$** H7	tief	**Ød** h6	**K_1**	**K_2**	**K_3**	**K_4**	**K_5** ± 0,1
-280-DB	280	204	160	190	156	79,5	120	25	50	35	M12	26	93	120	40

Straightness and flatness tolerance in accordance with DIN EN 12020-2.
Note: all dimensions in mm. Drawings not schematically to scale.
Exact contours and dimensions can be found in the CAD model.
CAD configurator available on the Internet at www.boschrexroth.com "Product configurators".
For dimension drawings of the frame, carriages/connecting plates and motor attachment, see the following pages
Length calculation of the linear system ! see chapters "Technical Data" and "Project Planning/Calculation."

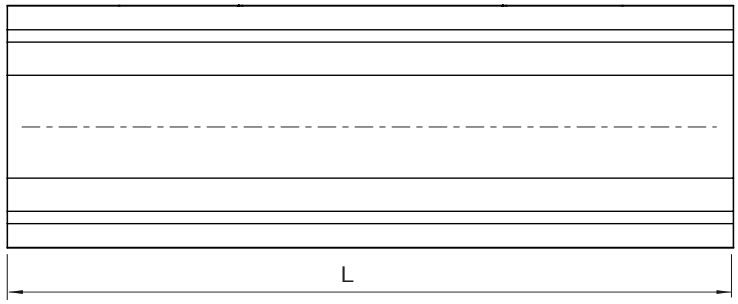


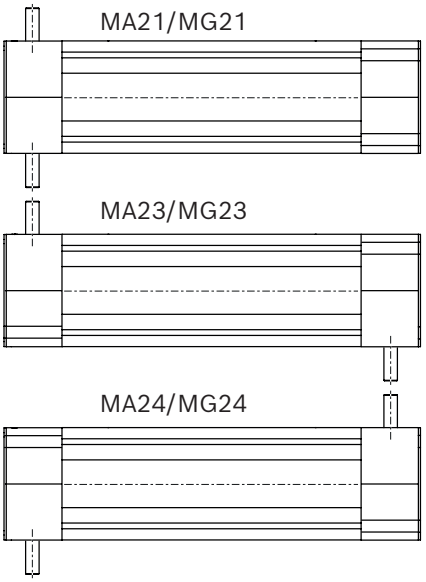
	K_6	K_7	L_1	L_2	L_3	L_4	L_5	L_6	L_7	N_1	N_2	N_3	N_4
	102	M10 (ISO 4762)	72	185	185	11	20	4	52	29	57	123	142

A Usable by customer
B For switch mounting arrangements / cable duct
C Usable by customer
D For mounting with clamping fixtures
E For fastening with sliding blocks

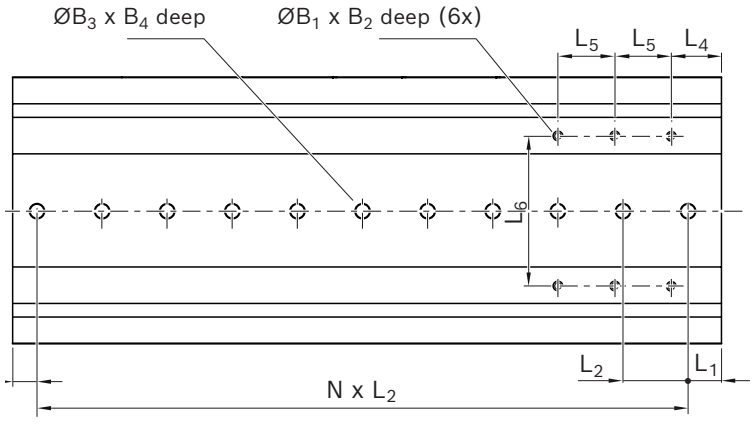
Frame CKR-280-DB

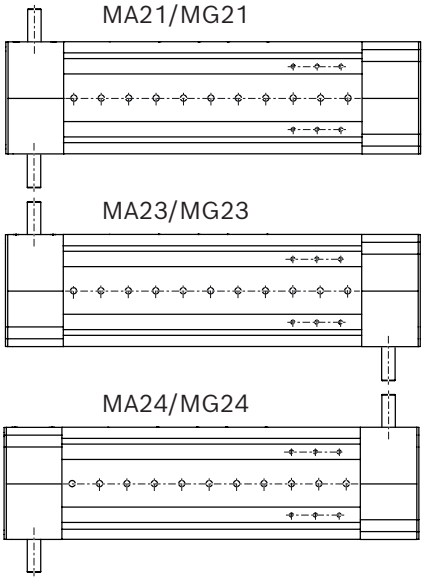
Option 001





Option 003

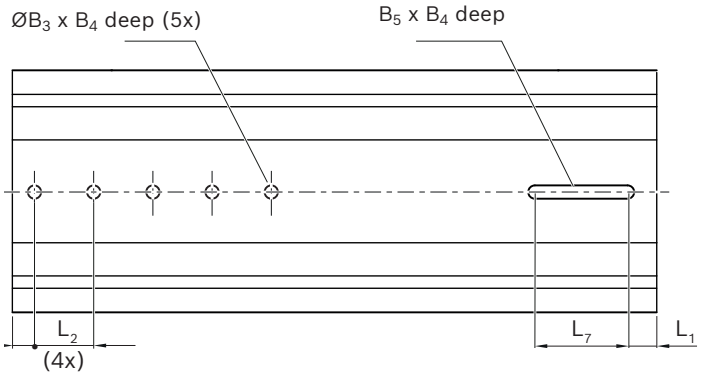


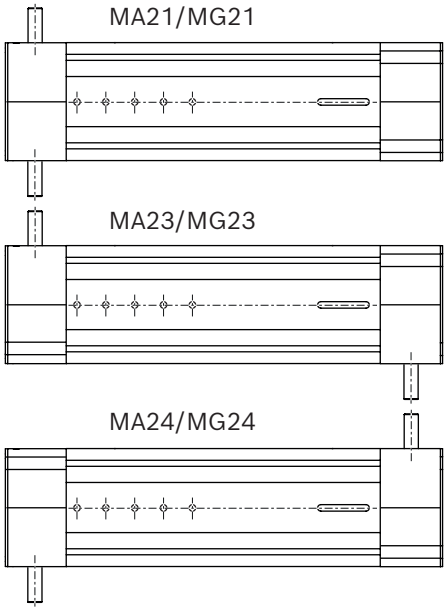


Views from below (ground area)
Option 001 / standard
Option 003 / with centering holes
Option 004 / with centering holes and long hole

CKR	Option	Dimensions (mm)											
		B_1	B_2	$ØB_3^{H7}$	B_4	B_5^{H8}	L_1	L_2 ± 0,01	L_3 (min)	L_4	L_5	L_6	L_7
-280-DB	003	M10	15.0	16	3.1	–	20	40	10	35	40	242	–
	004	–	–			16			–	–	–	–	60

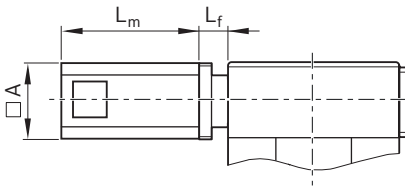
Option 004


ØB3 x B4 deep (5x)
B5 x B4 deep
L2
(4x)
L7
L1

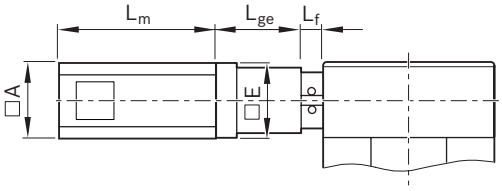

MA21/MG21
MA23/MG23
MA24/MG24

Motor attachment CKR-280-DB

Version MA21/23/24

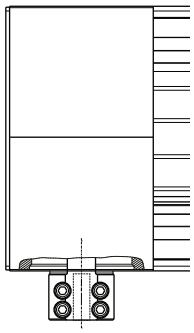


Version MG21/23/24

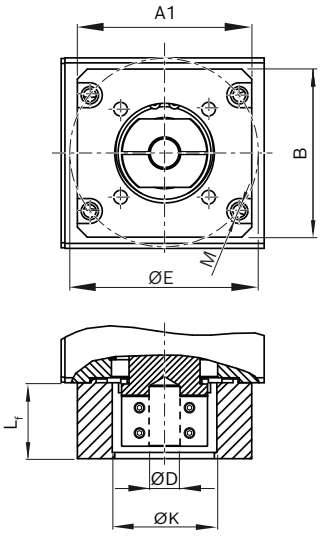


Motor attachment Option 000 (adapter flange for customer-side gear attachment)

Version

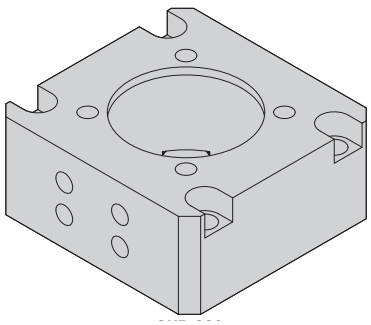


Schnitt A-A

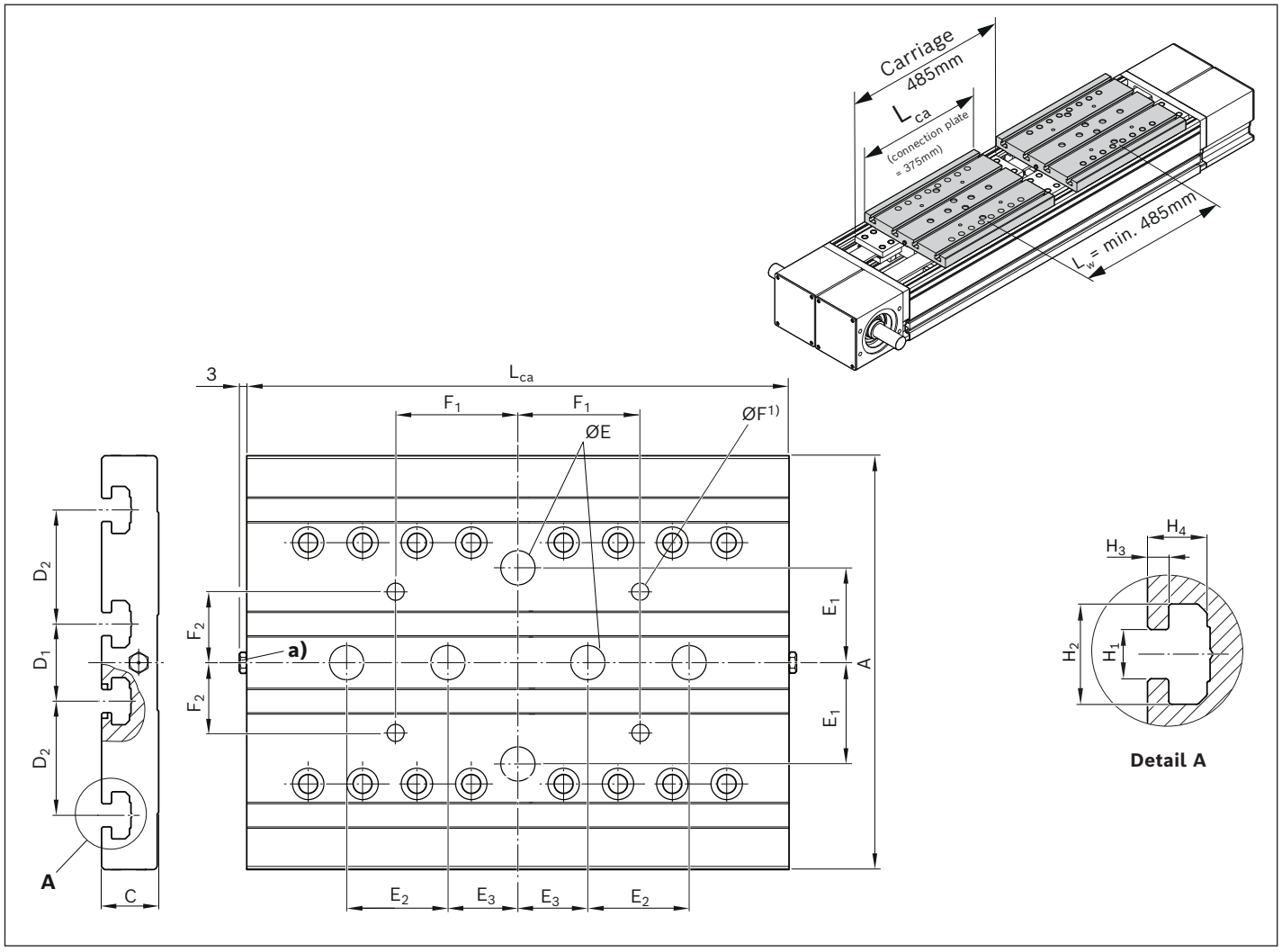


CKR	Version	Motorcode	Dimensions (mm)											
			□ E	L_f	L_{ge}	L_m □ A	A1	B	Ø E	G	H	Ø D	Ø K	Ø M
-280-DB	**MG01, MG02**	MS2N07-B1BNN MS2N07-C1BRN MS2N07-D1BNN	140	61.0	i: 5 =147.0 i: 12/16 =174.5	See chapter "Motors"	140	135	100	–	5	25^{H7}	80^{H7}	11.0

Adapter flange



Connection plate



1) For customer-built attachment

a) Funnel-type lube nipple AM8 x 1 for lube version LSS/LPG; lubrication points from two sides (central lubrication only necessary with grease gun on one of the two sides).

Function:

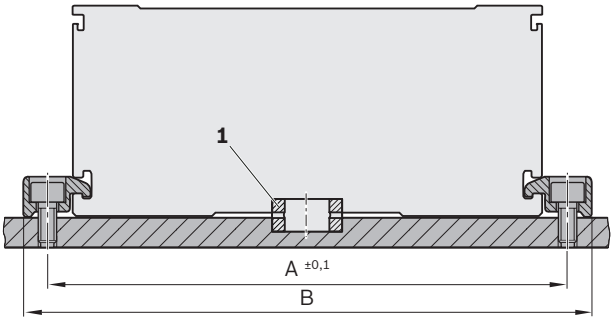
- Fastening of attachments (with sliding blocks)
- Lubrication of the ball rail system possible via the connection plate
- For lube version LSS, LPG

- The assembly consists of: Connection plate, Mounting accessories for fastening to the carriages, Sliding blocks are not included with delivery

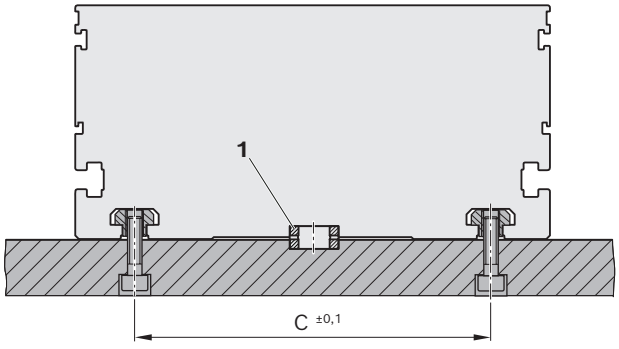
CKR	Dimensions (mm)																	Mass	Material number
	L_{ca}	A	C	D_1	D_2	ØE^{H7}	E_1	E_2 ±0,01	E_3	ØF^{H7}	F_1 ±0,01	F_2	H_1	H_2	H_3	H_4		(kg)	
-280-DB	375	278	30	71	112.5	16 - 3.1 deep	80	60	40	8 - 16 deep	50.0	60	12.3	20.5	8.0	17.3		7,02	R0375 700 25

Attachments and accessories
Mounting/mounting accessories

Fastening with clamping fixtures



Mounting with sliding blocks (size -200/-280)

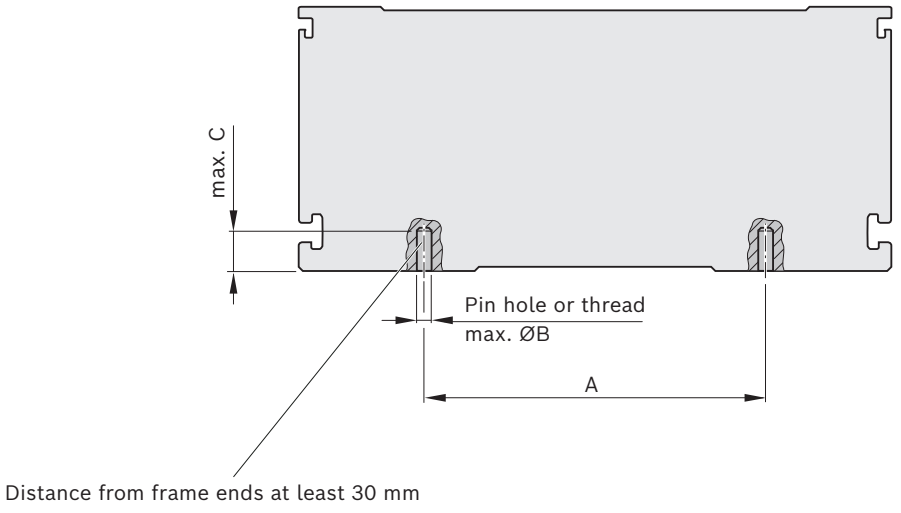


1 For compact modules with centering holes in the ground area (selection via the guideway option):
Use centering rings to better align to other linear motion systems and connection elements.

⚠ **Do not fasten or support the compact module at the end enclosures! The frame is the load-bearing part!**

Size	**Dimensions** (mm)		
	A	**B**	**C**
-070	82	95	–
-090	102	112	–
-110	126	140	–
-145	161	175	–
-200	222	240	150
-280	310	336	204

Special modification in the base surface of the frame
(not available from factory)



Mounting by means of special modification in the base surface of the frame is possible

⚠ **Option guideway 003 already includes threaded holes in the ground area of the frame (see dimension drawings).**

Size	**Dimensions** (mm)		
	A	**B**	**C**
-070	59	3	7.5
-090	76	4	7.5
-110	92	5	9.0
-145	124	6	13.0
-200	119	8	12.0
-280	242	15	10.0

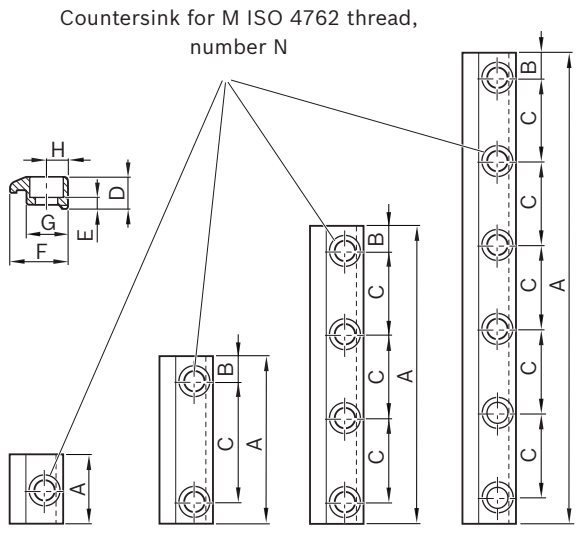
Mounting accessories

Recommended number of clamping fixtures:

- Type 1: 6/3[1)] pieces per meter and side
- Type 2: 4 pieces per meter and side
- Type 3: 3 pieces per meter and side
- Type 4: 3 pieces per meter and side

1) For size 070

Clamping fixtures



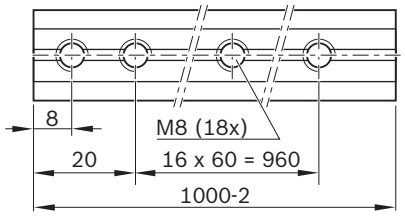
Size	For thread	Type	Number of bores N	Dimensions (mm)								Material number
				A	B	C	D	E	F	G	H	
-070	M5	1	1	22	–	–	10.0	4.8	15.0	12.2	6.5	R1419 010 01
		2	2	57	8.5	40	10.0	4.8	15.1	12.2	6.5	R1419 010 43
-090	M4	1	1	25	–	–	9.0	4.6	14.5	10.5	5.0	R0375 310 00
		3	4	87	6.0	25						R0375 310 02
		3	4	107	8.5	30						R0375 310 03
		2	2	72	11.0	50						R0375 310 32
		2	2	62	11.0	40						R0375 310 33
		3	4	87	13.5	20						R0375 310 38
		4	6	107	8.5	18						R0375 310 41
-110 / -145	M5	3	4	107	8.5	30	11.5	4.8	19.3	14.0	7.0	R0375 410 02
		3	4	77	8.5	20						R0375 410 26
		4	6	107	8.5	18						R0375 410 41
	M6	1	1	25	–	–	11.5	5.3	19.3	14.0	7.0	R0375 510 00
		3	4	142	11.0	40						R0375 510 02
		2	2	72	11.0	50						R0375 510 33
		2	2	62	11.0	40						R0375 510 34
		2	2	47	8.5	30						R0375 510 23
		4	6	142	8.5	25						R0375 510 41
-200	M8	2	2	108	19.0	70	27.5	16.3	29	19.0	9.0	R1175 290 26
		2	2	88	19.0	50		14.8				R1175 290 96
		2	2	78	19.0	40		14.8				R1175 290 97
-280	M10	2	2	163	29.0	105	32.0	18.5	41	25	13.0	R1175 290 44

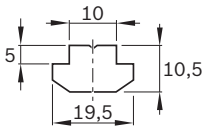
Compact modules CKR: When mounting the clamping fixtures, observe a minimum distance of 10 mm to the end face of the frame.

Sliding blocks, springs and strips

Recommended number of sliding blocks: with 1 thread, 6 pieces per meter and side

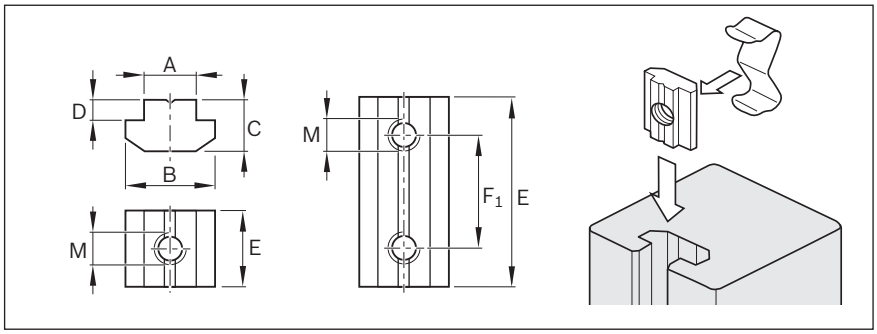
Strip





Material number
R3447 008 01

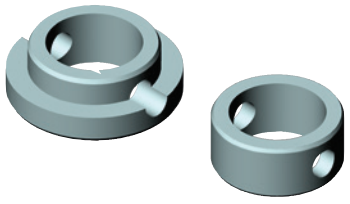
For fastening attachments on the connection plate.
The spring serves as assembly and positioning aid.

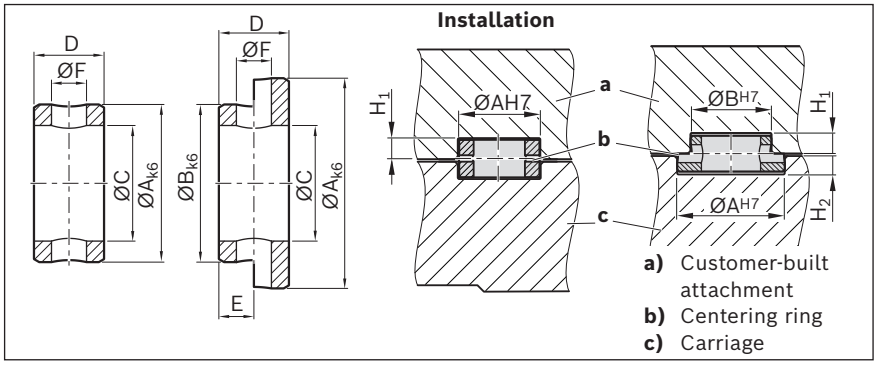


Size	Thread	Dimensions (mm)						Material number	
		A	B	C	D	E	F_1	Sliding block	Spring
-070	M4 (1x)	4	7,8	3,9	0,4	10	–	R0375 210 20	–
	M4 (2x)					19	10	R0375 210 21	–
-090 / -110	M4 (1x)	6	11,5	4,0	1,0	12	–	R3447 014 01	R3412 010 02
	M5 (2x)					45	30	R0391 710 09	–
	M5 (1x)					12	–	R3447 015 01	R3412 010 02
-145	M4 (1x)	8	16,0	6,0	2,0	16	–	R3447 017 01	R3412 011 02
	M5 (1x)					16	–	R3447 018 01	R3412 011 02
	M6 (1x)					16	–	R3447 019 01	R3412 011 02
	M6 (2x)					50	36	R0391 710 08	–
	M8 (1x)					16	–	R3447 020 01	R3412 011 02
-200	M4 (1x)	10	19,5	10,5	5,0	20	–	R3447 012 01	R3412 009 02
	M5 (1x)					20	–	R3447 011 01	R3412 009 02
	M6 (1x)					20	–	R3447 010 01	R3412 009 02
	M8 (1x)					20	–	R3447 009 01	R3412 009 02
	M8 (2x)					90	70	R0391 710 07	–
	M8 (2x)					50	30	R0391 710 61	–
-280	M10 (4x)	12	18,0	14,0	7,0	108	30	R0391 710 84	–

Centering rings

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

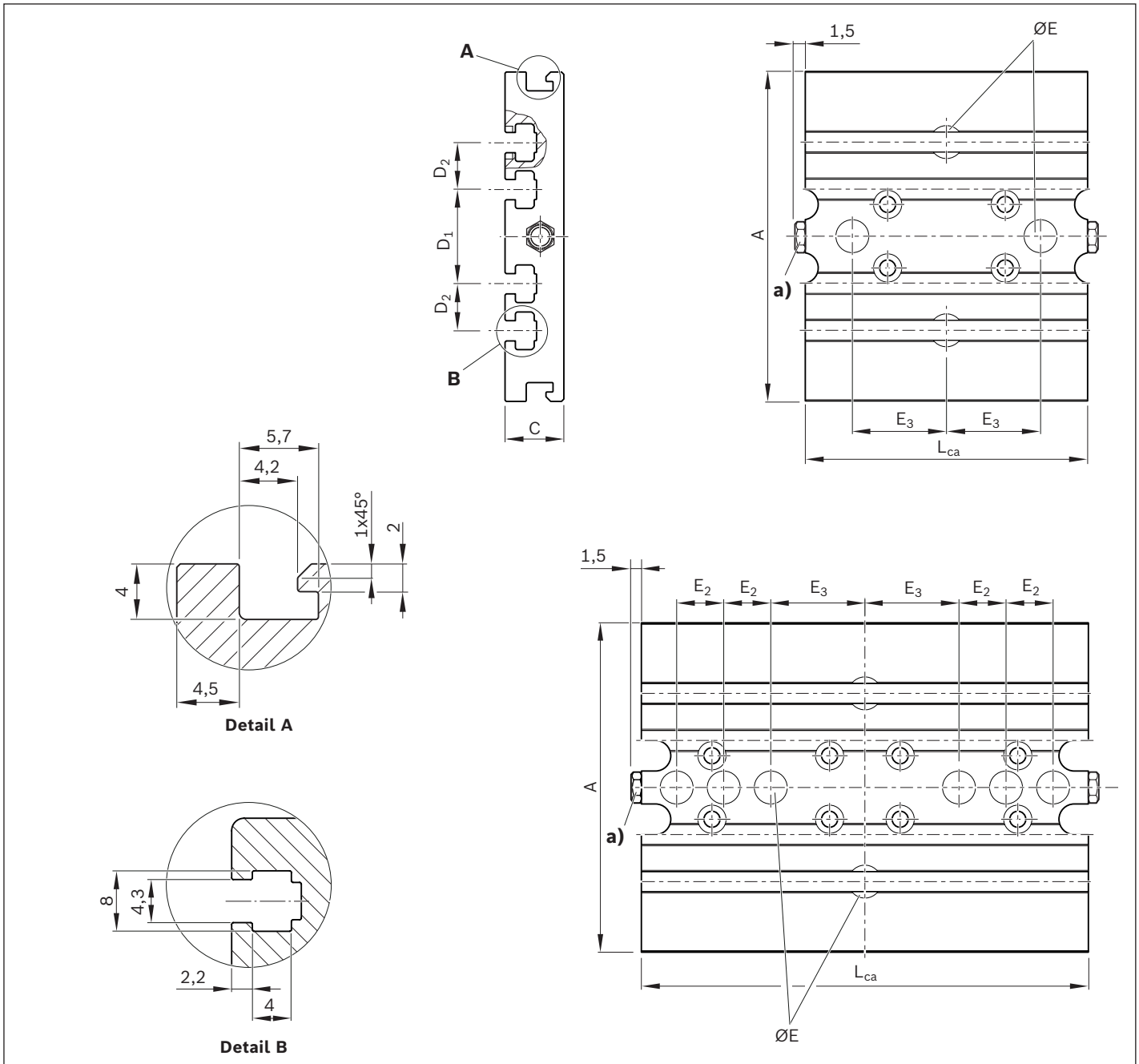




Ø Size (mm)	Dimensions (mm)								Material number
	A	B	C ±0.1	D –0.2	E +0.2	ØF	H_1 +0.2	H_2 +0.2	
5	5	–	3.4	3.0	–	1.6	1.6	–	R0396 605 42
7	7	–	5.5	3.0	–	1.6	1.6	–	R0396 605 43
9	9	–	6.6	4.0	–	2.0	2.1	–	R0396 605 44
12	12	–	9.0	4.0	–	2.0	2.1	–	R0396 605 45
16	16	–	11.0	6.0	–	3.0	3.1	–	R0396 605 46
7 - 5	7	5	3.4	3.0	1.5	1.6	1.6	1.6	R0396 605 47
9 - 5	9	5	3.4	3.5	1.5	1.6	2.1	1.6	R0396 605 48
9 - 7	9	7	5.5	3.5	1.5	1.6	2.1	1.6	R0396 605 49
12 - 9	12	9	6.6	4.0	2.0	2.0	2.1	2.1	R0396 605 50
16 - 12	16	12	9.0	5.0	2.0	2.0	2.1	3.1	R0396 605 51

Connection plates

CKK/CKR -070



The connection plates differ in appearance in the representation.

a) Funnel-type lube nipple DIN 3405-D4; lubrication points from two sides (central lubrication only necessary with grease gun on one of the two sides).

Function:

- Fastening of attachments (with sliding blocks)
- Lubrication of the ball rail system and the ball screw assembly possible via the connection plate
- For lube version LSS, LPG

The assembly consists of:

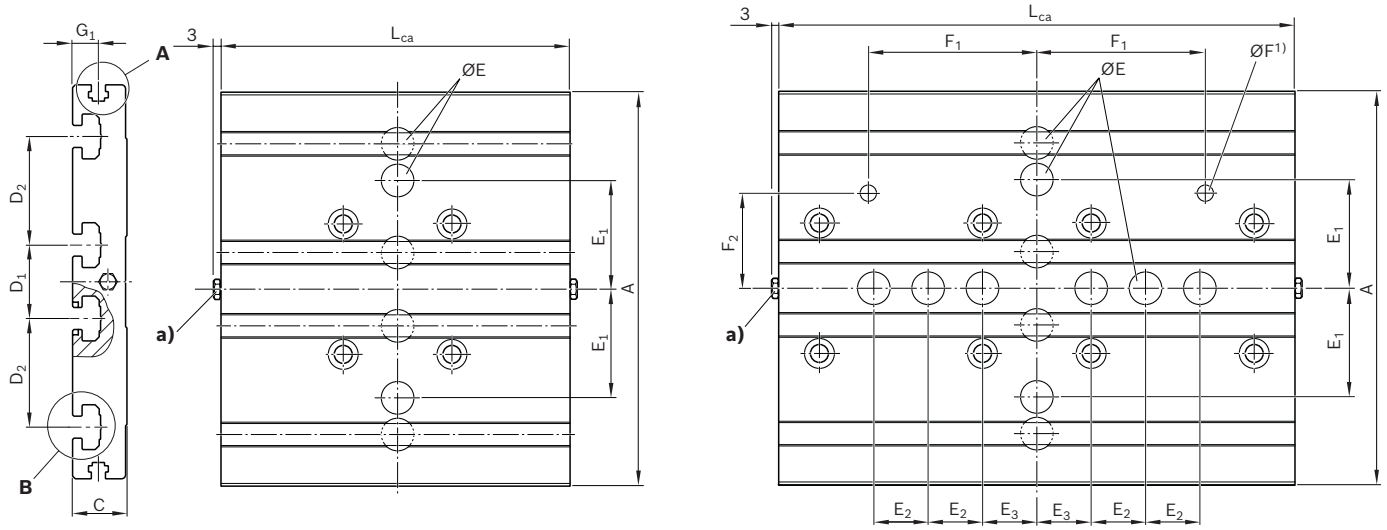
- Connection plate
- Mounting accessories for fastening to the carriages
- Sliding blocks are not included with delivery

CKK/CKR	**Dimensions** (mm)								
	L_{ca}		A	C	D_1	D_2	ØE^{H7}	E_2	E_3
	CKK	CKR						±0.01	
-070	60	60	70	12.5	20	10	7 - 1.6$^{+0.2}$ deep	10	20
	95	95							

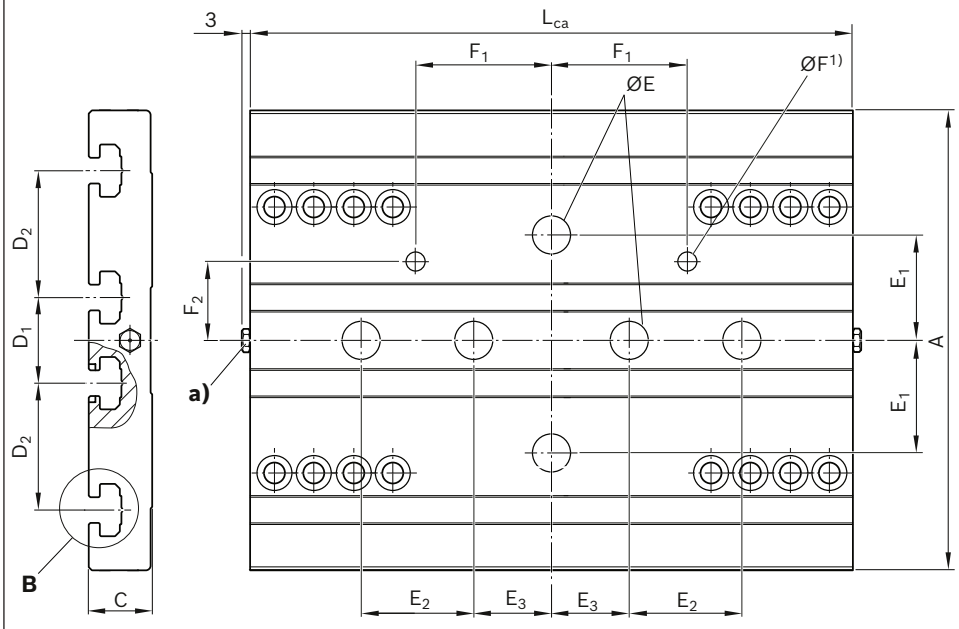
CKK/CKR	L_{ca} (mm)	Material number		Mass (kg)
		CKK	CKR	
-070	60	R0375 200 15	R0375 200 16	0.11
	95	R0375 200 10	R0375 200 11	0.17

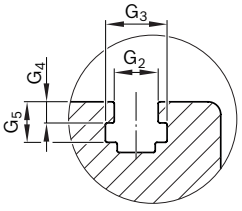
CKK / CKR

CKK / CKR -090, -110, -145, -200

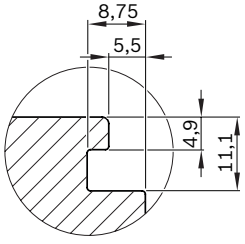


CKK / CKR -280



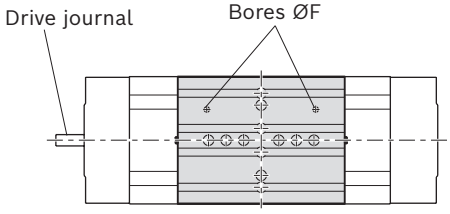


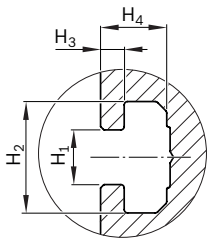
Detail A
Größe -090,-110,-145



Detail A
Größe-200

Mounting orientation





Detail B

The connection plates differ in appearance in the representation. Shown here is the connection plate for CKK-145.

1) For customer-built attachment

a) Funnel-type lube nipple AM8 x 1 for lube version LSS/LPG; lubrication points from two sides (central lubrication only necessary with grease gun on one of the two sides). Lube fittings for lube versions LCF/LCO see next page.

Function:

- Fastening of attachments (with sliding blocks)
- Lubrication of the ball rail system and the ball screw assembly possible via the connection plate
- For lube version LSS, LPG

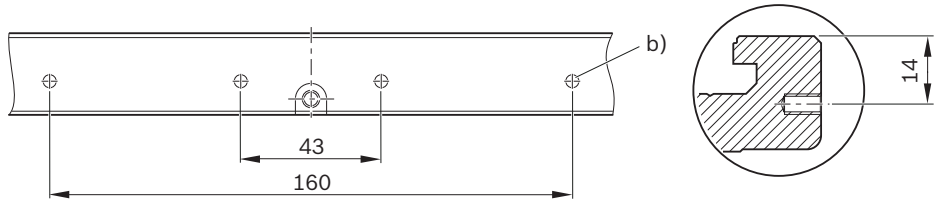
The assembly consists of:

- Connection plate
- Mounting accessories for fastening to the carriages
- Sliding blocks are not included with delivery

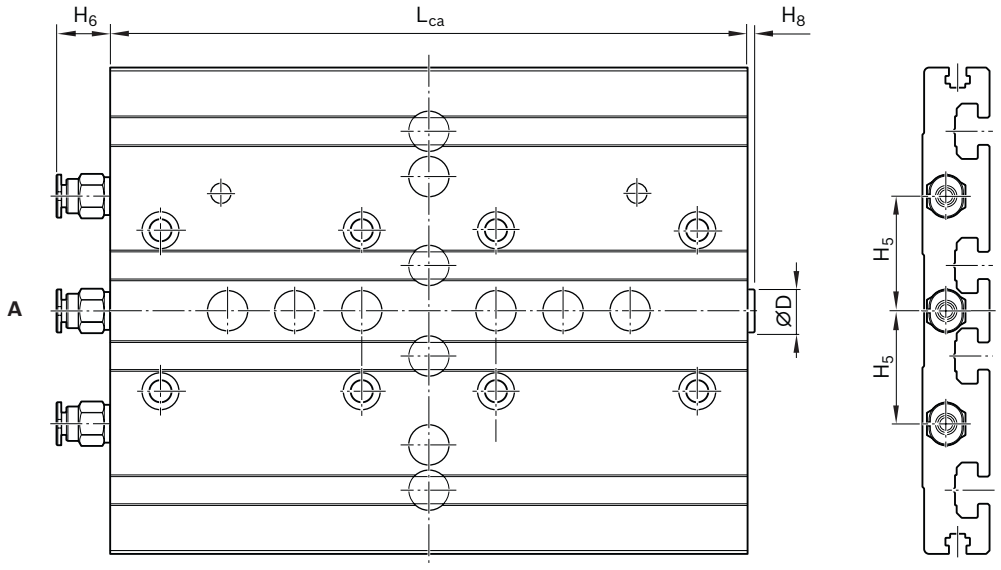
CKK/ CKR	**Dimensions** (mm) (mm)																				
	L_{ca}		A	C	D_1	D_2	$ØE^{H7}$	E_1	E_2	E_3	$ØF^{H7}$	F_1	F_2	G_1	G_2	G_3	G_4	G_5	H_1	H_2	H_3	H_4
	CKK	CKR							±0,01			±0,01										
-090	60		90	16	20	20	9 - 2.1 deep	–	–	20	–	–	–	7.6	4.2	7.3	2.0	4.3	6.0	12.0	3.5	7.7
	125								10		4 - 6 deep	38.0	20									
-110	60	110	110	16	20	20	9 - 2.1 deep	–	–		–	–	–	9.5	5.2	7.3	2.5	4.8	6.0	12.0	3.5	7.7
	155								10		5 - 6.5 deep	46.0	42									
-145	80	125	145	20	27	40	12 - 2.1deep	40	–		–	–	–	9.5	5.2	7.3	2.5	4.8	8.0	16.5	3.5	9.8
	190								20		6 - 12 deep	62.0	35									
-200	190		200	27	40	40	16 - 3.1 deep	–	–		–	–	–	–	–	–	–	–	10.0	20.1	6.0	12.5
	305								20		8 - 16 deep	59.5	41									
-280	375		278	30	71	112.5	16 - 3.1 deep	80	60	40	8 - 16 deep	50.0	60	–	–	–	–	–	12.3	20.5	8.0	17.3

CKK/ CKR	L_{ca} (mm)		**Material number**		**Mass** (kg)	
	CKK	CKR	CKK	CKR	CKK	CKR
-090	60		R0375 300 15	R0375 300 16	0.18	
	125		R0375 300 10	R0375 300 11	0.37	
-110	60	110	R0375 400 15	R0375 400 16	0.23	0.38
	155		R0375 400 10	R0375 400 11	0.59	0.58
-145	80	125	R0375 500 15	R0375 500 16	0.50	0.81
	190		R0375 500 10	R0375 500 11	1.20	1.15
-200	190		R0375 600 15	R0375 600 16	2.20	2.20
	305		R0375 600 10	R0375 600 11	3.60	3.60
-280	375		R0375 710 28	R0375 740 28	6.93	7.02

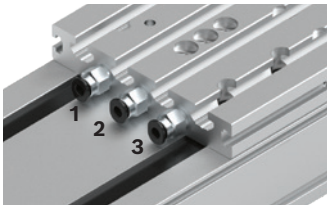
Connection dimensions for switching cam (size 200)



For lube version LCF/LCO

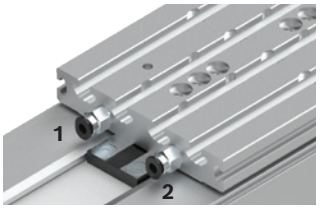


CKK



A Drive side
1 Lube connection, runner block left
2 Lube connection, runner block right
3 Lube connection, ball screw assembly

CKR

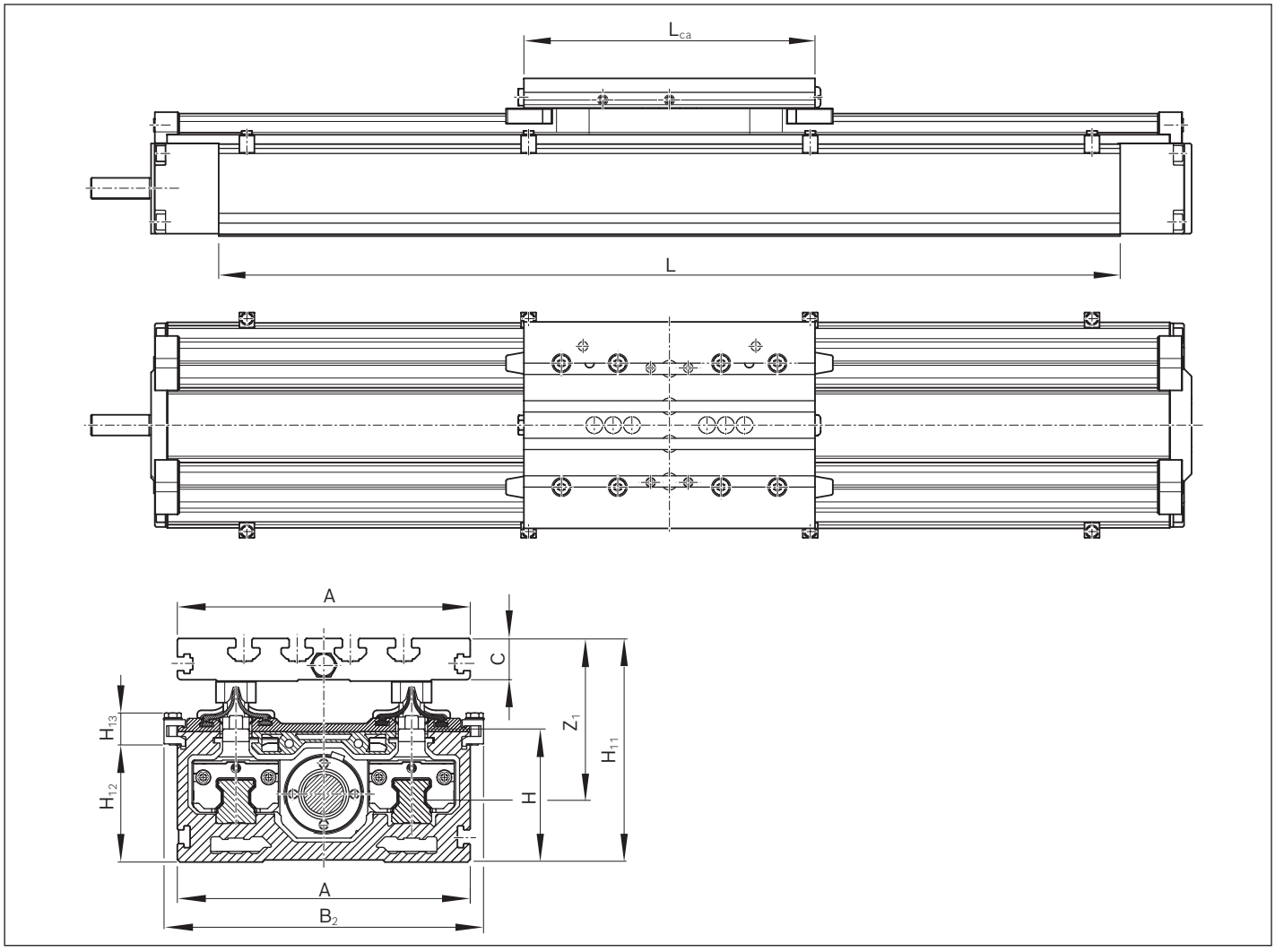


A Drive side
1 Lube connection, runner block left
2 Lube connection, runner block right

CKK/CKR	**Dimensions** (mm)					
	ØD	**H_5**		**H_6**	**H_8**	**L_{ca}**
		CKK	**CKR**			
-070	–	–	–	–	–	–
-090	8.5	19	19	12.5	3	125
-110	8.5	20	40		3	155
-145	–	26	42		–	190
-200	–	31	55		–	305

More dimensions ➠ Chapter "Connection plates".
Lube fittings: Straight connector (SW 9), for Ø 4 mm plastic tubes and metal pipes

Resist cover



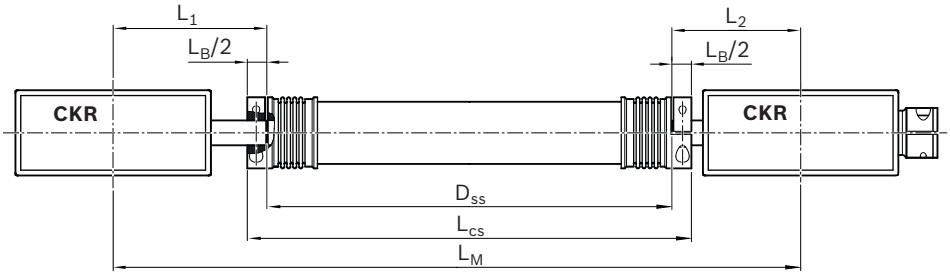
CKK	**Dimensions** (mm)								
	A	**B_2**	**C**	**H**	**H_{11}**	**H_{12}**	**H_{13}**	**L_{ca}**	**Z_1**
-110	100	120	16	50	84	44	12	155	60.7
-145	145	155	20	65	105	59	12	190	71.6
-200	200	212	27	100	150	82	24	305	86.4

Z_1 = Application point of the effective force

Connecting shafts

Features

- Bridge large distances between axes
- Can be mounted radially by split clamping hub
- Mounting and dismounting without shifting the aligned axes
- Backlash-free and torsionally stiff



Schematic figure

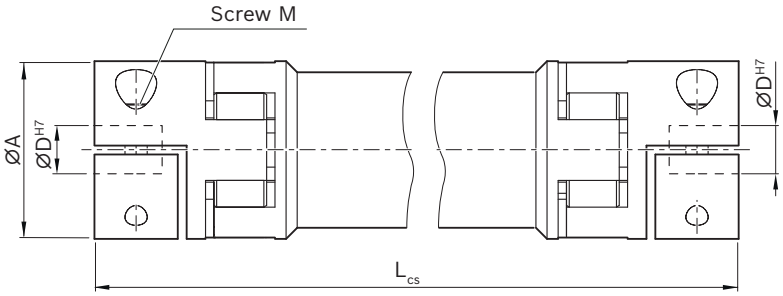
CKR-070

Material

Coupling hub: high-strength aluminum

Elastomer circle: precision manufactured, extremely wear resistant, and thermally stable plastic

Connecting tube: high-precision aluminum tube

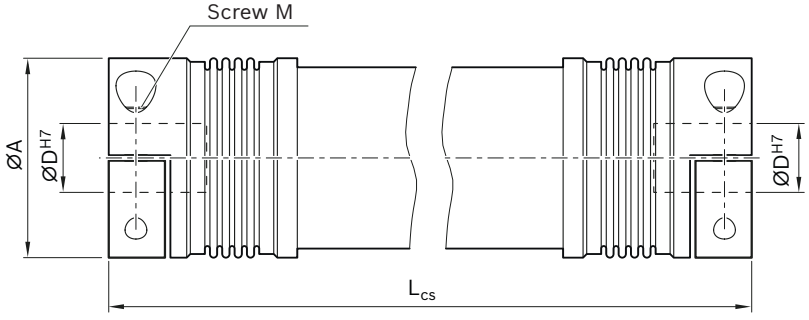


CKR-090, -110, -145, -200

Material

Bellows: highly flexible stainless steel

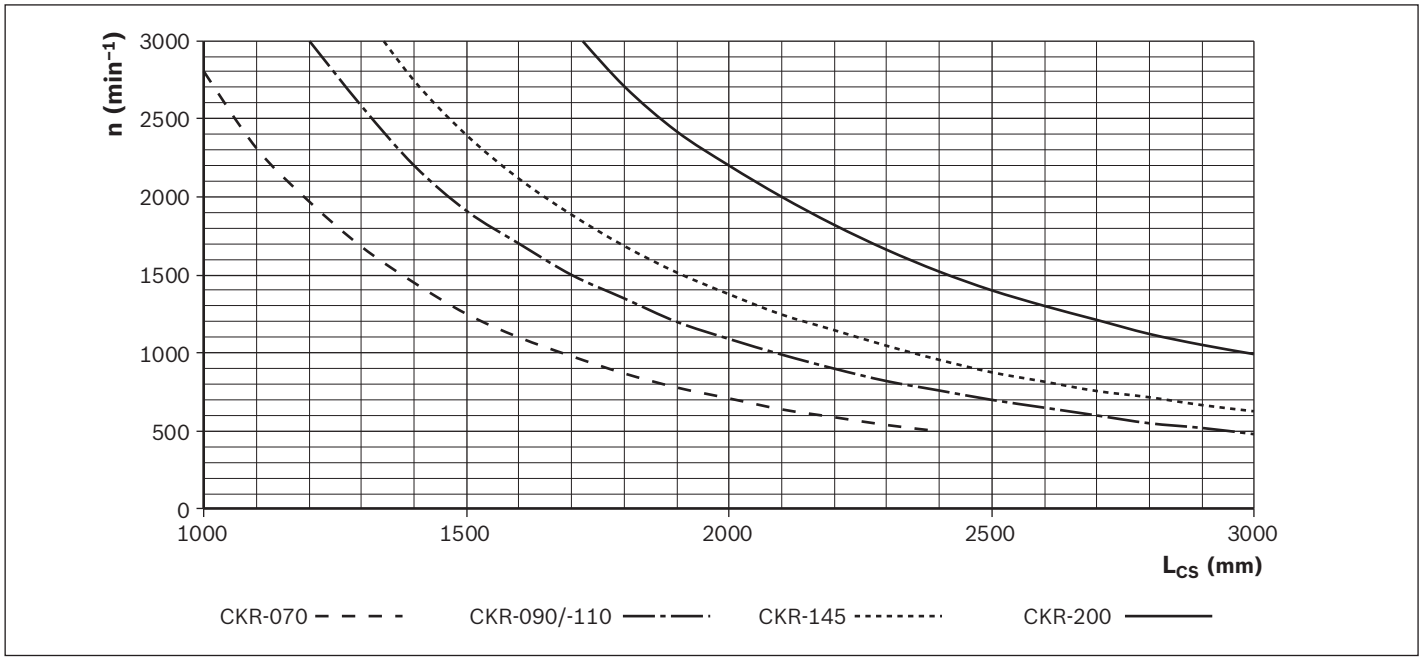
Connecting tube and clamping hub: Aluminum



Size	Material number	Dimensions (mm)						M_A (Nm)
		A	D	M	L_B	$L_{cs\ min}$	$L_{cs\ max}$	
-070	R0391 510 22	30	8	M4	21	95	2,400	4
-090	R0391 510 16	40	10	M4	22	105	3,000	5
-110	R0391 510 20	40	14	M4	22	105	3,000	5
-145	R0391 510 18	55	19	M6	32	150	3,000	15
-200	R0391 510 19	83	24	M10	50	200	3,000	70

Size	M_S (Nm)	M_{cs} (Nm)	Mass moment of inertia (10^{-6} kgm²)	Weight (kg)
-070	25	12.5	0.090 · (L_{cs} (mm) - 80) + 30	0.00054 · (L_{cs} (mm) - 80) + 0.12
-090	17	10.0	0.032 · (L_{cs} (mm) - 80) + 68.2	0.00090 · (L_{cs} (mm) - 80) + 0.21
-110	17	10.0	0.032 · (L_{cs} (mm) - 80) + 68.2	0.00090 · (L_{cs} (mm) - 80) + 0.21
-145	45	30.0	0.670 · (L_{cs} (mm) - 118) + 246	0.00120 · (L_{cs} (mm) - 118) + 0.62
-200	170	170.0	4.500 · (L_{cs} (mm) - 160) + 2,000	0.00320 · (L_{cs} (mm) – 160) + 2.00

Bending-critical speed



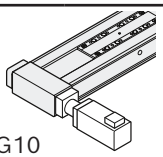
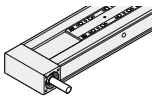
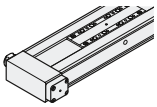
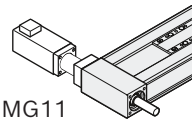
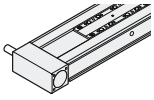
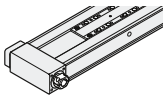
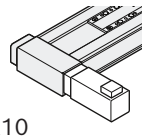
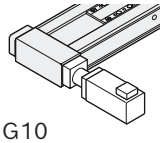
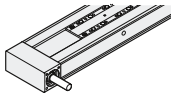
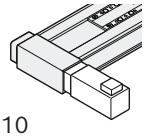
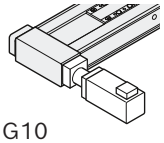
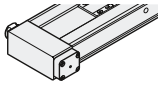
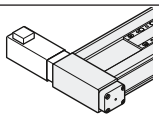
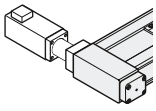
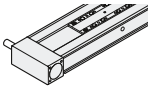
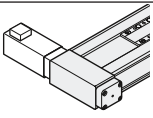
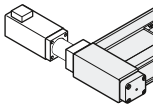
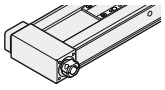
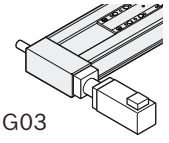
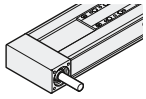
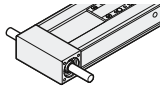
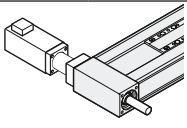
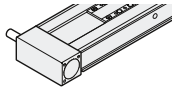
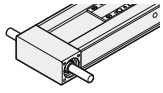
Order

Please state the material number and length L_{cs}.
e.g.: R0391 510 20, L_{cs} = 550 mm

$L_{cs} = D_{SS} + L_B$
$D_{SS} = L_M - L_1 - L_2$
L_1/L_2: For the calculation, refer to the dimension drawings

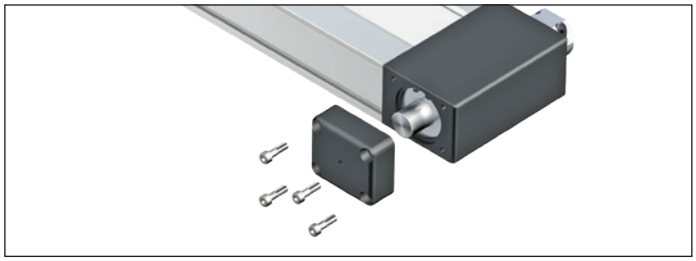
D_{SS} = Distance drive journals
L_{cs} = Overall length of the connecting shaft
L_M = Centerline-to-centerline distance between compact modules
M_A = Tightening torque of screws
M_{cs} = Rated torque of connecting shaft
M_S = Peak torque of connecting shaft
n = Rotary speed (rpm)
L_{cs} = Overall length of the connecting shaft (mm)

Combination possibilities for multi-axis systems with connecting shaft

Size	Version			
-070	 MG10	⟷	 MA01	 MA06
	 MG11	⟷	 MA02	 MA05
-090 **-110** **-145**	 MA10	 MG10	⟷	 MA01
	 MA10	 MG10	⟷	 MA06
	 MA11	 MG11	⟷	 MA02
	 MA11	 MG11	⟷	 MA05
-200	 MG03	⟷	 MA01	 MA03
	 MG04	⟷	 MA02	 MA03

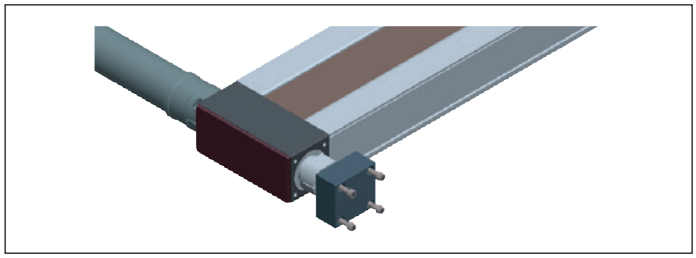
Drive end enclosure with additional drive journal

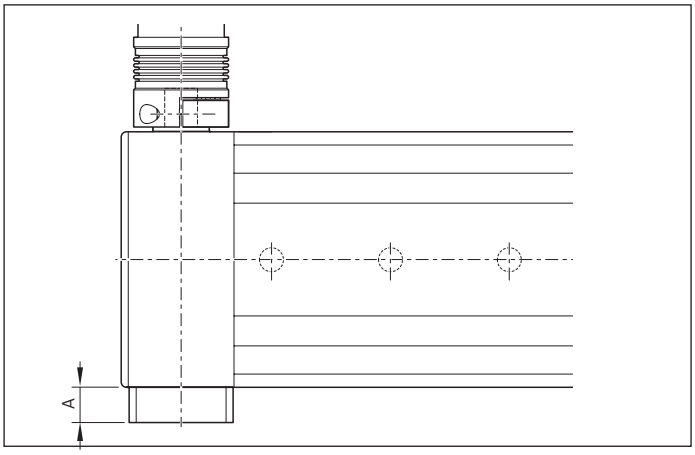
In the versions MA05, MA06, MA10, MA11, MG10 and MG11, a second drive journal can be made available by removing the screws and cover.



Cover

By attaching the cover, the open end of the drive (clamping hub) is closed.
This means there is no longer any risk of injury from the rotating motor holder.

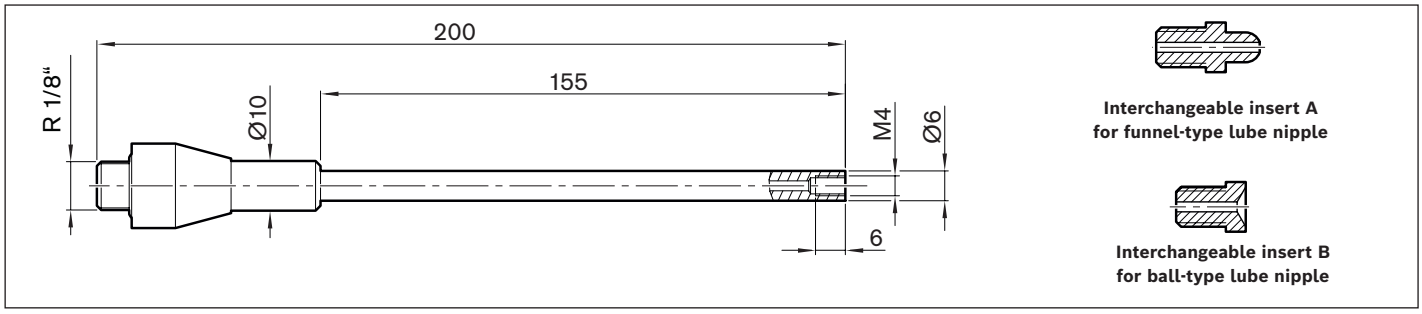




Size	Dimension (mm) A	Material number
-070	20	R0375 200 09
-090	24	R0375 300 09
-110	26	R0375 400 09
-145	31	R0375 500 09

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 the adjustment of the toothed belt pretension when driven via a belt side drive.

The compact IGAT measuring device TECO-PRO enables easy measurement of the pretension of standard belt systems. Equipped with the latest microprocessor technology, the measuring device enables precise adjustment of all V-belts, toothed belts and power belts that need to be tensioned in the measuring range between 10 and 600 Hz. Belt construction, color and material of the belt as well as the influence of light have no effect on the measurement result because the acoustic principle is used.

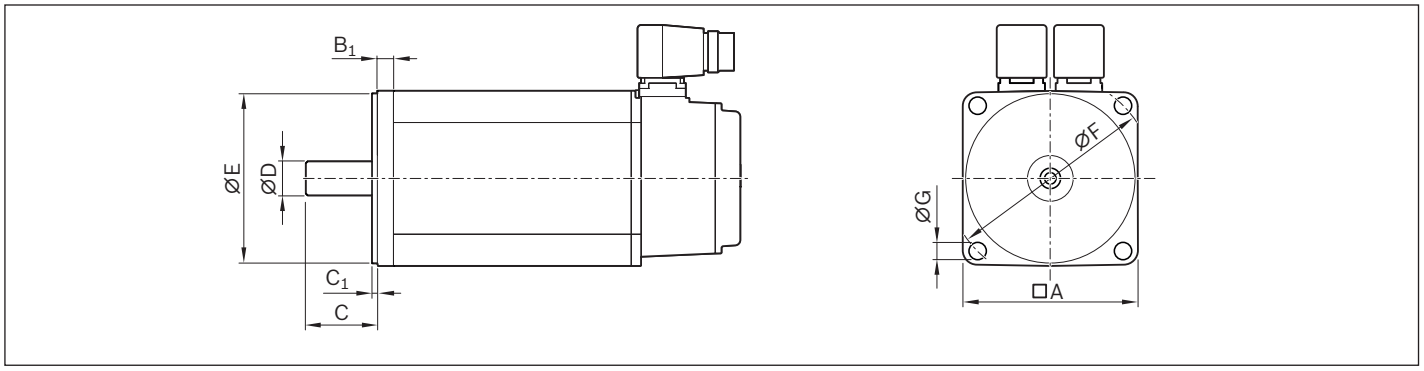
Scope of delivery:
The device is delivered with a permanently installed gooseneck. A leather belt bag is included. The device is delivered with a USB charging cable and a euro plug in a sturdy hard box.

Source: https://www.igat.net

Material number
R913057897

Motors

Motor attachment kits according to customer spec.
The motor of linear motion systems with ball screw assembly is attached by either an attachment kit with flange and coupling (MF) or a belt side drive (RV).
The available combinations are shown in the "Configuration and ordering" selection tables for each size. In addition to attachment kits for Rexroth motors, attachment kits for motors according to customer specification are also available.
In order to determine the appropriate attachment kit, the connection geometry of the motor is crucial. Characteristics required to clearly determine motor geometry are shown below.

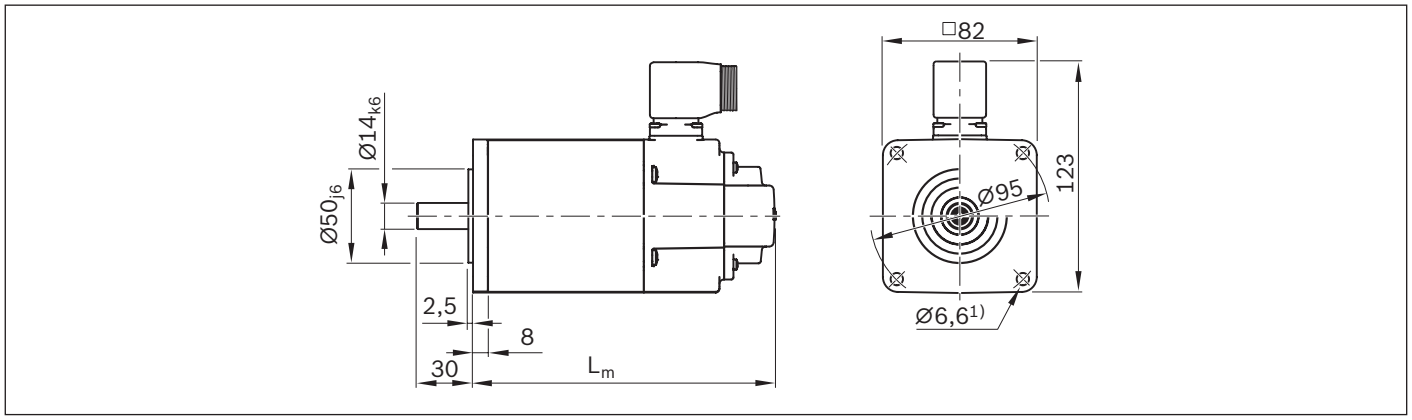


The dimensions queried result in a unique "motor geometry code":

□□ – □□ – □□□ – □□□ – □□□ – **M**□□ – □□□ – □□□

ØD	=	Shaft diameter
C	=	Shaft length
ØE	=	Centering diameter
C_1	=	Centering depth
ØF	=	Pitch diameter
ØG	=	Drill hole for fastening screw (specify thread diameter)
B_1	=	Flange thickness
A	=	Flange edge dimension

Example illustration of servo motor IndraDyn S type MS2N04



1 **4** – **3** **0** – **0** **5** **0** – **2** **.** **5** – **0** **9** **5** – **M** **0** **6** – **0** **0** **8** – **0** **8** **2**

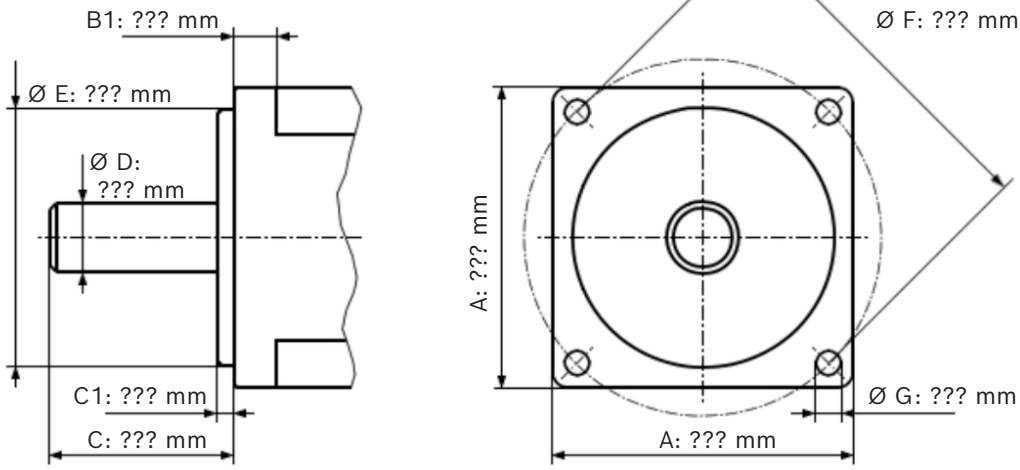
[1)] The drill hole Ø 6.6 mm results in the type designation M06 for the geometry motor code (nominal thread diameter fastening screw M6).

Motor attachment kits for motors according to customer specification can be configured using the online configurator in the eShop. To do this, select the "Attachment kits for motors according to customer specification" option. Enter motor geometry in the input dialog box. The dimensions can be entered directly or by using a drop-down menu.

Size of customer motor

Motor manufacturer ▼

Motor type ▼

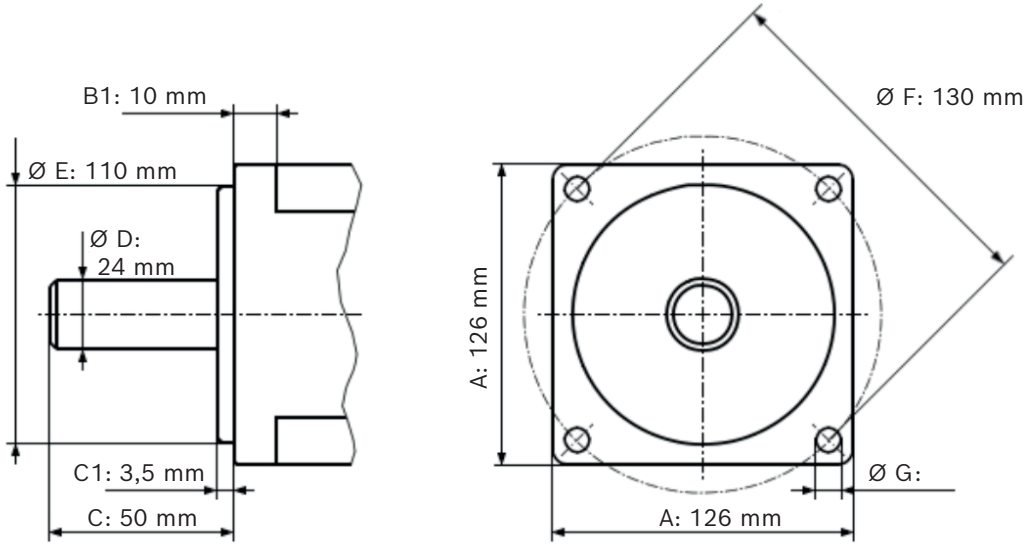


Example

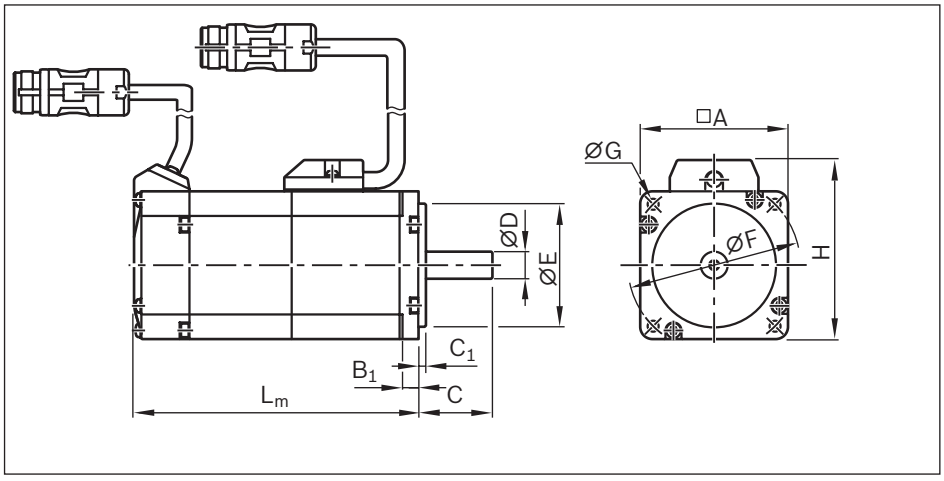
Size of customer motor

Motor manufacturer Siemens ▼

Motor type 1FK706 ▼



IndraDyn S - Servo motors MSM



Motor schematic

Motor code	Dimensions (mm)											
	A	B_1	C	C_1	Ø D	Ø E	Ø F	Ø G	H	L_m Brake		
					h6	h7				without	with	
MSM 019A-0300	38	6.0	25	3	8	30	45	3.4	51	72.0	102.0	
MSM 019B-0300	38	6.0	25	3	8	30	45	3.4	51	92.0	122.0	
MSM 031B-0300	60	6.5	30	3	11	50	70	4.5	73	79.0	115.5	
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

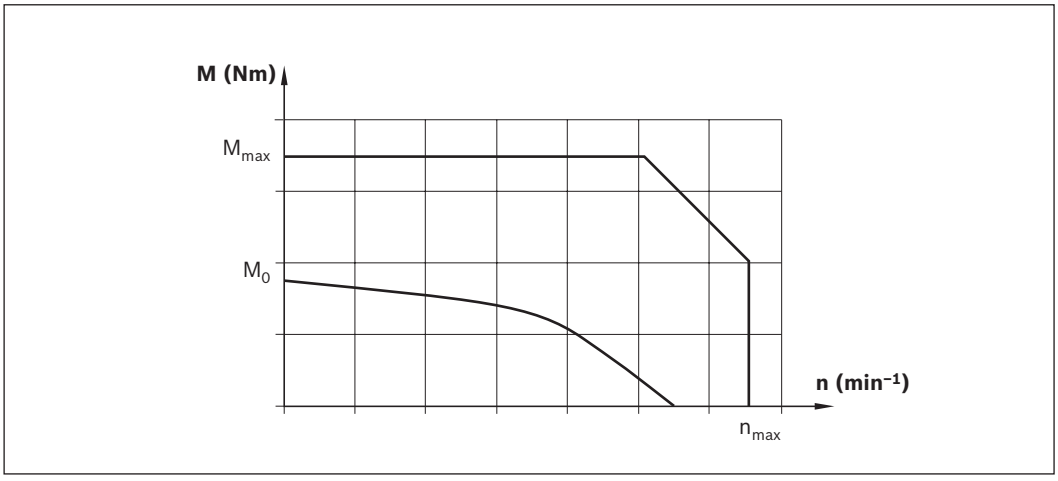
Note

Motors are available with controllers and control systems. For more information on motors, controllers and control systems, please refer to the Rexroth automation solutions ➠ Chapter "Further information"

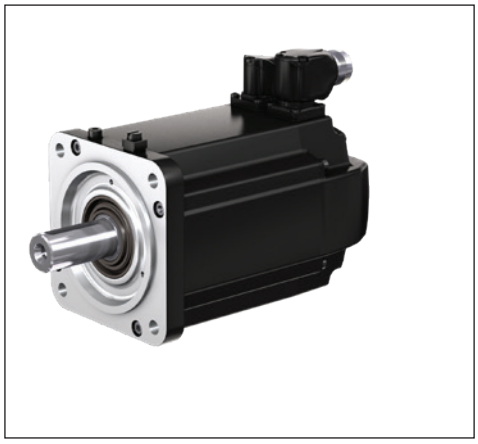
Motor data										Type code	Material number
n_{max} (rpm)	M_0 (Nm)	M_{max} (Nm)	M_{br} (Nm)	J_m (kgm^2)	J_{br} (kgm^2)	m_m (kg)	m_{br} (kg)	Motor connection 1/2 cable(s)	Holding brake		
5,000	0.16	0.48	0.29	0.0000025	0.0000002	0.32	0.21	2	N	MSM 019A-0300-NN-M5-MH0	R911344209
									Y	MSM 019A-0300-NN-M5-MH1	R911344210
5,000	0.32	0.95	0.29	0.0000051	0.0000002	0.47	0.21	2	N	MSM 019B-0300-NN-M5-MH0	R911344211
									Y	MSM 019B-0300-NN-M5-MH1	R911344212
5,000	0.64	1.91	1.27	0.0000140	0.0000018	0.82	0.48	2	N	MSM 031B-0300-NN-M5-MH0	R911344213
									Y	MSM 031B-0300-NN-M5-MH1	R911344214
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

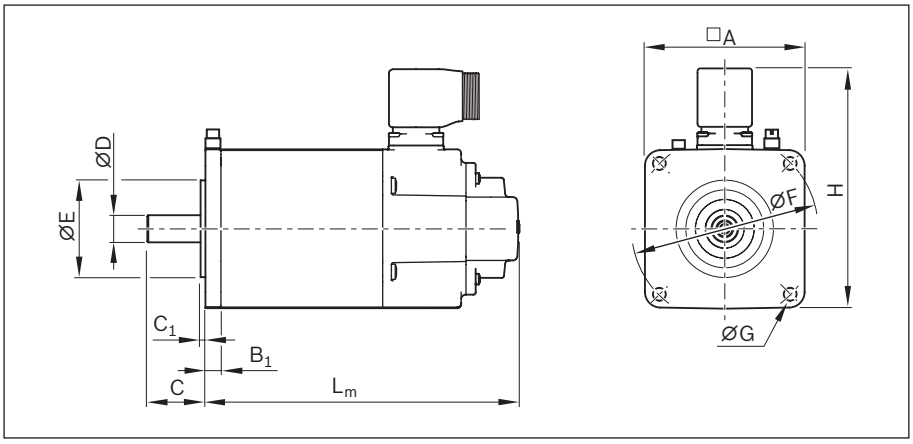
For abbreviations, see chapter “Service and Information”

Motor characteristic
(Schematic)



IndraDyn S - Servo motors MS2N





Motor schematic

Dimensions / motor data

Motor code	Dimensions (mm)											
	□ A	B_1	C	C_1	⌀ D_{k6}	⌀ E_{j6}	⌀ F	⌀ G	H Cabel 2	H Cabel 1	L_m Brake without	L_m Brake with
MS2N03-B0BYN	58	7,5	20	2,5	9	40	63	4,5	84	99	163	192
MS2N03-D0BYN	58	7,5	23	2,5	11	40	63	4,5	84	99	203	232
MS2N04-B0BTN	82	8	30	2,5	14	50	95	6,6	108	123	162	194,5
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-B0BTN	98	9	40	3	19	95	115	9	124	139	188	218
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-B1BNN	116	14	50	3	24	95	130	9	156	156	164	201
MS2N06-C0BTN	116	14	50	3	24	95	130	9	156	156	184	202
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
MS2N06-E0BRN	116	14	50	3	24	95	130	9	156	156	264	301

MS2N07/ MS2N10 see next page

The table lists motors that might not be used with this product

Version

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

Note

Motors are available with controllers and control systems. For more information on motors, controllers and control systems, please refer to the Rexroth automation solutions ➠ Chapter "Further information". For further information on the type code, see chapter "Type code".

Motor data										Type code	Material number
n_{max} (min^{-1})	M_0 (Nm)	M_{max} (Nm)	M_{br} (Nm)	J_m (kgm^2)	J_{br} (kgm^2)	m_m (kg)	m_{br} (kg)	Motor connection 1 / 2 cable	Holding brake		
9 000	0,73	3,46	1,8	0,000023	0,000007	1,4	0,4	1	N	MS2N03-B0BYN-CMSH0-NNNNE-NN	R911384767
								1	Y	MS2N03-B0BYN-CMSH1-NNNNE-NN	R911384769
9 000	1,15	6,8	1,8	0,000037	0,000007	2,0	0,4	1	N	MS2N03-D0BYN-CMSH0-NNNNE-NN	R911384772
								1	Y	MS2N03-D0BYN-CMSH1-NNNNE-NN	R911384773
6 000	1,75	5,9	5,0	0,000070	0,000040	2,7	0,7	1	N	MS2N04-B0BTN-CMSH0-NNNNE-NN	R911384527
								1	Y	MS2N04-B0BTN-CMSH1-NNNNE-NN	R911384528
6 000	2,80	12,0	5,0	0,000110	0,000050	3,7	0,7	1	N	MS2N04-C0BTN-CMSH0-NNNNE-NN	R911384531
								1	Y	MS2N04-C0BTN-CMSH1-NNNNE-NN	R911384532
6 000	3,85	18,1	5,0	0,000160	0,000040	4,7	0,7	1	N	MS2N04-D0BQN-CMSH0-NNNNE-NN	R911384535
								1	Y	MS2N04-D0BQN-CMSH1-NNNNE-NN	R911384536
6 000	3,75	10,6	10,0	0,000170	0,000110	4,0	1,1	1	N	MS2N05-B0BTN-CMSH0-NNNNE-NN	R911384542
								1	Y	MS2N05-B0BTN-CMSH1-NNNNE-NN	R911384543
6 000	6,10	20,8	10,0	0,000290	0,000110	5,9	1,1	1	N	MS2N05-C0BTN-CMSH0-NNNNE-NN	R911384546
								1	Y	MS2N05-C0BTN-CMSH1-NNNNE-NN	R911384547
6 000	7,90	31,3	10,0	0,000400	0,000110	7,3	1,1	1	N	MS2N05-D0BRN-CMSH0-NNNNE-NN	R911384550
								1	Y	MS2N05-D0BRN-CMSH1-NNNNE-NN	R911384551
6 000	3,25	9,5	10,0	0,000480	0,000110	5,1	1,1	1	N	MS2N06-B1BNN-CMSH0-NNNNE-NN	R911384929
								1	Y	MS2N06-B1BNN-CMSH1-NNNNE-NN	R911384930
6 000	6,00	16,0	10,0	0,000390	0,000110	6,4	1,0	1	N	MS2N06-C0BTN-CMSH0-NNNNE-NN	R911384933
								1	Y	MS2N06-C0BTN-CMSH1-NNNNE-NN	R911384934
6 000	9,70	32,0	15,0	0,000650	0,000140	9,0	1,5	1	N	MS2N06-D0BRN-CMSH0-NNNNE-NN	R911384937
								1	Y	MS2N06-D0BRN-CMSH2-NNNNE-NN	R911384938
6 000	9,00	38,4	15,0	0,001400	0,000140	9,0	1,5	1	N	MS2N06-D1BNN-CMSH0-NNNNE-NN	R911384941
								1	Y	MS2N06-D1BNN-CMSH2-NNNNE-NN	R911384942
6 000	13,0	49,0	15,0	0,000890	0,000140	11,5	1,5	1	N	MS2N06-E0BRN-CMSH0-NNNNE-NN	R911384945
								1	Y	MS2N06-E0BRN-CMSH2-NNNNE-NN	R911384946

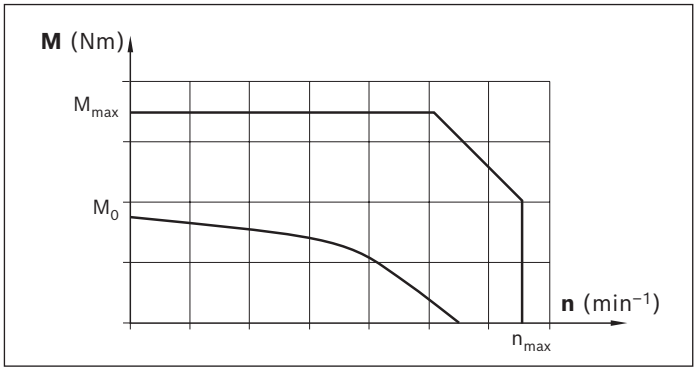
Motor code	**Dimensions** (mm)												
	□ A	**B_1**	**C**	**C_1**	**⌀ D_{k6}**	**⌀ E_{j6}**	**⌀ F**	**⌀ G**	**H**		**L_m**		
									Cabel		**Brake**		
									2	1	without	with	
MS2N07-B1BNN	140	18	58	4	32	130	165	11	180	180	176	230	
MS2N07-C0BQN	140	18	58	4	32	130	165	11	180	180	205	259	
MS2N07-C1BRN	140	18	58	4	32	130	165	11	180	180	205	259	
MS2N07-D0BHA	140	18	58	4	32	130	165	11	203	-	384	438	
MS2N07-D0BRN	140	18	58	4	32	130	165	11	180	-	263	317	
MS2N07-D1BNN	140	18	58	4	32	130	165	11	180	180	263	317	
MS2N07-E0BQN	140	18	58	4	32	130	165	11	203	-	321	375	
MS2N07-E1BNN	140	18	58	4	32	130	165	11	203	-	321	375	
MS2N10-C0BNN	196	20	80	4	38	180	215	14	270	-	238	298	
MS2N10-D0BHA	196	20	80	4	38	180	215	14	274	-	394	454	
MS2N10-E0BHA	196	20	80	4	38	180	215	14	274	-	452	512	
MS2N10-E0BNA	196	20	80	4	38	180	215	14	270		452	512	
MS2N10-F1BHA	196	20	80	4	38	180	215	14	276		510	570	

The table lists motors that might not be used with this product

Motor data								Motor connection 1 / 2 cable	Holding brake	Type code	Material number
n_{max} (min^{-1})	M_0 (Nm)	M_{max} (Nm)	M_{br} (Nm)	J_m (kgm^2)	J_{br} (kgm^2)	m_m (kg)	m_{br} (kg)				
6 000	7,40	21,0	20,0	0,001970	0,000260	9,5	2,0	1	N	MS2N07-B1BNN-CMSH0-NNNNE-NN	R911384951
								1	Y	MS2N07-B1BNN-CMSH1-NNNNE-NN	R911384952
6 000	12,8	35,7	20,0	0,001200	0,000260	12,0	2,0	1	N	MS2N07-C0BQN-CMSH0-NNNNE-NN	R911384955
								1	Y	MS2N07-C0BQN-CMSH1-NNNNE-NN	R911384956
6 000	11,50	42,2	20,0	0,003050	0,000260	12,0	2,0	1	N	MS2N07-C1BRN-CMSH0-NNNNE-NN	R911384959
								1	Y	MS2N07-C1BRN-CMSH1-NNNNE-NN	R911384960
4 000	35,5	73,2	36,0	0,00210	0,000410	20,0	2,5	2	N	MS2N07-D0BHA-CMVH0-NNNNE-NN	R914503253
								2	Y	MS2N07-D0BHA-CMVH2-NNNNE-NN	R914503254
6 000	22,0	73,2	36,0	0,002100	0,000410	17,5	2,5	2	N	MS2N07-D0BRN-CMVH0-NNNNE-NN	R914504164
								2	Y	MS2N07-D0BRN-CMVH2-NNNNE-NN	R911394492
6 000	18,90	84,8	36,0	0,005290	0,000410	17,5	2,5	1	N	MS2N07-D1BNN-CMSH0-NNNNE-NN	R911384965
								1	Y	MS2N07-D1BNN-CMSH2-NNNNE-NN	R911384966
6 000	29,2	109,5	36,0	0,003000	0,000410	23,0	3,0	2	N	MS2N07-E0BQN-CMVH0-NNNNE-NN	R914501679
								2	Y	MS2N07-E0BQN-CMVH2-NNNNE-NN	R914504165
6 000	25,8	128,5	36,0	0,007520	0,000410	23,0	3,0	2	N	MS2N07-E1BNN-CMVH0-NNNNE-NN	R914504166
								2	Y	MS2N07-E1BNN-CMVH2-NNNNE-NN	R914504167
6 000	30,2	70,5	53,0	0,004800	0,001470	23,5	5,0	2	N	MS2N10-C0BNN-CMVH0-NNNNE-NN	R914503255
								2	Y	MS2N10-C0BNN-CMVH2-NNNNE-NN	R914503256
4 000	82,4	142,0	53,0	0,008100	0,001470	35,0	5,0	2	N	MS2N07-D0BHA-CMVH0-NNNNE-NN	R914503257
								2	Y	MS2N07-D0BHA-CMVH2-NNNNE-NN	R914503258
6 000	119,0	214,0	90,0	0,011400	0,002700	46,0	7,0	2	N	MS2N10-E0BHA-CMAH0-NNNNE-NN	R914503270
								2	Y	MS2N10-E0BHA-CMAH3-NNNNE-NN	R914503271
6 000	119	214	90	0,011400	0,002700	46,0	7,0	2	N	MS2N10-E0BNA-CMAH0-NNNNE-NN	R914509918
									Y	MS2N10-E0BNA-CMAH3-NNNNE-NN	R914502696
4 000	145	333	90	0,032900	0,002700	60	7,0	2	N	MS2N10-F1BHA-CMAH0-NNNNE-NN	R914509919
									Y	MS2N10-F1BHA-CMAH3-NNNNE-NN	R914509920

For abbreviations, see chapter “Service and Information”

Motor characteristic
(Schematic)



Automation package

2 ORDERING OPTIONS

- Single axis
- Single axis + drive (incl. mains filter/cable (optional))

Ordering options	System	Options				
		Motor MS2N	Drive controller		Cable	Mains filter
			Indra-Drive HCS	ctrlX Drive		
1	CKK / CKR MKK / MKR	—	—	—	—	—
		✔	—	—	—	—
2	EMC EMC-HP	✔	✔	—	Optional	Included
			—	✔	Optional	Included

Motor/controller combinations

Several motor-controller combinations are available in order to provide the most cost-effective solution for every customer application. When dimensioning the drive, always consider the motor-controller combination.
For more information on motors, controllers and control systems, please refer to the Rexroth automation solutions
➠ Chapter "Further information".

IndraDrive drive family
The converters of the IndraDrive C series generate a DC link direct voltage from the grid supply voltage and from it a controlled AC output voltage with variable amplitude and frequency for operation of a servo motor.
The compact format contains additional mains connection components, making it particularly suitable for single-axis applications.

Version
- Basic Universal or Basic Universal with Safe Motion
- Multi-Ethernet for communication with a superior controller
- More interfaces or integrated controls available
- For the converter HCS01, a smart function kit for pressing and joining applications is available
- Brake resistor included
- Adapters included
- Separate mains filter included

IndraDrive Cs
HCS01.1E-W0054

IndraDrive C
HCS03.1E-W0100

ctrlX drive family
With ctrlX DRIVE, Bosch Rexroth has developed the most compact, modular drive system worldwide for their customers. In addition to space-saving dimensions and maximum scalability, an almost unlimited number of combination options for the user, mature engineering tools and high energy efficiency are among the advantages of ctrlX DRIVE. The Bosch Rexroth servo motors are the perfect team players in the ctrlX DRIVE portfolio.
With compact dimensions, they combine highest dynamics with maximum accuracy for the position, rotary speed and torque values.

- EtherCAT SOE with Safe Torque Off or EtherCAT SOE with safe field bus
- Multi-Ethernet for communication with a superior controller
- More interfaces or integrated controls available
- Adapters included
- Separate mains filter included

ctrlX Drive (XCS)

Motor/controller combinations

Motor				Drive controller				
	Brake			Without controller	HCS	Controller option		
	Without	With				BASIC		
						UNIVERSAL		
						MultiEthernet		
						(B-ET) + L3	(B-ET) + S4	
						Safe torque off	Safe motion	
Without motor	000			000	Without	000	000	
Motor not listed								
MS2N03-B0BYN-CMSHx	203	204	1 cable		HCS01-W0008	102	101	
MS2N03-D0BYN-CMSHx	207	208			HCS01-W0018	302	301	
MS2N04-B0BTN-CMSHx	211	212						
MS2N04-C0BTN-CMSHx	215	216						
MS2N04-D0BQN-CMSHx	219	220						
MS2N05-B0BTN-CMSHx	223	224						
MS2N05-C0BTN-CMSHx	227	228			HCS01-W0028	402	401	
MS2N05-D0BRN-CMSHx	231	232						
MS2N06-B1BNN-CMSHx	235	236			HCS01-W0008	102	101	
MS2N06-C0BTN-CMSHx	239	240			HCS01-W0028	402	401	
MS2N06-D0BRN-CMSHx	243	244						
MS2N06-D1BNN-CMSHx	247	248						
MS2N06-E0BRN-CMSHx	251	252			HCS01-W0054	502	501	
MS2N07-B1BNN-CMSHx	255	256			HCS01-W0018	302	301	
MS2N07-C0BQN-CMSHx	259	260			HCS01-W0028	402	401	
MS2N07-C1BRN-CMSHx	263	264			HCS01-W0054	502	501	
MS2N07-D1BNN-CMSHx	269	270						
MS2N07-D0BHA-CMVHx	287	288	2 cables					
MS2N07-D0BRN-CMVHx	295	296						
MS2N07-E1BNN-CMVHx	299	300						
MS2N07-E0BQN-CMVHx	297	298			HCS03-W0100	702	701	
MS2N10-C0BNN-CMVHx	289	290			HCS01-W0054	502	501	
MS2N10-D0BHA-CMVHx	291	292						
MS2N10-E0BHA-CMAHx	293	294			HCS03-W0100	702	701	
MS2N10-E0BNA-CMAHx	301	302			-	-	-	
MS2N10-F1BHA-CMAHx	303	304			-	-	-	

The table lists motors that might not be used with this product.

[1] Further related information ➠ Smart Function Kit Handling (SFK-H)

				Cable option						
	XCS2	**Controller option**		**Without**	**Controller HCS / XCS2**					
		MultiEthernet			**1 cable**			**2 cables**		
		**CAT SOE**								
		+ T0	**+FSoE + M5**		**5 m**	**10 m**	**15 m**	**5 m**	**10 m**	**15 m**
		Safe torque off	**Safe motion**							
	Without	000	000	000	000	000	000	000	000	000
	XCS2-W0023	2100	2130		105	110	115	-	-	-
	XCS2-W0054	3100	3130							
	XCS2-W0023	2100	2130							
	XCS2-W0054	3100	3130							
	XCS2-W0023	2100	2130							
	XCS2-W0054	3100	3130							
	XCS2-W0070	4100	4130		-	-	-	205	210	215
	XCS2-W0054	3100	3130							
	XCS2-W0070	4100	4130							
	XCS2-W0100	5100	5130							
	XCS2-W0100	5100	5130							
	XCS2-W0150	7100	7130							

Motor/controller/cable combinations

Hybrid cable (power and encoder cable combined, 1 cable)

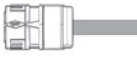
Motor	Drive controller	Technical data						
		Cable designation **Part number**	**Cable weight (approximately)** kg/m	**Cable outside diameter D** (mm)	**Bending radius minimum** Fixed installation	 Flexible installation	**Bending cycle**	
MS2N03-B0BYN-CMSHx MS2N06-B1BNN-CMSHx	HCS01.1E-W0008	RH2-021DBB-NN-xxx,x 5m R911372050 10m R911372052 15m R911372053	0.26	13.0 +/- 0.3	5 x D	7.5 x D	> 5 mill.	
MS2N03-D0BYN-CMSHx MS2N04-B0BTN-CMSHx MS2N04-C0BTN-CMSHx MS2N04-D0BQN-CMSHx MS2N05-B0BTN-CMSHx MS2N07-B1BNN-CMSHx	HCS01.1E-W0018	RH2-023DBB-NN-xxx,x 5m R911372062 10m R911372064 15m R911372065						
MS2N05-C0BTN-CMSHx MS2N05-D0BRN-CMSHx MS2N06-C0BTN-CMSHx MS2N06-D0BRN-CMSHx MS2N06-D1BNN-CMSHx MS2N07-C0BQN-CMSHx	HCS01.1E-W0028							
MS2N06-E0BRN-CMSHx MS2N07-C1BRN-CMSHx MS2N07-D1BNN-CMSHx	HCS01.1E-W0054	RH2-024DBB-NN-xxx,x 5m R911374454 10m R911379794 15m R911379795						
MS2N03-B0BYN-CMSHx MS2N03-D0BYN-CMSHx MS2N04-B0BTN-CMSHx MS2N04-C0BTN-CMSHx MS2N04-D0BQN-CMSHx MS2N05-B0BTN-CMSHx MS2N05-C0BTN-CMSHx MS2N05-D0BRN-CMSHx MS2N06-B1BNN-CMSHx MS2N06-C0BTN-CMSHx MS2N06-D1BNN-CMSHx MS2N07-B1BNN-CMSHx MS2N07-C0BQN-CMSHx	XCS2-W0023	RHB2-021DCB-NN-xxx,x 5m R914507997 10m R914508010 15m R914508018	0.27	13.0 +/- 0.3	5 x D	7.5 x D	> 5 mill.	
MS2N06-D0BRN-CMSHx MS2N06-E0BRN-CMSHx MS2N07-C1BRN-CMSHx MS2N07-D1BNN-CMSHx	XCS2-W0054	RHB2-022DCB-NN-xxx,x 5m R914508036 10m R914508046 15m R914508052						

The table lists motors that might not be used with this product.

Motor/controller/cable combinations

Power and encoder cable separate, 2 cables

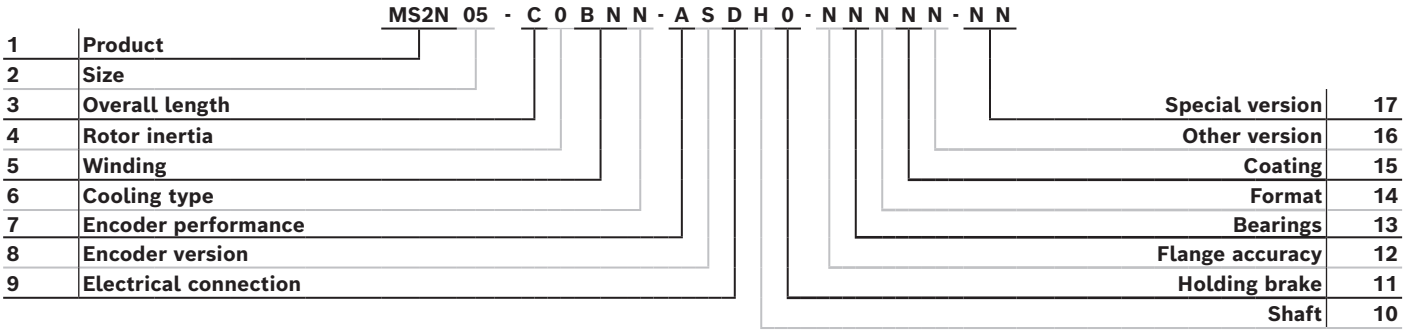
Motor	Drive controller	Technical data power cable						
		Cable designation Part number	**Cable weight (approxi-mately)** kg/m	**Cable outside diameter D** (mm)	**Bending radius minimum** Fixed installation	Flexible installation	**Bending cycle**	
MS2N07-D0BHA-CMVHx MS2N07-E1BNN-CMVHx	HCS01.1E-W0054	RL2-044DBB-NN-xxx,x 5m R911374900 10m R911379527 15m R911379528	0.23	12.2 +/- 0.5				
MS2N07-D0BRN-CMVHx MS2N10-C0BNN-CMVHx MS2N10-D0BHA-CMVHx	HCS01.1E-W0054	RL2-044EBB-NN-xxx,x 5m R911374902 10m R911384595 15m R911384596	0.33	14.8 +/- 0.5	5 x D	7.5 x D	> 5 mill.	
MS2N07-E0BQN-CMVHx	HCS03.1E-W0100	RL2-046EBB-NN-xxx,x 5 m R911376628 10m R911376666 15m R911376667						
MS2N10-E0BHA-CMAHx	HCS03.1E-W0100	RL2-066HBB-NN-xxx,x 5m R911373948 10m R911375037 15m R911375038	0.84	22.2 +/- 1.0				

MS2N07-D0BHA-CMVHx	XCS2-W0054	RLB2-042DBB-NN-xxx,x 5m R911397223 10m R911397225 15m R911397226	0.23	12.2 +/- 0.5				
MS2N07-E1BNN-CMVHx	XCS2-W0070							
MS2N07-D0BRN-CMVHx MS2N10-C0BNN-CMVHx	XCS2-W0054	RLB2-042ECB-NN-xxx,x 5m R911396693 10m R911396695 15m R911396696	0.33	14.8 +/- 0.5				
MS2N07-E0BQN-CMVHx	XCS2-W0070							
MS2N10-D0BHA-CMVHx	XCS2-W0070	RLB2-042GDB-NN-xxx,x 5m R911397170 10m R911397173 15m R911397174"	0.58	18.2 +/- 0.6				
MS2N10-E0BHA-CMAHx	XCS2-W0100	RLB2-063HDB-NN-xxx,x 5m R911395186 10m R911395188 15m R911395189"	0.84	22.2 +/- 1.0	5 x D	7.5 x D	> 5 mill.	
MS2N10-E0BNA-CMAHx	XCS2-W0100	RLB2-063JEB-NN-xxx,x 5m R911395201 10m R911395203 15m R911395204	1,2	25,5+/-1,0				
MS2N10-F1BHA-CMAHx	XCS2-W0150	RLB2-064JEB-NN-xxx,x 5m R914503275 10m R914503276 15m R914510782						

		Technical data encoder cable						
		Cable designation **Part number**	**Cable weight (approxi-mately)** kg/m	**Cable outside diameter D** (mm)	**Bending radius minimum** Fixed installation	 Flexible installation	**Bending cycle**	
		RG2-002AAB-NN-XXX,X 5 m R911371232 10m R911371935 15m R911371936	0.08	7.2 +/-0.2	4 x D	7.5 x D	> 5 mill.	
		RG2-007AAB-NN-XXX,X 5m R911382615 10m R911382617 15m R911382618						
		RG2-007AAB-NN-XXX,X 5m R911382615 10m R911382617 15m R911382618						

Type designation

MS2N05 type designation / features (example)

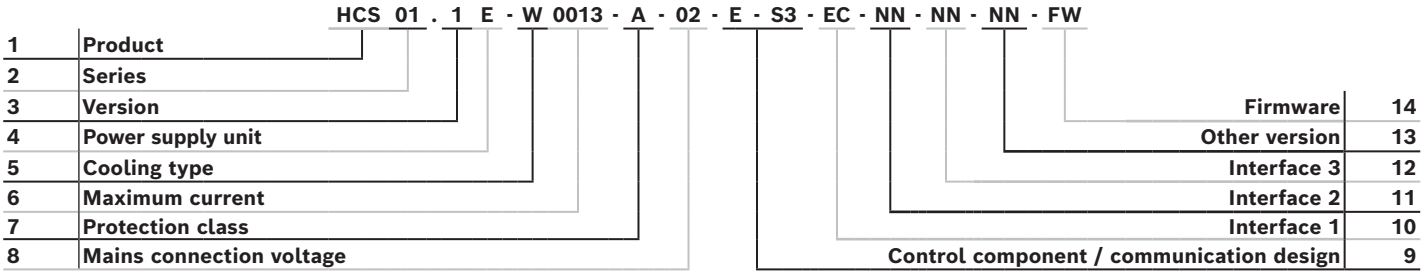


Description / options

1	**Product**	MS2N
2	**Size**	05
3	**Overall length**	B, C, D, E
4	**Rotor inertia**	0 = low inertia / 1 = mean inertia
5	**Winding**	BY = 9000 1/min / BT = 6000 1/min / BR = 4500 1/min / BQ = 4000 1/min BN = 3000 1/min / BH = 2000 1/min
6	**Cooling type**	N = self-cooling / A = external cooling axial 230 V/50 Hz
7	**Encoder performance**	Basic - 16 signal periods, Hiperface® = A Standard - 128 signal periods, Hiperface® (SIL2, PL d)= B Advanced - 20-bit, ACURO®Link (SIL2, PL d)= C Advanced - 20-bit, ACURO®Link (SIL2, PL e)= H
8	**Encoder version**	Single-turn - 1 revolution absolute = S Multi-turn - 4096 revolutions absolute = M
9	**Electrical connection**	Two-cable connection 2x M17, rotatable = D Single-cable connection M17, rotatable = H Single-cable connection M23, rotatable = S
10	**Shaft**	Smooth, without shaft seal ring = H / Smooth, with shaft seal ring = G Keyway, half-spine balancing without shaft seal ring = L Keyway, half-spine balancing with shaft seal ring = K
11	**Holding brake**	Without holding brake = 0 / size 1, electrically releasing = 1
12	**Flange accuracy**	Standard = N
13	**Bearings**	Standard bearing = N
14	**Format**	B5 / IM3001, PT1000 = N
15	**Coating**	Standard painting RAL 9005 black = N
16	**Other version**	None = N / Additional earthing connection = E / Sealing air connection = P
17	**Special version**	None = NN

▶ Further information on MS2N synchronous servo motors ➠ Chapter "Further information"

Type designation controller HCS01 (example)

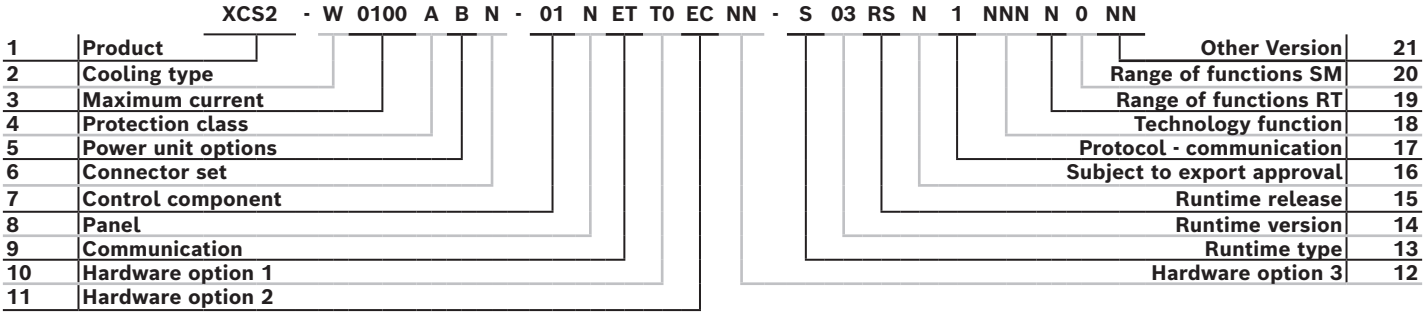


Description / options

1	**Product**	HCS
2	**Series**	01
3	**Version**	1
4	**Power supply unit**	E = infeed
5	**Cooling type**	W = air, internal
6	**Maximum current**	02:0003 = 3 A / 0006 = 6 A / 0009 = 9 A / 0013 = 13 A / 0018 = 18 A 03: 0005 = 5 A / 0008 = 8 A /0018 = 8 A /0028 = 28 A / 0054 = 54 A
7	**Protection class**	A = IP20
8	**Mains connection voltage**	02 = 3 x AC 110...230 V / 03 = 3 x AC 200...500 V
9	**Control component version | Communication**	A-CC = Advanced | Sercos III Master / B-ET = Basic | Multi-Ethernet/ E-S3 = Economy Sercos III
11	**Interface 1**	EC = Encoder IndraDyn / Hiperface / 1VSS / TTL / Endat 2.1/2.2
12	**Interface 2**	CN = CANopen / EC = Multi-encoder interface / EM = Encoder emulation / ET = Multi-Ethernet NN = Not equipped / PB = PROFIBUS
13	**Interface 3**	L3 = STO (Safe Torque Off) L4 = STO (Safe Torque Off) and SBC (Safe Brake Control) NN = Not equipped / S4 = Safe Motion
14	**Other version**	NN = None
15	**Firmware**	

▶ Further information on the controller ➠ Chapter "Further information"

Type designation controller XCS2 (example)



Description / options

1	**Product**	1: X =ctrlX DRIVE / 2: C = converter, feed-in / 3: S = single axis / 4: 2 = generation 2; 1 = generation 1
2	**Cooling type**	W = air, internal
3	**Maximum current**	0100 = 100 A (example) / 23, 54, 70. 100 ...
4	**Protection class**	A = IP20, 3 x AC 200...500 V
5	**Power unit options**	B = Brake transistor (XCS ≥ W0100) / R = Brake transistor/brake resistor integrated (XCS ≤ W0070)
6	**Connector set**	N = Without motor connector set
7	**Control component**	01 = ctrlX DRIVE / 02 = ctrlX DRIVEplus
8	**Panel**	N = Without panel / A = With panel
9	**Communication**	ET = Multi-Ethernet (RJ45) / X3 = ctrlX Core
10	**Hardware option 1**	T0 = Safe Torque Off (STO) / M5 = SafeMotion (M5)
11	**Hardware option 2**	EC = Multi-encoder interface / NN = Not equipped
12	**Hardware option 3**	ET = Multi-Ethernet / DA = I/O extension digital/analog / NN = Not equipped
13	**Runtime type**	S = Standard
14	**Runtime version**	02 = Version 02 (XCS1) / 03 = Version 03 (XCS2)
15	**Runtime release**	RS = Current release
16	**Subject to export approval**	N = No (maximum output frequency < 599 Hz)
17	**Protocol - communication**	0 = Defined via ctrlX CORE apps (XCS2) 1 = Sercos III / 2 = EtherCAT (SoE) / 4 = PROFINET IO
18	**Technology function**	NNN = None TF1 = Install technology apps (XCS2) TE1 = Install/program technology apps (XCS2) TX1 = Install/program technology apps incl. LIBs (Bosch Rexroth libraries) (XCS2)
19	**Range of functions RT**	N = DRIVE Runtime P = DRIVE Runtime Productivity
20	**Range of functions SafeMotion**	0 = Hardware option / 1 ≠ SafeMotion 3 = SafeMotion Speed / 5 = SafeMotion Position
21	**Other Version**	NN = No

▶ Further information on the controller ➠ Chapter "Further information"

Mains filter

Controller / mains filter option						
Controller			**Mains filter**			
	Option	**Weight (kg)**		**Option**	**Weight (kg)**	**Material number**
HCS01-W0008	101 / 102	1.3	NFD03.1-480-007	007	0.88	R911286917
HCS01-W0018	301 / 302	2.1	NFD03.1-480-007	007	0.88	R911286917
HCS01-W0028	401 / 402	2.1	NFD03.1-480-016	016	1.00	R911286918
HCS01-W0054	501 / 502	4.6	NFD03.1-480-030	030	1.67	R911286919
HCS03-W0100	701 / 702	8.0	NFD03.1-480-055	055	2.21	R911286920
CtrlX Drive XCS2-W0023A	2100 / 2130	3.0	NFD03.1-480-016	016	1.00	R911286918
	2160 / 2161					
CtrlX Drive XCS2-W0054A	3100 / 3130	6.3	NFD03.1-480-030	030	1.67	R911286919
	3160 / 3161					
CtrlX Drive XCS2-W0070A	4100 / 4130	6.3	NFD03.1-480-055	055	2.21	R911286920
CtrlX Drive XCS2-W0100A	5100 / 5130	18.1	NFD03.1-480-055	055	2.21	R911286920

Mains filter option	
Assembly	R039949992

Option	**Material number**	**Type**
000	Without mains filter	
001	Only CMS: with mains filter	
007	R911286917	NFD03.1-480-007 = 7 A
016	R911286918	NFD03.1-480-016 = 16A
030	R911286919	NFD03.1-480-030 = 30A
055	R911286920	NFD03.1-480-055 = 55A
100	R911383506	XNF1-1A-0100N = 100A

▶ Further information on the controller ➠ Chapter "Further information"

Switching system

Socket-connector

Notes:

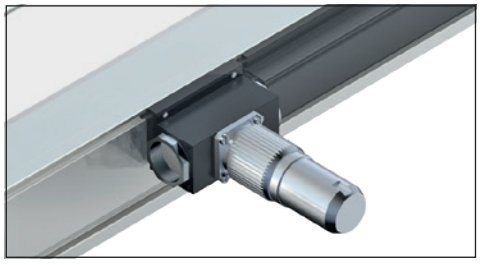
The socket and connector are not pre-wired.

This allows optimal assignment of switch activation points during commissioning.

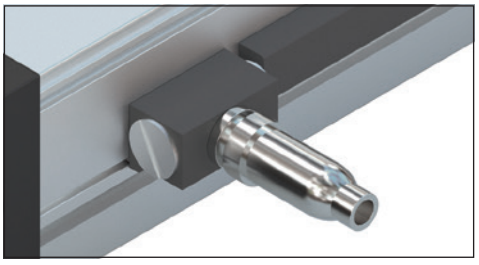
One connector is included.

The connector can be mounted in three directions.

For further information, see the section "Socket-connector".



Socket-connector	
Compact module	**Material number**
CKK/CKR: 070	R117560102
CKK/CKR: 090, 110, 145	R037540000



Socket-connector	
Compact module	**Material number**
CKK/CKR: 200	R037540000

Overview of attachment variants

Magnetic sensor with

free cable end

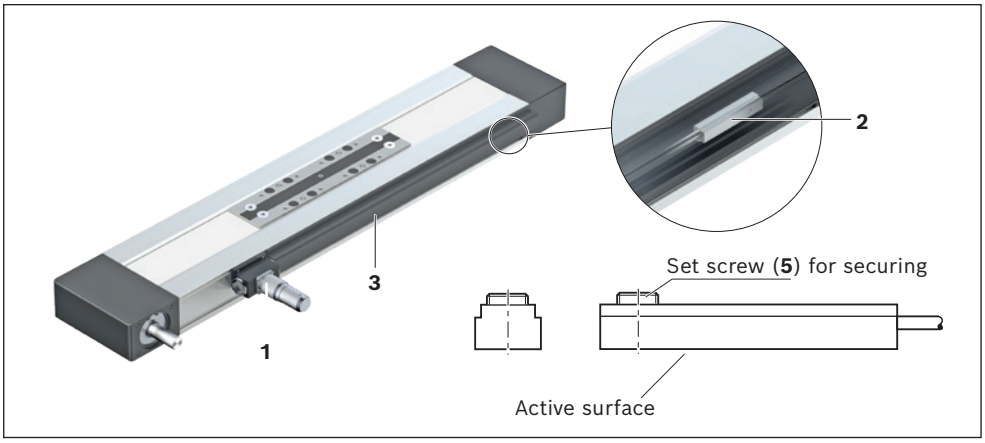
1 Socket and connector

2 Sensor

3 Cable duct

Alternatively, the sensor can also be fastened by switch mounting plate and cable holder.

See the magnetic sensor with connector.



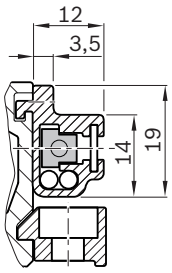
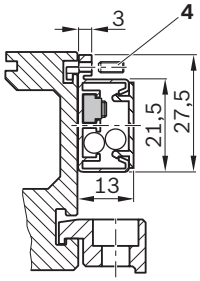
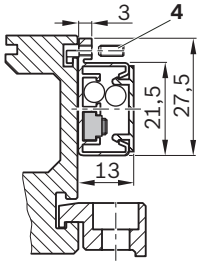
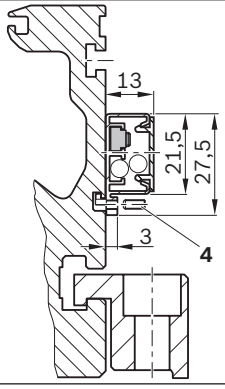
Attachment/actuation

A cable duct is needed to fasten the sensors and for cable routing. This is suspended at the side in a slot at the compact module and fastened with set screws (**4**).

The set screws are included.

The sensors are pushed into the upper T-slot (CKK/CKR-090,-110 and CKK-145)
or into the lower T-slot (CKR-145, CKK/CKR-200) of the cable duct and secured with set screws (**5**).

Switch activation is done by magnets in the carriage.

CKK/CKR-070	CKK/CKR-090 CKK/CKR-110 CKK-145	CKR-145	CKK/CKR-200
			

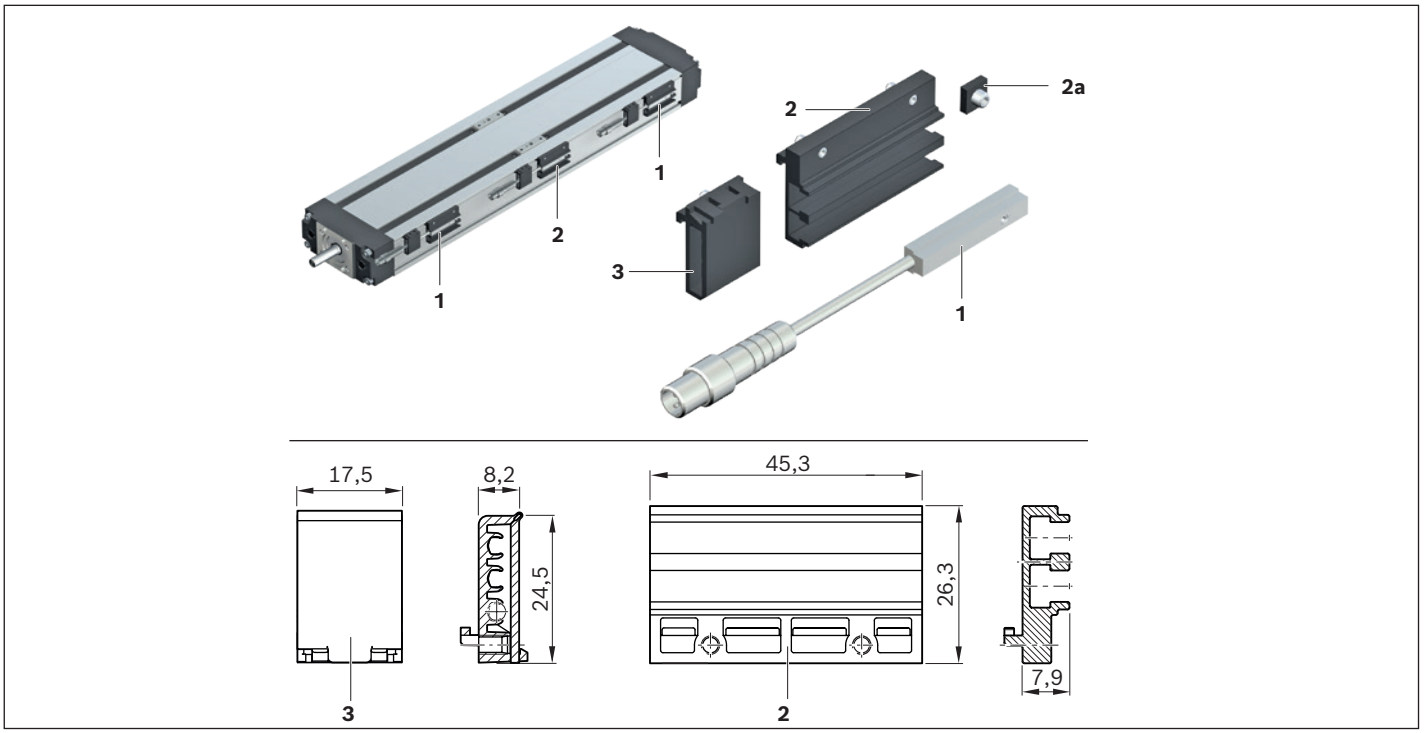
Cable duct

Compact module	Material number	Length calculation
CKK/CKR: 070	R039662026	$L_K = L - 5$
CKK: 090, 110, 145, 200	R039662018	$L_K = L - 5$
CKR: 090, 110, 145, 200	R039662018	$L_K = L - 10$

L_K = Length of the cable duct (mm)
L = Length of the linear motion system (mm)

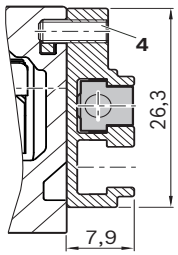
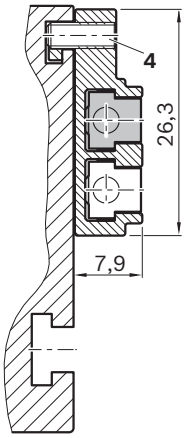
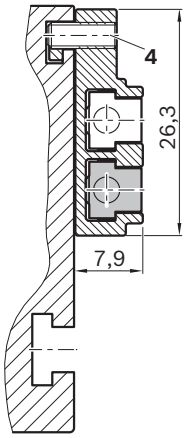
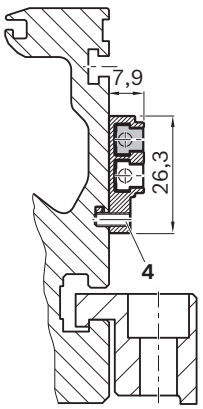
Magnetic sensor with connector

1 Sensor (Material number see chapter sensors and accessories)
2 Switch mounting plate including set screws (loose) and square nut (**2a**) (Material number R037530021)
3 Cable holder including set screw (loose) (Material number R037530022)



Attachment/actuation

A switch mounting plate (**2**) is required to fasten the sensors. This is suspended in the slot on the compact module and fastened with set screws (**4**). The sensors are pushed into the respective slot on the switch mounting plate and secured with one set screw. The square nut with set screw (**2a**) serves as a positive stop for the sensor (switch activation point when changing sensors). Parts are included in the scope of delivery of the sensor mounting kit.
Switch activation is done by magnets in the carriage.

CKK/CKR-070	CKK/CKR-090, -110, CKK-145	CKR-145	CKK/CKR-200
			

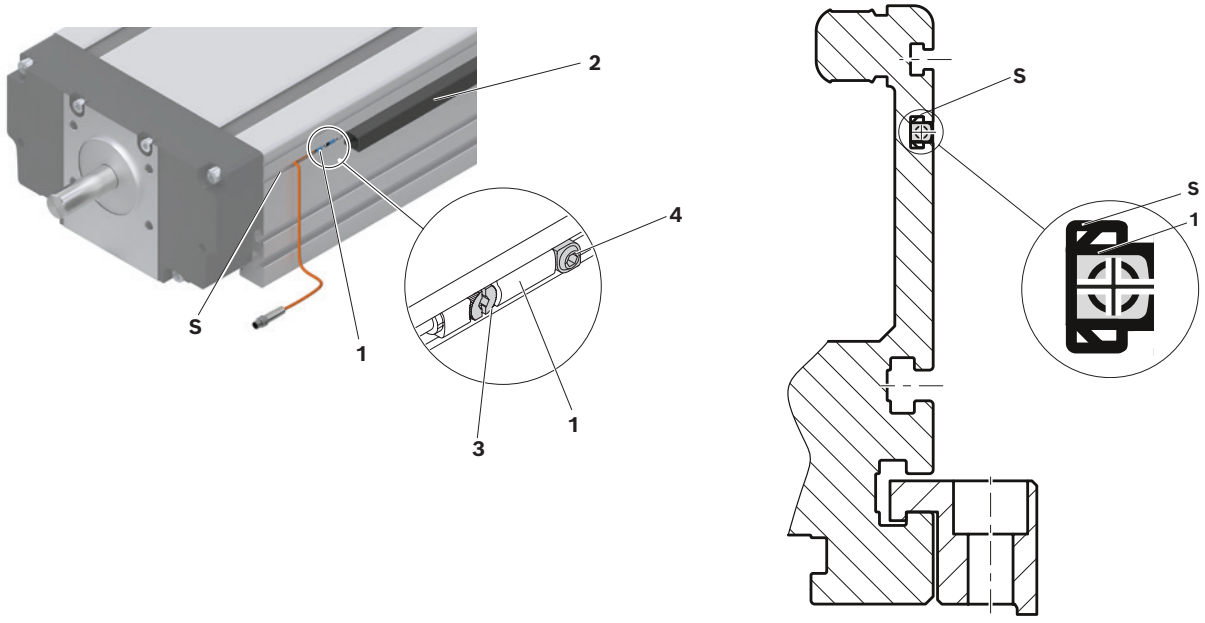
Magnetic sensor with connector (only for CKK/CKR -280)

1 Sensor (Material number see chapter sensors and accessories)
2 Cable duct L_K = XX mm (R039662017)
3 Clamping screw
4 Sliding block (R117509008)

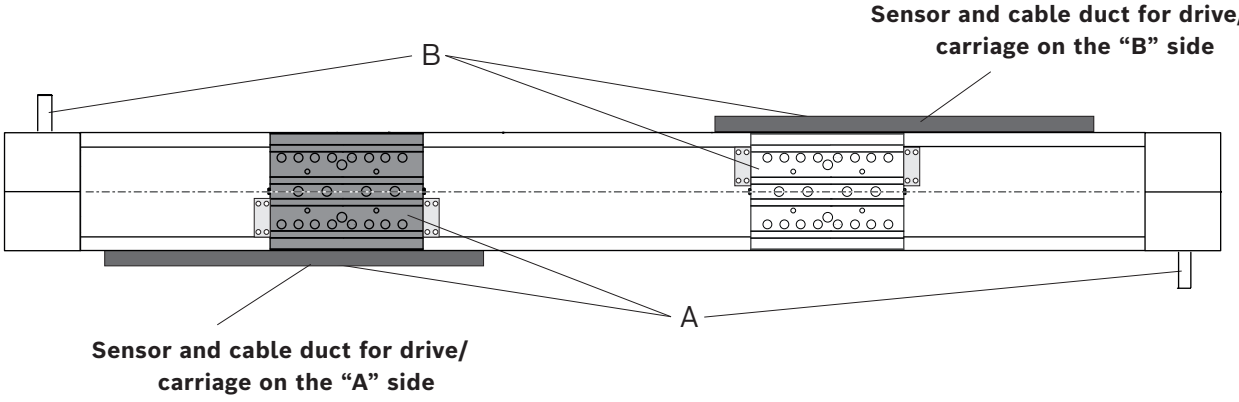
Attachment/actuation

The switch activator is a magnet (on both sides) that is integrated in the carriage (no switching cam necessary).
The switch activation points can be positioned anywhere along the stroke.
The magnetic sensor is positioned in the corresponding sensor slot (S) and fixed by turning the clamping screw (3)
The sliding block (4) is not necessarily required for mounting, it is only required for repeatable mounting of the sensor.

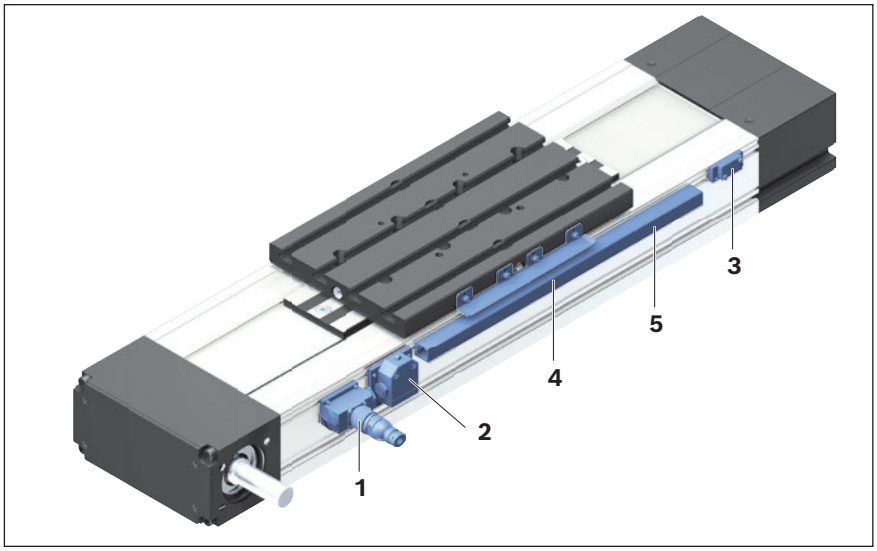
CKK/CKR -280



For the CKR-280-DB (Compact Module CKR with 2 motor attachments), a switching system (sensor/cable duct) for each drive/carriage must be mounted on each side of the frame.



Inductive sensors and mechanical switches for CKK/CKR-200



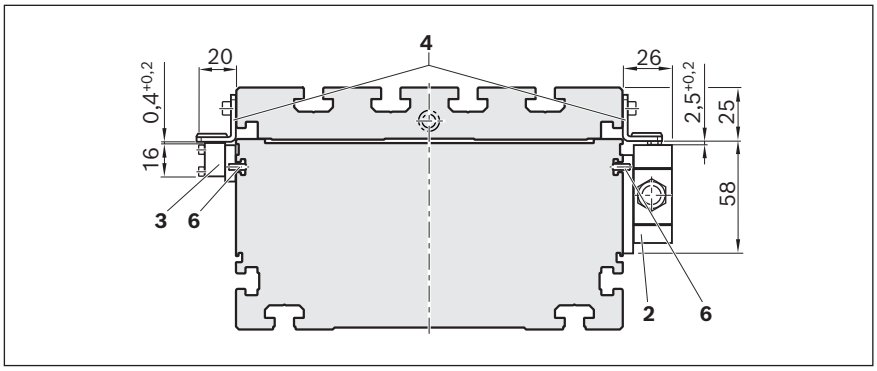
1 Socket and connector
2 Mechanical switch (with attachments)
3 Inductive sensor (with attachments)
4 Switching cam (attachment only at the connection plate)
5 Cable duct

Alternatively, the connection line of the switches can also be fastened by cable holder.
See "Switching system".

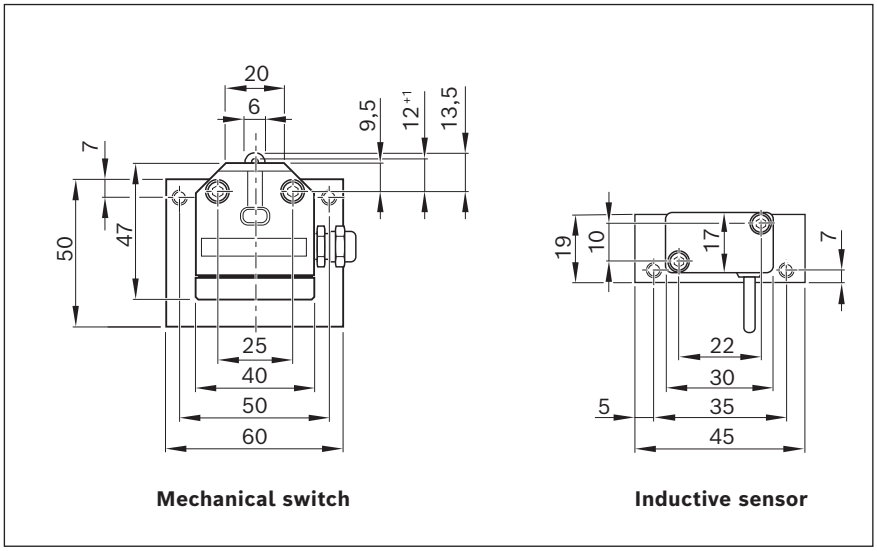
Attachment/actuation

The switches are suspended in the upper slot on the compact module and fastened with set screws (**6**).

The actuation is done using switching cams (**4**). This is fastened with the screws to the connection plate.
Fastening screws are included.

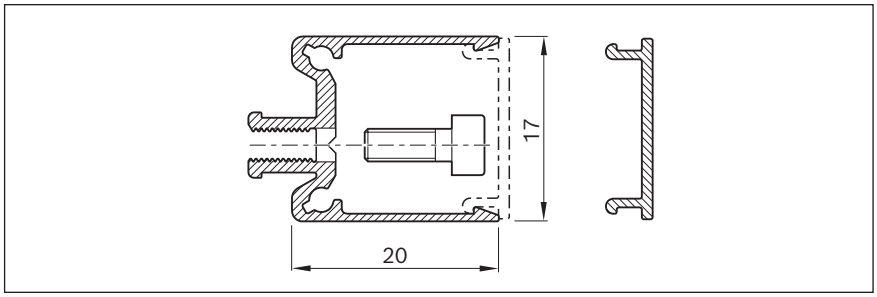


Switch with attachment



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.
The cable duct will accommodate up to two cables for mechanical switches and three cables for proximity switches.
Fastening screws are included.

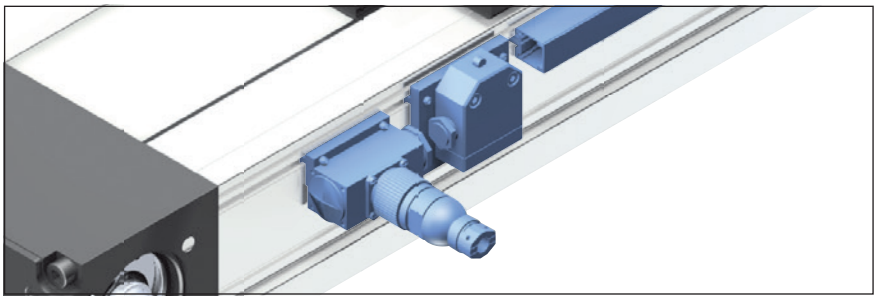


Cable duct	
Compact module	**Length calculation**
CKK 200	$L_K = L - 5$
CKR 200	$L_K = L - 10$

L_K = Length of the fastening and the cable duct (mm)
L = Length of the linear motion system (mm)

Socket-connector

Notes:
The socket and connector are not pre-wired. This allows optimal assignment of switch activation points during commissioning.
One connector is included.
The connector can be mounted in three directions.



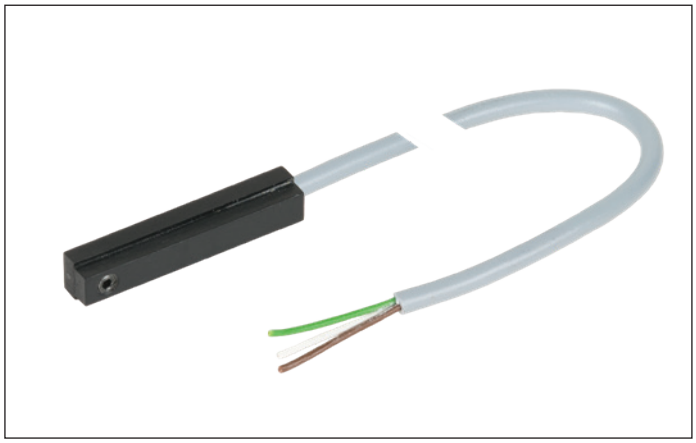
Switches and attachments

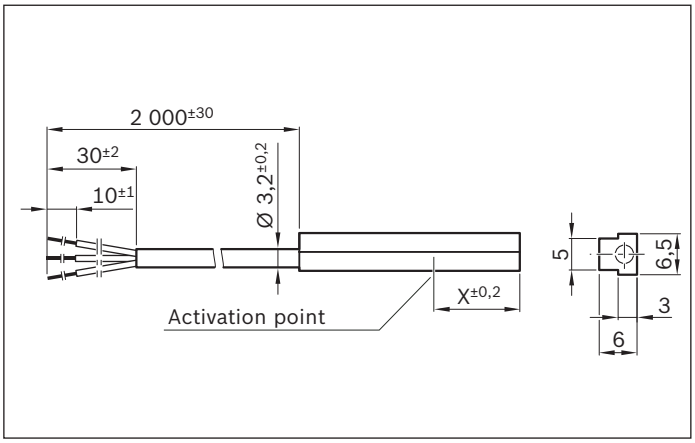
Item		Material numbers
1	**Socket-connector**	R117500153
2	**Mechanical switch**	See the chapter on sensors and accessories
	– Attachments without switch	R117500165
3	**Inductive sensor**	See the chapter on sensors and accessories
	– Attachments without sensor	R117500152
4	**Switching cam**[1)]	R117500150
5	**Cable duct L_K = XX mm**	R039662017

[1)] Size 200 switching cam attachment is only possible on connection plate, otherwise customer-designed solution.

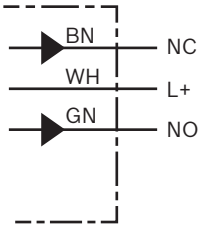
Sensors

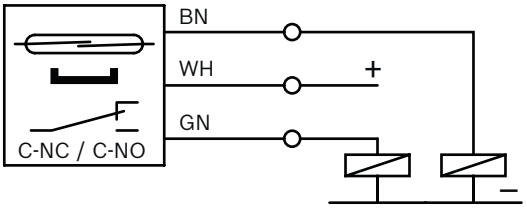
Magnetic sensor with free cable end



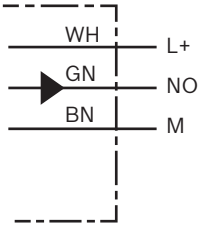


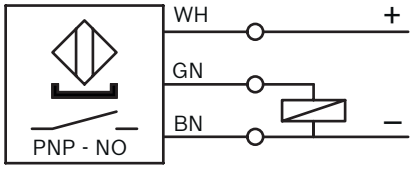
R347600903

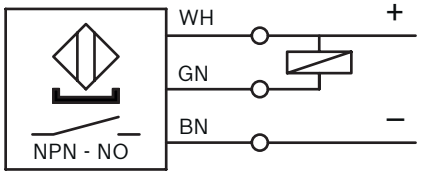




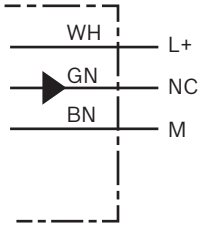
R347601203
R347601403

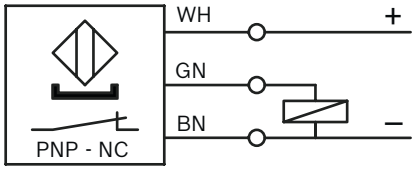


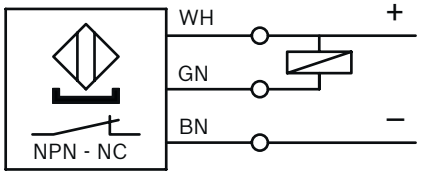




R347601003
R347601303







Material number R347600903

Use	Reference, limit switch
Material number	R347600903
Designation	R12212
Functional principle	magnetic
Operating voltage	max. 30 V DC
Load current	500 mA
Switching function	REED/changeover contact: (NC: C+NC, NO: C+NO)
Activation point (dimension "X")	9 mm

Material numbers R347601003 / R347601203 / R347601403 / R347601303

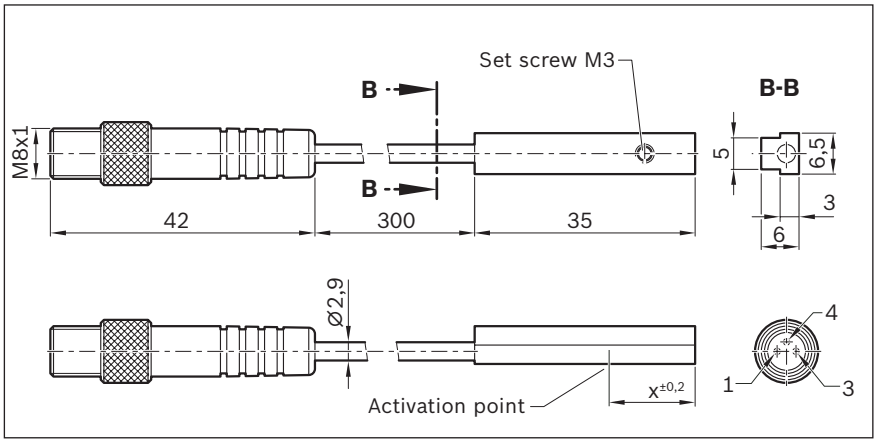
Use	Limit switch	Reference switch	Limit switch	Reference switch
Material number	R347601003	R347601203	R347601303	R347601403
Designation	H14118	H15637	H15638	H15080
Functional principle	magnetic			
Operating voltage	3.8 - 30 V DC			
Load current	≤ 20 mA			
Switching function	Hall PNP/NC	Hall PNP/NO	Hall NPN/NC	Hall NPN/NO
Activation point dimension "X"	13.65 mm			

Technical data for R347600903 / R347601003 / R347601203 / R347601403 / R347601303

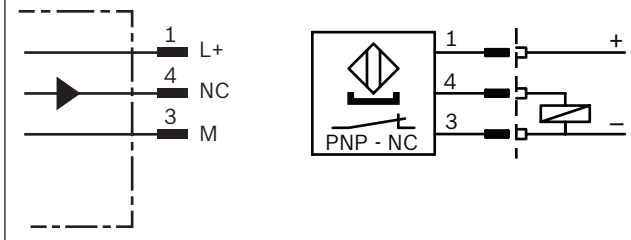
Connection type	Cable 2.0 m, 3-pin
Galvanized connection ends	✔
Function indicator	–
Short-circuit protection	–
Reverse polarity protection	–
Switch-on suppression	–
Switching frequency	2.5 kHz
Pulse elongation (off delay)	–
Max. permissible starting speed	2 m/s
Suitable for drag chains[1)]	–
Torsion-resistant[1)]	–
Welding spark-resistant*	–
Cable cross-section*	3 x 0.14 mm^2
Cable diameter D	3.2 ±0.20 mm
Static bending radius[1)]	–
Dynamic bending radius[1)]	–
Bending cycles[1)]	–
Maximum permissible travel speed[1)]	–
Max. permissible acceleration[1)]	–
Ambient temperature	-40 °C to +85 °C
Protection class	IP66
MTTFd (per EN ISO 13849-1)	–
Certifications and approvals[2)]	–

[1)] Technical data only for the cast-on connection line at the 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.

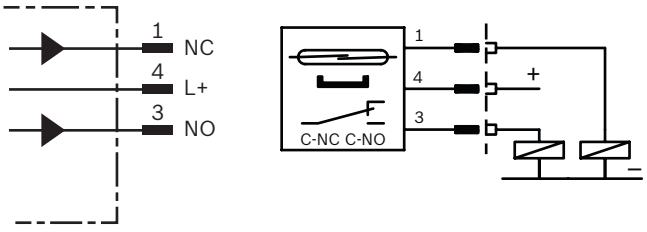
Magnetic sensor with M8x1 connector



R347602403



R347602303



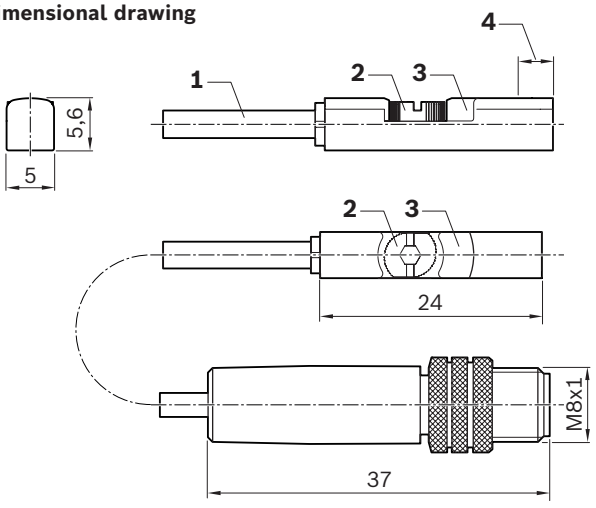
Material numbers/technical data

Use	Reference / limit switch	Limit switch
Material number	R347602403	R347602303
Designation	H10706	R10705
Functional principle	magnetic	
Operating voltage	3.8 - 30 V DC	30 V DC
Load current	≤ 20 mA	500 mA
Switching function	Hall PNP/NC	REED/single-pole changeover (NC: C+NC, NO: C+NO)
Activation point dimension "X"	13.65 mm	9 mm
Connection type	0.3 m cable and M8x1 connector, 3-pin with knurled screw connection	
Function indicator	–	
Short-circuit protection	–	
Reverse polarity protection	–	
Switch-on suppression	–	
Switching frequency	2.5 kHz	
Pulse elongation (off delay)	–	
Max. permissible starting speed	2 m/s	
Suitable for drag chains[1)]	–	
Torsion-resistant[1)]	–	
Weld spark-resistant[1)]	–	
Cable cross-section[1)]	3 x 0.14 mm^2	
Cable diameter D[1)]	3.2 ±0.20 mm	
Static bending radius[1)]	–	
Dynamic bending radius[1)]	–	
Bending cycles[1)]	–	
Maximum permissible travel speed[1)]	–	
Max. permissible acceleration[1)]	–	
Ambient temperature	-40 °C to +85 °C	
Protection class	IP66	
MTTFd (per EN ISO 13849-1)	–	
Certifications and approvals[2)]	–	

1) Technical data only for the cast-on connection line at the 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.

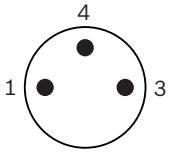
Magnetic switches with M8x1 connector (only for CKK/CKR-280)

Dimensional drawing



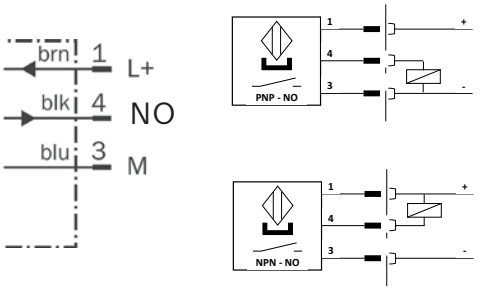
1) Connection
2) Fastening screw
3) LED display
4) Position of sensor element: 2 mm

1 brown (+)
3 blue (-)
4 black (signal)

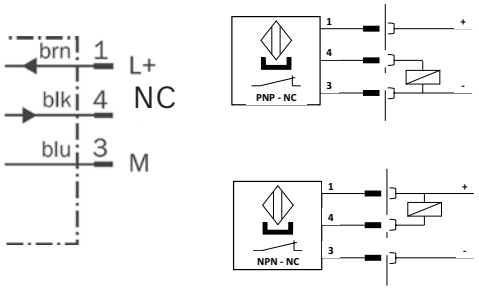


Connection diagram

R913037444
R913037446



R913037443
R913037445



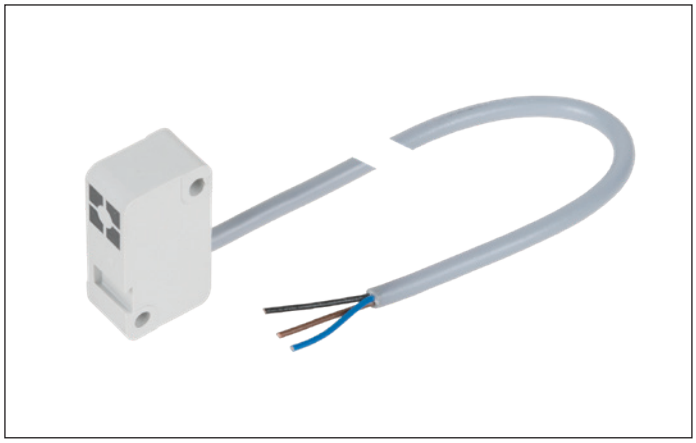
Material numbers / technical data

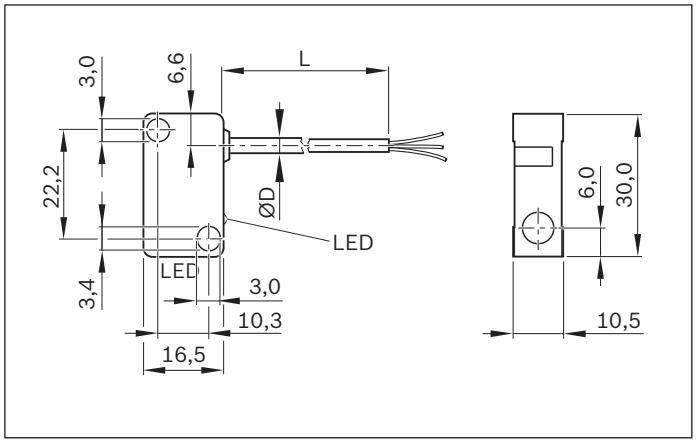
Use	Limit switch	Reference switch	Limit switch	Reference switch
Material number	R913037445	R913037444	R913037443	R913037446
Designation	MZT8-03VPO-KRDS14	MZT8-03VPS-KRDS13	MZT8-03VNO-KRDS16	MZT8-03VNS-KRDS15
Functional principle	Magnetic			
Operating voltage	10 - 30 VDC			
Load current	≦ 200 mA			
Switching function	PNP/NC	PNP/NO	NPN/NC	NPN/NO
Connection type	0.5 m cable and M8x1 plug, 3-pin with knurled screw connection			
Function indicator	✓			
Short-circuit protection	✓			
Reverse polarity protection	✓			
Switch-on suppression	✓			
Switching frequency	3 kHz			
Pulse elongation (off delay)	20 ms			
Max. permissible starting speed	5 m/s			
Suitable for drag chains*	✓			
Torsion-resistant*	✓			
Welding spark-resistant*	–			
Cable cross-section*	3x0.14 mm^2			
Cable diameter D*	2.9 ±0.15 mm			
Static bending radius*	≧ 5xD			
Dynamic bending radius*	≧ 10xD			
Bending cycles*	> 2 Mio.			
Max. permissible travel speed*	5 m/s			
Max. permissible acceleration*	≦ 5 m/s^2			
Ambient temperature	-30 °C to +80 °C			
Protection class	IP 68			
MTTFd (per EN ISO 13849-1)	MTTFd = 2,339.0 years			
Certifications and approvals**	CE cULus LISTED RoHS			

*) Technical data only for the cast-on connection line (0.5 m) on the magnetic sensor. Available extension cables offer even more performance, e.g. for use in a cable drag chain (see below).

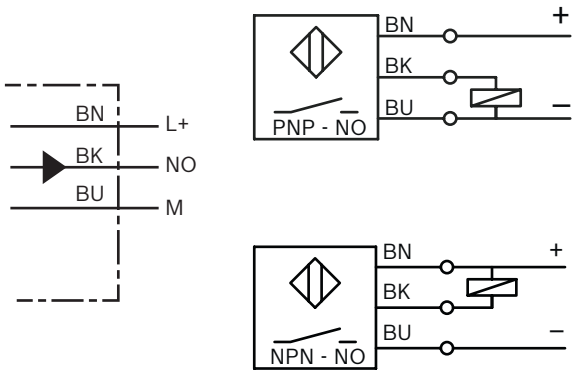
**) No certificate for import to the CCC Chinese market required for these products. Document "Sales information CCC" available on request.

Inductive sensor with free line end

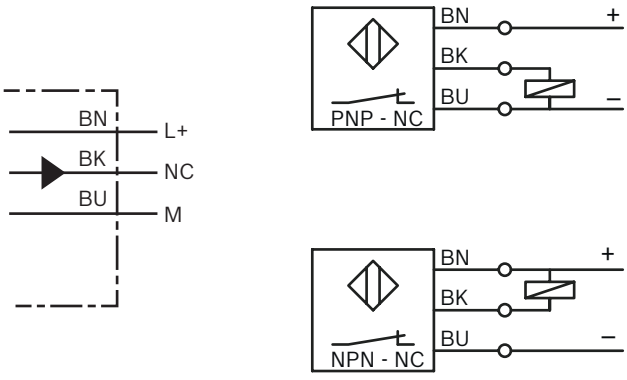




R345304003
R345304004



R345304001
R345304002

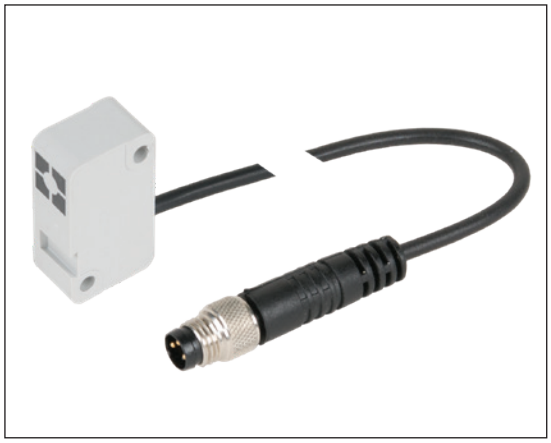


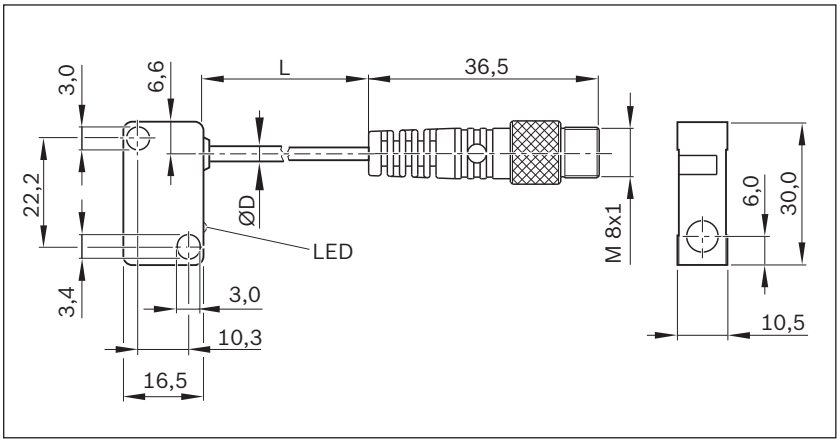
Material numbers/technical data

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	Line 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)]	3 x 0.14 mm^2			
Cable diameter D[1)]	3.5 ±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 (acc. to EN ISO 13849-1)	MTTFd = 830 years		MTTFd = 585 years	
Certifications and approvals[2)]	CE cULus LISTED RoHS			

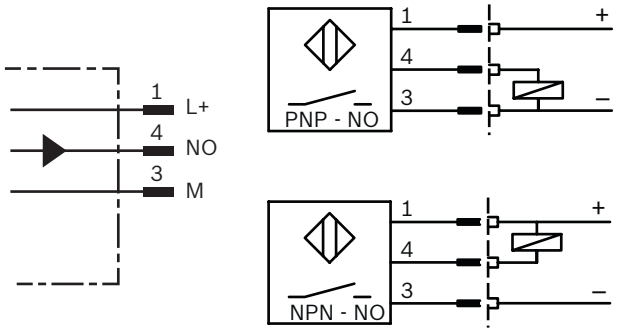
[1)] Technical data only for the cast-on connection line at the sensor.
The available extension cables offer even better performance, e.g., when using a cable drag chain (see following pages).
[2)] No CCC certificate is required to introduce these products to the Chinese market.

Inductive sensor with M8x1 connector

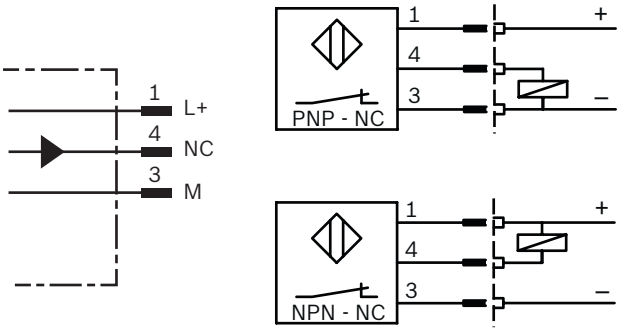




R901420156
R901420158



R901420149
R901420152



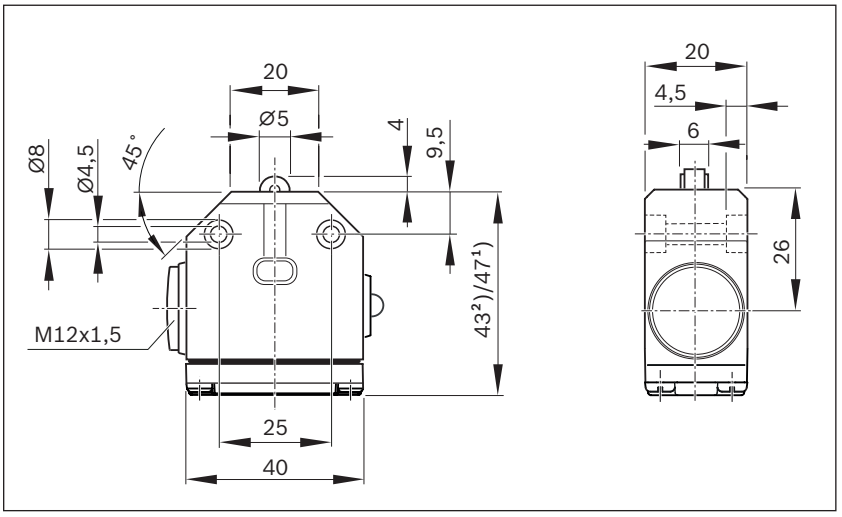
Material numbers/technical data

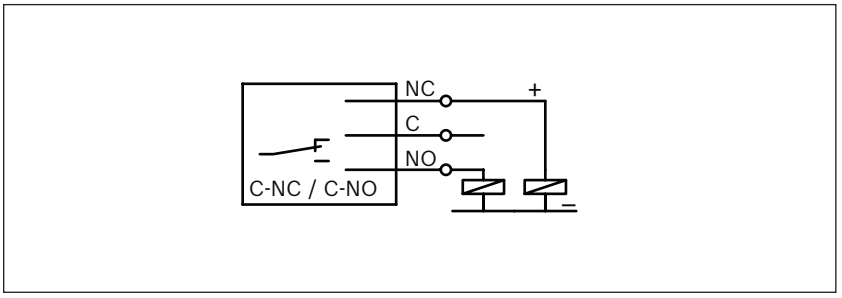
Use	Limit switch	Reference switch	Limit switch	Reference switch
Material number	R901420149	R901420156	R901420152	R901420158
Designation	BES 517-351-NO-C-S49-00.2	BES 517-398-NO-C-S49-00.2	BES 517-352-NO-C-S49-00.2	BES 517-399-NO-C-S49-00.2
Functional principle	inductive			
Operating voltage	10–30 V DC			
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 mm²			
Cable diameter D[1)]	3.5 ±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 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.

Switches

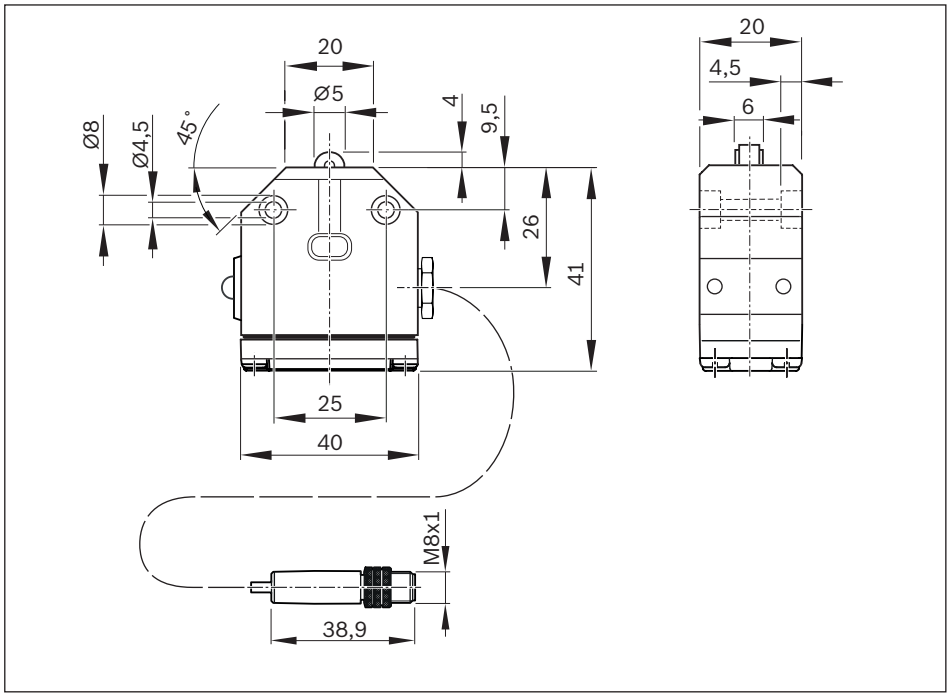
Mechanical switch

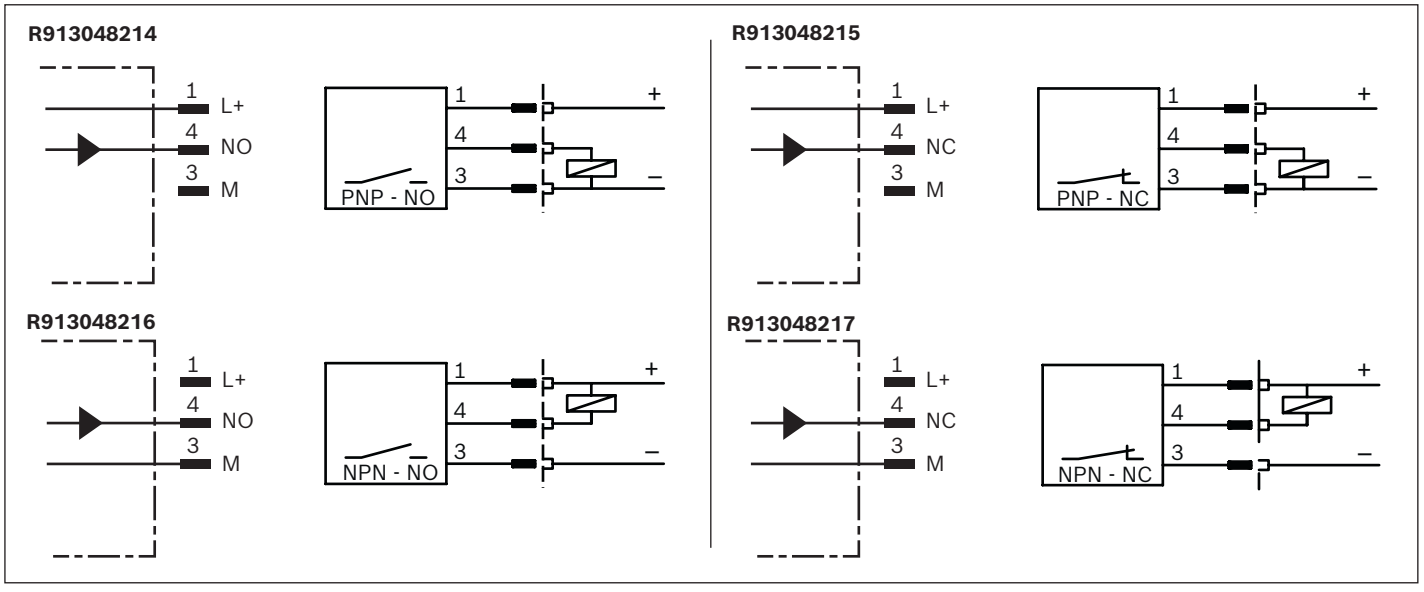




Material numbers/technical data		
Use	Limit switch	
Material number	R345304016[1)]	R347600305[2)]
Designation	BNS 819-X496-99-R-11	BNS 819-X510-99-R-10
Functional principle	mechanical, roller	
Operating voltage	250 V AC	
Load current	≤ 5 A	
Switching function	single-pole changeover/ (NC: C+NC, NO: C+NO)	
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		
Certifications and approvals, switching element		

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. perm. 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 ±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 SP RoHS			

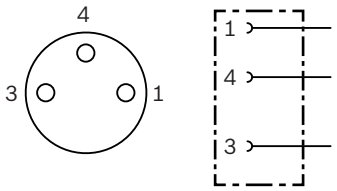
[1)] Technical data only for the cast-on connection line at the mechanical switch.
The available extension cables offer even better performance, e.g., when using a cable drag chain (see following pages).
[2)] No CCC certificate is required to introduce these products to the Chinese market.

Extensions

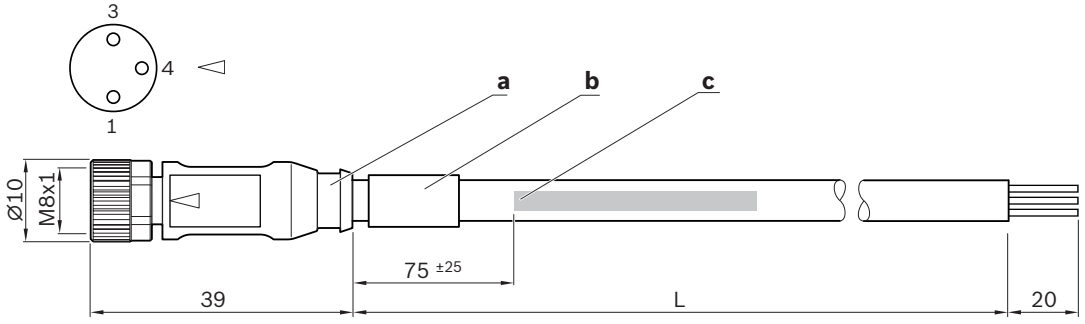
Assembled on one end

Connection diagram

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



Dimensional drawing

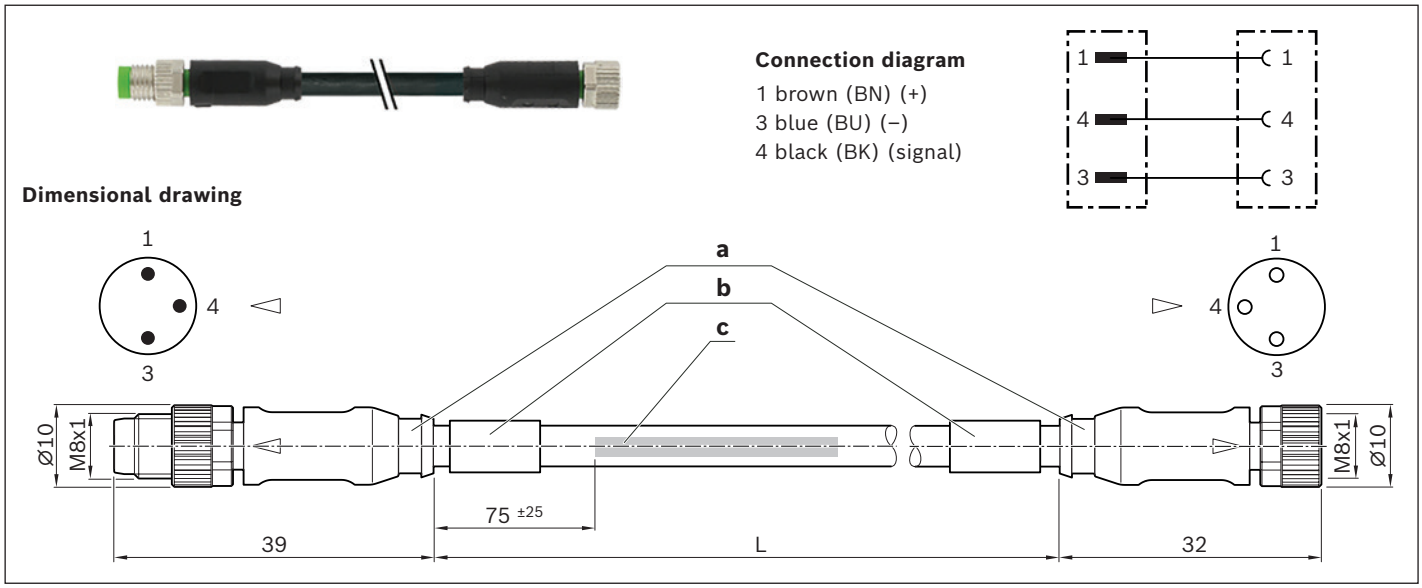


Material numbers

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	Female connector, straight, M8x1, 3-pin		
Connection type 2	Unassembled cable end		

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

Assembled on two sides



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	Connector, straight, M8x1, 3-pin				

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

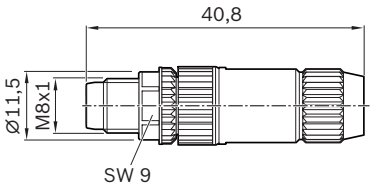
Function indicator	–
Operating voltage indicator	–
Operating voltage	10–30 V DC
Type of cable	PUR black
Suitable for drag chains	✓
Torsion-resistant	✓
Weld spark-resistant	✓
Cable cross-section	3x0.25 mm^2
Cable diameter D	4.1 ±0.2 mm
Static bending radius	≥ 5xD
Dynamic bending radius	≥ 10xD
Bending 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 C US, PG, RoHS

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

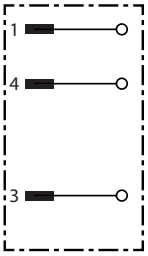
Connectors

R901388333

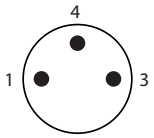
Dimensional drawing



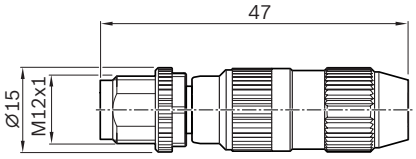
Connection diagram

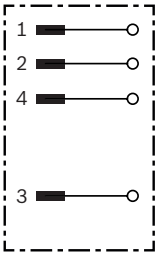


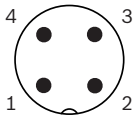
View Connector side



R901388352



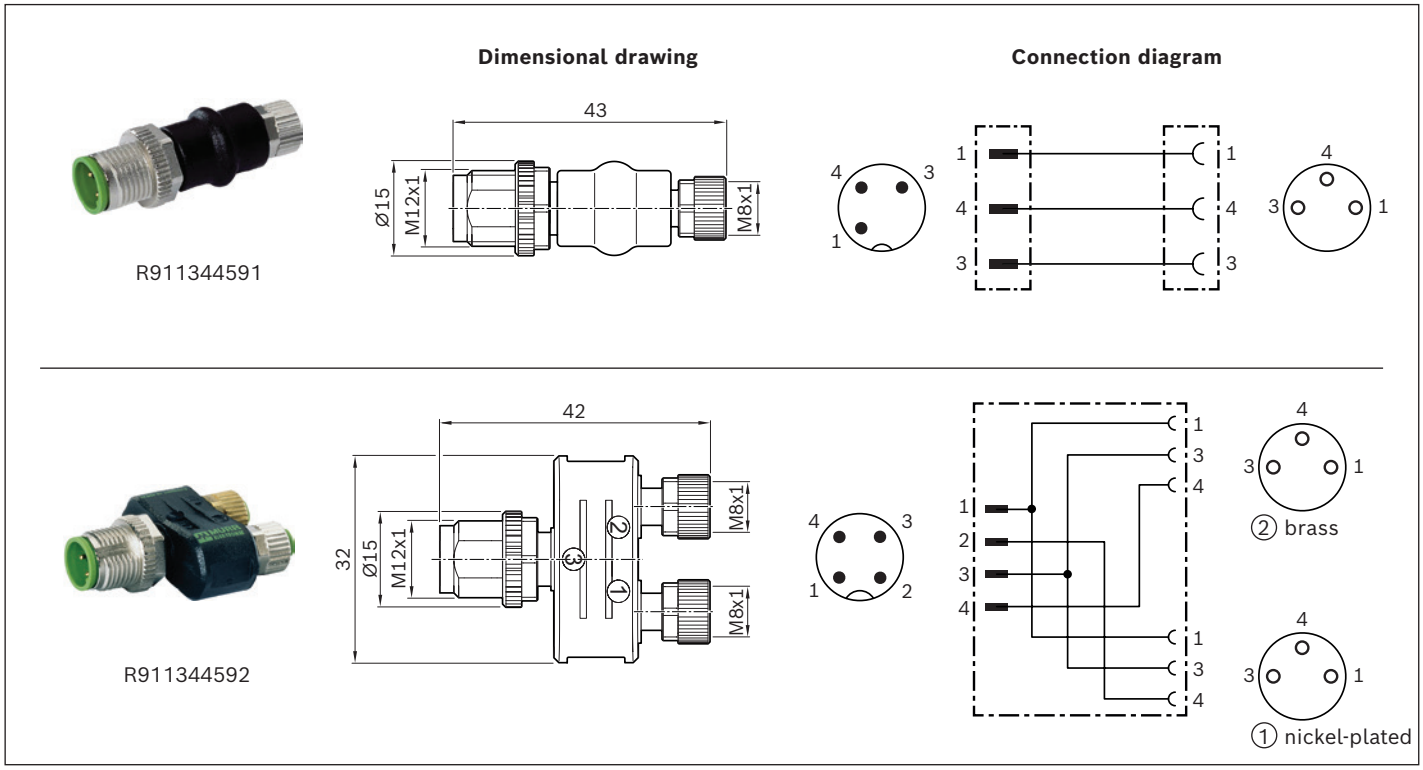




Material numbers/technical data

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	Straight connector, M8x1, 3-pin, IDC, self-locking screw	Straight connector, 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 bolted)	
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	Male connector, straight, M12x1, 3-pin, self-locking screw thread	Straight connector, M12x1, 4-pin, IDC, self-locking screw thread
Function indicator	–	
Operating voltage indicator	–	
Connection cross-section	–	
Ambient temperature	-25°C to +85°C	
Protection class	IP67 (inserted and bolted)	
Certifications and approvals	RoHS	c UL us LISTED, RoHS

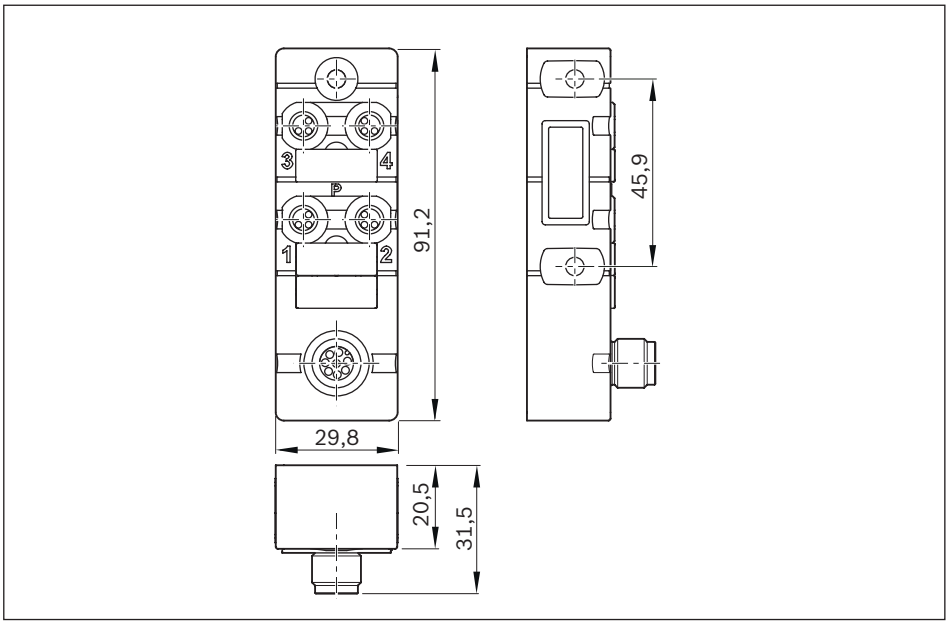
Distributors

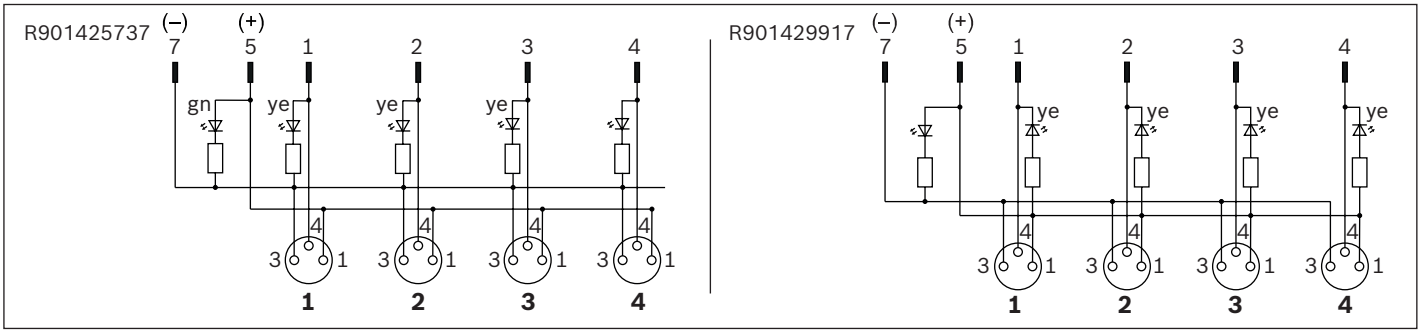
Passive distributor

R901425737

R901429917

R911344592





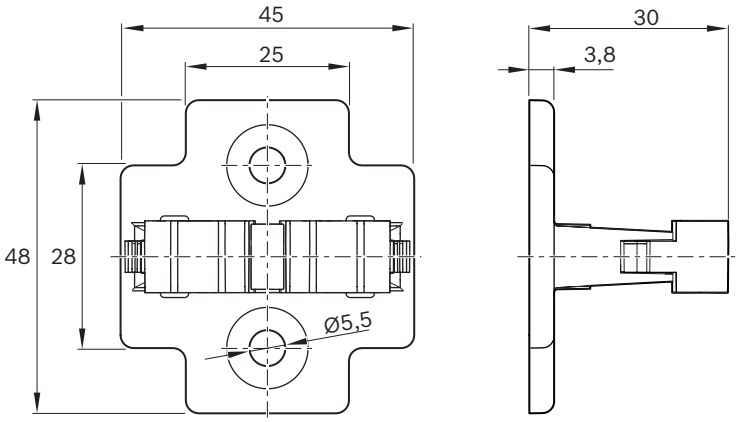
Material numbers/technical data

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 VDC		
Switching logic	PNP	NPN	
Connection type 1	4x female connectors, straight, M8x1, 3-pin, self-locking screw thread		
Connection type 2	Male connector, straight, 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 (inserted and bolted)		
Certifications and approvals	c UL us LISTED, RoHS		

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

Extensions for passive distributors

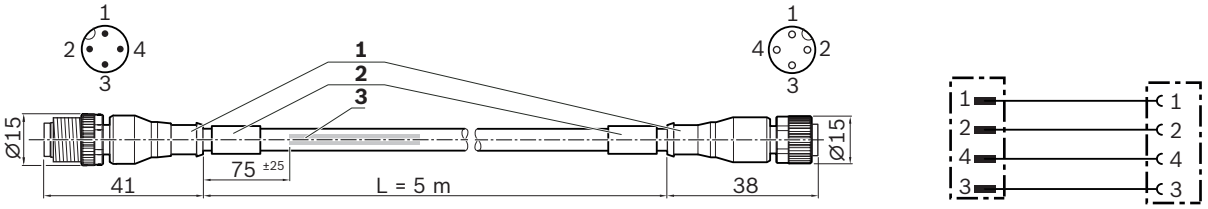
R911371982

R911371981

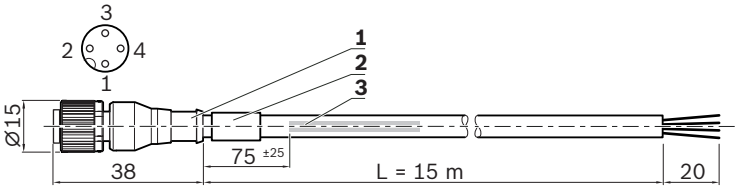
R911371980

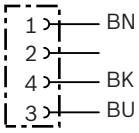
R911371983

M12 R911371982 **M12**

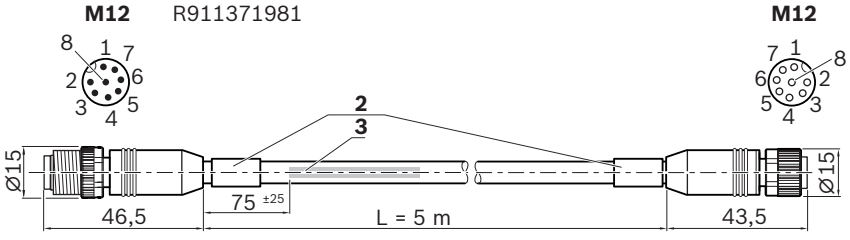


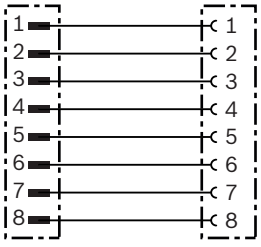
M12 R911371980



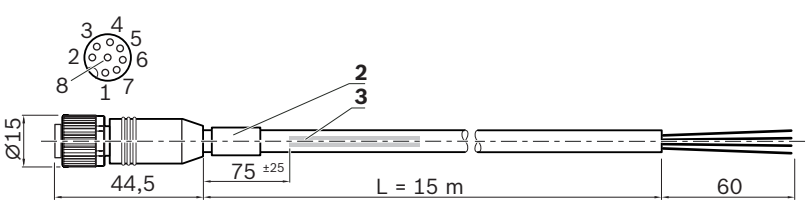


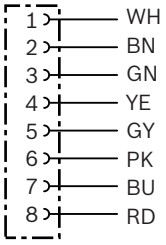
M12 R911371981 **M12**





M12 R911371983



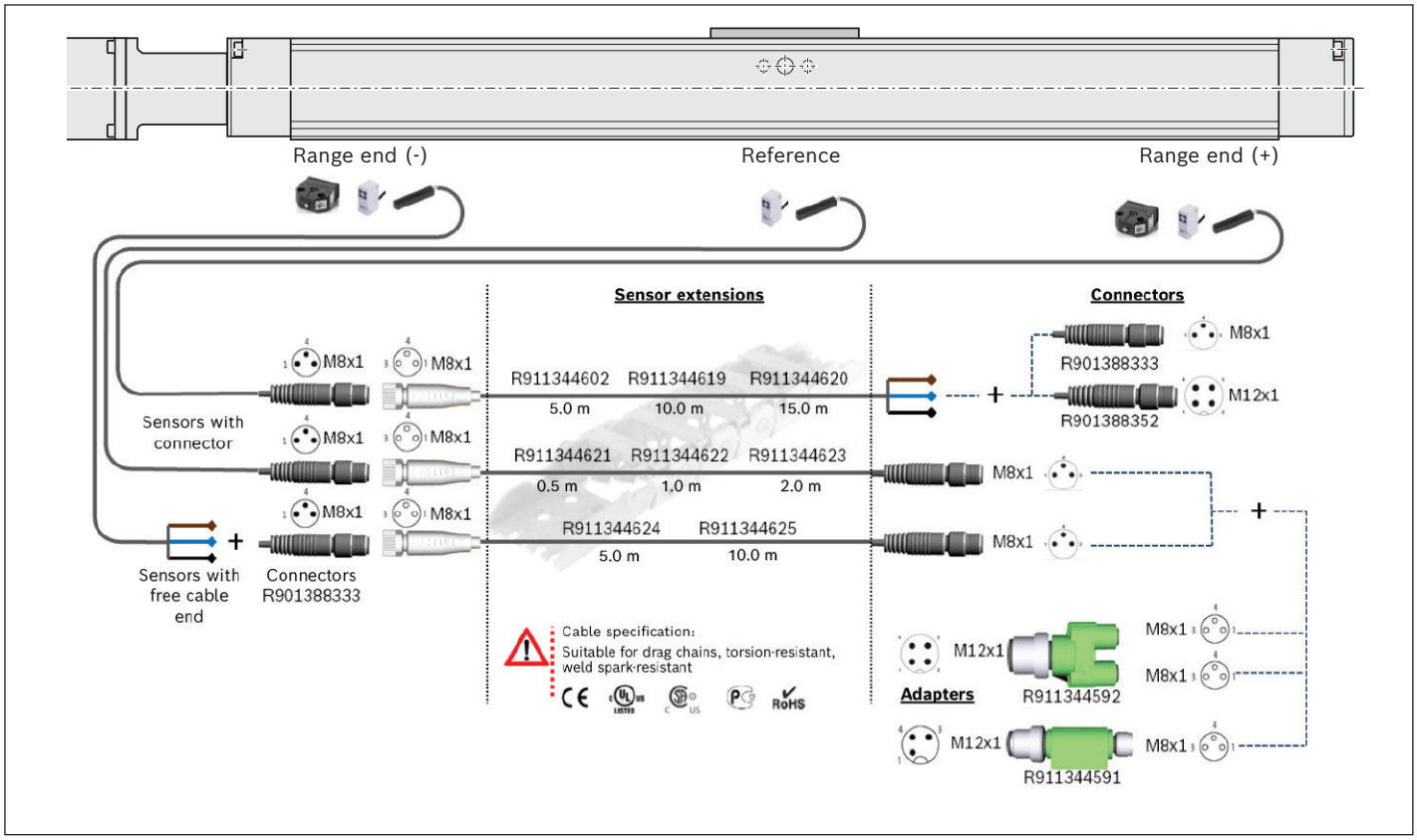


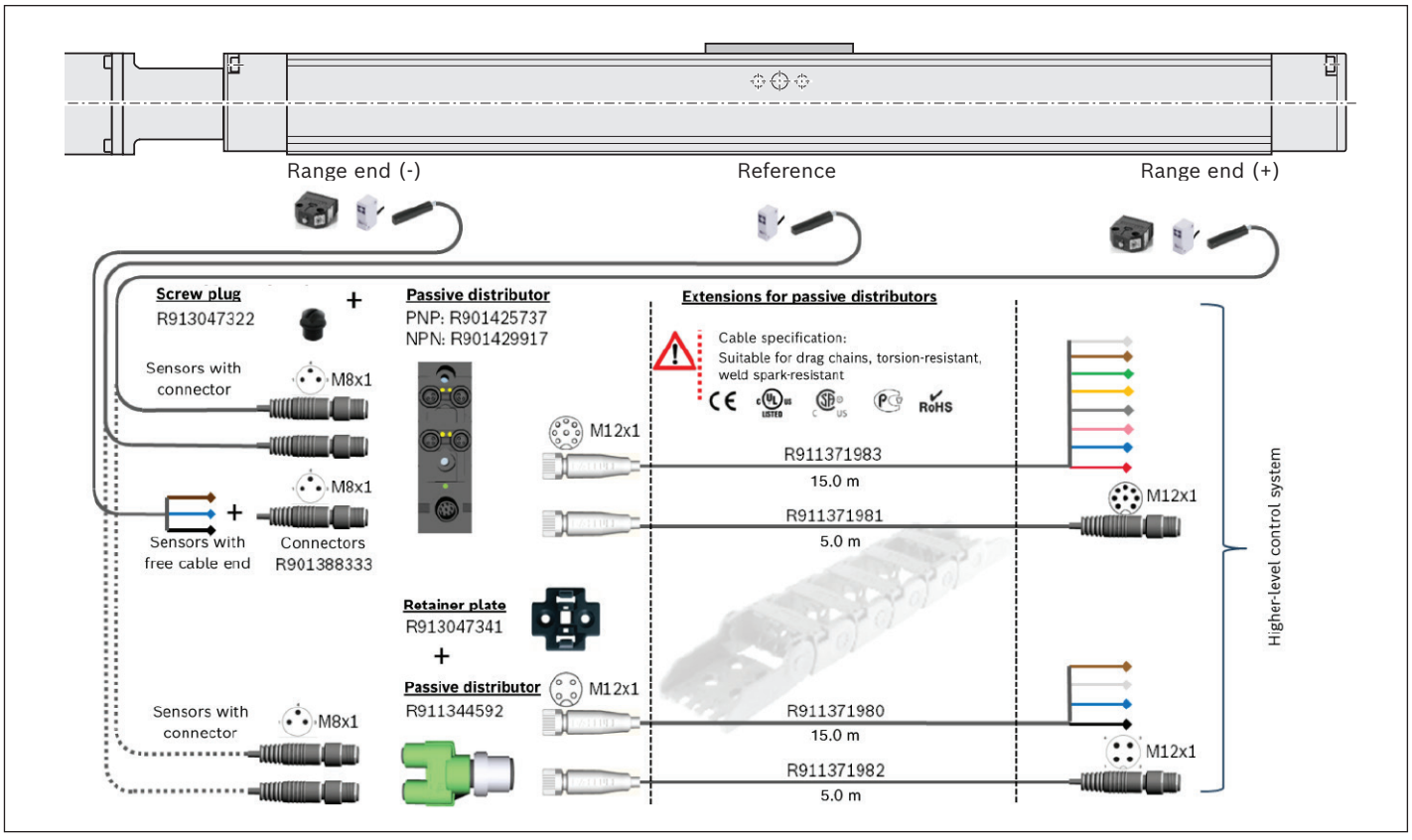
1) Contour for conduit pipe with inner diameter of 10
2) Cable grommet
3) Cable print per ordering specification 7000-08001

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	Male connector, straight, M12x1, 4-pin	Unassembled cable end	Male 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 mm²		8x0.34 mm²	
Cable diameter D	4.7 +/– 0.2 mm		6.2 +/– 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 distance			
Max. permissible acceleration	≤ 30 m/s²			
Ambient temperature fixed ext.	–40°C to +80°C (90° max. 10,000h)			
Ambient temperature flexible ext.	–25°C to +80°C (90° max. 10,000h)			
Protection class	IP67 (inserted and bolted)			
Certifications and approvals	CE, cULus LISTED, CSA C US, PG, RoHS			

Combination examples

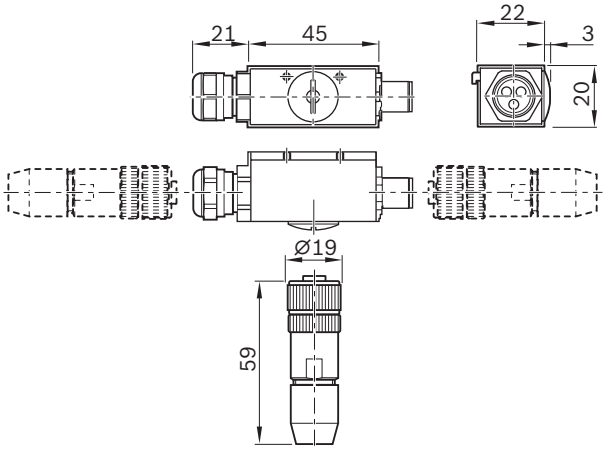


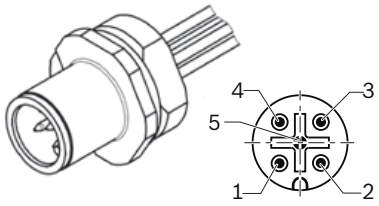

Range end (-)
Reference
Range end (+)
Screw plug
R913047322
Sensors with connector
M8x1
Sensors with free cable end
Connectors
R901388333
Passive distributor
PNP: R901425737
NPN: R901429917
Retainer plate
R913047341
Passive distributor
R911344592
Extensions for passive distributors
Cable specification: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

Socket and connector

Attach the socket on the side with the magnetic sensors. The 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.

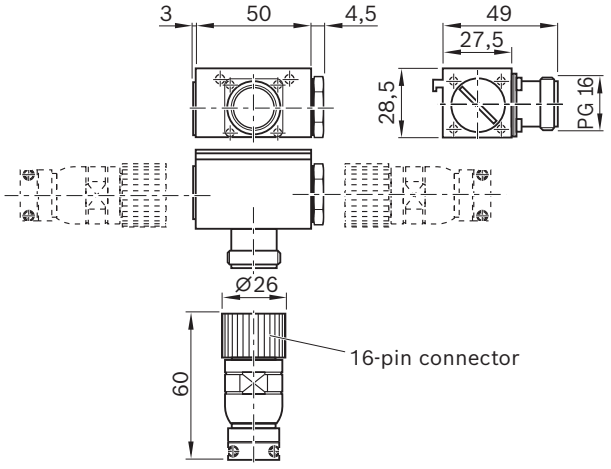
R117560102

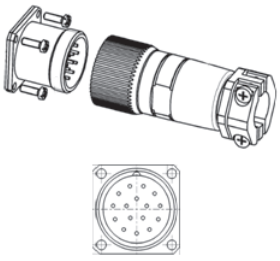




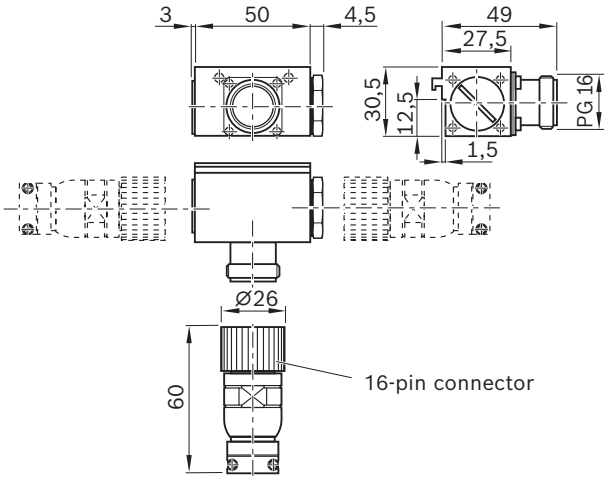
Pin		Color
1	BN	brown
2	WH	white
3	BU	blue
4	BK	black
5	GY	gray

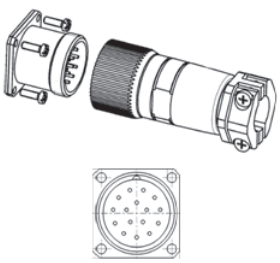
R037540000





R117500153





Use	Socket and connector	
Material number	R117560102	R037540000 / R117500153
Designation	for CKK / CKR-070	for CKK / CKR-090, -110, -145, -200
Version	angled, for suspension in the lateral slot of the linear motion system	
Operating current per contact	max. 4 A	max. 8 A
Operating voltage	10–30 V DC	150V AC/DC
Connection type 1	Male connector, straight, M12x1, 5-pin, spring-cage connection	Male connector, straight, 16-pin, soldered connection
Connection type 2	Coupling / flange socket M12x1, 5-pin, with 0.5 m cable	Coupling / flange socket, 16-pin, soldered connection
Cable bushing Housing	Cable gland M16x1.5 with seal (bore 3x3.5 mm) incl. cap and blind plug	1 seal with bore 2x5.5 mm, 1x3.5 mm 1 adaptable seal, max. 14 mm diameter incl. cap and blind plug
Cable bushing, connector	Bolting with pull relief	
Connection cross-section	0.14 ... 0.5 mm	0.14 ... 1 mm
Cable diameter	4 ... 8 mm	10 ... 14 mm
Ambient temperature	-25°C to +85°C	-20°C to +125°C
Protection class	–	
Certifications and approvals	–	

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 the CKK/CKR "technical data" table
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 documents that you want.

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

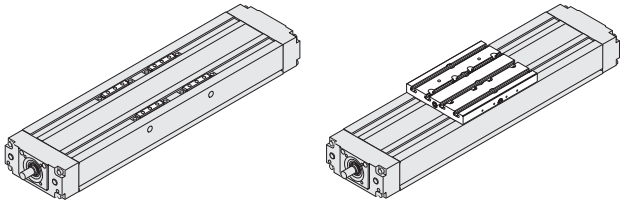
Lubrication

The profiled rail system and the ball screw assembly must be lubricated (compact modules CKK). The basic lubrication of all other components, e.g. deep-groove ball bearings, cover strips, gear units, etc. is done by the manufacturer.

Overview of lubrication versions

Compact modules CKK
Lubrication version LSS, LPG

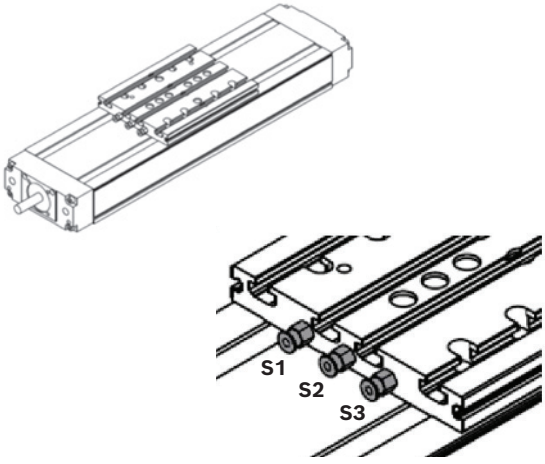
- Grease lubrication using manual grease gun via
  - Frame
  - Carriage
  - Connection plate



with connection plate

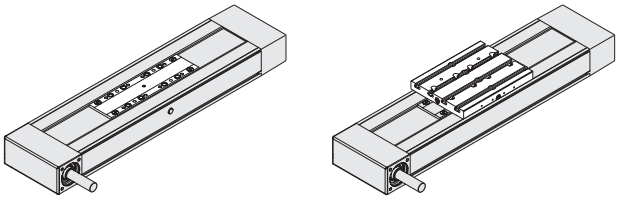
Lubrication version LCF, LCO

- 3 lube fittings
- Prepared for connection to central lubrication systems



Compact modules CKR
Lubrication version LSS, LPG

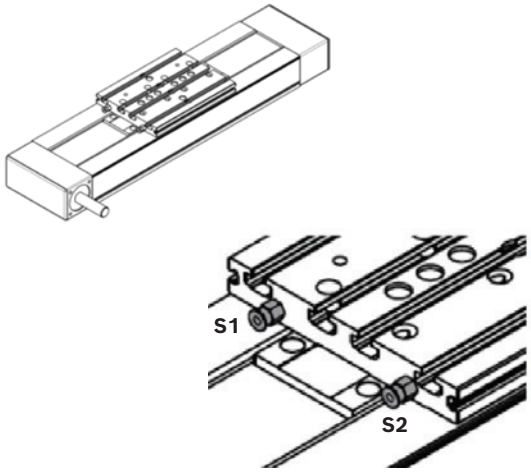
- Grease lubrication using manual grease gun via
  - Frame
  - Carriage
  - Connection plate



with connection plate

Lubrication version LCF, LCO

- 2 lube fittings
- Prepared for connection to central lubrication systems



- Further information on the lubrication versions ➠ Page 9
- Further information on lubrication points, lubrication intervals and lubrication quantities, etc. ➠ Instruction compact modules R320103178 ➠ Chapter "Further information"

Lubricants

Lubrication version	LSS		LPG	
Size	CKx-110, -145, -200, -280	CKx-070, -090	CKx-110, -145, -200,-280	CKx-070, -090
Basic lubrication	Dynalub 510	Dynalub 520	Preserved, basic lubrication required (see instructions)	
Consistency class	NLGI 2 (DIN 51818)	NLGI 00 (DIN 51818)	–	
Identification	KP2K-20 (DIN 51825)	GP00K-20 (DIN 51826)	–	
Lubrication with grease gun	yes	yes	yes	
Prepared for connection to central lubrication systems	–	–	–	
Recommended lubricants	Dynalub 510 (grease lubricant) (NLGI2 DIN 51818)	Dynalub 520 (liquid grease) (NLGI00 DIN 51818)	Dynalub 510 (grease lubricant) (NLGI2 DIN 51818)	Dynalub 520 (liquid grease) (NLGI00 DIN 51818)
Features	• Good water resistance • Corrosion protection • Temperature range: –20 to +80 °C		• Good water resistance • Corrosion protection • Temperature range: –20 to +80 °C	
Material numbers	R3416 037 00 (400 g cartridge)	R3416 043 00 (400 g cartridge)	R3416 037 00 (400 g cartridge)	R3416 043 00 (400 g cartridge)
	R3416 035 00 (25 kg container)	R3416 042 00 (5 kg bucket)	R3416 035 00 (25 kg container)	R3416 042 00 (5 kg bucket)
Alternative lubricants	• Tribol GR 100-2 PD • Elkalub GLS 135/N2	• Tribol GR 100-00 PD • Elkalub GLS 135/N00	• Tribol GR 100-2 PD • Elkalub GLS 135/N2 • Tribol GR 100-00 PD • Elkalub GLS 135/N00 • Dynalub 520	• Tribol GR 100-00 PD • Elkalub GLS 135/N00
Alternative lubricants with H1 approval	–	–	• Berulub FG H2 SL • Cassida Grease EPS2 • VP 874	• Berulub FB 34-00 • Elkalub GLS 367/N00

⚠ Notes on lubrication

- Follow the product instructions.
- Do not use lubricants with solid particles (e.g. graphite or MoS_2).
- If you use different lubricants than the ones specified, relubrication intervals may be shorter and performance may decrease with short stroke and load ratio; in addition, chemical interactions can take place between the plastics, lubricants and preservative agents.
  Single-line central lubrication systems also need to be able to pump these lubricants.
- If using a central lubrication system, make sure all lines and elements are filled with lubricant all the way to the connection to the consumer (carriage) and that there are no air bubbles.
- Lubricant reservoirs should contain an agitator to ensure the lubricant can flow (avoids hardening in the reservoir).
- For relubrication, it is not possible to switch from grease to oil lubrication and vice-versa.
- If environmental factors such as contamination, vibrations, impact loads, etc. are present, we recommend shorter relubrication intervals.
  Even under normal operating conditions, relubrication is required every two years due to grease aging.
- Rexroth recommends piston distributors by SKF. These should be installed as close to the carriage lube fittings as possible.
  Avoid long lines (no longer than 1 m) and narrow line diameters. Install the lines at a gradient.
- If other consumers are connected to the single-line lubrication system, the weakest link in this chain determines the lubrication cycle.
- Excess lubricant can accumulate inside of the compact module or flow out and may lead to contamination of the environment
- Never put a compact module into operation without basic lubrication.

	LCF	LCO
	CKx-090, -110, -145, -200	CKx-090, -110, -145, -200
	required, see instructions	required, see instructions
	NLGI 00 (DIN 51818)	–
	GP00K-20 (DIN 51826)	–
	–	–
	• only via single-line piston distributor system • smallest permissible piston distributor size: CKx-090, -110, -145, -200: 0.2 cm^3	• only via single-line piston distributor system • smallest permissible piston distributor size: CKx-090, -110: 0.2 cm^3; CKx-145: 0.4 cm^3; CKx-200: 0.6 cm^3
	Dynalub 520 (liquid grease) (NLGI00 DIN 51818)	Shell Tonna S3 M220 (lubricant oil)
	• Good water resistance • Corrosion protection • Temperature range: –20 to +80 °C	• Special demulsifying oil CLP or CGLP as per DIN 51517-3 for machine bed tracks and tool guides • A blend of highly refined mineral base oils and additives • Can be used even when mixed with significant quantities of metaLWorking fluids
	R3416 043 00 (400 g cartridge)	–
	R3416 042 00 (5 kg bucket)	–
	• Tribol GR 100-00 PD • Elkalub GLS 135/N00	• Special demulsifying oil CLP or CGLP as per DIN 51517-3 for machine bed tracks and tool guides
	–	–

⚠ Use of lubricants with H1 approval:

Loss of H1 approval

H1 lubricants or release agents (preservative agents) only have H1 approval if they are separated and unmixed (including at the lubrication point). A blend of two H1 approval lubricants or separating agents does not have H1 approval.

No approval or authorization for use in the food industry

Because of the use of H1 lubricants, the compact modules do not have authorization or approval for the food industry.

Components lubricated at the factory

Components lubricated by the manufacturer at the factory such as deep-groove ball bearings, cover strips, gears, etc. do not use H1 lubricants.

⚠ Compact modules with Dynalub 520 (NLGI 00 consistency class) initial greasing must not be pre-lubricated with lubricants of NLGI 2 consistency class!

For relubrication quantity and relubrication position ⇒ see Compact modules CKK / Compact modules CKR instructions.

Relubrication interval

When using the standard lubrication from the manufacturer:

Relubrication interval ⇒ see Compact modules CKK / Compact modules CKR instructions.

Use of Dynalub 520 (NLGI 00) instead of Dynalub 510 (NLGI 2):

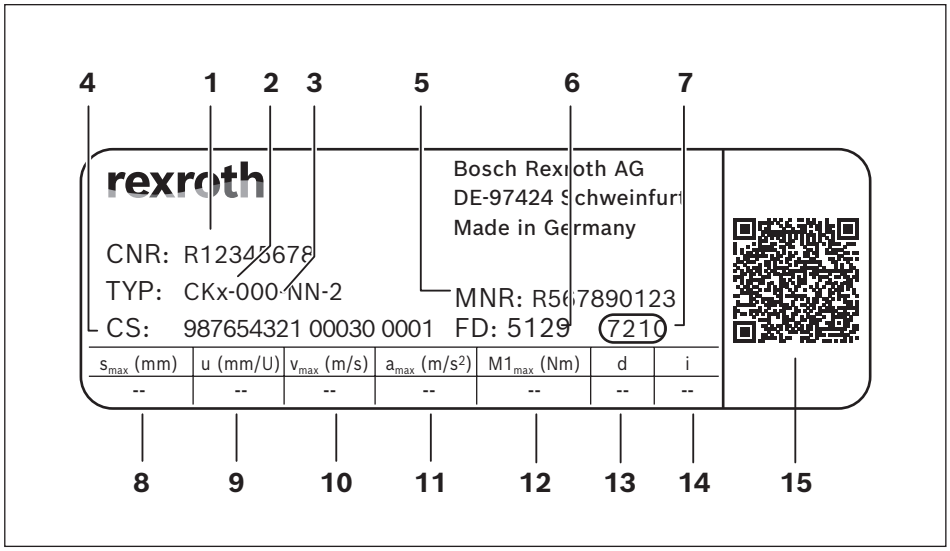
The relubrication interval is 75% of the standard relubrication interval ⇒ CKK/CKR instructions.

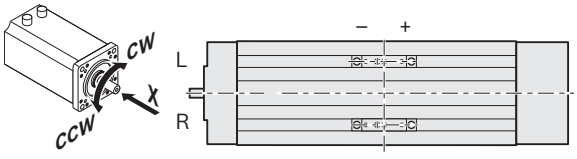
Use of lubricants with H1 approval:

First relubrication takes place after 20 km. As a guideline value for relubrication intervals, 50% of the standard relubrication intervals must be applied ⇒ See Compact modules CKK / Compact modules CKR instructions.

Parameterization (commissioning)

The nameplate contains reference information on the production of the linear motion system as well as technical commissioning parameters.



1	CNR	Customer's material number
2	TYP	Short product name
3	110	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 = Counterclockwise 
14	i	Gear ratio
15		QR code

Documentation

Standard report

Option 001

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.

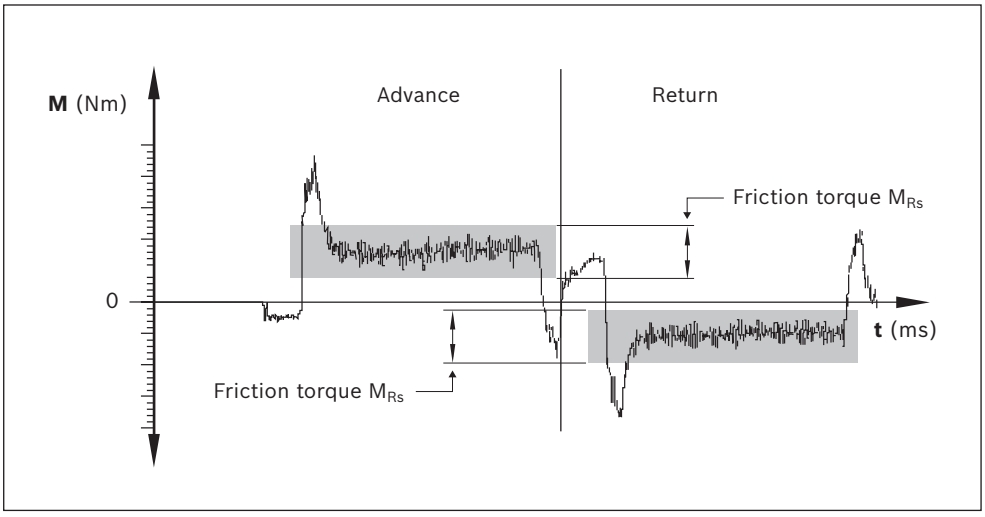
Checks listed in the standard report:

- Functional checks of mechanical components
- Functional checks of electrical components
- Design as per order confirmation

Measurement of frictional torque of complete system

Option 002 (includes option 001)

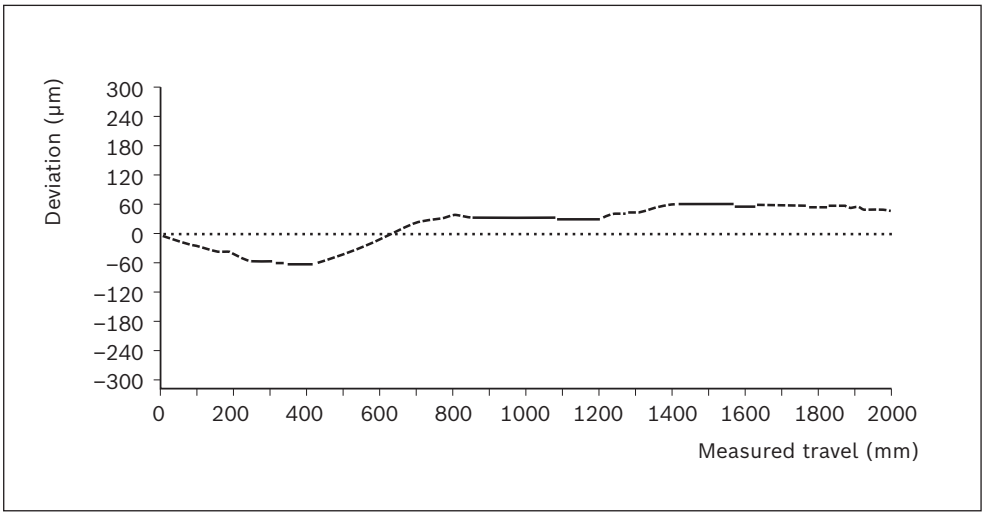
The friction torque is measured over the entire travel range.



Lead deviation of the ball screw assembly with compact modules CKK

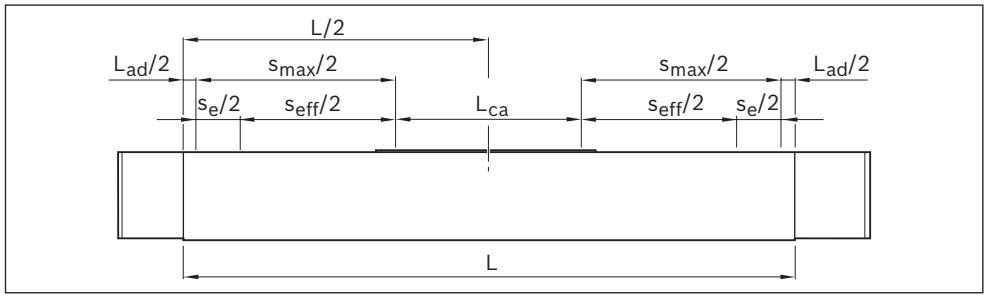
Option 003 (includes option 001)

In addition to graphical representation (see illustration), a measurement report is supplied in table form.



Project planning/calculation
Calculation principles

Length calculation of the linear motion system



For length calculation values, see chapter "Technical Data" of the relevant compact module (CKK/CKR)

The stroke reserve (S_e) is required, for example, for overruns, lubrication strokes, tool changes, maintenance, interference contours, compensation of assembly tolerances, etc.The final verification/determination of the stroke reserve must be carried out by the user.
The following stroke reserves are recommended:

Linear systems: S_e = 20 mm
Multi-axis systems: S_e = 20 mm
Electromechanical cylinders: S_e = 10 mm

⚠ If no stroke reserve (S_e = 0 mm) is specified, the effective stroke (S_{eff}) corresponds to the maximum travel distance (S_{max}) of the system. There is no clearance to the mechanical end position, thus creating a risk of mechanical damage.

CKx-070, -090, -110, -145, -200, -280

$$L = s_{eff} + s_e + L_{ca} + L_{ad}$$

CKR-280-DB

$$L = s_{eff} + s_e + L_{ca} + L_w + L_{ad}$$

Effective stroke

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

Stroke: maximum distance from carriage center to the outer-most switch activation points.

Mass of the linear motion system

Weight calculation:

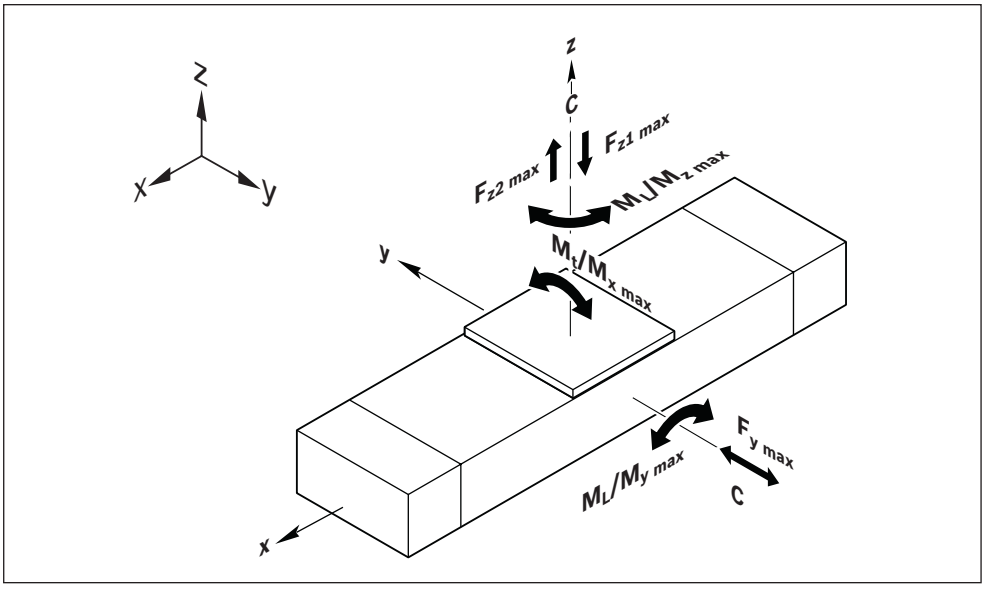
- without motor
- without switch mounting
- without motor attachment

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

Note on dynamic load capacities and moments

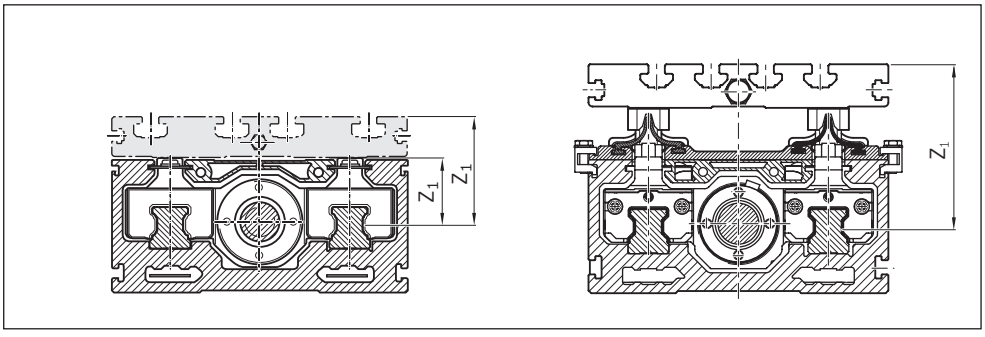
Determination of the dynamic load capacities and moments is based on a total travel of 100,000 m. Often only 50,000 m of total travel are actually stipulated.
For comparison: Multiply values C, M_t and M_L by a factor of 1.26.

Suitable loads



Regarding the desired service life, general loads for F_{mgw}, F_{mbs} should not exceed around 20% of the dynamic characteristic values (C_{gw}, C_{bs}).
See "Project planning" chapter.
Do not exceed the technical data for the linear motion system.

Application point of the effective force (Z_1)



Modulus of elasticity E

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

Maximum permissible load

When selecting linear motion systems, it is essential to consider the maximum permissible load and force tolerances according to the table. The values depend on the system. In other words, the tolerances are determined not only by the load capacities of the bearing points but are also based on design and material.
Conditions for combined loads:

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

Life expectancy calculation of the linear guide

The service life of the rolling bearing points contained in a linear motion system can be calculated using the formulas given below. The roller bearing points that determine the life of a linear motion system with ball screw assembly are the linear guide, the ball screw assembly (nut) and the fixed bearing. The linear guide in the linear motion system must withstand the load as well as any process forces that occur.
⚠ **The calculated service life specification for the linear motion system is determined by the shortest of the separately determined service life values for linear guide, ball screw assembly or fixed bearing.**

Where the operating conditions vary (speed and load), the service life must be calculated using the average values v_{mgw} and F_{mgw}.

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:

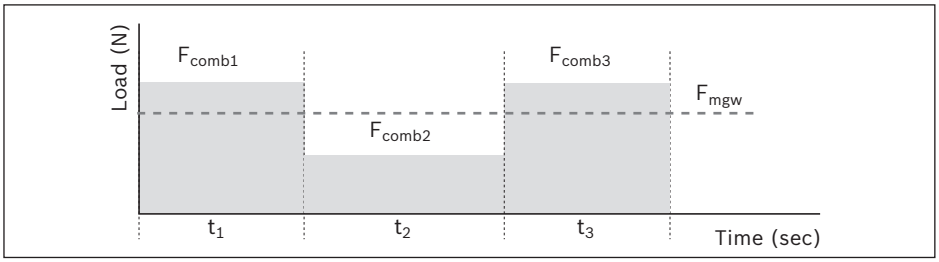
$$F_{mgw} = \sqrt[3]{|F_{eff1}|^3 \cdot \frac{q_{t1}}{100\%} + |F_{eff2}|^3 \cdot \frac{q_{t2}}{100\%} + |F_{eff3}|^3 \cdot \frac{q_{t3}}{100\%} + |F_{effn}|^3 \cdot \frac{q_{tn}}{100\%}}$$

The following applies to linear motion systems:

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

Combined equivalent bearing load:

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



Average linear speed of the guideway:

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

Service life of ball screw assembly or fixed bearing

Where the operating conditions vary (rotary speed and load), the service life must be calculated using the average values F_{mbs} and n_m.

Nominal service life in revolutions:

$$L_{bs} = \left(\frac{C_{bs}}{F_{mbs}}\right)^3 \cdot 10^6$$

Nominal service life in hours:

$$L_{hbs} = \frac{L_{bs}}{60 \cdot n_m}$$

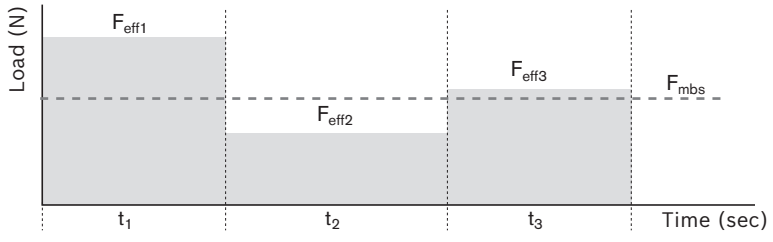
Dynamically equivalent load on bearing of the ball screw assembly:

$$F_{mbs} = \sqrt[3]{|F_{eff1}|^3 \cdot \frac{|n_1|}{n_m} \cdot \frac{q_{t1}}{100\%} + |F_{eff2}|^3 \cdot \frac{|n_2|}{n_m} \cdot \frac{q_{t2}}{100\%} + |F_{eff3}|^3 \cdot \frac{|n_3|}{n_m} \cdot \frac{q_{t3}}{100\%} + \ldots + |F_{effn}|^3 \cdot \frac{|n_n|}{n_m} \cdot \frac{q_{tn}}{100\%}}$$

The following applies to the axial load F_n for linear motion systems:

$$F_{eff} = |F_n|$$

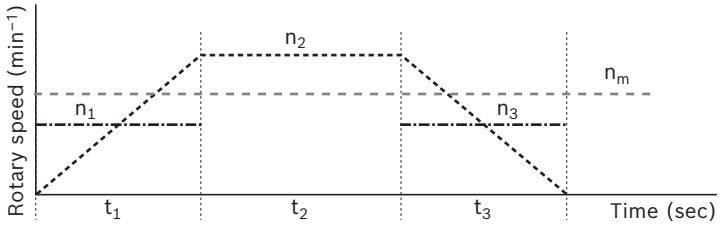
When both the load and the rotary speed vary, the average load F_{mbs} is calculated as follows:



Average rotary speed of the screw:

$$n_m = \frac{|n_1| \cdot q_{t1} + |n_2| \cdot q_{t2} + \ldots + |n_n| \cdot q_{tn}}{100\%} = \frac{v_{mgw} \cdot 60\,000}{P}$$

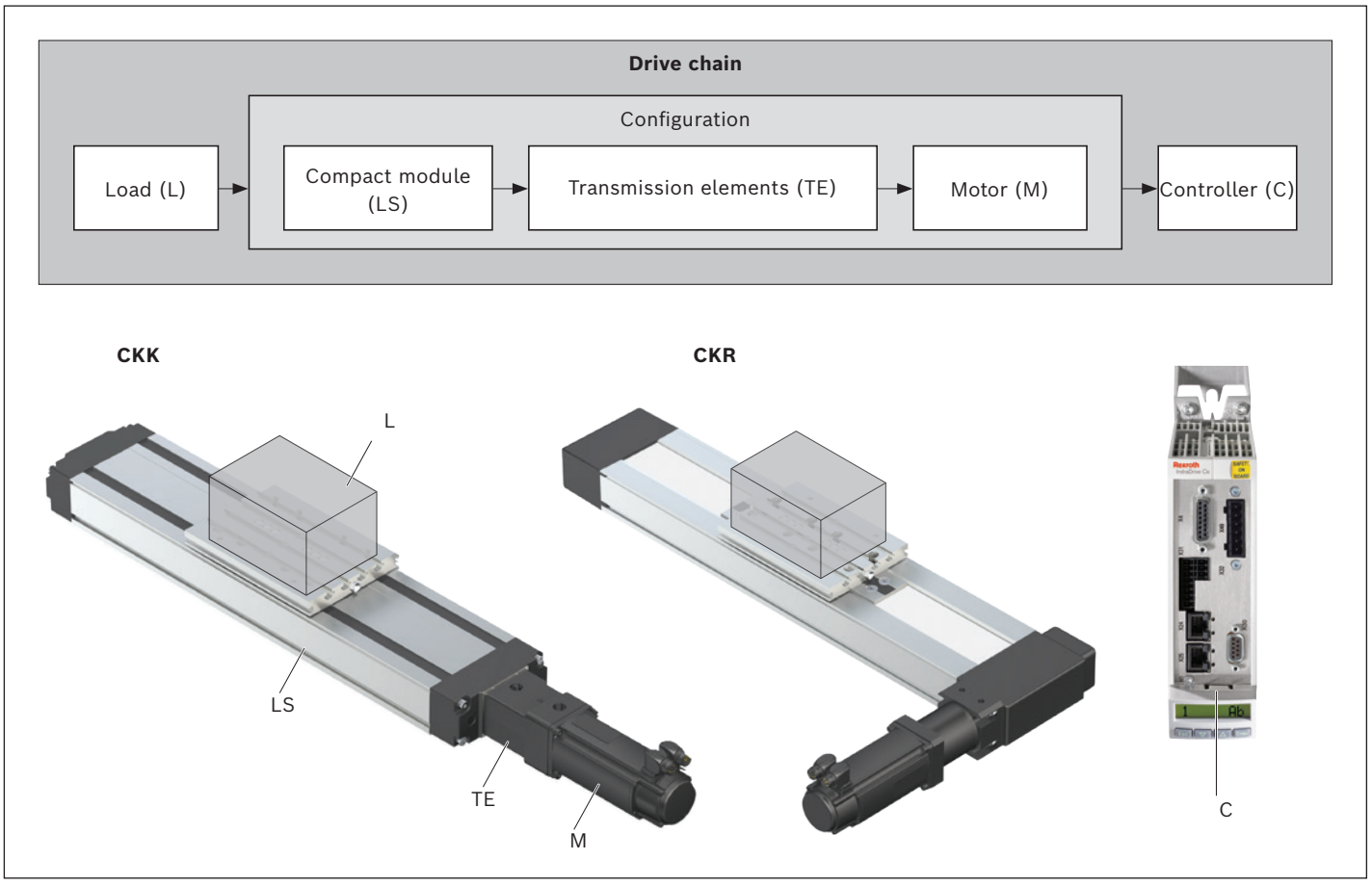
If rotary speed varies, average rotary speed n_m is calculated as follows:



Rotary speed in acceleration and braking phases $n_{1 \ldots n}$:

$$n_{1 \ldots n} = \frac{n_{A1 \ldots n} + n_{E1 \ldots n}}{2}$$

Drive sizing



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 (coupling, belt side drive or gear unit) and the motor – which can be ordered in that constellation in the catalog.

Basic principles

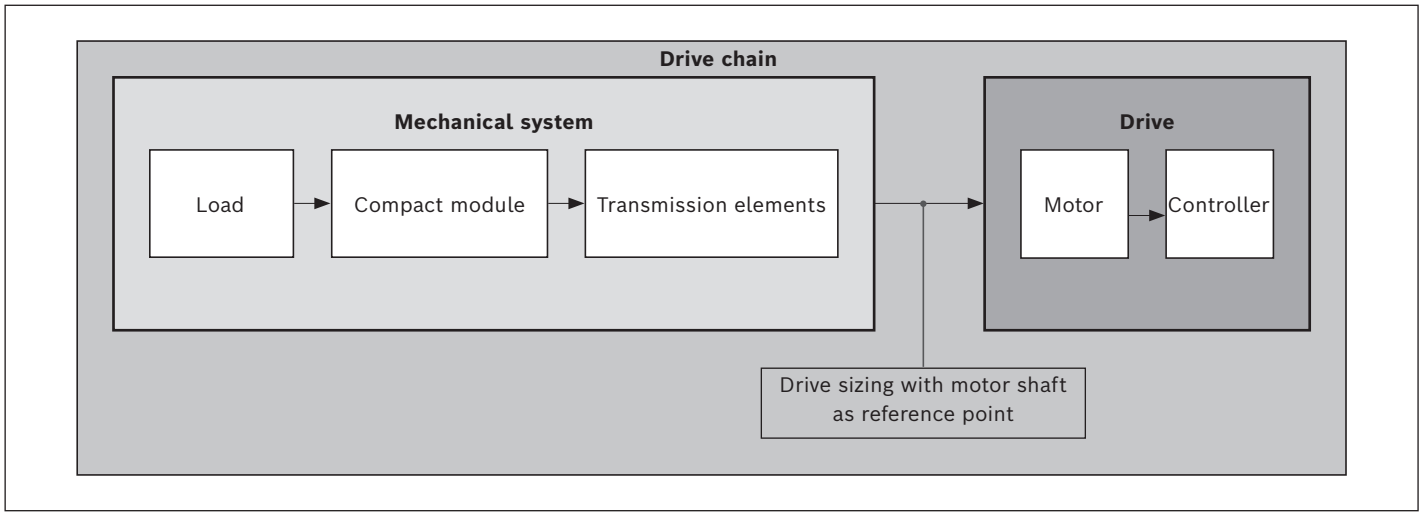
For drive sizing, the drive chain can be divided into mechanical system and drive system.

The **mechanical** system includes the physical components – linear motion system and the transmission elements (belt side drive, coupling) – and the load to be carried.

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

For every component (linear motion system, coupling, belt side drive, gear unit), the corresponding maximum permissible limits for drive torque and speed, and the base values for friction torque and mass moment of inertia have to be used.

The following technical data with the associated formula symbols are used when considering the basic **mechanical** system requirements in the design calculations for sizing the drive. 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**	**Transmission element**		
				Coupling	**Belt side drive**	**Gearing**
Weight moment	(Nm)	M_g [5]	–	–	–	–
Friction torque	(Nm)	–[4]	M_{Rs} [3]	–	M_{Rsd} [3]	M_{Rge} [3]
Mass moment of inertia	(kgm²)	J_t [1]	J_s [2]	J_c [3]	J_{sd} [3]	J_{ge} [3]
Max. permissible speed	(m/s)	–	v_{max} [3][4]	–	–	–
Max. permissible rotary speed	(rpm)	–	n_p [1]			n_{ge} [3]
Max. permissible drive torque	(Nm)	–	M_p [3][4]	M_{cN} [3]	M_{sd} [3]	M_{ge} [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] CKK: Length-dependent value, to be read off the graph
[5] Any additional process forces are to be taken into consideration as load moments
[6] 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. For a combination of mechanical components within the drive chain, this will result in one value for each of the following:

- Friction torque M_R
- Mass moment of inertia J_{ex}
- Max. permissible speed v_{mech} (maximum permissible rotary speed n_{mech})
- Max. permissible drive torque M_{mech}

Determination of the values for each mechanical component in the drive chain based on the motor shaft as a reference point

Compact modules CKK

Friction torque M_R

For motor attachment via flange and coupling	$M_R = M_{Rs}$
For motor attachment via belt side drive	$M_R = M_{Rsd} + \frac{M_{Rs}}{i}$

Mass moment of inertia J_{ex}

For motor attachment via flange and coupling	$J_{ex} = J_s + J_t + J_c$
For motor attachment via belt side drive	$J_{ex} = J_{sd} + \frac{(J_s + J_t)}{i^2}$

Compact modules CKR

Friction torque M_R

For motor attachment via gear	$M_R = M_{Rge} + \frac{M_{Rs}}{i}$

Mass moment of inertia J_{ex}

For direct motor attachment (without gear)	$J_{ex} = J_s + J_t$
For motor attachment via gear	$J_{ex} = J_{ge} + \frac{(J_s + J_t)}{i^2}$

Mass moment of inertia of linear motion system	$J_s = (k_{J\,fix} + k_{J\,var} \cdot L) \cdot 10^{-6}$
Determination of translative mass moment of inertia of the external load	$J_t = m_{ex} \cdot k_{J\,m} \cdot 10^{-6}$

Maximum permissible speed v_{mech} or maximum permissible rotary speed n_{mech}

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

Depending on the system, the maximum permissible speed/rotary speed of the linear motion system with ball screw assembly is aLWays below the limits for the coupling or belt side drive components, meaning it determines the maximum permissible speed of the mechanical system.

Compact modules CKK

Maximum permissible speed

$$v_{mech} = v_{max}$$

Maximum permissible rotary speed

For motor attachment via flange and coupling

$$n_{mech} = \frac{v_{mech} \cdot 1\,000 \cdot 60}{P}$$

For motor attachment via belt side drive

$$n_{mech} = \frac{v_{mech} \cdot i \cdot 1\,000 \cdot 60}{P}$$

Compact modules CKR

Maximum permissible speed

For direct motor attachment (without gear)

$$v_{mech} = v_{max}$$

$$v_{mech} = \frac{n_{mech} \cdot \pi \cdot d_3}{1000 \cdot 60}$$

For motor attachment via gear

$$v_{mech} = \frac{n_{mech} \cdot \pi \cdot d_3}{i \cdot 1\,000 \cdot 60}$$

Maximum permissible rotary speed

For direct motor attachment (without gear)

$$n_{mech} = \frac{v_{mech} \cdot 1\,000 \cdot 60}{\pi \cdot d_3}$$

$$n_{mech} = n_p$$

For motor attachment via gear

$$n_p = \frac{v_{max} \cdot 1\,000 \cdot 60}{\pi \cdot d_3}$$

$$n_{mech} = \text{minimum } (n_p \cdot i \; ; \; n_{ge})$$

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.

Compact modules CKK

For motor attachment via flange and coupling	M_{mech} = minimum (M_{cN}; M_p)
For motor attachment via belt side drive	M_{mech} = minimum (M_{sd}; $\frac{M_p}{i}$)

Compact modules CKR

For direct motor attachment (without gear)	$M_{mech} = M_p$
For motor attachment via gear	M_{mech} = minimum ($\frac{M_{ge}}{i}$; $\frac{M_p}{i}$)

⚠ **When considering the complete drive chain (mechanical system + motor/controller), the maximum torque of the motor can lie below the upper 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 upper 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 required for the mechanical system (but not exceeding 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 ratio of the mass moments of inertia 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.

Ratio of mass moments of inertia.
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

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

Condition 3:

Estimation of the 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 missing dynamic characteristics of an exact motion profile with the required motor torques.

Torque ratio

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

Static load moment

$$M_{stat} = M_R + M_g$$

Compact modules CKK

Weight moment
For vertical installation position only!
For motor attachment via flange and coupling: i = 1

$$M_g = \frac{P \cdot (m_{ex} + m_{ca}) \cdot g}{2\,000 \cdot \pi \cdot i}$$

Compact modules CKR

Weight moment For vertical installation position only!

$$M_g = \frac{d_3 \cdot (m_{ex} + m_{ca}) \cdot g}{2\,000 \cdot i}$$

In the chapter titled ➠ "Configuration and ordering", users can put together standard configurations, including motor attachment, gears and motor, for the various linear motion system sizes by selecting the appropriate options.
By checking the above 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.

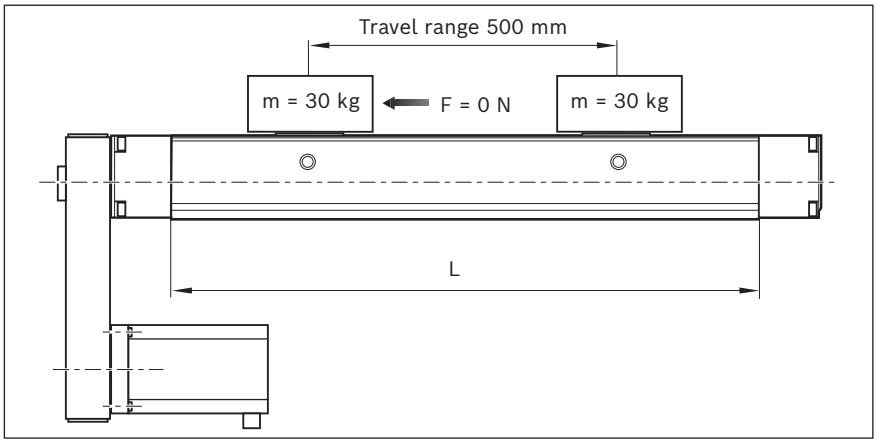
Precise drive sizing

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 catalog "Rexroth drive technology". When sizing the drive, the maximum permitted values for linear speed, drive torque and acceleration must not be exceeded, in order to avoid damaging the mechanical system.

Calculation example CKK

Given data

In a handling task, a mass of 30 kg is to be moved horizontally by 500 mm at a travel speed of 0.5 m/s. The following was selected based on the technical data and the installation space:



Compact module CKK-110

- Carriage with connection plate L_{ca} = 155 mm
- With cover strip
- Motor attachment via belt side drive, i = 1.5
- With motor MS2N04-B0BTN with brake

Calculation of length L

Excess travel:	s_e	= 20 mm
Max. travel range:	s_{max}	= s_{eff} + s_e
		= 500 + 20 = 520 mm
Length:	L	= 520 + 155 + 20 = 695 mm

Selection of the ball screw assembly

(Better to choose the lowest lead as this is favorable in terms of resolution, braking distance, length.)

Permissible ball screw assemblies according to "Permissible speed" graph with given v = 0.5 m/s and L = 695 mm:

BASA 16 x 10 and BASA 16 x 16

Selected ball screw assembly (lower lead):

BASA 16 x 10

Maximum permissible speed for BASA 16 x 10 from graph:

v_{max} = 0.77 m/s

Friction moment M_R

(motor attachment via belt side drive)

$$M_R = M_{Rsd} + \frac{M_{Rs}}{i}$$

Compact module:	M_{Rs} = 0.43 Nm
Belt side drive:	M_{Rsd} = 0.40 Nm (i = 1.5)
Friction torque:	$M_R = 0.40 + \frac{0.43}{1.5}$ = 0.69 Nm

Mass moment of inertia J_{ex}
(motor attachment via belt side drive)

$$J_{ex} = J_{sd} + \frac{(J_s + J_t)}{i^2}$$

Belt side drive: $J_{sd} = 82 \cdot 10^{-6}\ kgm^2$

Compact module: $J_s = (k_{J\,fix} + k_{J\,var} \cdot L) \cdot 10^{-6}$
$= (8.432 + 0.031 \cdot 715) \cdot 10^{-6}$
$= 29.977 \cdot 10^{-6}\ kgm^2$

External load: $J_t = m_{ex} \cdot k_{J\,m} \cdot 10^{-6}$
$= 30 \cdot 2.533 \cdot 10^{-6}$
$= 75.99 \cdot 10^{-6}\ kgm^2$

Mass moment of inertia: $J_{ex} = 82 \cdot 10^{-6} + \frac{(29.977 \cdot 10^{-6} + 75.99 \cdot 10^{-6})}{1.5^2}$
$= 129.096 \cdot 10^{-6}\ kgm^2$

Maximum permissible rotary speed n_{mech}
(motor attachment via belt side drive)
mechanical system limit

$$n_{mech} = \frac{(0.77 \cdot 1.5 \cdot 1\,000 \cdot 60)}{10}$$

Max. permissible speed: $v_{mech} = v_{max} = 0.77$ m/s

Max. permissible rotary speed: $n_{mech} = \frac{(v_{mech} \cdot i \cdot 1{,}000 \cdot 60)}{P}$
$= 6\,930\ min^{-1}$

Maximum rotary speed of the application n_{mech}
(motor attachment via belt side drive)
application limit

Speed: $v_{mech} = 0.5$ m/s

Rotary speed: $n_{mech} = \frac{0.5 \cdot 1.5 \cdot 1\,000 \cdot 60}{10}$
$= 4\,500\ min^{-1}$

Calculation example CKK

Maximum permissible drive torque M_{mech}
(motor attachment via belt side drive)
mechanical system limit

M_{mech} = Minimum (M_{sd}; $\frac{M_p}{i}$)
Belt side drive: M_{sd} = 5.11 Nm (gear ratio i = 1.5 for MS2N04-B0BTN)
Compact module: M_p = 13.51 Nm
Drive torque: M_{mech} = Minimum (5,11; $\frac{13.51}{1.5}$)
= Minimum (5.11; 9.0)
= 5.11 Nm

Motor preselection check
Selected motor:
MS2N04-B0BTN with brake

Condition 1:
Rotary speed: $n_{max} \geq n_{mech}$
6,000 ≥ 4500 condition met – motor selection OK

Condition 2:
Mass moment of inertia ratio: $V = \frac{J_{ex}}{J_m + J_{br}}$
Motor inertia: $J_m = 70 \cdot 10^{-6}$ kgm²
Brake moment of inertia: $J_{br} = 40 \cdot 10^{-6}$ kgm²
Moment of inertia ratio: $V = \frac{129.096 \cdot 10^{-6}}{(70 \cdot 10^{-6} + 40 \cdot 10^{-6})} = 1.17$
Handling condition: $V \leq 6$
$1.17 \leq 6$ condition met
– motor selection OK

Condition 3:
Torque ratio: $\frac{M_{stat}}{M_0} \leq 0.6$
Static load moment: $M_{stat} = M_R + M_g$ (installed horizontally $M_g = 0$)
= 0.69 Nm
Continuous motor torque: M_0 = 1.75 Nm
Torque ratio: $\frac{0.69}{1.75} = 0.39$
$0.39 \leq 0.6$ condition met
– motor selection OK

All three conditions met ➠ Selected motor is suitable for the application.

Result

Compact module CKK-110

Length:	L =	695 mm
Max. travel range:	s_{max} =	520 mm
Carriage length:	L_{ca} =	155 mm
Ball screw assembly:	Nominal diameter:	d_0 = 16 mm
	Lead:	P = 10 mm

With cover strip
Motor attachment via belt side drive, gear ratio i = 1.5
Motor preselection: MS2N04-B0BTN with brake

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 = 0.69 Nm
Mass moment of inertia:	J_{ex} = $129.096 \cdot 10^{-6}$ kgm^2
Speed:	v_{mech} = 0.5 m/s (n_{mech} = 4 500 rpm)
Drive torque limit:	M_{mech} = 5.11 Nm

➠ The motor torque must be limited to 5.11 Nm on the drive side!

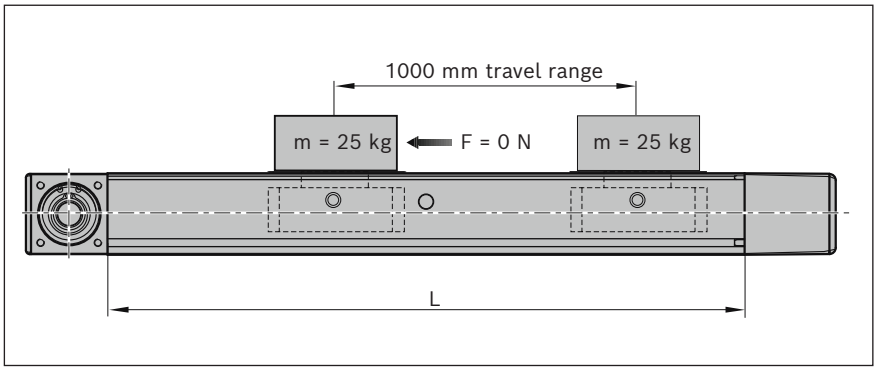
Acceleration limit:	a_{max} = 50 m/s^2
Limit for speed:	v_{max} = 0.77 m/s (n_{mech} = 6 930 rpm)

Besides the preferred type MS2N04-B0BTN, other motors with identical connection dimensions can be adapted while taking care not to exceed the calculated limit values.

Calculation example CKR

Given data

In a handling task, a mass of 25 kg is to be moved horizontally by 1000 mm at a travel speed of 1.5 m/s. The following was selected based on the technical data and the installation space:



compact module CKR-145

- Carriage length = 190 mm
- With connection plate
- Motor attachment via planetary gear, i = 5
- With motor MS2N04-D0BQN
  without brake

Calculation of length L

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

Stroke reserve: $s_e = 20$ mm

Max. travel range: $s_{max} = s_{eff} + s_e$

$= 1\,000 + 20 = 1020$ mm

Length: $L = 1\,020 + 190 + 75 = 1285$ mm

Friction torque M_R

$$M_R = M_{Rge} + \frac{M_{Rs}}{i}$$

Compact module: $M_{Rs} = 2.04$ Nm

Gear: $M_{Rge} = 0.17$ Nm

Friction torque: $M_R = 0.17 + \frac{2.04}{5} = 0.58$ Nm

Mass moment of inertia J_{ex}

$$J_{ex} = J_{ge} + \frac{(J_s + J_t)}{i^2}$$

Gear: $J_{ge} = 27 \cdot 10^{-6}$

Compact module: $J_s = (k_{J\,fix} + k_{J\,var} \cdot L) \cdot 10^{-6}$

$= (2\,276.71 + 0.3172 \cdot 1285) \cdot 10^{-6}$

$= 2\,684.312 \cdot 10^{-6}$ kgm^2

External load: $J_t = m_{ex} \cdot k_{J\,m} \cdot 10^{-6}$

$= 25 \cdot 689.59 \cdot 10^{-6}$

$= 17\,239.75 \cdot 10^{-6}$ kgm^2

Mass moment of inertia:

$$J_{ex} = 27 \cdot 10^{-6} + \frac{(2\,684.312 \cdot 10^{-6} + 17\,239.75 \cdot 10^{-6})}{5^2}$$

$= 823.962 \cdot 10^{-6}$ kgm^2

Maximum permissible rotary speed n_{mech}
(Motor attachment via gear reducer, without considering the motor)
Limit for mechanical system

Compact module:

$$n_{mech} = \text{Minimum } (n_p \cdot i \; ; \; n_{ge})$$

$$n_p = \frac{(v_{max} \cdot 1\,000 \cdot 60)}{\pi \cdot d_3}$$

$$= \frac{(5 \cdot 1\,000 \cdot 60)}{\pi \cdot 52.52}$$

$$= 1\,818 \text{ rpm}$$

Gear: $n_{ge} = 8\,000$ rpm

Max. permissible rotary speed:

$$n_{mech} = \text{Minimum } (1\,818 \cdot 5 \; ; \; 8\,000)$$

$$= \text{Minimum } (9\,090 \; ; \; 8\,000)$$

$$= 8\,000 \text{ rpm}$$

Maximum permissible speed v_{mech}
(Motor attachment via gear reducer, without considering the motor)
Limit for mechanical system

Max. permissible speed:

$$v_{mech} = \frac{(n_{mech} \cdot \pi \cdot d_3)}{i \cdot 1\,000 \cdot 60}$$

$$v_{mech} = \frac{(8\,000 \cdot \pi \cdot 52.52)}{5 \cdot 1\,000 \cdot 60}$$

$$= 4.4 \text{ m/s}$$

Maximum permitted rotary speed of the application n_{mech}
(Motor attachment via gear reducer, without considering the motor)
Application tolerance

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

Rotary speed:

$$n_{mech} = \frac{(1.5 \cdot 5 \cdot 1\,000 \cdot 60)}{\pi \cdot 52.52}$$

$$= 2\,727 \text{ rpm}$$

Maximum permissible drive torque M_{mech}
(Motor attachment via gear reducer, without considering the motor)
Limit for mechanical system

$$M_{mech} = \text{Minimum } \left(\frac{M_{ge}}{i} \; ; \; \frac{M_p}{i}\right)$$

Compact module: $M_p = 32.5$ Nm

Gear: $M_{ge} = 40$ Nm

Drive torque:

$$M_{mech} = \text{Minimum } \left(\frac{40}{5}; \frac{32.5}{5}\right)$$

$$= \text{Minimum } (8.0 \; ; \; 6.5)$$

$$= 6.5 \text{ Nm}$$

Calculation example CKR

Motor preselection check

Selected motor:
MS2N04-D0BQN without brake

Condition 1:

Rotary speed: $n_{max} \geq n_{mech}$

$6{,}000 \geq$ 2727 condition met – motor selection OK

Condition 2:

Mass moment of inertia ratio: $V = \frac{J_{ex}}{J_m + J_{br}}$

Motor inertia: $J_m = 160 \cdot 10^{-6}$ kgm²

Brake moment of inertia: $J_{br} = 0$ kgm² (without brake)

Moment of inertia ratio: $V = \frac{823.962 \cdot 10^{-6}}{160 \cdot 10^{-6}}$

$= 5.15$

Handling condition: $V \leq 6$

$5.15 \leq 6$ condition met

– motor selection OK

Condition 3:

Torque ratio: $\frac{M_{stat}}{M_0} \leq 0.6$

Static load moment: $M_{stat} = M_R + M_g$ (installed horizontally $M_g = 0$)

$\frac{0.58}{3{,}85} = 0.58$ Nm

Continuous torque of the motor: $M_0 = 3.85$ Nm

Torque ratio: $= 0.15$

$0.15 \leq 0.6$ condition met

– motor selection OK

All three conditions met ➠ selected motor is suitable for the application.

Result

compact module CKR-145

Length	L	= 1 285 mm
Max. travel range	s_{max}	= 1 020 mm
Carriage length	L_{ca}	= 190 mm

Toothed belt drive
With connection plate
Motor attachment via planetary gear, gear ratio i = 5
Motor preselection: MS2N04-D0BQN without brake

For precise sizing of the electric drive, the motor-controller combination must aLWays be considered, as the performance data (for example, 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	= 0.58 Nm
Mass moment of inertia	J_{ex}	= 823.962 · 10^{-6} kgm^2
Travel speed	v_{mech}	= 1.5 m/s (n_{mech} = 2 727 min^{-1})
Drive torque limit	M_{mech}	= 6.5 Nm

➠ The motor torque must be limited to 6.5 Nm on the drive side!

Acceleration limit	a_{max}	= 50 m/s^2
Limit for travel speed	v_{max}	= 3.3 m/s (n_{max} = 6 000 min^{-1})

After determining the emergency-stop 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 MS2N04-D0BQ, other motors with identical connection dimension can be adapted while taking care not to exceed the calculated limits.

Abbreviations

Abbreviation/ 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)
$F_{t\ zul}$	Belt elasticity limit	(N)
F_y	Load due to a resulting force in the 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	(kgm^2)
J_c	Mass moment of inertia of the coupling	(kgm^2)
J_{dc}	Mass moment of inertia of the drive train	(kgm^2)
J_{ex}	Mass moment of inertia of the mechanical system	(kgm^2)
J_{ge}	Mass moment of inertia of the gear about the motor journal	(kgm^2)
J_m	Mass moment of inertia of the motor	(kgm^2)
J_s	Mass moment of inertia of the linear motion system	(kgm^2)
J_{sd}	Mass moment of inertia of the belt side drive about the motor journal	(kgm^2)
J_t	Translative mass moment of inertia of external load based on the linear motion system screw journal	(kgm^2)
$k_{g\ fix}$	Constant for fixed portion of mass	(kg)
$k_{g\ var}$	Constant for variable-length portion of mass	(kg/mm)

Abbreviation/ index	Designation	Unit
$k_{J\ fix}$	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)
$k_{J\ var}$	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_{ca}	Carriage length	(mm)
L_{bs}	Nominal service life (ball screw assembly, fixed bearing)	(rpm)
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_m	Length of the motor	(mm)
L_{max}	Max. length	(mm)
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 gear at motor journal	(Nm)
M_{Rs}	Friction torque of system	(Nm)
M_{Rsd}	Friction torque of belt side drive at 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)

Abbreviation/ index	Designation	Unit
M_y	Dynamic torsional moment around the y-axis	(Nm)
$M_{y\ max}$	Maximum permissible torsional moment around the y-axis	(Nm)
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	(rpm)
$n_1, n_2, \ldots n_n$	Rotary speed in acceleration and braking phases	(rpm)
$n_{A1 \ldots n}$	Starting speed in phase 1 ... n	(rpm)
$n_{E1 \ldots n}$	Ending speed in phase 1 ... n	(rpm)
n_{ge}	Maximum permissible rotary speed of the gear	(rpm)
n_m	Average rotary speed of the ball screw assembly	(rpm)
n_{mech}	Maximum permissible rotary speed for mechanical system	(rpm)
n_{max}	Max. motor speed	(rpm)
n_p	Maximum permissible rotary speed of the linear motion system	(rpm)
P	Screw lead	(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	Stroke reserve	(mm)
s_{eff}	Effective stroke	(mm)
s_{min}	Minimum travel range	(mm)
s_{max}	Maximum travel	(mm)
s_{ov}	Overlap travel	(mm)
SPU	Screw support	
t_a	Acceleration/braking time	(s)
$t_1, t_2, \ldots t_n$	Time for phase 1 ... n	(s)
u	Feed constant	(mm/rev)
$v_1, v_2, \ldots v_n$	Speed in phase 1 ... n	(m/s)
v_{max}	Maximum permissible speed	(m/s)
v_{mech}	Maximum permissible speed of mechanical system	(m/s)
v_{mgw}	Average linear 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)

Ordering example CKK

Ordering data		**Explanation**
Compact module	CKK-110-NN-1	Compact module with ball screw assembly CKK-110-NN-1
Length L	715	Length = 715 mm
Version	RV01	Belt side drive
Guideway	001	Standard main body
Lubrication[1)]	LSS	Standard lubrication
Drive		
BASA (ball screw assembly d_0 x P)	002	Nominal diameter = 16 mm, lead = 10 mm
Carriage		
Carriage[2)]	041	Carriage with connection plate, L_{ca} = 155 mm
Carriage centerline-to-centerline distance L_W	–	Only necessary with carriages with variable center-to-center distance
Motor attachment		
Gear ratio	–	Without gear ratio
Attachment kit[3)]	023	Motor attachment for MS2N04-C0BTN servo motor
Motor		
Motor code	212	MS2N04-B0BTN, 1 cable, with brake
Motor connector position	270	Motor connector position = 270°
Cover		
Cover	002	With cover strip
Switching system (max. 6 switches/sensors selectable)		
Sensor 1	021	REED, changeover contact (NC: C+NC, NO: C+NO)
Sensor 2	022	Hall, PNP normally closed (NC)
Sensor 3	021	REED, changeover contact (NC: C+NC, NO: C+NO)
Cable duct / cable channel	025	Cable duct
Socket-connector	017	Socket-connector
Automation package (Controller, Cable)		➠ Chapter "Automation package"
Documentation	001	Standard report

1) Not part of the option key
2) For the permissible values see "General technical data"
3) The motor geometry code is required for motors according to customer specifications

Further information

Bosch Rexroth Linear Motion Technology homepage	
Compact module product information (instruction, configurator, store, etc.)	
Smart Function Kit Handling (SFK-H)	
Product overview, automation solutions (motors, drives, control systems, etc.)	

Bosch Rexroth AG
Ernst-Sachs-Straße 100
97424 Schweinfurt, Germany
Tel. +49 9721 937-0
Fax +49 9721 937-275
https://www.boschrexroth.com

Find your local contact person here:

https://www.boschrexroth.com/en/xc/contact/index

R999000479/2025-05
replaces
R999000479/2024-09
© Bosch Rexroth AG 2025
Subject to change without notice.

The data specified above only serves to describe the product.
Due to the continuing development of our products, no statements concerning a certain condition or suitability for a certain application can be derived from our information. The information given does not release the user from the obligation of their own judgment and verification.
Please note that our products are subject to a natural process of wear and aging.